APPENDIX A

Notice of Preparation

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NCRWQCB

APR 19 2019

EO WMgmt Admin
AEO Timber Legal
Reg/NPS Cleanups CEQA

CEQA: California Environmental Quality Act

NOTICE OF PREPARATION

To: **Distribution List**

From: **Humboldt County**
Department of Planning and Building
3015 H Street
Eureka, CA 95501

Subject: ***Notice of Preparation*** **of a Draft Environmental Impact Report for the North McKay Tract General Plan Amendment, Zone Reclassification, Final Map Subdivision and Planned Development Permit**

Humboldt County Department of Planning and Building will be the Lead Agency and will prepare an environmental impact report for the project identified below. We need to know the views of your agency as to the scope and content of the environmental information which is germane to your agency's statutory responsibilities in connection with the proposed project. Your agency will need to use the EIR prepared by our agency when considering your permit or other approval for the project.

The project description and the potential environmental effects are attached. A copy of the Initial Study is not attached. ***The Department has determined that the project will likely have significant effects and that an EIR will clearly be required.***

Due to the time limits mandated by State law, your response must be sent at the earliest possible date but not later than 30 days after receipt of this notice.

Please send your response to Michael E. Wheeler at the address shown above. We will need the name, phone number, and email address of a contact person in your **agency**. Your comments may also be transmitted electronically to mwheeler@co.humboldt.ca.us. Please identify the name(s) of the person(s) to contact in the event there are questions about your agency's comments.

Project Title: North. McKay Ranch Subdivision, General Plan Amendment (GPA-15-005), Zoning Ordinance Amendment (ZR-15-008), Major Subdivision (FMS-15-004), Planned Development Permit (PDP-15-001): APNs 017-032-003, 017-071-004, 017-071-009, 017-072-002, 017-072-003, 017-073-007, and 017-073-009; Case Nos.: GPA-15-005, FMS-15-004, PDP-15-001, ZR-15-008. Application No. 9902.

Project location: The project is located in Cutten, California, an unincorporated community within Humboldt County, immediately south of the southern boundary of the City of Eureka (Figure 1); United States Geological Survey [USGS] Eureka 7.5-minute Quadrangle, Township 5 North, Range 1 West, Section 36, Humboldt Meridian. The project is located on 7 adjacent legal parcels, for a total of 81.34 assessed acres (Assessor's parcel numbers [APNs] 017-032-003, 017-071-004, 017-071-009, 017-072-002, 017-072-003, 017-073-007, and 017-073-009) (Figure 2) with a central location at latitude and longitude 40.769735° and -124.136079° (Google Earth, 2017). The project area is approximately 2.5 miles south of Humboldt Bay at its nearest point, 2.5 miles southeast of downtown Eureka and U.S Hwy 101, and 1,800 feet southeast of Sequoia Park at its nearest point.

Project Applicant: Kramer Properties

Date March 28, 2019

Signature Michael E. Wheeler

Title: Senior Planner

Telephone (707) 268-3730

Reference: California Code of Regulations, Title 14, (CEQA Guidelines) Sections 15082(a), 15103, 15375.

Project Description

1. **Project title**: North McKay Ranch Subdivision, General Plan Amendment (GPA-15-005), Zoning Ordinance Amendment (ZR-15-008), Major Subdivision (FMS-15-004), Planned Development Permit (PDP-15-001): APNs 017-032-003, 017-071-004, 017-071-009, 017-072-002, 017-072-003, 017-073-007, and 017-073-009; Case Nos.: GPA-15-005, FMS-15-004, PDP-15-001, ZR-15-008. Application No. 9902.

2. **Lead agency name and address**: Humboldt County Planning & Building Department, 3015 H Street, Eureka, CA 95501-4484; Phone: (707) 445-7541; Fax (707) 445-7446

3. **Contact person and phone number**: Michael Wheeler, Senior Planner (707) 268-3730; fax: 707-445-7446; email: mwheeler@co.humboldt.ca.us.

4. **Project location**: The project is located in Cutten, California, an unincorporated community within Humboldt County, immediately south of the southern boundary of the City of Eureka (Figure 1); United States Geological Survey [USGS] Eureka 7.5-minute Quadrangle, Township 5 North, Range 1 West, Section 36, Humboldt Meridian. The project is located on 7 adjacent legal parcels, for a total of 81.34 assessed acres (Assessor's parcel numbers [APNs] 017-032-003, 017-071-004, 017-071-009, 017-072-002, 017-072-003, 017-073-007, and 017-073-009) (Figure 2) with a central location at latitude and longitude 40.769735° and -124.136079° (Google Earth, 2017). The project area is approximately 2.5 miles south of Humboldt Bay at its nearest point, 2.5 miles southeast of downtown Eureka and U.S Hwy 101, and 1,800 feet southeast of Sequoia Park at its nearest point.

5. **Project sponsor's name and address**:

Applicant	**Owner**
Attn: Kurt Kramer	Attn: Kurt Kramer
Kramer Properties, Inc.	Fairhaven Cottages, LLC
1589 Myrtle Ave, Suite B	1589 Myrtle Ave, Suite B
Eureka, CA 95501	Eureka, CA 95501

6. **General Plan designation**:

   Existing: The project parcels are designated Residential Low Density (RL) 1-7 units/acre (Humboldt County, 2017a). The RL designation is used for areas suitable for residential use where urban services are available or are anticipated to be available. Single-family units on individual lots are the dominant use, but the designation can accommodate a mix of housing types including townhouses and common-wall clustered units (Humboldt County, 2017c).

   Proposed: Residential Low Density (RL) 1-7 units/acre, Residential Medium Density (RM) 7-16 units/acre, and Commercial General (CG). The project areas proposed for single-family residential development are proposed to retain their existing RL land use designation. The project areas proposed for multifamily residential development are proposed to have their general plan designation changed to the RM land use designation. The project areas proposed for neighborhood commercial development

are proposed to have their general plan designation changed to the CG land use designation. The areas proposed for each land use designation are shown in Figure 3B.

7. **Zoning:**

   Existing: The project parcels are zoned Residential Single Family (R-1), with combining zones indicating Planned Unit Development (P), Recreation (R), and Greenway with Open Space (GO): R-1/P, R, GO.

   Proposed: Residential Single Family (R-1), with combining zones indicating Planned Unit Development (P), Recreation (R), and Greenway with Open Space (GO): R-1/P, R, GO; Apartment Professional(R-4), Planned Unit Development (P), and Greenway with Open Space (GO): R-4/P, GO; Neighborhood Commercial (C-1), Planning Unit Development (P), and Greenway with Open Space (GO): C-1/P, GO. The project areas proposed for single-family residential development are proposed to be rezoned to R-1/P, GO. The project areas proposed for multifamily residential development are proposed to be rezoned to R-4/P, GO. The project areas proposed for neighborhood commercial development are proposed to be rezoned to C-1/P, GO.

8. **Possible Permits and Approvals**

   - Humboldt County General Plan Amendment, Major Subdivision, Planned Development Permit, and Zoning Ordinance Amendment
   - Annexation into Humboldt Community Services District approved by Humboldt Local Agency Formation Commission (LAFCO)
   - California Department of Forestry and Fire Protection (Calfire) Timberland Conversion Permit (TCP) and Timber Harvest Plan (THP)
   - Humboldt County Special Permit for vegetation removal and work within a Streamside Management Area
   - Humboldt County Building Division Grading Permits
   - Humboldt County Department of Public Works Encroachment Permits
   - Humboldt County Building Permits
   - Regional Water Quality Control Board Stormwater Pollution Prevention Plan (SWPPP)
   - Regional Water Quality Control Board 401 Water Quality Certification
   - CA Department of Fish and Wildlife (CDFW) Streambed Alteration Agreement
   - Army Corps of Engineers Section 404 Permit

9. **Project Site History:** During the historic period, the primary forests of the Ryan Slough area were harvested by Ryan and Duff Company and then the McKay & Co., who owned this section after 1875. This creek valley was the main artery of the McKay & Co. land holdings and facilitated an early logging railroad along the flat canyon bottom which conveyed logs to the Occidental Mill near the bottom of the Freshwater Channel. Several early Eureka City maps show a "trail" in the project vicinity, which was used by McKay & Co. workers to reach the street car station near Sequoia Park (Rohde, 2014). Through the 1900s, pieces of the McKay Tract property were sold to the Pacific Conservation Company. For 35 years, the Pacific Conservation Company allowed the forest to regrow (Rohde, 2014). In 1967, the Georgia Pacific Corporation acquired the property and built truck roads through the tract in

place of the old railroad grades. Georgia Pacific resumed logging operations in the area at that time. The project location remained in timber production, under the ownership of Green Diamond Resource Company. Kramer Properties, Inc. recently purchased a portion of the McKay Tract timber property where they are proposing a new subdivision referred to as the McKay Ranch Subdivision. It will border the existing Redwood Fields ballpark (APNs 017-073-008 and -010), which is a cut-out within the western portion of the project site that is owned by the Field Committee Corporation.

10. **Surrounding land uses and setting**: The project site is located in the Cutten area, near Sequoia Park, to the east of Walnut Drive. The site is currently accessed from Walnut Drive by Fern Street. This access is utilized by users of Redwood Fields and other users of the project site. Currently the site is surrounded by adjacent forests buffering residences to the west and northwest. Views to the site or from the site are very limited. To the south is Glen Paul School. To the north is the gulch occupied by Ryan Creek and development at the end of Manzanita Avenue. Northeast is Redwood Acres Fairgrounds. To the east is a PG&E powerline, Ryan Creek/Slough, the McKay Community Forest (owned by Humboldt County), and Green Diamond Industrial Timberland.

11. **Description of project**: Kramer Properties, Inc. proposes to subdivide 7 parcels of land, approximately 81 acres total in size, into 154 mixed-use lots (Figures 3A-3E). Uses for the lots are intended to include single-family dwellings, multifamily dwellings, and neighborhood commercial. A total of 320 residential units are proposed which, based on market conditions, may include 110 single-family houses and 210 multifamily units. Two commercial parcels are also proposed as part of the project, which will contain approximately 22,000 square feet of commercial space. The project would occur as a nine-phase subdivision; other on-site improvements would include open space, access roads, utilities, landscaping, stormwater infrastructure, etc. Consistent with Humboldt County Zoning Regulations Section 313-31.1.6.5.4, all utilities shall be placed underground. Lots are to be served by community water, wastewater, and street lighting services which are to be extended from Humboldt Community Services District (HCSD. The project includes annexation into HCSD. The project includes a General Plan Amendment and Rezoning. A Planned Development is proposed to allow for lots smaller than the minimum parcel size for this zone. Redwood and Arbutus Streets are proposed to be extended east, with Arbutus Street curving north and eventually intersecting with Redwood Street. Additional side streets will be constructed southeast and northeast of Redwood and Arbutus Streets. All development is proposed to occur on the flat upper terrace portion of the property. Development will have an approximate 100-foot buffer from the 30% break in slope to protect steep slopes from erosion, thereby protecting Ryan Creek and accompanying wetlands. Steep slopes and drainages will remain in protected open space area, in addition to stands of trees to protect adjacent viewsheds and provide habitat. The project is located in the unincorporated area of Humboldt County, California (Township 5 North, Range 1 West, in the Northwest quarter of Section 36) and is within the United States Geological Survey (USGS) 7.5-minute Eureka topographic quadrangle. Elevations at the site occur between 150 and 200 feet above mean sea level.

The project will be built in nine phases over an anticipated 20 or more years. Market conditions will determine the actual timing and order of phased development. The following is an example of how the property may be built out.

Phase 1

- Timber conversion of 26 acres with clear-cutting occurring adjacent to and within the loop road described above and selective cutting for the remainder of the project on top of the bench.
- Construction of the loop road from Walnut Drive connecting extensions of Arbutus Street with Redwood Street. Utilities are to be constructed concurrently for this portion.
- Construction of 69 multifamily (MF) units on 11.9 acres.

Phase 2

- Construction of 56 residential units (12 small-lot single-family (SF) units and 44 multifamily (MF) and 2 commercial units on 7.6 acres, thereby completing the development surrounding Redwood Fields.

Phase 3

- Construction of McKay Lane with extension of utilities.
- Construction of 31 residential units (11 SF residences and 20 small-lot SF units) on 5.8 acres.

Phase 4

- Construction of Oakview Drive with extension of utilities.
- Construction of 45 residential units on 8.8 acres.

Phase 5

- Construction of S Canyon Lane with extension of utilities.
- Construction of 74 residential units (13 SF residences and 61 MF units) on 8.4 acres.

Phase 6

- Extension of McKay Lane and Oakview Drive with extension of utilities.
- Construction of 20 SF units on 6.9 acres.

Phase 7

- Construction of Canyon Court with extension of utilities.
- Construction of 15 SF units on 4.9 acres.

Phase 8

- Construction of Canyon Circle with extension of utilities.
- Construction of 7 SF units on 3.9 acres.

Phase 9

- Extension of Manzanita Avenue with extension of utilities.
- Construction of 3 SF units on 1.07 acres.
- NOTE: This phase is separate from the rest of the development and may occur at anytime after annexation.

This results in a total of 320 residential units and 2 Commercial units on 81 acres.

Off-site Improvements

There are a number of off-site improvements that are subject to approval through this process including transportation, water supply/storage, and wastewater connections. These will be discussed in detail in appropriate sections such as the Transportation, Public Services, and Utilities sections of this document. There is still ongoing discussion on whether these improvements will be paid for through an impact fee or whether they will be built by the applicant and what the timing is for these improvements. Since the original application was submitted to the County in 2015, the Martin Slough Interceptor project has been completed, and the Humboldt Community Services District updated its Sphere of Influence (SHN, 2014) to include this project area. To the extent that off-site improvements have not included sufficient details because they are too speculative to analyze at this time, subsequent CEQA review of the improvements may be necessary prior to approval. These improvements and their required timing will be specified as part of the phased subdivision conditions of approval.

Construction Activity

As noted, the above phasing is likely to take 20 or more years to complete. As designed, as each phase is completed it will block impacts, such as construction dust and noise, to the existing residential neighborhood to the west and towards recently completed phases. Air quality and greenhouse gas emissions have been considered for each of the phases. Traffic will be primarily construction-related during the construction season until the residences become occupied, at which time a growing number of year-round trips will outnumber seasonal construction-related trips. The construction SWPPP will include year-round sediment and erosion control measures which will continue to be implemented during each phase.

Access/Parking

The project site is currently accessed from Fern Street, which is a 60-ft wide County right-of-way that is paved approximately 16 feet in width. This road provides access to Redwood Fields and other uses in the area. Fern Street will remain the primary access for the development until the Arbutus Street extension right-of-way is cleared of vegetation and

constructed. Redwood Street will also be extended as part of Phase 1, which requires culverting a first order (headwater) stream and stabilizing a steep section of proposed roadway. The actual phasing of this roadway improvement may occur after Phase 2 is completed. Other proposed roadways will be paved as described in the Phasing Plan.

The project proposes to develop several internal access roads and parking areas to serve the project. All of the internal access roads are proposed to be paved, with most sections having on-street parking.

Lighting

The project site currently contains existing outdoor lighting around the Redwood Fields and its associated parking areas. The new roadways and commercial buildings will have street lighting installed for security purposes. All new outdoor lighting will be the minimum lumens required for security purposes, directed downward, and shielded to prevent lighting spillover onto adjacent properties.

Landscaping

As development occurs, the project will provide landscaping throughout the site.

Stormwater Management

Development of the proposed project will create additional impervious surfaces and result in an increase in stormwater runoff. A portion of the site is within Humboldt County's MS4 permit jurisdiction and each individual parcel within the development will be required to comply with the MS4 permit requirements. As described in the Preliminary Drainage Report prepared by Ontiveros (2017), this can be accomplished with a combination of Low Impact Development (LID) features including infiltration galleries, bioswales, rain gardens, rain barrels, trees, etc. All proposed roadways will have a depressed parkway adjacent to the road surface which will function as a bioswale for roadway drainage. Storm drain inlets will be located within the bioswales to convey drainage to the storm drain system for flows exceeding the 85th percentile storm. Storm drainage will then be conveyed to the drainage area outlet. Each drainage management area within the MS4 permit area will require additional stormwater detention.

Wetlands and Jurisdictional Waters Present

As shown in the wetland delineation (SHN 2017b), two small pocket wetlands are located in the northern part of the project area within a compacted ATV track (22 sf wetland area) and along a former logging road (1,089 sf wetland area). A large slow-draining wetland (78,147 sf wetland area) is located along the proposed Arbutus Street extension that presumably drains runoff from Cedar and Arbutus Streets into a ravine and thence to Ryan Creek. The wetlands are freshwater emergent wetlands that occur within a third-growth forest and within areas cleared during past land use and development. The wetland delineation also documented two first order (headwater) streams (tributaries of Ryan Creek) along the northwestern border of the project area (SHN 2017b).

The two pocket wetlands (22 sf and 1,089 sf in size) are located within the Phase 7 portion of the project and would be filled (removed) in their entirety at that time. The large slow-draining wetland is located along the proposed Arbutus Street extension and a large portion of it (35,506 sf) would be filled (removed) during Phase 1 of project development. The two first order (headwater) streams cross the proposed Redwood Street extension and would be culverted during construction of that roadway.

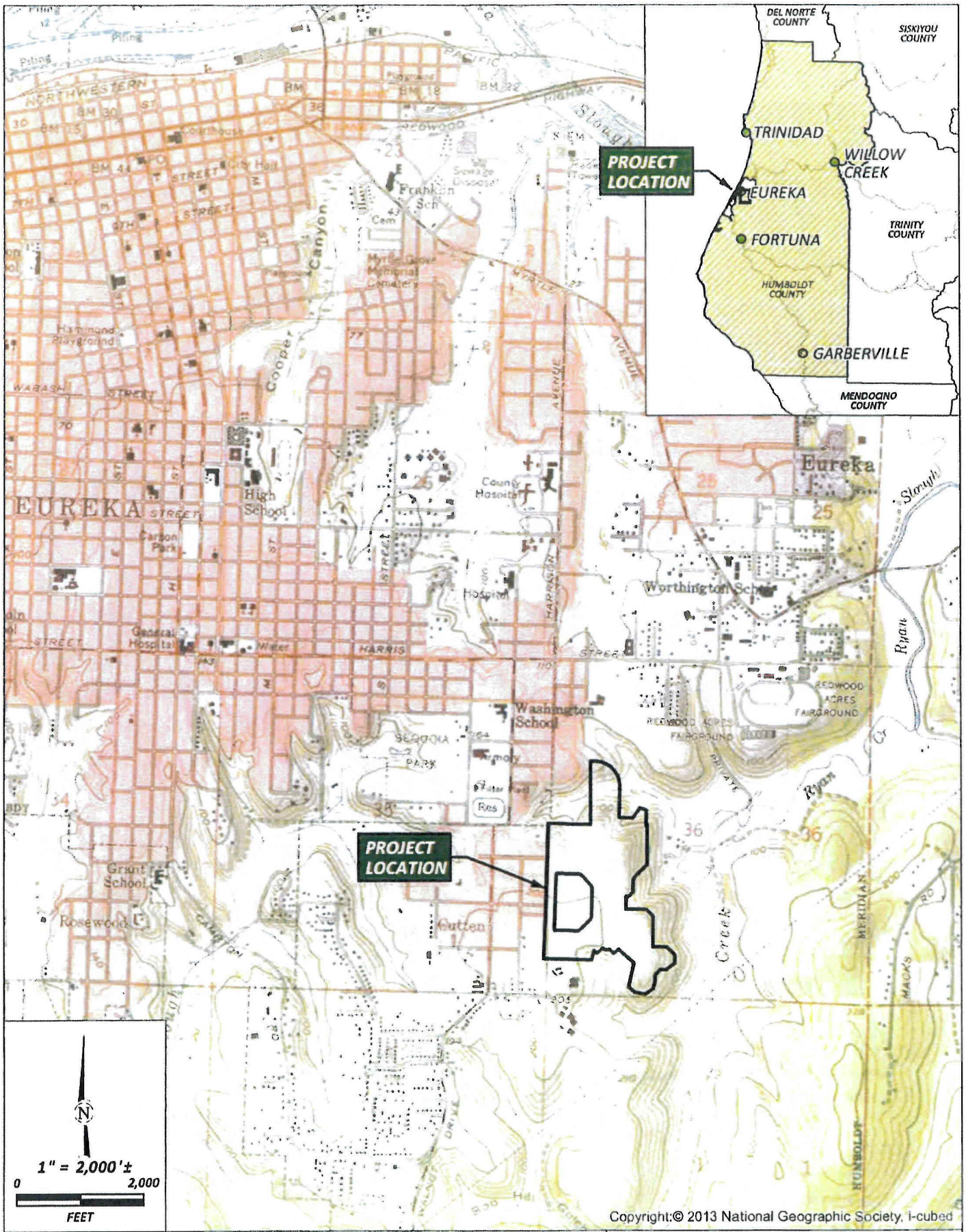
Wetland Mitigation

The wetland mitigation, monitoring, and reporting plan (SHN, 2018) proposes to minimize the impacts from the Ryan Creek tributary crossings by using large half-round culverts or small bridges, and to decommission, re-contour, and stabilize the deteriorating logging road within the northern portion of the project. Wetland impacts are proposed to be mitigated at a 1:1 replacement ratio. In accordance with the recommendations of the wetland mitigation, monitoring, and reporting plan, the wetlands expected to be impacted by the project and project-related activities, estimated at 36,617 square feet, would be replaced by the creation of 36,617 square feet of wetlands. The areas mitigated would be planted with native wetland vegetation and contoured to create wetlands of equal or greater value than those lost due to the project. Wetland mitigation would occur within upland areas to ensure that additional wetland area is not lost. Loss of wetland buffer around the southern wetland as a result of the Arbutus Street extension would be mitigated through existing wetland enhancement, and revegetating the highly eroded logging road within the northern portion of the project area. Existing wetlands would be enhanced with the removal of non-native vegetation and planting of native hydrophytes. In addition, temporary fencing would be installed prior to construction to prevent additional wetland disturbance during construction. Wildlife friendly fencing would be installed to prevent accidental encroachment into wetlands following completion of the project (SHN, 2018).

To protect the delineated jurisdictional areas during construction activities, it is proposed to impose a 100 foot development setback from the 30% break in slope, to be designated as non-buildable to reduce erosion and removal of trees, thereby reducing impacts to Ryan Creek and associated wetlands. Temporary construction fencing shall be installed and maintained along the top edge of grade breaks adjacent to the phase(s) that is/are being constructed. The fencing shall be installed prior to the beginning of construction activities and shall be removed after the final inspection is completed by the Humboldt County Building Division. At the completion of the construction phase once the temporary construction fencing has been removed, wooden fencing shall be constructed and maintained along the top edge of grade breaks.

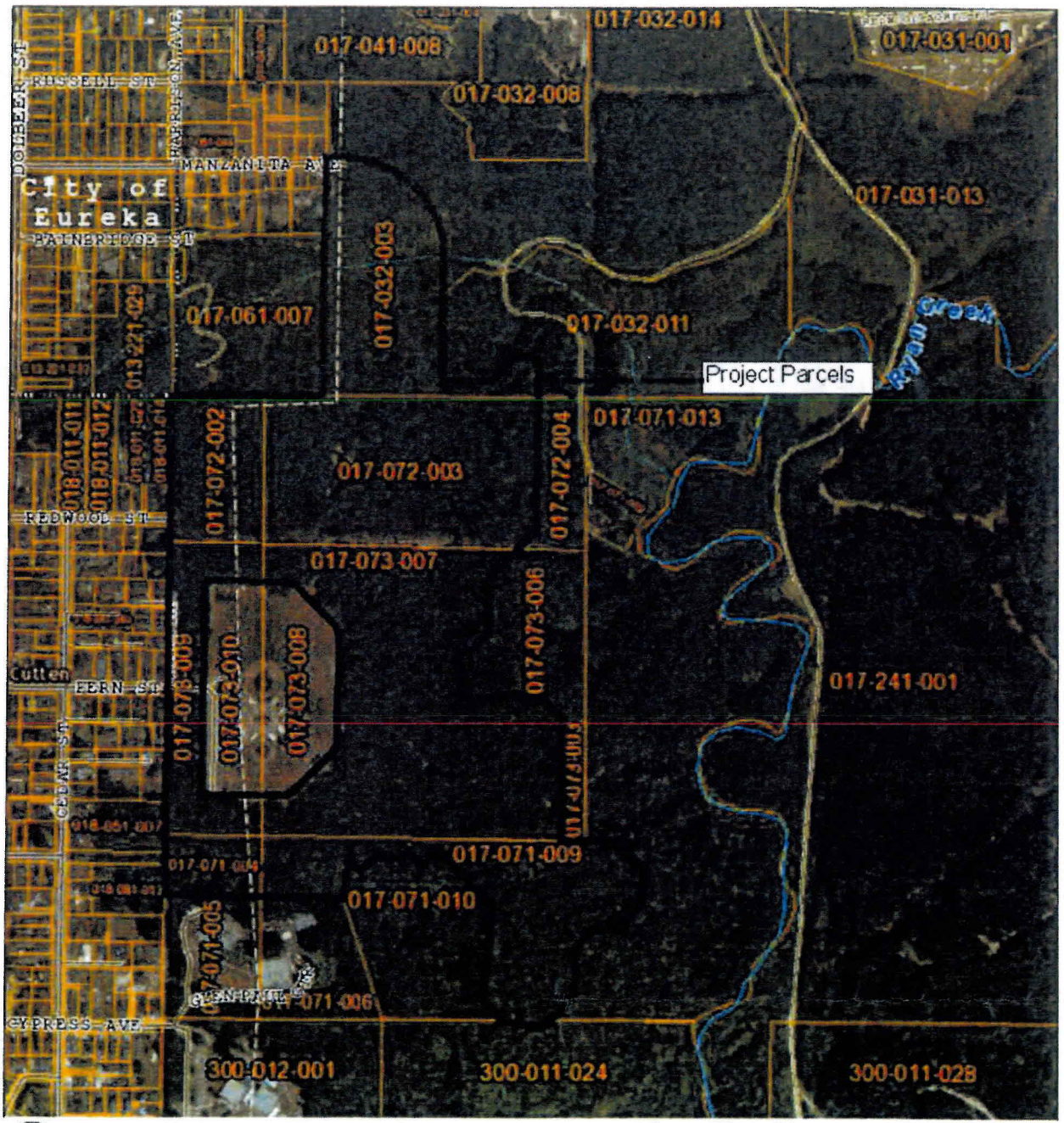
Open Space

The project includes the designation of a number of acres as permanent open space (areas of steep slopes and drainages), to be preserved as open space through the establishment of a permanent easement.



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SHN Consulting Engineers & Geologists, Inc.	Kramer Properties, Inc.	Project Location SHN 016148
	July 2018	Figure 1



ArcGIS Web Map

Humboldt County Planning and Building Department

0 350 700 1,400 Feet

0 0.05 0.1 0.2 Miles

RF= 1:9,028 1 in = 752 ft

Highways and Roads
- Principal Arterials
- Minor Arterials
- Major Collectors
- Minor Collectors
- Local Roads

Private or Unclassified
Major River or Stream
Blue Line Streams
- Perennial 1-3
- Perennial >4

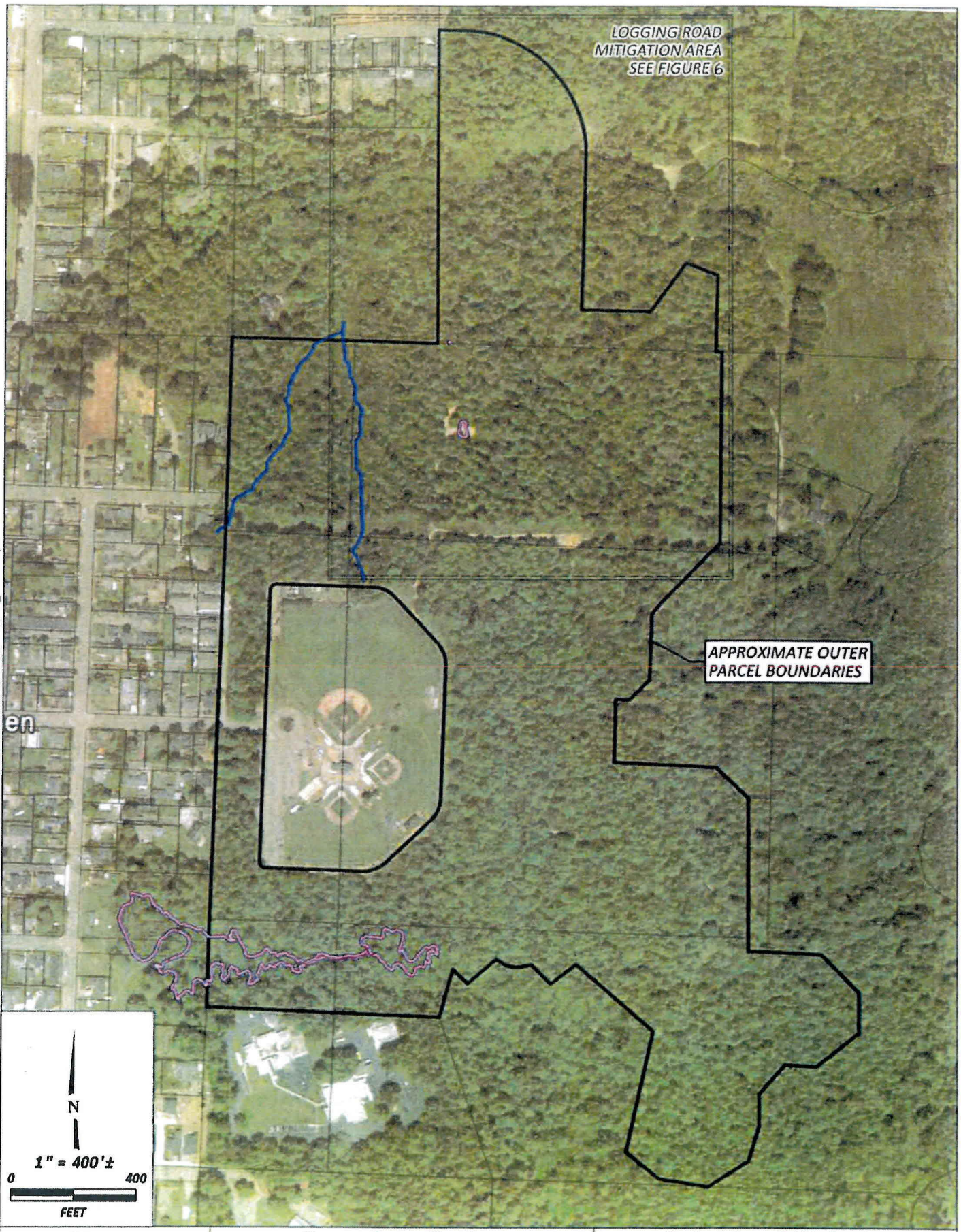
Intermittent
Subsurface
City Boundary
Counties
Parcels
Parcels (no APN labels)

Printed: June 11, 2018 Web AppBuilder 2.0 for ArcGIS

Map Disclaimer:
While every effort has been made to assure the accuracy of this information, it should be understood that it does not have the force & effect of law, rule, or regulation. Should any difference or error occur, the law will take precedence.

Source: NRCS, Humboldt County GIS, California Coastal Commission GIS/Mapping Unit, 2014, Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community, Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community, FRAP, FEMA, USGS

SHN Consulting Engineers & Geologists, Inc.	Kramer Properties, Inc.	Project Parcels SHN 016148	
	July 2018	\\arcatasvr1\Projects\2016\016148A-McKay-Ranch\Figs\Figs for Initial Study June2018\20180706-Edited Figures\Figure 2.docx	Figure 2



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Consulting Engineers & Geologists, Inc.	Kramer Properties, Inc. **Initial Study** McKay Ranch Subdivision, Cutten, California	Project Area & Wetlands SHN 016148
	March 2018	Figure 4

MCKAY RANCH SUBDIVISION
TENTATIVE MAP FOR A PLANNED DEVELOPMENT

LOCATED IN THE NORTHWEST QUARTER OF SECTION 36,
TOWNSHIP 5 NORTH, RANGE 1 WEST, H.M.,
IN THE UNINCORPORATED AREA OF
HUMBOLDT COUNTY, CALIFORNIA
(APN's 017-032-003, 017-071-004 & 009, 017-072-002 & 003, 017-073-007 & 009)

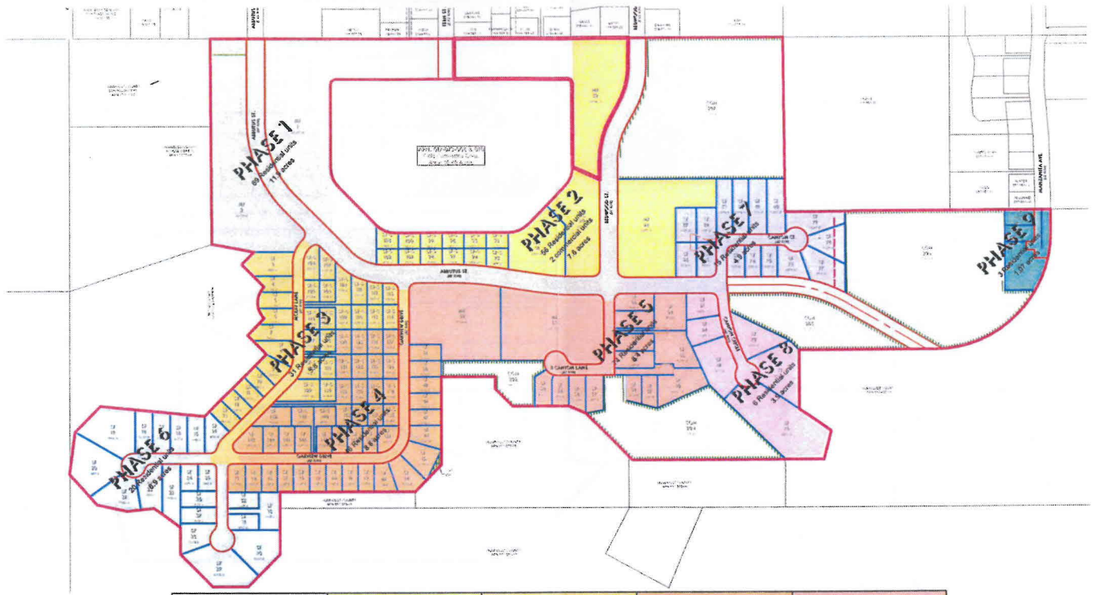
Figure 3A

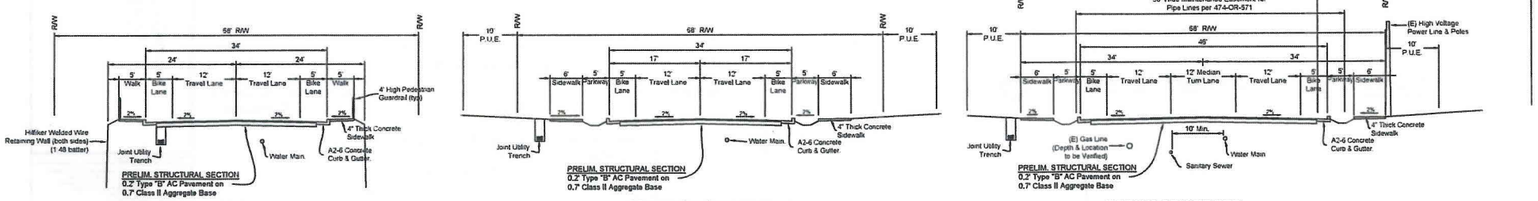
PROJECT DESCRIPTION

1. This subdivision application proposes a subdivision of the legal parcels known as APN's 017-032-003, 017-071-004 & 009, 017-072-002 & 003, 017-073-007 & 009. The combined ±91.1 acre site is proposed to be subdivided into varying single-family and multi-family lots as well as a neighborhood commercial lot.
   Proposed are: 96 Single Family lots (lots 3-50, 53-87 & 142-154)
   ranging in size from 6,600sf to 39,670sf.
   50 Small Lot Single Family (lots 92-141) with a minimum size of 4,758sf.
   174 Multi-Family (lots 1-2, 51-52 & 88-89)
   2 Neighborhood Commercial Lot (lot 90 & 91)
   The adjacent properties to the West are primarily single family residences. The adjacent properties to the North, South & East are primarily undeveloped timberland
2. There are currently no structures on the property and the parcels have historically been used as timber land.
3. Water service will be supplied by the Humboldt Community Services District (HCSD).
4. Sewer service will be provided by the HCSD. It is proposed to gravity flow the sewer within the subdivision to the low point at the North end of the subdivision to a sewage lift station where the sewer is then proposed to be pumped to the existing gravity lines at Hemlock & Dolbeer Streets.
5. PG&E supplies electricity and gas, AT&T provides telephone services, and Suddenlink provides cable television services.
6. The property is not shown on official maps to be subject to flooding (FIRM Community Panel No. 060060 0775 C). No hazardous areas, historic buildings, or archaeological sites are known to exist on or adjacent to the property.
7. Topography is shown at 5 foot contour intervals based on vertical datum NAVD88 from LIDAR data obtained by Humboldt County.
8. The property naturally drains to the North, East & South in several natural ravines down to Ryan Creek. It is proposed to collect storm water from the roadways into bioswales located adjacent to the roadways. Overflow from the bioswales will be collected in drainage infrastructure located throughout the site. It is proposed to discharge this overflow storm water into the naturally occurring drainage courses within and along the boundaries of the property.
9. It is proposed to cut most roadways within 5' of the existing surface. Roadway elevations and proposed cuts are shown along the roadway centerlines on the grading plan. Cuts are shown in parenthesis. The two large ravines at the west end of Redwood Street are proposed to be crossed with the use of Hilfiker Retaining Walls to limit the impact of fill material in the ravine. The preliminary estimated balanced cut and fill for the project is approximately 100,000cy.
10. SHN has prepared Preliminary General Criteria for grading activities for the proposed project in the form of a letter dated December 11, 2007 and is incorporated by reference. In general the recommendations are to adhere to building setbacks from the 25% break-in-slope and to limit cut and fill depths.
11. Adjacent APN information is from the Humboldt County Assessor's Office.
12. All easements of record are shown or referenced on the Tentative Map and will appear on the recorded subdivision map.

EASEMENTS & ENCUMBRANCES
(AS NOTED IN SCHEDULE B OF THE TITLE REPORT)

TITLE REPORT REF.	DEED REFERENCE	DESCRIPTION
3	BOOK 229 OF DEEDS, PAGE 249	Rights in Conjunction with the right to the free use of water from a spring.
4	BOOK 6 OF MAPS, PAGE 34, HCR	Private easements for ingress and egress.
5	BOOK 293 O.R., PAGE 586	PG&E ingress, egress & public utilities.
6	BOOK 474 O.R., PAGE 571	50' wide ingress, egress & public utilities.
7	BOOK 1618 O.R., PAGE 1105	Agreement relating to a 30' wide access strip
8	BOOK 1633 O.R., PAGE 769	30' private R/W for access.
9	O.R. 1991-15178-4, HCR	40' wide ingress, egress and public utilities & drainage.
10	O.R. 1991-17053-3, HCR	40' wide ingress, egress and public utilities.
11	O.R. 1992-17995-3, HCR	PG&E & Pacific Bell - Ingress, egress and public utilities.
12	O.R. 1997-28279-0, HCR	Notice of Lot Line Adjustment & Certificate of Subdivision Compliance
13	O.R. 1997-31485-4, HCR	20' wide storm drainage easement.
14	O.R. 1999-2551-4, HCR	60' wide ingress egress and public utilities.
	O.R. 1999-19479-4, HCR	
15	O.R. 1999-5365-1, HCR	40' wide water line easement
17	O.R. 2009-22919-2, HCR	40' wide ingress, egress, public & private utilities





SHEET LIST

C1.0 TITLE SHEET with PHASING PLAN AND ROAD SECTIONS
C1.1 PROPOSED LAND USE DESIGNATIONS
C2.0 TENTATIVE MAP SITE PLAN
C3.0 PRELIMINARY GRADING AND DRAINAGE PLAN
C4.0 PRELIMINARY UTILITY PLAN

O&A
ONTIVEROS & ASSOCIATES
CONSULTING ENGINEERS AND SURVEYORS
404 N. Fortuna Blvd. • Fortuna, CA 95540
Phone (707) 725-7430 • Fax (707) 725-7211
OntiverosAssociates.com

DEVELOPER
kramer investment corp.
1589 myrtle avenue suite b
eureka, ca 95501
(707)444-2919 office
(707)444-2396 fax
Contacts: Kurt Kramer
Chris Mikkelsen

PROJECT NAME
McKAY RANCH SUBDIVISION
TENTATIVE MAP FOR a PLANNED DEVELOPMENT
HUMBOLDT COUNTY
APN's 017-032-003, 017-071-004 & 009, 017-072-002 & 003, 017-073-007 & 009

SHEET TITLE
PHASING PLAN and ROAD SECTIONS

PLOT INFORMATION
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REVISIONS

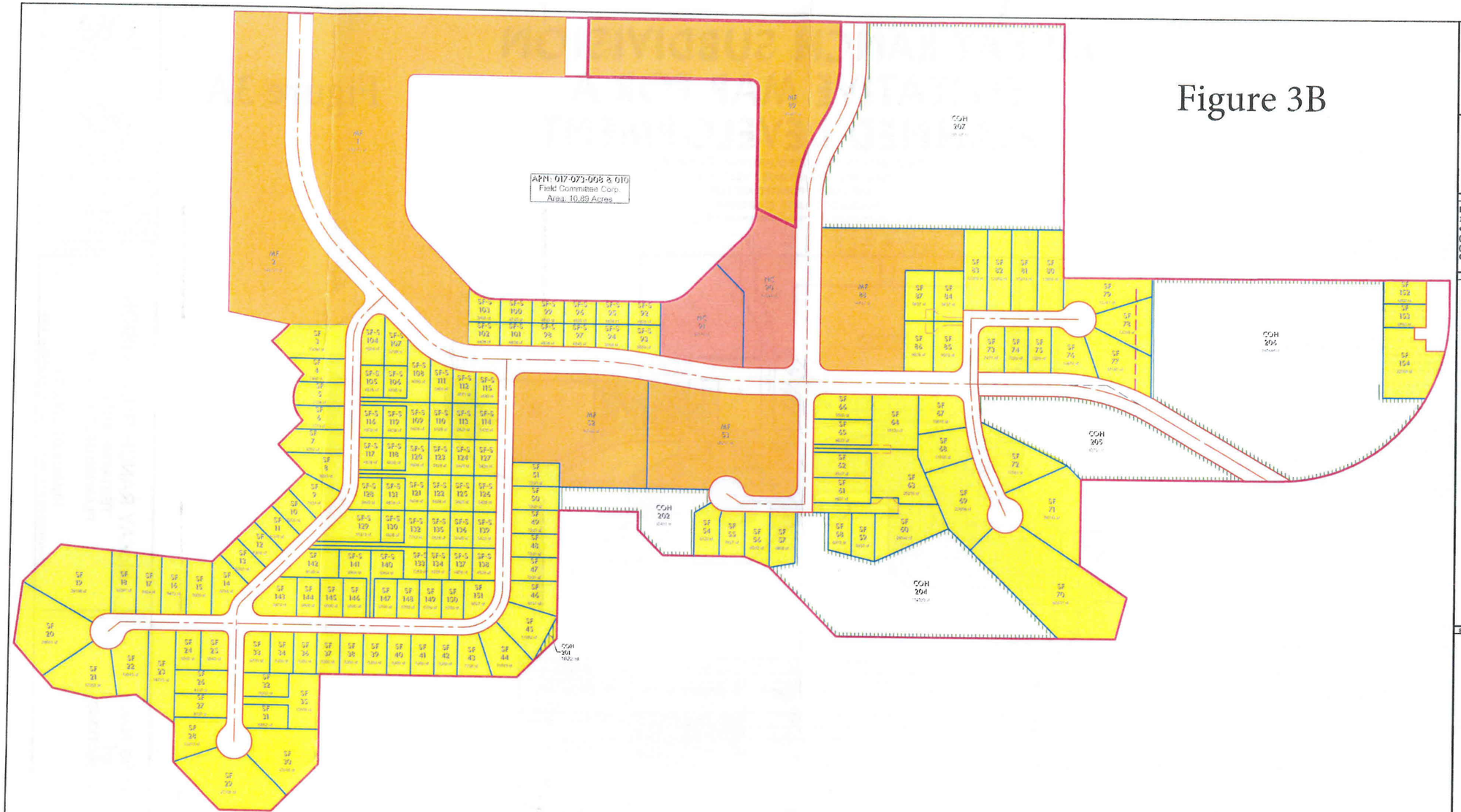
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PROJECT NO.	14-102
DATE	04/17/19
DRAWN BY	BKO/BAQ
CHK'D BY	BKO

SUBMITTAL STATUS
PLANNING NOP REVIEW

C1.0
SHEET 1 OF 5

Figure 3B



PROPOSED LAND USE DESIGNATIONS

SCALE: HOR: 1" = 100'

Lot Type	Zoning Designation/Color	Plan Designation
Single Family	R-1 / P, GO Residential Single Family (R-1) w/Planned Development (P), and Greenway and Open Space (GO) Combining Zones	Residential, Low Density (RL), 1 - 6 units/acre
Multi Family Lots 1, 8 & 9	R-4 / P, GO Apartment Professional (R-4) w/Planned Development (P), and Greenway and Open Space (GO) Combining Zones	Residential, Multiple Family (RM), 7 - 16 units/acre
Commercial Lots 4	C-1 / P, GO Neighborhood Commercial (C-1) w/Planned Development (P), and Greenway and Open Space (GO) Combining Zones. C-1/P, GO	Commercial General (CG)

O&A
ONTIVEROS & ASSOCIATES
CONSULTING ENGINEERS AND SURVEYORS
1604 N. Fortuna Blvd. • Fortuna, CA 95540
Phone (707) 725-7400 • Fax (707) 725-7411
Ontiveros1@sbcglobal.net

DEVELOPER

kramer investment corp.
1589 myrtle avenue suite b
eureka, ca 95501
(707)444-2919 office
(707)444-2396 fax
Contacts: Kurt Kramer
Chris Mikkelsen

PROJECT NAME

McKAY RANCH SUBDIVISION
TENTATIVE MAP FOR a
PLANNED DEVELOPMENT
HUMBOLDT COUNTY
APNs 017-032-003, 017-071-004 & 009, 017-072-002 & 003, 017-073-007 & 009

SHEET TITLE

PROPOSED LAND USE DESIGNATIONS

PLOT INFORMATION

DATE/TIME PLOT: 4/17/2019 8:48 AM
DATE SAVED: 4/17/2019 8:48 AM

REVISIONS

MARK	DATE	DESCRIPTION

PROJECT NO: 14-102
DATE: 04/17/19
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CHK'D BY: BKO

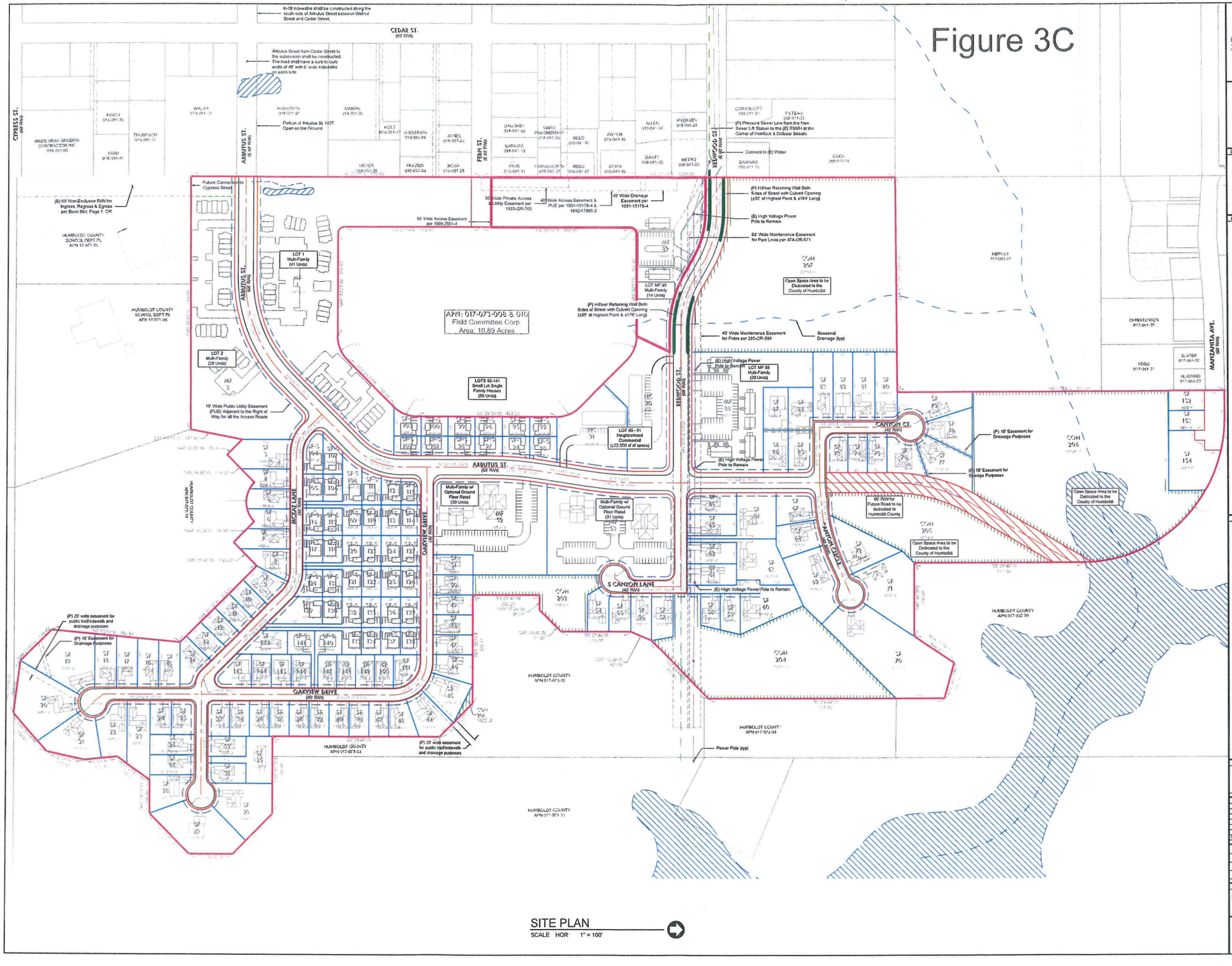
SUBMITTAL STATUS

PLANNING NOP REVIEW

C1.1

SHEET 2 OF 5

Figure 3C



SITE PLAN
SCALE HOR: 1" = 100'

O&A
ONTIVEROS & ASSOCIATES
CONSULTING ENGINEERS AND SURVEYORS
404 N. Fortuna Blvd. • Fortuna, CA 95540
Phone (707) 725-7045 • Fax (707) 725-7411
Ontiveros.Associates@gmail.com

DEVELOPER

kramer investment corp.
1589 myrtle avenue suite b
eureka, ca 95501
(707)444-2919 office
(707)444-2396 fax
Contacts: Kurt Kramer
Chris Mikkelsen

PROJECT NAME

McKAY RANCH SUBDIVISION

TENTATIVE MAP FOR a PLANNED DEVELOPMENT

HUMBOLDT COUNTY

APN's 017-032-003, 017-071-004 & 009, 017-072-002 & 003, 017-073-007 & 009

SHEET TITLE

SITE PLAN

PLOT INFORMATION

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REVISIONS

MARK	DATE	DESCRIPTION

PROJECT NO:	14-102
DATE:	04/17/19
DRAWN BY:	BKO/BAQ
CHK'D BY:	BKO

SUBMITTAL STATUS

PLANNING NOP REVIEW

C2.0

SHEET 3 OF 5

COMMENTS RECEIVED ON THE NOTICE OF PREPARATION

DEPARTMENT OF FORESTRY AND FIRE PROTECTION
118 S. Fortuna Blvd
Fortuna, CA 95540
(707) 725-4413
Website: www.fire.ca.gov

Ref: 7100 Planning
Date: March 29th, 2019

To: Humboldt County Planning and Building Department – Planning Division
3015 H Street
Eureka, CA 95501

RE: BASIC PROJECT REVIEW INPUT ON ALL DEVELOPMENT PROJECTS

The California Department of Forestry and Fire Protection (CALFIRE) provides these standard project review comments on all projects for the following subject matter:

-Fire Safe
-Resource Management
-Cannabis

The following pages address these concerns directly.

If CALFIRE staff develops additional comment on this project, it will be forwarded in an additional response letter.

By: Planning Battalion
CALFIRE Humboldt – Del Norte Unit

For ***Kurt McCray***, Unit Chief

FIRE SAFE

General:
CALFIRE has responsibility for enforcement of Fire Safe Standards as required by Public Resources Code (PRC) 4290 and 4291. However, CAL FIRE is not the lead agency in planning development and project permitting. CALFIRE provides input as a contributing agency, generally limited to plan review, and is not the approving agency for these projects.

Local Responsibility Areas:
Should this project include Local Responsibility Area (LRA) lands, CAL FIRE has no direct fire safe input on those parcels. However, in those areas with LRA parcels adjacent to State Responsibility Area (SRA) land, CAL FIRE recommends that local standards be applied that are consistent with those CALFIRE makes for SRA lands.

State Responsibility Areas:
Should this project include State Responsibility Area (SRA) lands, the following are CAL FIRE's Fire Safe minimum input and recommendation for any and all development.

1. In Humboldt County, developments must meet minimum fire safe standards by constructing the project in conformance with County Fire Safe Ordinance 1952, which the California Board of Forestry and Fire Protection has accepted as functionally equivalent to PRC 4290. The County Fire Safe Ordinance

provides specific standards for roads providing ingress and egress, signing of streets and buildings, minimum water supply requirements, and setback distances for maintaining defensible space.

2. New buildings located in any Fire Hazard Severity Zone within State Responsibility Areas shall comply with the 2007 California Building Code (CBC) Section 701A.3.2. This requires roofing assemblies, attic and eve ventilation, exterior siding, decking and deck enclosure, windows and exterior doors, and exposed under floor areas that are approved "ignition resistive" in design.

3. All development, especially commercial or industrial development, should be designed to comply with the most current versions of the following standards:
    a) California Fire Code (CFC) — for overall design standards
    b) Public Utilities Commission (PUC) General Order 103 — for design of water systems
    c) National Fire Protection Association Standards (NFPA) for fire flow minimums and other design questions not specifically covered by CFC and PUC
    d) Housing and Community Development Codes and Standards —for mobile home parks and recreational camps

4. For Department of Real Estate reporting purposes, fire protection coverage in SRA is generally described as follows:
    a) During the declared fire season CAL FIRE increases its preparedness level for the purpose of suppressing wildland fires in the SRA. Response to non-fire incidents in the SRA or to areas outside of the SRA are usually predetermined through Cooperative Fire Protection Agreements with the agency having fiscal responsibility for fire protection. When cooling weather, rain, and snow are sufficient to reduce the fire threat, CAL FIRE then reduces its preparedness level by reducing seasonal staff, and closing outlying stations.
    b) It is not CAL FIRE's responsibility to provide fire protection services to any building or structure located within the wildlands unless the Department of Forestry and Fire Protection has entered into a cooperative agreement with a local agency for those purposes pursuant to Section 4142 of the Public Resources Code.
    c) Subdivisions increase fire risks from additional people and increase probable dollar losses in the event of fire due to added structures and improvements.

5. If the project expects to produce densities consistent with a major subdivision, the impacts on all infrastructures should be mitigated. Local government more appropriately provides the responsibility for high-density area protection and services. Annexation or inclusion into Local Responsibility Area should be studied as well.

6. CALFIRE does not support development in areas where there is no local agency fire service for structure fires and emergency medical response. Fire services should be extended into service gap areas as a condition of development. New development can adversely impact existing fire services. Careful consideration must be given where development may overload the local fire service's ability to respond.

RESOURCE MANAGEMENT

CAL FIRE has enforcement responsibility for requirements of the Z'berg—Nejedly Forest Practice Act of 1973. CAL FIRE is also the lead agency for those parts of projects involving the scope of the Forest Practice Act. The following basic input will cover the majority of projects. Each project will be reviewed with additional input sent at a later date, if needed.

The following comments reflect the basic Resource Management policies of the Board of Forestry and Fire Protection and CALFIRE on CEQA review requests. These policies apply to both Local and State Responsibility Areas.

1. If this project reduces the amount of timberland, by policy, the Board of Forestry and CALFIRE cannot support any project that will reduce the timberland base of California. "Timberland" means land which is available for, and capable of, growing a crop of trees of any commercial species used to produce lumber and other forest products, including Christmas trees regardless of current zoning (PRC 4526). However, if the zoning and intended use are consistent with the county's general plan; and if no land other than timberland can be identified to site the project; then CALFIRE may choose not to oppose the project.

2. If **any** commercial timber operations are involved with a project, the timber operations cannot be conducted without a CAL FIRE permit. Commercial timber operations include the cutting or removal of trees offered for sale, barter, exchange, or trade or the conversion of timberlands to land uses other than the growing of timber (PRC 4527). Contact your nearest CAL FIRE Resource Management office for guidance on obtaining the necessary permits.

3. If **any** timberlands are being converted to a non-timber growing use by this project, the conversion operations cannot be conducted without a CAL FIRE permit (PRC 4621). Conversion of timberland takes place when trees are removed and the land use changes, even without the sale, barter, exchange, or trade of the trees. Contact your nearest CAL FIRE Resource Management office for guidance on obtaining the necessary permits.

4. If timberland is in the viewshed of a project, the current and future owners should be overtly notified that changes will occur to their views due to timber management activities. Further, no project should be allowed to negatively affect access to timberland for timber management purposes; neither on the project parcel(s) nor any other timberland parcels.

5. If timber harvesting has occurred and post-harvest restocking and prescribed erosion control maintenance obligations have not been met on a parcel, future owners should be overtly notified (14 CCR 1042). The current owner of a parcel is responsible for restocking requirements and maintenance of roads whether or not they were involved in the actual harvest plan.

6. If the project involves the development of parcels zoned as Timber Production Zone (TPZ), CALFIRE cannot support the project. Dividing TPZ land into parcels of less than 160 acres requires a Joint Timber Management plan prepared by a Registered Professional Forester (RPF), recorded as a deed restriction for a minimum of 10-years on all affected parcels, and approved by a four – fifths vote of the full board (Govt. Code 51119.5). TPZ may be rezoned using a "Ten Year Phase Out," which precludes the need for a Timberland Conversion Permit. CALFIRE opposes immediate rezoning of TPZ land.

CANNABIS PROJECTS

Local Responsibility Areas:
CAL FIRE is the primary command and control dispatch center for many local agency fire districts and departments. Potential life hazard threats associated with a project must be identified and documented for the protection of the public and first responders. Projects which include timber harvesting or conversion of timberland are subject to the Forest Practices Act and Rules, regardless of wildland fire responsibility area.

State Responsibility Areas:
Should this project include State Responsibility Area (SRA) lands, the following are CAL FIRE's minimum input.

Conversion of timberland to a non-timber producing use is subject to permit from CAL FIRE. Commercial timber harvesting operations to facilitate cannabis cultivation and processing are subject to permitting and regulation under the Forest Practice Act and Rules. Please refer to the RESOURCE MANAGEMENT comments.

General Recommendations:
The following recommendations are made by CAL FIRE with the understanding that most areas of Humboldt County do not have a paid fire department providing fire prevention services.

1. Cannabis growing operations shall have easily accessible safety data sheets (SDS) for all chemicals and hazardous materials on site. Commercial operations must have a current Hazardous Materials Business Plan on file with Humboldt County Environmental Health, where applicable.

2. California Health & Safety Code 11379.6 states that oil extraction with flammable or volatile solvents is prohibited within 300 feet of a residential occupancy. HSC 11362.769 Requires that indoor and outdoor medical marijuana cultivation shall be conducted in accordance with state and local laws related to land conversion, grading, electricity usage, water usage, water quality, woodland and riparian habitat protection, agricultural discharges, and similar matters.

3. Cannabis growing and extraction shall be in accordance with California Fire Code. Specifically, Chapter 38 Plant Processing and Extraction Facilities and Chapter 53 Compressed Gases.

4. All materials hazardous and non-hazardous associated with oil extraction and plant process shall be utilized in conformance Chapter 38 of the California Fire Code. Manufacture of marijuana extracts and concentrates are commercial or industrial activities, and may be subject to the county's SRA Fire Safe Ordinance. Any new residential units associated with cannabis cultivation and processing may also be subject to the SRA Fire Safe Ordinance.

5. Humboldt County Ordinance 55.4.11(u) (a) states; "Those cultivators using artificial lighting for mixed-light cultivation shall shield greenhouses so that little to no light escapes. Light shall not escape at a level that is visible from neighboring properties between sunset and sunrise." Failure to shield artificial light during the night creates a light pollution that is easily mistaken for a fire. As a result, a CAL FIRE wildland fire response may be initiated and ultimately terminated as a false alarm. This false alarm may result in citation and/or fine to the violator.

State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
Northern Region
601 Locust St
Redding, CA 96001
www.wildlife.ca.gov

GAVIN NEWSOM, Governor
CHARLTON H. BONHAM, Director

April 23, 2019

Michael Wheeler
Senior Planner
Humboldt County Planning and Building Department
3015 H Street
Eureka, CA 95501

Subject: Notice of Preparation for the North McKay Tract Subdivision Environmental Impact Report SCH# 2019049034

Dear Mr. Wheeler:

On April 4, 2019, the California Department of Fish and Wildlife (CDFW) received a Notice of Preparation (NOP) for a draft Environmental Impact Report (DEIR) from the Humboldt County Planning and Building Department (Lead Agency) for the North McKay Tract Subdivision (Project) pursuant the California Environmental Quality Act (CEQA) and CEQA Guidelines (Public Resources Code § 21000 *et seq* and California Code of Regulations Title 14 § 1500 *et seq*). The proposed Project is in the unincorporated area of Humboldt County, California (Township 5 North, Range 1 West, in the Northwest quarter of Section 36) and is within the United States Geological Survey (USGS) 7.5-minute Eureka topographic quadrangle.

CDFW Role

CDFW is the Trustee Agency for the State's fish and wildlife resources and holds those resources in trust by statute for all the people of the State, pursuant to Fish and Game Code sections 711.7 (a) and 1802; Public Resources Code section 21070; and CEQA Guidelines section 15386 (a). CDFW, in its Trustee capacity, has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants and their habitat. CDFW is also a Responsible Agency pursuant to CEQA. As such, CDFW administers the California Endangered Species Act ([CESA] Fish & G. Code § 2050 *et seq*), the Lake or Streambed Alteration program (Fish & G. Code § 1600 *et seq*) and other provisions of Fish and Game Code that conserve the State's fish and wildlife public trust resources.

CDFW offers the following comments and recommendations on this Project in our role as a Trustee and Responsible Agency pursuant to CEQA. CDFW's primary concerns with this Project are its potential impacts to on-site wetlands and headwater streams, and off-site stormwater runoff affecting the Ryan Creek watershed.

Project Description

The Project consists of the subdivision of seven parcels of land, approximately 81 acres total in size, into 154 mixed-use lots including single-family dwellings, multifamily dwellings, and commercial space. The Project would occur in nine phases over approximately 20 years and includes open space, access roads, parking lots, utilities, landscaping, and stormwater infrastructure. The Project proposes road extensions which will necessitate filling of 35,506 square feet of wetlands and installation of road crossings over two headwaters tributaries to Ryan Creek. The Project proposes to implement a 100-foot buffer from the 30 percent break in slope to reduce impacts to Ryan Creek and its tributaries.

Ryan Creek Biological Resources

Ryan Creek and its tributaries and adjacent wetland areas provide habitat for sensitive aquatic species including the southern torrent salamander (*Rhyacotriton variegatus*), the western pond turtle (*Actinemys marmorata*) and northern red-legged frog (*Rana aurora*), both State Species of Special Concern (SSC).

CDFW designates certain vertebrate species as SSC because declining population levels, limited ranges, and/or continuing threats have made them vulnerable to extinction or extirpation in California. Though not listed pursuant to the federal Endangered Species Act (ESA) or CESA, the goal of designating taxa as SSC is to halt or reverse these species' decline by calling attention to their plight and addressing the issues of conservation concern early enough to help secure their long-term viability. Hence, the ultimate goal of the SSC designation is to avoid CESA or ESA listing.

Ryan Creek is also a fish-bearing stream that supports Coho Salmon (*Oncorhynchus kisutch*) a State and federally-threatened species, coastal cutthroat trout (*O. clarki clarki*), a SSC, and steelhead (*O. mykiss*) a federally-threatened species.

Ryan Creek is within the Eureka Plain Hydrologic Unit (EPHU), and is named as a "*key population to maintain or improve*" in CDFW's 2004 Coho Recovery Strategy (CDFG 2004). According to the Coho Recovery Strategy, impairments in the EPHU include "*high instream sediment levels, stream channel aggradation and widening, lack of stream habitat structure (i.e., deep pools), high water temperatures, and loss of functioning estuary habitat.*" Watershed recommendations for the EPHU include assessment and remediation of sediment inputs, reduction of fine sediment inputs, prevention of point and non-point source pollution, maintaining open space lands, and limiting addition of impervious surfaces in the watershed.

Comments and Recommendations

CDFW offers the comments and recommendations below to assist the Lead Agency in adequately identifying and/or mitigating the Project's significant, or potentially significant, direct and indirect impacts on fish and wildlife (biological) resources.

1. **Impacts to Wetlands**

   The NOP states that the Project will impact approximately 37,000 square feet of wetlands and proposes to mitigate for wetland loss at a 1:1 ratio. CDFW recommends avoidance of wetlands when feasible. A 1:1 wetland mitigation ratio is not typically effective in mitigating for wetland loss due to the significant lag time for created wetland vegetation, soils, and hydrology to develop and provide functional wildlife habitat values.

   The NOP states that compensatory wetlands will be constructed prior to the Project filling wetlands, however, it remains unlikely a 1:1 mitigation ratio will effectively mitigate for wetland loss and meet CDFW's and the State's no-net-loss wetland policies. The DEIR should analyze in detail the Project's impacts to wetlands, how mitigation approaches will meet a no-net-loss standard for these impacts and should prioritize avoidance of wetlands. Mitigation proposals should also include mitigation from impacts of any fill associated with installation of crossings as described in comment #2 below. CDFW does not support the use of constructed mitigation wetlands for stormwater treatment.

2. **Impacts to Headwaters Streams**

   The Project will directly impact two headwaters tributaries of Ryan Creek via installation of stream crossings for access roads. These streams and adjacent wetland areas provide habitat for sensitive aquatic species including the southern torrent salamander and northern red-legged frog, both State SSC. Impacts to the stream/wetland areas should be minimized when designing the crossings. The stream crossings should be designed to provide passage for wildlife and should minimize fill and loss of riparian habitat to the greatest extent feasible. CDFW recommends the Project analyze installation of bridges or arch culverts with natural bottoms to best maintain stream habitat and wildlife crossing capabilities. Stream crossings will require a Lake or Streambed Alteration Agreement (LSAA) with CDFW pursuant to Fish and Game Code section 1602.

3. **Low Impact Development**

   Given the importance of Ryan Creek watershed and surrounding habitats, the Lead Agency should require that no-net-increase in stormwater runoff results from the Project, in addition to the requirements of the State Water Resources

Control Board's 2013 Waste Discharge Requirements for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4s) General Permit. CDFW recommends that the Project use Low Impact Development (LID) strategies such as permeable pavement, vegetated stormwater bio-swales and retention basins to treat, retain and infiltrate stormwater runoff on site. CDFW supports the use of LID strategies because they minimize impacts to aquatic habitats by filtering out pollution, preventing increased peak flows and related erosion, and because they increase ground water recharge and therefore help maintain biologically-important summer low flows.

4. Impacts to Nesting Birds

The Project has the potential to impact nesting birds. CDFW recommends that tree removal and any vegetation clearing associated with the Project be conducted outside of the bird breeding season (generally no work during March 1 – August 15) in order to avoid 'take' as defined and prohibited by Fish and Game Code sections 3503, 3503.5, 3513, and by the Federal Migratory Bird Treaty Act (16 U.S. Code 703 *et seq.*). If trees, other vegetation, or any other nesting bird habitat is proposed to be removed or disturbed within the bird nesting season, CDFW recommends, as a condition of approval for the Project, that the Project proponent consult with CDFW prior to vegetation removal, to assess the potential for take of active nests. CDFW may recommend that the Project proponent hire a qualified biologist to survey the area no more than five days prior to disturbance to determine if any birds are nesting in the area. However, some areas may be too difficult to adequately survey, and disturbance should be avoided in these areas until after the nesting season. CDFW strongly recommends scheduling any ground disturbing work or vegetation or tree removal outside of the nesting season whenever possible. Please note that the March 1 – August 15 work window is not all-inclusive, and it is incumbent upon the Lead Agency and Project proponent to ensure that take of active nests is avoided if nests are encountered during Project work.

5. Impacts to Special Status Plants and Sensitive Natural Communities

Because of the phased implementation of the Project over 20 or more years, additional surveys will be required to ensure impacts to special status plant species and Sensitive Natural Communities (plants with a California Rare Plant Rank of 1 or 2; Natural Communities with a rank of S1-S3) are avoided. Typically, results of surveys for special status plants are only considered to be valid for 3 – 5 years. Thus, if ground disturbance will occur in an area identified as potential habitat for special status plants that has not been surveyed within the prior five years, a new floristic level survey should be conducted using CDFW's 2018 "*Protocols for Surveying and Evaluating Impacts to Special Status Native*

Plant Populations and Natural Communities," or the most current CDFW protocol at the time of survey, and results should be submitted to CDFW for review and concurrence prior to ground disturbing work.

6. Impacts of Night Lighting

Artificial night lighting is an unavoidable consequence of development and has well-documented adverse effects on a wide variety of fish, wildlife, and plants (CDFW 2014). The Project should minimize outdoor lighting to the greatest extent feasible. CDFW recommends the Project's exterior light fixtures and street standards be fully-shielded and designed and installed to minimize off-site glare and photo-pollution.

7. Invasive Species Management

The project site contains several invasive plant species such as Himalayan blackberry (*Rubus armenaicus*), Scotch broom (*Cytisus scoparius*), Spanish heather (*Erica lusitanica*), pampas grass (*Cortaderia selloana*), and cotoneaster (*Cotoneaster* spp.). The Lead Agency should require as a condition of approval of the Project that invasive plants are eradicated and/or controlled for the life of the Project via an Integrated Pest Management Plan (IPM), or similar approach. This plan should also require use of appropriate native plants in Project-provided landscaping. More information on IPM is available here: https://www2.ipm.ucanr.edu/What-is-IPM/. The California Invasive Plant Council has resources that will aid in developing an IPM or similar plan, see https://www.cal-ipc.org.

8. Domestic and Feral Cats

Free-roaming cats in the United States are estimated to kill billions of birds, mammals, amphibians and reptiles each year, including threatened and endangered species. Predation by feral and free-ranging house cats is likely the single greatest source of anthropogenic mortality for birds and mammals in the United States (Loss et al. 2013). Additionally, free roaming cats have been documented to carry and transmit diseases such as rabies, toxoplasmosis, and plague, which may affect native wildlife as well as humans (Gerhold and Jessup 2013). CDFW recommends that as a condition of approval, the Lead Agency require the Project prohibit outdoor domestic housecats as well as prohibiting support of feral cat colonies (e.g., prohibit supplemental feeding and trap-neuter-return programs) on the Project site for the life of the Project.

Environmental Data

CEQA requires that information developed in Environmental Impact Reports and negative declarations be incorporated into a database that may be used to make subsequent or supplemental environmental determinations (Pub. Resources Code § 21003, subd. (e)). Accordingly, please report any special status species and natural communities detected during Project surveys to the California Natural Diversity Database (CNDDB). The online submission and PDF CNNDB field survey forms, as well as information on which species are tracked by the CNDDB, can be found under their corresponding tabs at the following link: https://www.wildlife.ca.gov/Data/CNDDB/Submitting-Data.

Summary of Comments and Recommendations

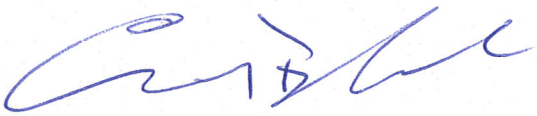
1. The DEIR should include a detailed analysis of Project impacts to all onsite wetlands, prioritizing avoidance of wetlands, and proposing mitigation sufficient to meet a no-net-loss standard when avoidance is not feasible. 1:1 mitigation ratios are typically insufficient to meet this standard.
2. CDFW recommends the Project analyze installation of bridges or arch culverts with natural bottoms to best maintain stream habitat and wildlife crossing capabilities. Stream crossings will require a LSAA with CDFW pursuant to Fish and Game Code section 1602.
3. The Lead Agency should require that no-net-increase in stormwater runoff results from the Project. CDFW supports the use of LID strategies to achieve this goal and to minimize impacts to aquatic habitats.
4. CDFW recommends, as a condition of approval for the Project, that the Project proponent consult with CDFW prior to vegetation removal, to assess the potential for take of active nests if trees, other vegetation, or any other nesting bird habitat is proposed to be removed or disturbed between March 1 and August 15.
5. If ground disturbance will occur in an area identified as potential habitat for special status plants that has not been surveyed within the prior five years, a new floristic level survey should be conducted using the most current CDFW protocol at the time of survey, and results should be submitted to CDFW for review and concurrence prior to ground disturbing work.
6. CDFW recommends the Project's exterior light fixtures and street standards be fully-shielded and designed and installed to minimize off-site glare and photo-pollution.
7. The Lead Agency should require as a condition of approval of the Project that invasive plants are eradicated and/or controlled for the life of the Project via an IPM, or similar approach, and should require use of native plants in Project-provided landscaping.
8. CDFW recommends that as a condition of approval, the Lead Agency require the Project prohibit outdoor domestic housecats as well as prohibiting support of feral

cat colonies (e.g., prohibit supplemental feeding and trap-neuter-return programs) on the Project site for the life of the Project.

Conclusion

CDFW appreciates the opportunity to comment on the NOP to assist the Lead Agency in identifying and mitigating potentially significant impacts of the Project on biological resources. Questions regarding this letter or requests for further coordination should be directed to Jennifer Olson, Environmental Scientist at (707) 445-5387 or jennifer.olson@wildlife.ca.gov.

Sincerely,



Curt Babcock
Habitat Conservation Program Manager

ec: Michael Wheeler
Humboldt County Planning and Building Department
mwheeler@co.humboldt.ca.us

Brendan Thompson, Brandon Stevens
Regional Water Quality Control Board
Brendan.Thompson@waterboards.ca.gov, Brandon.Stevens@Waterboards.ca.gov

Kasey Sirkin
Army Corps of Engineers
L.K.Sirkin@usace.army.mil

State Clearinghouse
state.clearinghouse@opr.ca.gov

Curt Babcock, Gordon Leppig, Dana Mason, Jennifer Olson,
California Department of Fish and Wildlife
Curt.Babcock@wildlife.ca.gov, Gordon.Leppig@wildlife.ca.gov,
Dana.Mason@wildlife.ca.gov, Jennifer.Olson@wildlife.ca.gov

References

California Department of Fish and Game. 2004. Recovery Strategy for California Coho Salmon. Report to the California Fish and Game Commission, Sacramento, CA.

California Department of Fish and Wildlife, Northern Region. 2014. Technical Memorandum: Development, Land Use, and Climate Change Impacts on Wetland and Riparian Habitats

Gerhold, R.W., and D.A. Jessup. "Zoonotic diseases associated with free-roaming cats." Zoonoses and Public Health 60(3): 189-195.

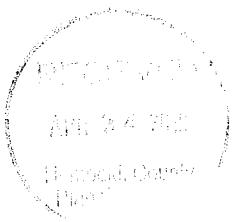
Loss, S.R., Will, T. and P.P. Marra. 2013. The impact of free-ranging domestic cats on wildlife of the United States. Nature communications 4: 1396.

Humboldt Community Services District

Post Office Box 158 Cutten, Ca 95534 (707) 443-4558 Fax (707) 443-0818

Humboldt County
Department of Planning & Building
Mr. Michael Wheeler
3015 H Street
Eureka, Ca 95501

April 22, 2019



Subject: North McKay Ranch Subdivision
Applicant: Kramer Properties

Dear Mr. Wheeler:

The Humboldt Community Services District (HCSD) received the Notice of Preparation of a Draft EIR for the North McKay Tract General Plan Amendment, Zone Reclassification, Final Map Subdivision, and Planned Development Permit. HCSD is in general support of the project and offers the following comments for consideration in preparation of the EIR:

- This project will require an annexation into the HCSD boundary.
- We understand that the County plans to re-refer the project out for agency comment in May 2019. We plan to revise our previous 7/16/2015 referral response letter (attached) based on project changes, updates to fire flow requirements, and updates to HCSD's water, sewer, and/or street lighting systems.
- As mentioned in the Off-site Improvements section of the NOP project description, there are a number of off-site improvements that are subject to approval through this process, including water supply/storage and wastewater connections. There is still ongoing discussion on what off-site improvements will be needed, whether these improvements will be paid for through an impact fee or whether they will be built by the applicant, and what the timing is for those improvements. The EIR will need to determine which off-site improvements are considered reasonably foreseeable and should be analyzed as part of the project.

Thank you for the opportunity to comment on the NOP. If you have any questions or comments please feel free to contact me at (707) 443-1340 ext. 225.

Sincerely,

Mickey Hulstrom, Community Services Manager

HUMBOLDT COUNTY
PLANNING AND BUILDING DEPARTMENT
CURRENT PLANNING DIVISION
3015 H STREET, EUREKA, CA 95501 ~ PHONE (707) 445-7541

RECEIVED
AUG 20 2015
Humboldt County
Planning Division

7/16/2015

PROJECT REFERRAL TO: Humboldt Community Services District

Project Referred To The Following Agencies:
Building Inspection Division, Public Works Land Use Division, Health and Human Services Environmental Health Division, Assessor's Office, Supervising Planner, Current Planning Division, County Counsel, CalFire, California Department of Fish And Wildlife, Northwest Information Center, City of Eureka, Regional Water Quality Control Board, North Coast Unified Air Quality Management District, United States Army Corps of Engineers, Humboldt Community Services District, Humboldt Bay Fire Protection District, Assigned Planner - MEW

Applicant Name Kramer Properties Inc. **Key Parcel Number** 017-032-003-000

Application (APPS#) 9902 **Assigned Planner** Michael Wheeler (707) 268-3730 **Case Number(s)** FMS15-004
ZR15-008
GPA15-005
PDP15-001

Please review the above project and provide comments with any recommended conditions of approval. To help us log your response accurately, please include a copy of this form with your correspondence.

Questions concerning this project may be directed to the assigned planner for this project between 8:30am and 5:30pm Monday through Friday.

County Zoning Ordinance allows up to 15 calendar days for a response. If no response or extension request is received by the response date, processing will proceed as proposed.

☐ If this box is checked, please return large format maps with your response.

Return Response No Later Than 7/31/2015

Planning Commission Clerk
County of Humboldt Planning and Building Department
3015 H Street
Eureka, CA 95501
E-mail: PlanningClerk@co.humboldt.ca.us **Fax:** (707) 268-3792

We have reviewed the above application and recommend the following (please check one):

☐ Recommend Approval. The Department has no comment at this time.

☒ Recommend Conditional Approval. Suggested Conditions Attached.

☐ Applicant needs to submit additional information. List of items attached.

☐ Recommend Denial. Attach reasons for recommended denial.

☐ Other Comments: See attached comments dated 8/17/15

JUL 9 3 2015
HUMBOLDT COMMUNITY

DATE: 8/17/15 PRINT NAME: Mickey Hulstrom, District Planner

Mickey Hulstrom, District Planner

August 17, 2015

HUMBOLDT COMMUNITY SERVICES DISTRICT

Tentative Map Conditions
(Referral dated July 20, 2015)
Kramer Properties Subdivision
Case No.FMS15-004, ZR15-008, GPA15-005, & PDP15-001

APPLICANT: Kramer Properties, Inc
1589 Myrtle Ave, suite B
Eureka, Ca 95501

I. GENERAL:

1. This project will require an annexation into the Humboldt Community Services District boundary.

2. Water and sewer service is available upon subdivision improvements being completed to HCSD satisfaction and payment of applicable fees.

3. Applicant to submit engineered utility plans for district review and approval. All design and construction per District Specifications dated August 1998.

4. Applicant to enter into a Main Extension Agreement with District.

5. Applicant to provide adequate access and utility easements (min. 20' wide) over all District facilities, proposed future or existing.

6. No water or sewer services to be located in a driveway area.

7. Streetlights - Streetlight requirements shall be as determined by the County, Developer, or Design Engineer. Streetlights proposed within the subdivision will be considered "private" streetlights and an application by the owner(s) must be filed to create a street lighting zone. Upon approval of the street light zone, a service fee would

then be charged to all utility customers located on the same street within 150 feet of the "private" streetlight.

8. All proposed landscaping shall be private. To be owned and maintained by others. Any proposed trees (or large shrubs)in the landscape strip shall be 10' clear from the proposed water and sewer services. Landscape water systems require an adequate water backflow prevention device.

II. WATER:

1. A water storage and supply study, based on District and Department of Health Services criteria, shall be prepared at Applicant's expense. The report shall determine the project's need to construct additional water storage and pumping facilities based on existing demand, proposed project demand and fire protection requirements for the proposed 320 unit subdivision. Applicant may have to cost share on a new water tank or other offsite improvements to support the needed domestic as well as fire protection needs of this large subdivision.

2. All fire hydrant locations shall be as approved by the Fire Department and HCSD.

III. SEWER:

1. An appropriately sized sewage lift station for the subdivision will be required. The lift station improvements shall include gravity and pressure sewer mains, power, telemetry, pump controls, alarm, and emergency generator. This sewage lift station upon completion will be publicly owned and maintained and will discharge to the new Martin Slough Interceptor.

2. Applicant shall construct an adequately sized pressure sewer transmission main from applicant's sewage lift station to a point of connection @ the intersection of Walnut and Hemlock.

3. Applicant shall designate and submit calculations and pump curves for privately owned and maintained sewage lift pumps for each lot requiring a sewage lift pump.

4. Offsite sewer improvements are needed to allow this project

to connect to the District's sewer collection system. District will be preparing a plan with the City of Eureka and scheduling the needed improvements. At this juncture it is unknown when these improvements will be completed.

5. Applicant's proceeding with the project expressly assumes the risk of the possibility in the future that City, State or Federal regulatory agencies, or other potential legal proceedings by third parties may enjoin, prevent, or delay providing additional flows to the Wastewater Treatment Plant or Collection System.

HUMBOLDT
Local Agency Formation Commission
1125 16th Street, Suite 202, Arcata, CA 95521
(707) 445-7508 / (707) 825-9181 fax
www.humboldtlafco.org

May 8, 2019

Michael Wheeler, Senior Planner
Humboldt County Department of Planning and Building
3015 H Street
Eureka CA 95501

Subject: LAFCo Scoping Comments for N McKay Tract GPA, ZR, Subdivision, PD Permit EIR

Michael Wheeler,

The North McKay Tract Subdivision proposal includes annexation into the Humboldt Community Services District (CSD) for water and wastewater services and will be within Humboldt Bay Fire's (HBF) service boundary for fire protection services. Humboldt LAFCo will be processing the annexation application subsequent to County action and reviewing the CSD's and HBF's ability to adequately serve the project. As such, Humboldt LAFCo serves as a responsible agency as defined by the California Environmental Quality Act (CEQA), and will rely on the environmental document prepared by the Humboldt County Department of Planning and Building, as lead agency, to support its decision on the proposed annexation and service capabilities analysis.

LAFCo staff has the following comments:

1. Rezoning. The proposal is for zoning R-4/P, GO and C-1/P, GO in addition to R-1/P, R, GO. Please describe the impacts the change in zoning from R-1/P, R, GO to the planned higher density development could have on local services.
2. Utility Connections. The EIR should evaluate the funding mechanism for new service connections and impact those connections will have on the Humboldt CSDs ability to provide adequate water supply/storage and wastewater services to the project.
3. Emergency Response Services. Please provide a discussion of the impact this project will have on Humboldt Bay Fire's emergency response services.
4. Open-Space Land Conversion. The EIR should evaluate the potential conversion of planned open-space lands in relation to the policies and priorities identified in Government Code Section 56377 which states that development should be guided away from existing open-space use.

Again, thank you for the opportunity to comment on this project. Please contact staff at 445-7508 if you have questions regarding this letter.

Sincerely,

George Williamson, AICP
LAFCo Senior Advisor

NATIVE AMERICAN HERITAGE COMMISSION
Cultural and Environmental Department
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691 Phone (916) 373-3710
Email: nahc@nahc.ca.gov
Website: http://www.nahc.ca.gov
Twitter: @CA_NAHC

RECEIVED
APR 18 2019
Humboldt County
Planning Dept.

April 16, 2019

Michael Wheeler
Humboldt County
3015 H St
Eureka, CA 95501-4484

RE: SCH# 2019049034 North McKay Ranch Subdivision, General Plan Amendment (GPA-15-005), Zoning Ordinance Amendment (ZR-15-008), Major Subdivision (FMS-15-004), Planned Development, Humboldt County

Dear Mr. Wheeler:

The Native American Heritage Commission (NAHC) has received the Notice of Preparation (NOP), Draft Environmental Impact Report (DEIR) or Early Consultation for the project referenced above. The California Environmental Quality Act (CEQA) (Pub. Resources Code §21000 et seq.), specifically Public Resources Code §21084.1, states that a project that may cause a substantial adverse change in the significance of a historical resource, is a project that may have a significant effect on the environment. (Pub. Resources Code § 21084.1; Cal. Code Regs., tit.14, §15064.5 (b) (CEQA Guidelines §15064.5 (b)). If there is substantial evidence, in light of the whole record before a lead agency, that a project may have a significant effect on the environment, an Environmental Impact Report (EIR) shall be prepared. (Pub. Resources Code §21080 (d); Cal. Code Regs., tit. 14, § 5064 subd.(a)(1) (CEQA Guidelines §15064 (a)(1)). In order to determine whether a project will cause a substantial adverse change in the significance of a historical resource, a lead agency will need to determine whether there are historical resources within the area of potential effect (APE).

CEQA was amended significantly in 2014. Assembly Bill 52 (Gatto, Chapter 532, Statutes of 2014) (AB 52) amended CEQA to create a separate category of cultural resources, "tribal cultural resources" (Pub. Resources Code §21074) and provides that a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment. (Pub. Resources Code §21084.2). Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource. (Pub. Resources Code §21084.3 (a)). **AB 52 applies to any project for which a notice of preparation, a notice of negative declaration, or a mitigated negative declaration is filed on or after July 1, 2015.** If your project involves the adoption of or amendment to a general plan or a specific plan, or the designation or proposed designation of open space, on or after March 1, 2005, it may also be subject to Senate Bill 18 (Burton, Chapter 905, Statutes of 2004) (SB 18). **Both SB 18 and AB 52 have tribal consultation requirements**. If your project is also subject to the federal National Environmental Policy Act (42 U.S.C. § 4321 et seq.) (NEPA), the tribal consultation requirements of Section 106 of the National Historic Preservation Act of 1966 (154 U.S.C. 300101, 36 C.F.R. §800 et seq.) may also apply.

The NAHC recommends consultation with California Native American tribes that are traditionally and culturally affiliated with the geographic area of your proposed project as early as possible in order to avoid inadvertent discoveries of Native American human remains and best protect tribal cultural resources. Below is a brief summary of portions of AB 52 and SB 18 as well as the NAHC's recommendations for conducting cultural resources assessments.

Consult your legal counsel about compliance with AB 52 and SB 18 as well as compliance with any other applicable laws.

AB 52

AB 52 has added to CEQA the additional requirements listed below, along with many other requirements:

1. Fourteen Day Period to Provide Notice of Completion of an Application/Decision to Undertake a Project: Within fourteen (14) days of determining that an application for a project is complete or of a decision by a public agency to undertake a project, a lead agency shall provide formal notification to a designated contact of, or tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice, to be accomplished by at least one written notice that includes:
   a. A brief description of the project.
   b. The lead agency contact information.
   c. Notification that the California Native American tribe has 30 days to request consultation. (Pub. Resources Code §21080.3.1 (d)).
   d. A "California Native American tribe" is defined as a Native American tribe located in California that is on the contact list maintained by the NAHC for the purposes of Chapter 905 of Statutes of 2004 (SB 18). (Pub. Resources Code §21073).

2. Begin Consultation Within 30 Days of Receiving a Tribe's Request for Consultation and Before Releasing a Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report: A lead agency shall begin the consultation process within 30 days of receiving a request for consultation from a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project. (Pub. Resources Code §21080.3.1, subds. (d) and (e)) and prior to the release of a negative declaration, mitigated negative declaration or Environmental Impact Report. (Pub. Resources Code §21080.3.1(b)).
   a. For purposes of AB 52, "consultation shall have the same meaning as provided in Gov. Code §65352.4 (SB 18). (Pub. Resources Code §21080.3.1 (b)).

3. Mandatory Topics of Consultation If Requested by a Tribe: The following topics of consultation, if a tribe requests to discuss them, are mandatory topics of consultation:
   a. Alternatives to the project.
   b. Recommended mitigation measures.
   c. Significant effects. (Pub. Resources Code §21080.3.2 (a)).

4. Discretionary Topics of Consultation: The following topics are discretionary topics of consultation:
   a. Type of environmental review necessary.
   b. Significance of the tribal cultural resources.
   c. Significance of the project's impacts on tribal cultural resources.
   d. If necessary, project alternatives or appropriate measures for preservation or mitigation that the tribe may recommend to the lead agency. (Pub. Resources Code §21080.3.2 (a)).

5. Confidentiality of Information Submitted by a Tribe During the Environmental Review Process: With some exceptions, any information, including but not limited to, the location, description, and use of tribal cultural resources submitted by a California Native American tribe during the environmental review process shall not be included in the environmental document or otherwise disclosed by the lead agency or any other public agency to the public, consistent with Government Code §6254 (r) and §6254.10. Any information submitted by a California Native American tribe during the consultation or environmental review process shall be published in a confidential appendix to the environmental document unless the tribe that provided the information consents, in writing, to the disclosure of some or all of the information to the public. (Pub. Resources Code §21082.3 (c)(1)).

6. Discussion of Impacts to Tribal Cultural Resources in the Environmental Document: If a project may have a significant impact on a tribal cultural resource, the lead agency's environmental document shall discuss both of the following:
   a. Whether the proposed project has a significant impact on an identified tribal cultural resource.
   b. Whether feasible alternatives or mitigation measures, including those measures that may be agreed to pursuant to Public Resources Code §21082.3, subdivision (a), avoid or substantially lessen the impact on the identified tribal cultural resource. (Pub. Resources Code §21082.3 (b)).

7. Conclusion of Consultation: Consultation with a tribe shall be considered concluded when either of the following occurs:
    a. The parties agree to measures to mitigate or avoid a significant effect, if a significant effect exists, on a tribal cultural resource; or
    b. A party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached. (Pub. Resources Code §21080.3.2 (b)).

8. Recommending Mitigation Measures Agreed Upon in Consultation in the Environmental Document: Any mitigation measures agreed upon in the consultation conducted pursuant to Public Resources Code §21080.3.2 shall be recommended for inclusion in the environmental document and in an adopted mitigation monitoring and reporting program, if determined to avoid or lessen the impact pursuant to Public Resources Code §21082.3, subdivision (b), paragraph 2, and shall be fully enforceable. (Pub. Resources Code §21082.3 (a)).

9. Required Consideration of Feasible Mitigation: If mitigation measures recommended by the staff of the lead agency as a result of the consultation process are not included in the environmental document or if there are no agreed upon mitigation measures at the conclusion of consultation, or if consultation does not occur, and if substantial evidence demonstrates that a project will cause a significant effect to a tribal cultural resource, the lead agency shall consider feasible mitigation pursuant to Public Resources Code §21084.3 (b). (Pub. Resources Code §21082.3 (e)).

10. Examples of Mitigation Measures That, If Feasible, May Be Considered to Avoid or Minimize Significant Adverse Impacts to Tribal Cultural Resources:
    a. Avoidance and preservation of the resources in place, including, but not limited to:
        i. Planning and construction to avoid the resources and protect the cultural and natural context.
        ii. Planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.
    b. Treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:
        i. Protecting the cultural character and integrity of the resource.
        ii. Protecting the traditional use of the resource.
        iii. Protecting the confidentiality of the resource.
    c. Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places.
    d. Protecting the resource. (Pub. Resource Code §21084.3 (b)).
    e. Please note that a federally recognized California Native American tribe or a non-federally recognized California Native American tribe that is on the contact list maintained by the NAHC to protect a California prehistoric, archaeological, cultural, spiritual, or ceremonial place may acquire and hold conservation easements if the conservation easement is voluntarily conveyed. (Civ. Code §815.3 (c)).
    f. Please note that it is the policy of the state that Native American remains and associated grave artifacts shall be repatriated. (Pub. Resources Code §5097.991).

11. Prerequisites for Certifying an Environmental Impact Report or Adopting a Mitigated Negative Declaration or Negative Declaration with a Significant Impact on an Identified Tribal Cultural Resource: An Environmental Impact Report may not be certified, nor may a mitigated negative declaration or a negative declaration be adopted unless one of the following occurs:
    a. The consultation process between the tribes and the lead agency has occurred as provided in Public Resources Code §21080.3.1 and §21080.3.2 and concluded pursuant to Public Resources Code §21080.3.2.
    b. The tribe that requested consultation failed to provide comments to the lead agency or otherwise failed to engage in the consultation process.
    c. The lead agency provided notice of the project to the tribe in compliance with Public Resources Code §21080.3.1 (d) and the tribe failed to request consultation within 30 days. (Pub. Resources Code §21082.3 (d)).

The NAHC's PowerPoint presentation titled, "Tribal Consultation Under AB 52: Requirements and Best Practices" may be found online at: http://nahc.ca.gov/wp-content/uploads/2015/10/AB52TribalConsultation_CalEPAPDF.pdf

SB 18

SB 18 applies to local governments and requires local governments to contact, provide notice to, refer plans to, and consult with tribes prior to the adoption or amendment of a general plan or a specific plan, or the designation of open space. (Gov. Code §65352.3). Local governments should consult the Governor's Office of Planning and Research's "Tribal Consultation Guidelines," which can be found online at: https://www.opr.ca.gov/docs/09_14_05_Updated_Guidelines_922.pdf

Some of SB 18's provisions include:

1. Tribal Consultation: If a local government considers a proposal to adopt or amend a general plan or a specific plan, or to designate open space it is required to contact the appropriate tribes identified by the NAHC by requesting a "Tribal Consultation List." If a tribe, once contacted, requests consultation the local government must consult with the tribe on the plan proposal. **A tribe has 90 days from the date of receipt of notification to request consultation unless a shorter timeframe has been agreed to by the tribe.** (Gov. Code §65352.3 (a)(2)).
2. No Statutory Time Limit on SB 18 Tribal Consultation. There is no statutory time limit on SB 18 tribal consultation.
3. Confidentiality: Consistent with the guidelines developed and adopted by the Office of Planning and Research pursuant to Gov. Code §65040.2, the city or county shall protect the confidentiality of the information concerning the specific identity, location, character, and use of places, features and objects described in Public Resources Code §5097.9 and §5097.993 that are within the city's or county's jurisdiction. (Gov. Code §65352.3 (b)).
4. Conclusion of SB 18 Tribal Consultation: Consultation should be concluded at the point in which:
    a. The parties to the consultation come to a mutual agreement concerning the appropriate measures for preservation or mitigation; or
    b. Either the local government or the tribe, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached concerning the appropriate measures of preservation or mitigation. (Tribal Consultation Guidelines, Governor's Office of Planning and Research (2005) at p. 18).

Agencies should be aware that neither AB 52 nor SB 18 precludes agencies from initiating tribal consultation with tribes that are traditionally and culturally affiliated with their jurisdictions before the timeframes provided in AB 52 and SB 18. For that reason, we urge you to continue to request Native American Tribal Contact Lists and "Sacred Lands File" searches from the NAHC. The request forms can be found online at: http://nahc.ca.gov/resources/forms/

NAHC Recommendations for Cultural Resources Assessments

To adequately assess the existence and significance of tribal cultural resources and plan for avoidance, preservation in place, or barring both, mitigation of project-related impacts to tribal cultural resources, the NAHC recommends the following actions:

1. Contact the appropriate regional California Historical Research Information System (CHRIS) Center (http://ohp.parks.ca.gov/?page_id=1068) for an archaeological records search. The records search will determine:
    a. If part or all of the APE has been previously surveyed for cultural resources.
    b. If any known cultural resources have already been recorded on or adjacent to the APE.
    c. If the probability is low, moderate, or high that cultural resources are located in the APE.
    d. If a survey is required to determine whether previously unrecorded cultural resources are present.

2. If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
    a. The final report containing site forms, site significance, and mitigation measures should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum and not be made available for public disclosure.
    b. The final written report should be submitted within 3 months after work has been completed to the appropriate regional CHRIS center.

3. Contact the NAHC for:
    a. A Sacred Lands File search. Remember that tribes do not always record their sacred sites in the Sacred Lands File, nor are they required to do so. A Sacred Lands File search is not a substitute for consultation with tribes that are traditionally and culturally affiliated with the geographic area of the project's APE.
    b. A Native American Tribal Consultation List of appropriate tribes for consultation concerning the project site and to assist in planning for avoidance, preservation in place, or, failing both, mitigation measures.

4. Remember that the lack of surface evidence of archaeological resources (including tribal cultural resources) does not preclude their subsurface existence.
    a. Lead agencies should include in their mitigation and monitoring reporting program plan provisions for the identification and evaluation of inadvertently discovered archaeological resources per Cal. Code Regs., tit. 14, §15064.5(f) (CEQA Guidelines §15064.5(f)). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American with knowledge of cultural resources should monitor all ground-disturbing activities.
    b. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the disposition of recovered cultural items that are not burial associated in consultation with culturally affiliated Native Americans.
    c. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the treatment and disposition of inadvertently discovered Native American human remains. Health and Safety Code §7050.5, Public Resources Code §5097.98, and Cal. Code Regs., tit. 14, §15064.5, subdivisions (d) and (e) (CEQA Guidelines §15064.5, subds. (d) and (e)) address the processes to be followed in the event of an inadvertent discovery of any Native American human remains and associated grave goods in a location other than a dedicated cemetery.

If you have any questions or need additional information, please contact me at my email address: Gayle.Totton@nahc.ca.gov.

Sincerely,

for

Gayle Totton
Associate Governmental Program Analyst

cc: State Clearinghouse

Garg, Tina

From: Wheeler, Michael <MWheeler@co.humboldt.ca.us>
Sent: Wednesday, May 29, 2019 3:51 PM
To: Garg, Tina; Chris Mikkelsen
Subject: FW: North McKay Tract

fyi

-----Original Message-----
From: Sirkin, L K CIV USARMY CESPN (USA) <L.K.Sirkin@usace.army.mil>
Sent: Wednesday, May 29, 2019 8:43 AM
To: Wheeler, Michael <MWheeler@co.humboldt.ca.us>
Subject: North McKay Tract

Good morning Mr. Wheeler,

Thank you for the opportunity to comment on the Draft Environmental Impact Report for the North McKay Tract General Plan Amendment and Zone Reclassification. While the proposed amendment and zoning changes do not involve activities that are regulated by the Corps, the ensuing proposed project does include a significant quantity of wetland fill, which is regulated by the Corps and would require a Section 404 Clean Water Act permit. Therefore, the Corps is requesting that the County inform the applicant regarding this permit requirement and have the applicant contact us at their earliest convenience to begin conversations regarding wetland mitigation and project impacts. Given the significant size of the development the Corps is very concerned in the quantity of wetland fill that would be permanently placed and will need to begin discussions with the applicant sooner than later. Thank you for your assistance with the request.

L. Kasey Sirkin
US Army Corps of Engineers - San Francisco District Lead Biologist - Eureka Field Office
601 Startare Drive, #14
Eureka, CA 95501
707-443-0855

Garg, Tina

From: Wheeler, Michael <MWheeler@co.humboldt.ca.us>
Sent: Monday, May 20, 2019 7:52 AM
To: Garg, Tina; Macenski, Trevor
Cc: Chris Mikkelsen
Subject: FW: Regional Board CEQA Comments: DEIR Notice of Preparation for North McKay Tract Project; SCH No. 2019049166
Attachments: NOPofDEIR_McKayTract.pdf

fyi

From: Thompson, Brendan@Waterboards <Brendan.Thompson@waterboards.ca.gov>
Sent: Friday, May 17, 2019 9:30 AM
To: Wheeler, Michael <MWheeler@co.humboldt.ca.us>
Cc: Olson, Jennifer@Wildlife <Jennifer.Olson@wildlife.ca.gov>; Moore, Heaven@Waterboards <Heaven.Moore@Waterboards.ca.gov>; Bargsten, Stephen@Waterboards <Stephen.Bargsten@waterboards.ca.gov>; Stevens, Brandon D.@Waterboards <Brandon.Stevens@Waterboards.ca.gov>; Warmerdam, Jonathan@Waterboards <Jonathan.Warmerdam@waterboards.ca.gov>; Mangelsdorf, Alydda@Waterboards <Alydda.Mangelsdorf@waterboards.ca.gov>; Reed, Charles@Waterboards <Charles.Reed@waterboards.ca.gov>; 'State Clearinghouse' <state.clearinghouse@opr.ca.gov>; 'Sirkin, L K SPN' <L.K.Sirkin@usace.army.mil>; Leppig, Gordon@Wildlife <Gordon.Leppig@wildlife.ca.gov>
Subject: Regional Board CEQA Comments: DEIR Notice of Preparation for North McKay Tract Project; SCH No. 2019049166

Dear Mr. Wheeler,

Thank you for providing North Coast Regional Water Quality Control Board (Regional Water Board) staff the opportunity to comment on the attached County of Humboldt's *Notice of Preparation of a Draft Environmental Impact Report for the North McKay Tract General Plan Amendment, Zone Reclassification, Final Map Subdivision and Planned Development Permit* (hereinafter "NOP"). The NOP notes that comments must be submitted not later than 30 days after receipt of the NOP. The North Coast Regional Water Quality Control Board (Regional Water Board) received the NOP on April 19, 2019 (see attached), and hereby submit the following comments within the required 30-day timeframe.

Project Description

The NOP describes a proposal by Kramer Properties, Inc., to subdivide seven currently undeveloped parcels totaling approximately 81 acres into 154 mixed-use lots to allow construction of 320 residential units, approximately 22,000 square feet of commercial space, and associated supporting infrastructure (Project). The NOP estimates the Project would be constructed in nine phases over an approximately 20-year period. The Project location is near the City of Eureka and shown on page 9 of 15 in the attached NOP.

Storm Water Control

The proposed Project area is within a currently undeveloped and well-forested area of the Ryan Creek watershed. Ryan Creek provides habitat for sensitive aquatic species, including:

- Coho salmon (*Oncorhynchus kisutch*), both a state- and federally-threatened species;
- Steelhead (*O. mykiss*), a federally-threatened species;

- Coastal cutthroat trout (*O. clarki clarki*), a state species of special concern;
- Southern torrent salamander (*Rhyacotriton variegatus*);
- Western pond turtle (*Actinemys marmorata*), a state species of special concern; and
- Northern red-legged frog (*Rana aurora*), a state species of special concern.

The proposed Project would change the land use of an approximately 81-acre contiguous area from primarily forested to primarily residential and commercial. Vegetated landscapes protect downstream receiving waters by filtering storm water pollutants, metering storm water flows, and regulating stream temperatures. Un-controlled storm water from residential and commercial areas will transport pollutants to receiving waters, including metals, sediment, nutrients, pesticides, petroleum, oxygen-demanding substances, and trash. Additionally, added impervious area may result in an increased volume and rate of storm water discharge that may erode creek beds and banks and damage aquatic habitat. For these reasons, this proposed Project presents a significant potential risk to the aquatic species and other beneficial uses of Ryan Creek. The following comments are intended to inform the County's DEIR preparation so that it may demonstrate avoidance of these storm water-related impacts.

The County of Humboldt is a permittee under State Water Resources Control Board Water Quality Order No. 2013-0001-DWQ, Waste Discharge Requirements for Storm Water Discharges From Small Municipal Separate Storm Sewer Systems (MS4) (Storm Water Permit). Storm Water Permit section E.12, which begins on permit page 48, includes post-construction storm water management program requirements to control pollutants from new and redeveloped projects within the County's MS4 jurisdiction. Because the Project would create and/or replace more than 5,000 square feet of impervious surface, this Project is required by the Storm Water Permit to implement measures to control the quality and volume of storm water runoff from the Project site. Specific Storm Water Permit requirements that the County must consider when evaluating the Project application include, but are not limited to:

- *Source Control and Site Design Measures*, Storm Water Permit sections E.12.d and E.12.e.ii.a, pages 51-53

  At the earliest planning stages, the Project must assess and evaluate how site conditions such as soils, vegetation, and flow paths may inform Project layout to meet the goals of capturing and treating runoff. Assessment and evaluation methods applicable to this Project include, but are not limited to the following:

  - Define the development envelope and protected areas, identifying areas that are most suitable for development and areas to be left undisturbed;
  - Set back development from creeks, wetlands, and riparian habitats;
  - Replicate the site's natural drainage patterns;
  - Conform the site layout along natural landforms;
  - Avoid excessive grading and disturbance of vegetation and soils; and
  - Detain and retain runoff throughout the site.

- *Storm Water Treatment Measures and Baseline Hydromodification Management Measures*, Storm Water Permit section E.12.e.ii.f, page 54

  After implementing source control and site design measures to the maximum extent feasible, the Project must be designed to route remaining storm water runoff from each discrete drainage catchment to one or more facilities that will infiltrate, evapotranspire, and/or bioretain the amount of runoff specified in Storm Water Permit section E.12.e.ii.c, page 53 (also refer to Humboldt County LID Manual). If an infiltration facility is used to meet these requirements, then the facility must incorporate a vegetated storm water treatment component to ensure storm water is treated to the maximum extent practicable.

Storm Water Permit requirements must be considered at the earliest stages of project development to ensure their compatibility and feasibility with the proposed project scope and design. Because DEIRs are required to show how any given project will avoid environmental impacts**, the Project DEIR must describe the specific source control, design, and treatment measures that will be used to comply with the Storm Water Permit and avoid impacts to Ryan Creek and its beneficial uses**.

Should the Project necessitate structural storm water controls to avoid and mitigate for storm water impacts, then the DEIR must discuss the siting of these measures and avoidance of wetland and riparian areas. For instance, if a structural control is proposed to control storm water from a large upgradient area of the Project, and that control would necessitate permanent impacts to wetlands or riparian areas, then alternatives to incorporate smaller-scale storm water control features into the project design (e.g., roadside or individual lot bioretention) must be shown first to be infeasible.

We are pleased that the NOP acknowledges that the County is beholden to Storm Water Permit requirements and that Low Impact Development will be proposed adjacent the Project roadways (i.e. bioswales). We look forward to reviewing more detailed storm water management Project plans in the DEIR.

Wetland and Waters Impacts

The NOP estimates that approximately 0.84 acres of wetlands would be permanently impacted by the Project. The NOP also notes that two headwater streams may be culverted during construction of Project roadways.

Waters of the U.S., State, and Permitting Requirements

The NOP does not discriminate between impacts to state and federal waters. **The DEIR should inventory proposed water impacts for both waters of the U.S. and waters of the state**. The Regional Water Board's Water Quality Control Plan for the North Coast Basin (Basin Plan) and the California Water Code define waters of the state as "any surface water or groundwater, including saline waters, within the boundaries of the state (Water Code §13050 (e)." This definition is broader than that of "waters of the United States" and should be acknowledged and considered when delineating impacts.

If the Project is found to impact waters of the U.S., then a permit from the U.S. Army Corps of Engineers will be required pursuant to section 404 of the Clean Water Act. Additionally, California Water Code Waste Discharge Requirements and a Clean Water Act section 401 water quality certification would also be required from the Regional Water Board (both of these permitting actions would be rolled-in to one 401 certification permit). In the unlikely scenario that the proposed Project only impacts waters of the state, then only Waste Discharge Requirements from the Regional Water Board would be required for impacts to waters of the state.

Avoidance, Minimization, and Mitigation of Impacts to State Waters

The NOP notes that the approximately 0.84 acres of wetlands would be permanently impacted as result of Project implementation. As noted above, the Project will require a permit from the Regional Water Board for permanent impacts to state waters. Before a water quality certification or waste discharge requirements may be issued, the Project proponent will need to demonstrate that the Project was designed to avoid wetland impacts to the maximum extent feasible. Once the Project proponent has demonstrated avoidance, then they must demonstrate that impacts have been minimized to the maximum extent feasible. Only after avoidance and minimization opportunities have been exhausted will the Regional Water Board consider mitigation opportunities for wetland impacts. **The DEIR should**

discuss in detail how the Project has been designed to avoid and minimize impacts to wetlands to the maximum extent feasible.

The NOP notes that 0.84 acres of wetlands would be created as mitigation for the 0.84 acres od permanent wetland impacts (i.e., "1:1 mitigation"). The Regional Water Board only accepts 1:1 mitigation for wetland impacts when the compensatory mitigation is provided at a mitigation bank, where wetlands have been certified as fully functional by a multi-agency mitigation bank review team. Unless the Project proponent is able to identify an approved mitigation bank with the Project location within the bank's service area (we are not aware of any as of this letter date), the Project proponent will need to provide a minimum 2:1 mitigation ratio for permanent wetland impacts, regardless of the impacted wetland's condition, in order to obtain a permit from the Regional Water Board. The minimum 2:1 ratio is required due to the uncertain success inherent in wetland creation and the temporal loss of wetland beneficial uses between the time a project wetland is impacted and the compensatory mitigation is deemed successful. **Update the DEIR to reflect the minimum mitigation ratio required by the Regional Water Board.**

The NOP also notes that crossings over two headwater streams would be provided using either a bridge or bottomless culvert. Proposed impacts to the two headwater streams do not appear to be included in the total 0.84 impact total and mitigation proposal. **If a crossing is placed within these streams, mitigation will be required and should be reflected in the DEIR.** Also, installation of clear span bridges at these locations would be the least damaging practicable crossing alternative at these locations and would require significantly less mitigation than the culvert alternative. **The DEIR should identify clear span bridges as the least damaging practicable crossing alternative and explain any decision to incorporate a more-impacting crossing into the Project design.**

Thanks again for considering our comments. Feel free to contact Regional Water Board staff if there are any questions.

Brendan Thompson
Environmental Scientist
North Coast Regional Water Quality Control Board
5550 Skylane Blvd. Ste. A
Santa Rosa, CA 95403-1072
(707) 407-0036

CPMSM #00000421, *QSP* #26942, *CISEC* #2232

N. McKay Tract NOP Scoping Comments from Public

- Sign-In Sheet from the June 13, 2019 Scoping meeting in Cutten.
- Scoping Issues raised at the June 13, 2019 Scoping meeting in Cutten.
- Written scoping comments from the public submitted in response to the Notice of Preparation.

Sign-In Sheet

Please sign in and provide your name and mailing address, and affiliation, if any. Thanks.

Name	Address	Affiliation
Lorraine Dillon	2480 Redwood St.	Neighbor
Rob Waltenhauer	[redacted]	H.C.O.E.
Steve Werner	3015 H Street	County Planning
MIKE FARNSWORTH	3975 HARRISON	
PERRY BRESSMAN	4029 WALNUT DR	NEIGHBOR
Nancy Walsh	3603 California	Homeowner on Cedar + Arbutus
Robin Gorter	4073 Cedar St. #2	Neighbor
Katherine Betts	Layman Lane	
Jean Harvey	4170 Bernerhaus	neighbor
ROBIN GOODWIN	〃	〃
Shirley + Peter Santino	2129 Hodgson St	owner

Sign-In Sheet

Please sign in and provide your name and mailing address, and affiliation, if any. Thanks.

Name	Address	Affiliation
Michele + David Jolyn	4007 Cedar	neighbor
Solomon Everta	3986 Cedar St.	neighbor
Bill + Colleen Hale	3683 Dolbeer St	"
Shawna Morales	6850 Eggert Rd	neighbor
Autumn Morales	6850 Eggert Rd.	neighbor
Wendy Robertson	2052 Bigham Ct	"
Holly Sage		Neighbor
Paul Schneeklath	P.O. Box 4904 Eureka	Neighbor.
Melinda Walsh	% in ownership in 4013 Cedar St/ Etc. Arbuckle	Neighboring Property Owner

Scoping Issues raised at the June 13, 2019 Scoping meeting in Cutten

- Concern about low-income housing in the Cutten neighborhood possibly increasing crime and drug use.
- Traffic on Walnut.
- Parking on Fern Street during large events.
- Traffic a Hemlock and Dolbeer.
- Access to the McKay Community Forest
- Proximity of the development to Ryan Creek and potential impacts to natural resources there.
- Increase draw on public services.
- Impact of high-density housing adjacent to Winship School.
- Need for stand of trees to be preserved to protect the viewshed.

Written scoping comments from the public submitted in response to the Notice of Preparation

- Solomon Everta
- Bill Hole
- Katherine Bettis
- Mary Hurley
- Melinda Walsh
- Rebecca Eldredge
- Teddee Boylan
- Wayne A Palmrose
- Rebecca Avila
- Earthjustice
- Alicia Sidebottom

Solomon Everta
P.O. Box 502
Cutten, CA 95534

Humboldt County Department of Planning and Building
3015 H St.
Eureka, CA 95501

June 13, 2019

Humboldt County Department of Planning and Building Staff,

I live a couple of blocks away from the site of the proposal known as the North McKay Ranch Subdivision and have a close connection to the area. My kids attend local public schools (one is still here at Cutten Elementary) and have played sports many years at Redwood Fields.

My concerns regarding this project are not that it is development per se, but that it is the wrong type of development for the location proposed. As the County recently acquired the neighboring property of the McKay Community Forest, this location provides a unique opportunity to create a healthy wildland urban interface which serves the interests of our entire community while showcasing the environmentally aware mindset which characterizes Humboldt.

The five major concerns which I suggest be addressed by the EIR are access to the McKay Community Forest, proximity to the Ryan Creek watershed and the plants and animals which call it home, traffic, the draw on services in the community including water, sewer, police, and fire departments, and expanding the idea of stakeholders in this planning process.

While the community has benefited from the privately held Redwood Fields complex, upon review of the planning process when that project was completed and the ultimate impact upon the community, we can see that we could have done better. Parking and traffic are challenging and obviously, not enough was done to plan that project ideally in this regard. Additionally, as a privately held property, the ball fields are only available to those who are part of a paying client rather than the community as a whole. This is, of course, all within the legal realities of the landowners. All I am suggesting is that when we plan, we can do better.

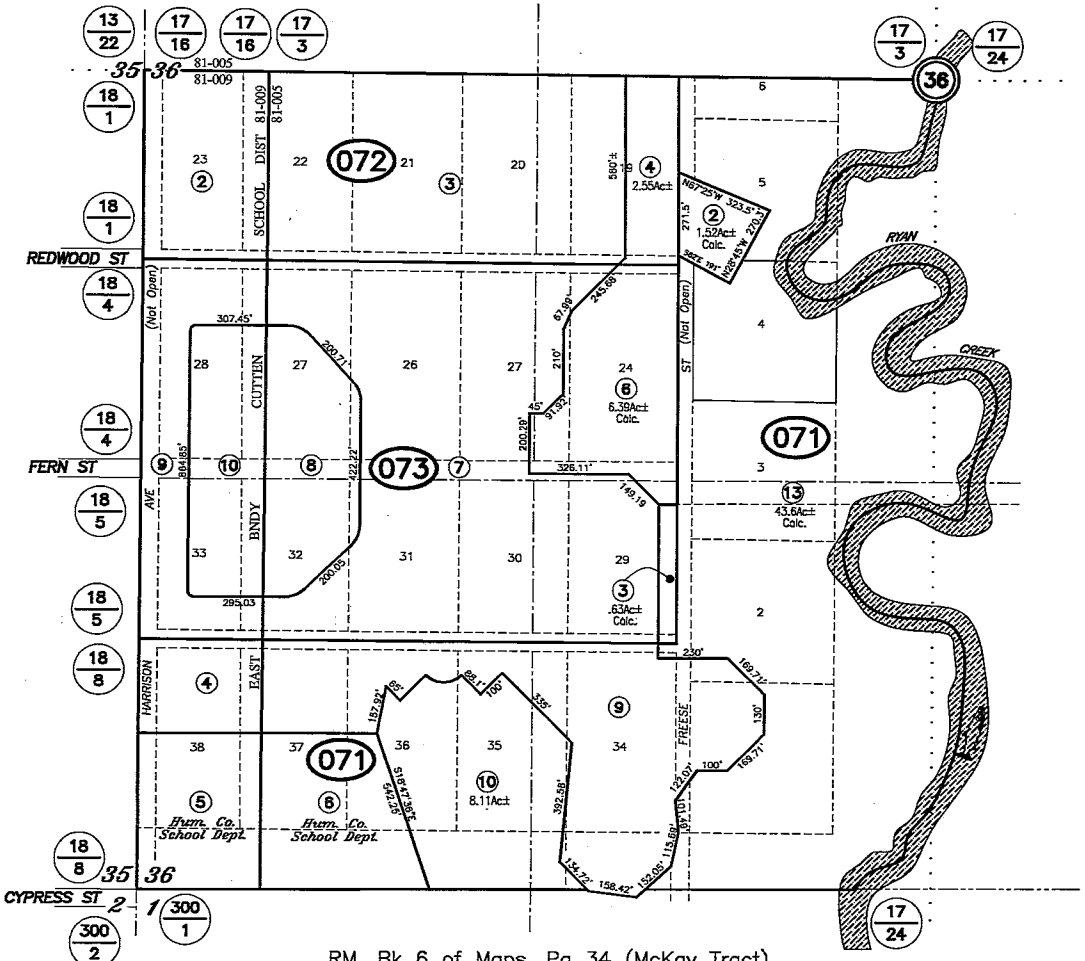
I request that local public employees expand their idea of what is possible, without being confined by the dominant view of how we plan for development. We now have a better understanding of how the natural world works and understand that we must think more holistically when looking at how we grow in the future. This project is a great chance to say, "No, this is not what is best for our community. Let's make something that will serve all of the community (including the natural community we live with) rather continue to enhance the ability of the few to continue their accumulation and enclosure of wealth and power. We can do better."

Assessor's Map Bk. 17, Pg. 07
County of Humboldt, CA.

S1/2 SEC 36, T5N R1W, H.B.& M.

17–07

NOTE – Assessor's Block Numbers Shown in Ellipses
Assessor's Parcel Numbers Shown in Small Circles



1" = 400'
H.B.&M.

100' 200' 400'

RM, Bk 6 of Maps, Pg 34 (McKay Tract)
RS, Bk 59 of Surveys, Pgs 41–45
RS, Bk 65 of Surveys, Pgs 9–12
RS, Bk 71 of Surveys, Pgs 44–50

ASSESSOR'S PARCEL MAP

1. THIS MAP WAS PREPARED FOR ASSESSMENT PURPOSES ONLY.
2. NO LIABILITY IS ASSUMED FOR THE ACCURACY OF THE DATA SHOWN.
3. ASSESSOR'S PARCELS MAY NOT COMPLY WITH LOCAL LOT-SPLIT OR BUILDING SITE ORDINANCES.

Mar 19, 2015
ERIN CEARLEY

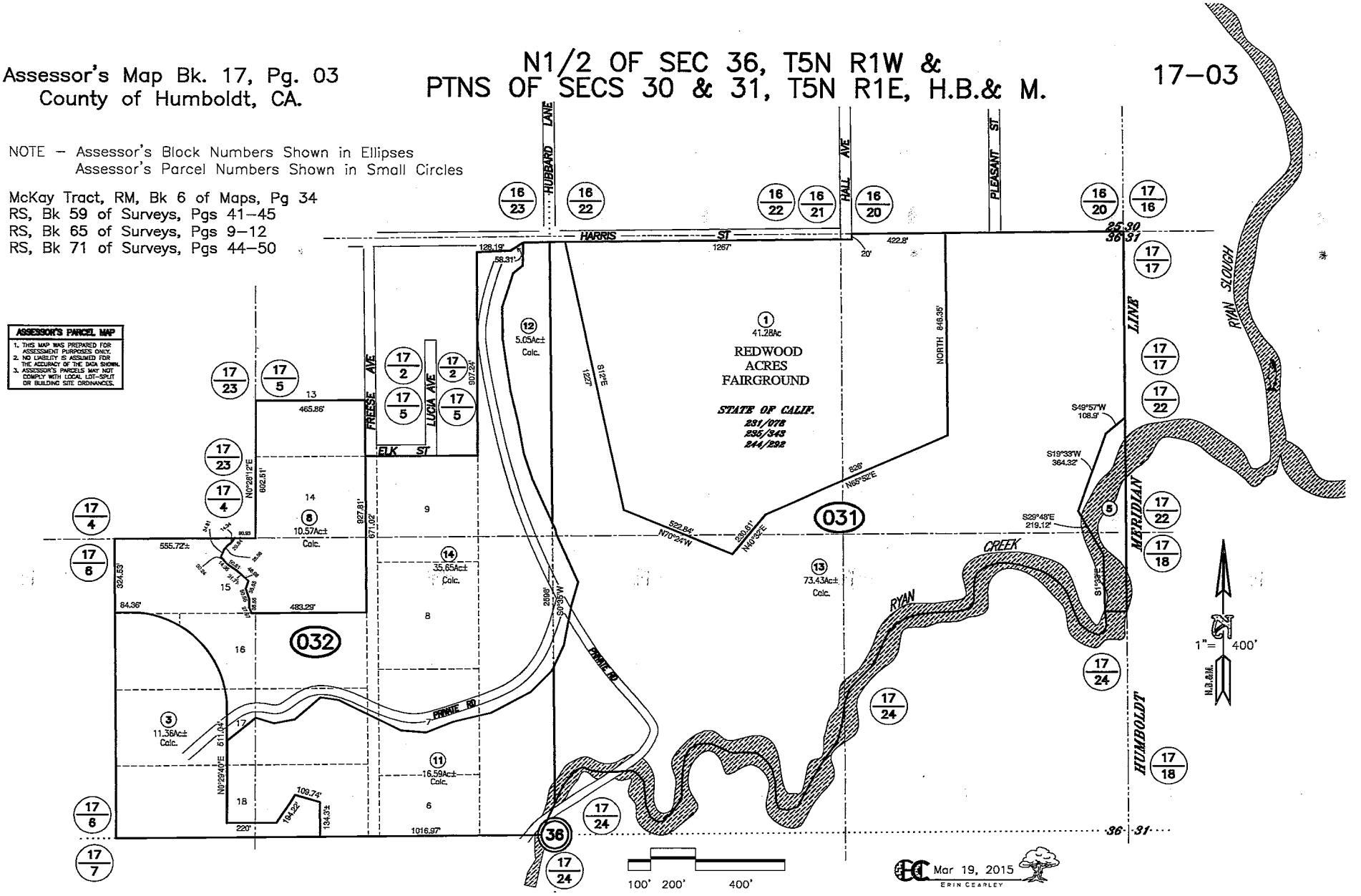
Assessor's Map Bk. 17, Pg. 03
County of Humboldt, CA.

N1/2 OF SEC 36, T5N R1W & PTNS OF SECS 30 & 31, T5N R1E, H.B.& M.

17–03

NOTE – Assessor's Block Numbers Shown in Ellipses
Assessor's Parcel Numbers Shown in Small Circles

McKay Tract, RM, Bk 6 of Maps, Pg 34
RS, Bk 59 of Surveys, Pgs 41–45
RS, Bk 65 of Surveys, Pgs 9–12
RS, Bk 71 of Surveys, Pgs 44–50



To: Humboldt County Supervisors, Planning Department, Eureka City Council

From: Bill Hole, Eureka and Humboldt County Resident
3683 Dolbeer St., Eureka

Date: June 13, 2019

All,
In receipt of North McKay Ranch Subdivision, I write to express my serious concerns.

The past experience of community support was the rejected plan for City of Eureka to move their corporation yard to the Kennedy Ball field's site between W and Dolbeer Sts. The major concerns expressed by the community then still exist.

The Schneider/Bode 49-unit apartment complex at 2409 Redwood Rd. still is a plan for at least 60 vehicles added to Hemlock/Walnut Dr. intersection.

This development proposes about 500+ more automobiles in an overtaxed traffic corridor. Public transit doesn't address this BH

There have been over 24 cars wrecked on Dolbeer and Hemlock since 1990 because of driver error and poor road design. It's surprising that pedestrians haven't perished to date.

As a resident on the border between Eureka and Humboldt County, I am concerned with the pace of progress and lack of public design input in this busy and community-oriented neighborhood. As a resident of this area, I often hear folks say, "Oh, you live by Sequoia Park, what a great neighborhood." However, recent changes in development, landscape, and possible soon-to-be infrastructure have brought out questions for me that, at best, have members of local government raising their shoulders in a collective shrug of "there isn't much I can do to help your concerns."

Residents of all Eureka city streets have the right to a safe environment; right to a fair share of law enforcement resources; and, protection from disproportionate increases in undesirable traffic conditions. When using city streets to travel between destinations or for purposes of recreation, city residents have the right to safe travel and crossing of these public facilities.

Stable residential neighborhood traffic requires efficient arterial and collector traffic flow to minimize incentives to cut through residential neighborhoods.

Raised crosswalks help reduce vehicle speeds at pedestrian crossing locations. ~~Speed humps are rounded raised areas placed across the roadway~~. } on Dolbeer mildly effective BH

These are some of my concerns.

Public transit does address

Thank you,
Bill Hole

To Kraner: You can completely redesign this in a forward thinking way. Make something sustainable & long lasting rather than hideous old fashioned & dull.

N McKay Tract Project Scoping Meeting 6/13/19

Written Comments Form

Please provide your name and mailing address, and affiliation, if any, and provide any written comments you have on scope of environmental issues to be addressed in the Environmental Impact Report

Name	Address	Affiliation
Katherine Bettis	2388 Austin Ave.	own property Layman Lane

COMMENTS

Please add me to your email list.

Katherine Bettis @ gmail.com

To protect the environment:

No single family homes,

No concrete (no sidewalks)

Forest is more valuable to society than housing.

There are plenty of places to build that have already been destroyed, ie. McKinney lot across from there.

This is primarily for the developer to make money,

- Do not allow cars,

Get with the times. This is VERY old fashioned, destructive development.

- How about no cars & no roads.

Wheeler, Michael

From: Mary Hurley <hurleymch@gmail.com>
Sent: Saturday, June 15, 2019 11:12 AM
To: Wheeler, Michael
Subject: Question on McKay Ranch Subdivision

Hello Mr. Wheeler,

I was reading some of the documents on the County website regarding the proposed project. I did not notice any discussion/research re: impact on wildlife habitat displacement. Has this been reviewed?

Are there going to be other opportunities for public comment beyond the public meeting that just occurred?

Thank you.

Mary Hurley'
hurleymch@gmail.com
(707) 273-3951 - Cell


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Wheeler, Michael

From: Melinda Walsh <melinda.walsh@att.net>
Sent: Friday, June 14, 2019 7:49 PM
To: Wheeler, Michael
Cc: Bohn, Rex
Subject: McKay Ranch Subdivision 20 Year Project- RE Scoping Meeting

Dear Mr. Wheeler,

CC to: County Supervisor-Rex Bohn,

My name is Melinda Walsh, I am a "community member" associated with the "Scoping Meeting" held June 13 2019.

As a member of the "Community" here is my input for the EIR

The EIR Report on Traffic Impact must be all inclusive and consider the impact of the traffic flow near the subdivision, near other County Rds., and County Rds. that lead to City Rds. Walnut Drive is already a congested road anytime school is open or games are in session at Redwood Fields. The EIR needs to describe in detail the estimated number of additional vehicles on the road due to the development, what if any other existing streets will have to be widened. What if any stop lights will have to be put in place.
How current existing walking and cycling will be affected on existing streets.
If traffic impact is shown to be severe, the EIR should make suggestions as to the volume of development that would be acceptable with the existing roads that will be traversed.

BACKGROUND:

The proposed project has not adequately dealt with the potential that 400 (Est.) or more vehicles will travel in and out of the subdivision each day. This proposed increase in traffic equates to much more than just noise, nuisance, congestion, it creates a PUBLIC SAFETY ISSUE.

It is a sad state of affairs that Harrison Extension planned probably 100 years ago is not useful now.

It is a sad state that Manzanita Ave is not available as access.

While not relevant to this project, there is more land south of the proposed subdivision that one day will most likely be developed and will increase traffic volume even further. Good planning now will make for a better tomorrow.

Other: To the planning department, please be "good" planners in these early stages for the future of our Community, and when a "Scoping Meeting" is required on future projects please be mindful of comments below.

I do not understand how this project made it to the Scoping Meeting level due to the following:

The maps provided in the packet announcing the Scoping Meeting lacked the following:
1. Street Names are not present on the maps.
2. All the proposed units were not visible on the maps due to poor contrast when duplicated, especially all the multi-family units close to the ball park.
4.The construction of a loop road from Walnut connecting Arbutus and Redwood is not visible on the map, or at least I sure cannot see it.
5. The Phase of Construction areas were not depicted on the map provided in the mailing.

SUMMARY: I do believe the land where the proposed development is a good match for the development of future housing. However good planning is imperative and Arbutus and Redwood Streets were neve designed for "heavy traffic" The now unused Harrison extension was designed for the heavier traffic, and we are now told it is no longer useful to get traffic to Harris St. These are unfortunate circumstances yet I do not believe all the rest of the Cutten community should have to endure the increased traffic due to the lack of proposed additional access and exit points.

I do not believe that quality information was provided to the "Community" to provide the kind of responses and concerns that is the true purpose of a "Scoping Meeting".

I am concerned that the County wants so badly to address the "affordable" housing issue that our "Community"

has been brushed over and the "Scoping Meeting" took place without quality information being in the hands of the "Community" prior to the "Scoping Meeting". Needless to say I am disappointed.

I just want a Community that has properly planned roadways for the homes
that the road serve and this proposed development does not provide adequate access.

Best Regards,
Melinda Walsh



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Wheeler, Michael

From: Rebecca Eldredge <mrsreldredge@gmail.com>
Sent: Friday, June 14, 2019 9:50 AM
To: Wheeler, Michael
Subject: North McKay Ranch Subdiv.

Hi! I was unable to make it to the community meeting last night but I have read the project documents posted online & have been told I can submit comments via an online form- could you send the link for that form when you have a moment? Thank you!

Rebecca Eldredge
Cutten, CA 95503
mrsreldredge@gmail.com

Wheeler, Michael

From: Rebecca Eldredge <mrsreldredge@gmail.com>
Sent: Wednesday, June 19, 2019 11:32 AM
To: Wheeler, Michael
Subject: Re: North McKay Ranch Subdiv.

1) HCSD Annexation:
I have a couple of concerns about this, my first being whether this would raise or lower the rates for current customers and by how much. My second concern would be whether HCSD could even handle this type of growth, given how every few years we hear about their budget shortfalls & a possibility of raising rates due to mis-management of funds.
2) Traffic:
Traffic can already become backed up at the intersection of Dolbeer-Hemlock-Walnut at the 3 way stop there. Ideally a light would be installed, and that would make it safer for pedestrians & kids going to/from Redwood Fields and Sequoia Park/ the zoo. Maybe even a by-pass for that area by extending Harrison? I am also concerned about Walnut Dr. traffic in general as it is hard enough to get onto that road from H Street/Campton during high traffic times, much less with the extra influx of at least 100 cards going to/from work.
3) Cutten School District:
I am concerned about the ability of the Cutten School District to properly serve the incoming students. I understand that they will get more money from the extra tax dollars, however I wonder if anyone has looked into what would they would need to do in order to have the space and resources for these extra students, and how much that would cost.
4) McKay Trail Access:
I have not seen anything in the project document about access to the McKay Trail/forest system. I have seen notes on the McKay Trail Plan Maps for the area indicating short term access points, but only one long-term access point. I would like to see one or more access points to the trails from the subdivision with parking and public restrooms.
5) Redwood Fields:
This park is very nice, but small. I would like to see a plan included that expands the recreation areas of redwood fields, specifically the playground and picnic areas so the park can remain accessible to the community without being overrun by the additional 300+ residents.
6) Multi-Family Units & Parcel Size:
I am excited to see so many multi-family units being proposed as our area needs this type of housing badly. I am concerned about a note in the project plan allowing for lots smaller than the minimum parcel size for this zone. I am not sure what the min. parcel size is for this zone however I am concerned about creating tiny lots similar to what is in eureka proper. The reason I moved to Cutten is because the lots are slightly bigger & the houses more spread out (a slightly more country feel is how I would describe it). I would hate to see this lost with the creation of a subdivision with houses so close you can reach out & touch your neighbor's home from your own window.
-Rebecca Elredge
mrsreldredge@gmail.com

On Mon, Jun 17, 2019 at 8:22 AM Wheeler, Michael <MWheeler@co.humboldt.ca.us> wrote:

> You can submit comments via email reply to me. Thanks.
>
> **From:** Rebecca Eldredge <mrsreldredge@gmail.com>
> **Sent:** Friday, June 14, 2019 9:50 AM
> **To:** Wheeler, Michael <MWheeler@co.humboldt.ca.us>
> **Subject:** North McKay Ranch Subdiv.

Hi! I was unable to make it to the community meeting last night but I have read the project documents posted online & have been told I can submit comments via an online form- could you send the link for that form when you have a moment? Thank you!

Rebecca Eldredge

Cutten, CA 95503

mrsreldredge@gmail.com

Wheeler, Michael

From: Teddee Boylan <2tedboy@gmail.com>
Sent: Friday, June 14, 2019 9:15 AM
To: Wheeler, Michael

Good morning, I am wondering if you realized this is graduation week in Humboldt County? It probably was not the best week to host a meeting on this issue. Since I was not available is there a site with updates from the meeting? Also are there any other meetings scheduled? My main concern is traffic impact. I have owned a home in this area for 42 years and have watched the traffic increase. We have 5 schools in close proximity with most children being dropped at school rather than walking or riding bicycles. The speed limit is reasonable, but most people don't drive the speed limit. Walnut has become busy because people going south use it rather than going through downtown. So you add more traffic, children are less likely to feel safe along the rode so more people drop at school in the morning. It's almost impossible to pull out of Campton onto Walnut, and has been for the last twenty years. I have many concerns about safety. It seems larger sidewalks, slower traffic, bike lanes along all of Walnut, basically ways to encourage walking and bicycling, a safety corridor for children going to school, baseball fields, parks, the market, etc. Please let me know about any future meetings and ways to communicate concerns. Thank you, Teddee-Ann Boylan

Wheeler, Michael

From: Wayne A Palmrose <wpalmrose@suddenlink.net>
Sent: Friday, June 14, 2019 2:03 AM
To: Wheeler, Michael
Subject: Cutten sub.....

MR WHEELER

IWISH HCO WOULD HAD GIVEN MORE NOTICE ABOUT THIS MEETING TONIGHT?!

WE NEED MORE HOUSING AND ALONG WITH IS THE INCREASE IN TRAFFIC. I WOULD HOPE HCO LOOKS INTO

ROAD IMPROVEMENTS LIKE PUTTING FERN THRU FROM WALNUT TO ACROSS GULCH AND CONNECT WITH VISTA DRIVE TO

LESSE FLOW AND CLEAN UP THE AREA AT WALNUT AND HEMLOCK. THERE IS AS YOU KNOW A LIGHT AT FERN AND THIS IS FINE.

ALSO WE DON'T NEED TO TAKEN IN BY CITY OF EUREKA EITHER THEY CAN GIVE US NOTHING MORE THAN WHAT WE ALREADY HAVE!

EXCEPT MORE TAXES

WE DO NEED MORE HEARINGS ON THIS

THANK YOU

WAYNE A PALMROSE CELL 499 2533 EMail as above!

PO BOX 113

BAYSIDE CA 95524

OWN AND LIVED IN CUTTEN SINCE 1946

Wheeler, Michael

From: Rebecca Avila <rebavila96@outlook.com>
Sent: Monday, June 17, 2019 11:29 AM
To: PlanningBuilding
Subject: McKay tract Kramer inc .

You can't be serious about permitting Kramer inc. to ruin that beautiful forest in Eureka . Their construction is cheap and their philosophy is the smallest sq. Footage, but the most units . It would ruin Eureka as we know it only to make Kramer wealthier . The traffic is already out of control in that area . Kramer will pillage that natural treasure with their unethical management and greed .from a native Eureka .

Sent from my i phone

EARTHJUSTICE
BECAUSE THE EARTH NEEDS A GOOD LAWYER

Via Electronic Mail

June 19, 2019

Michael Wheeler
Senior Planner
Humboldt County, Planning & Building Department
mwheeler@co.humboldt.ca.us

Re: Earthjustice Comments on the Notice of Preparation of a Draft Environmental Impact Report for the North McKay Ranch Subdivision

Earthjustice appreciates the opportunity to comment on the Notice of Preparation of a Draft Environmental Impact Report ("DEIR") for the North McKay Ranch Subdivision ("Project"), which contemplates the development of 320 residential units and 22,000 square feet of commercial space. Our initial comments focus on the importance of incorporating building electrification requirements into the Project. The transition from gas to electric buildings is critical to reaching a zero emissions future and will not occur at the scale or timing needed absent decisive County leadership. Consistent with California Environmental Quality Act ("CEQA") requirements to adopt all feasible mitigation to reduce significant greenhouse gas ("GHG") and energy impacts, building electrification is essential mitigation to reduce Project impacts and take meaningful action to address climate change. Building electrification will also provide economic, safety, and air quality benefits for Humboldt County. We therefore urge the County to require all-electric construction as feasible mitigation in the DEIR for the Project.

I. The Project Will Have Significant GHG Impacts.

CEQA requires a DEIR identify all the significant impacts of a proposed project, including from the project's GHG emissions and energy use and adopt feasible mitigation.[1] To determine the significance of the Plan's GHG impacts, the County should apply a net-zero emissions threshold. A net-zero threshold is also consistent with the severity of the climate crisis and the recognition that any increase in GHG emissions exacerbates the cumulative impacts of climate.

In determining the significance of project impacts, the County "must ensure that CEQA analysis stays in step with evolving scientific knowledge and state regulatory schemes." *Cleveland National Forest Foundation v. San Diego Assn. of Gov'ts* (2017) 3 Cal.5th 497, 519. Non-zero numeric thresholds, such as the 1,100 MT GHG significance threshold proposed by the Bay Area Air Quality Management District ("BAAQMD") in 2009 are unlikely to survive legal scrutiny. The BAAQMD numeric threshold was derived from Assembly Bill ("AB") 32's 2020 GHG reduction targets and does not reflect Senate Bill 32's requirement to reduce GHGs to 40

[1] CEQA Guidelines § 15126.2; Appendix F; Appendix G § VII.

percent below 1990 levels by 2030 or our increased understanding of the severity of climate impacts California is and will experience.[2] While useful when first recommended ten years ago, it has not kept in step with scientific knowledge and regulatory developments and is no longer supported by substantial evidence.

Alternative approaches to determining the significance of Project GHG impacts, such as using a comparison against "business-as-usual" emissions or a per capita emissions metric, may not withstand legal scrutiny and should not be used to evaluate the Project's emissions in the DEIR. In *Center for Biological Diversity v. Cal. Dept of Fish & Wildlife* (2015) 62 Cal.4th 204, the California Supreme Court held that determining the significance of project GHG impacts by comparing project emissions with emissions under a business-as-usual scenario derived from statewide emissions reduction goals under AB 32 lacked substantial evidence. For similar reasons, use of statewide per capita emissions metrics to determine the significance of project emissions has also been rejected for the purpose of determining project GHG impacts under CEQA. As the court held in *Golden Door Properties LLC*, because "using a statewide criterion requires substantial evidence and reasoned explanation to close the analytical gap left by the assumption that the 'level of effort required in one [statewide] context . . . will suffice in the other, a specific land use development.'" *Golden Door Properties LLC v. County of San Diego* (2018) 27 Cal.App.5th 892, 904 (quoting *Center for Biological Diversity*, 62 Cal.4th at 227). While use of a statewide per capita metric to determine the significance of GHG impacts may be useful for a General Plan, which examines collective community emissions of existing and proposed new development, it is not appropriate for projects that only govern new development. Accordingly, the County should apply a net-zero emissions GHG threshold to ensure a legally defensible EIR. Because the Project will result in an increase in GHG emissions, the County should consider its GHG impacts significant.

II. The Project Will Have Significant Energy Impacts if it Requires Gas Connections.

As stated in the Revised Notice of Preparation ("NOP") for this project, energy conservation was not addressed in the Initial Study but "may possibly be significant."[3] A key purpose of the evaluation of project energy impacts under CEQA is "decreasing reliance on fossil fuels, such as coal, natural gas and oil."[4] Addressing energy impacts of proposed projects requires more than mere compliance with Title 24 Building Energy Efficiency Standards.[5] Including gas hook-ups in new projects, and thereby perpetuating reliance on fossil fuels, is contrary to California's energy objectives. As the California Energy Commission ("CEC") determined its 2018 Integrated Energy Policy Report ("IEPR") Update:

> New construction projects, retrofitting existing buildings, and replacing appliances and other energy-consuming equipment essentially lock in energy

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[2] *See* BAAQMD, *CEQA Guidelines Update, Proposed Thresholds of Significance* at 10-22 (Dec 7, 2009), http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/proposed-thresholds-of-significance-dec-7-09.pdf?la=en (explaining methodology for project-level GHG threshold).

[3] Humboldt County Dept. of Planning and Building, *North McKay Ranch Subdivision, General Plan Amendment RNOP* at 11. Probable Effects (May 2019), https://saoprceqap001.blob.core.windows.net/250226-3/attachment/IocUBWLHA4jB-2Tx3Fm3lnv7rbYUOzkWjhsyxuHOo_XGx60ubqj6bNxazZSQgmgXY0EKXC1F3eZN_XdG0.

[4] CEQA Guidelines, Appendix F, Sec. I.

[5] *See California Clean Energy Committee v. City of Woodland* (2014) 225 Cal.App.4th 173, 211.

> system infrastructure for many years. As a result, each new opportunity for truly impactful investment in energy efficiency and fuel choice is precious. If the decisions made for new buildings result in new and continued fossil fuel use, it will be that much more difficult for California to meet its GHG emission reduction goals. Parties planning new construction have the opportunity instead to lock in a zero- or low-carbon emission outcome that will persist for decades.[6]

Accordingly, projects that contain new gas connections, and therefore result in new fossil fuel delivery infrastructure, have significant energy impacts under CEQA. The example built out schedule identified in the Project's NOP plans for utility construction during the Phase 1 construction of the Project.[7] Phase 1 is a prime opportunity to establish a zero-emission utility system and align with California's energy goals. By providing a zero-emission system in Phase 1, the following phases of the Project can easily connect to and provide clean energy to the future residents and commercial area.

III. Building Electrification is Feasible and Effective Mitigation to Reduce Project GHG and Energy Impacts.

A lead agency may not lawfully approve a Project where "there are feasible alternatives or feasible mitigation measures available which would substantially lessen [its] significant environmental effects."[8] Eliminating natural gas use in new buildings is feasible mitigation that will substantially lessen the Project's GHG and energy impacts. Indeed, building electrification is one of the fastest and most cost-effective ways to achieve the transition to net-zero emissions. In the 2018 IEPR Update, the CEC recognized the "growing consensus that building electrification is the most viable and predictable path to zero-emission buildings . . . due to the availability of off-the-shelf, highly efficient electric technologies (such as heat pumps) and the continued reduction of emission intensities in the electricity sector."[9]

All-electric developments are being constructed for a range of building types pursuing low or zero emissions objectives and are a feasible mitigation requirement for new development under the Project. Sacramento's Municipal Utility District has partnered with homebuilders to construct entire neighborhoods that are all-electric, with 400 all-electric homes planned in the next two years alone.[10] Some California developers now exclusively build all-electric homes, and have already deployed a range of affordable, luxury, single- and multi-family housing units

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[6] CEC, *2018 Integrated Energy Policy Report Update, Vol. II* at 18 (Jan. 2019), https://efiling.energy.ca.gov/getdocument.aspx?tn=226392

[7] Humboldt County Dept. of Planning and Building, *North McKay Ranch Subdividion, General Plan Amendement RNOP* at 11. Description of Project (May 2019), https://saoprceqap001.blob.core.windows.net/250226-3/attachment/IocUBWLHA4jB-2Tx3Fm3lnv7rbYUOzkWjhsyxuHOo_XGx60ubqj6bNxazZSQgmgXY0EKXC1F3eZN_XdG0.

[8] Pub. Res. Code § 21002.

[9] CEC, *2018 Integrated Energy Policy Report Update, Vol. II* at 20 (Jan. 2019), https://efiling.energy.ca.gov/getdocument.aspx?tn=226392.

[10] Justin Gerdes, *All-Electric Homes Are Becoming the Default for New Residential Construction in Sacramento*, Greentech Media (Nov. 13, 2018), https://www.greentechmedia.com/articles/read/all-electric-homes-are-becoming-the-default-for-new-residential-constructio#gs.VYzCCMQ.

all across the state.[11] Given that other entities are now requiring all-electric construction, there is no reason for the County not to also do so. For example, the University of California announced in August of 2018 that "[n]o new UC buildings or major renovations after June 2019, except in special circumstances, will use on-site fossil fuel combustion, such as natural gas, for space and water heating."[12]

Similarly, in its Downtown Specific Plan, the City of Hayward required for multifamily residential developments that "[a]ll buildings will be all electric, meaning that electricity is the only permanent source of energy for water-heating, mechanical and heating, ventilation, and air conditioning (HVAC) (i.e., space-heating and space cooling), cooking, and clothes-drying and there is no gas meter connection."[13] The natural next step is to extend such a requirement to commercial developments, which can also be feasibly electrified.[14]

IV. There Are Multiple Co-Benefits to Achieving Zero Emission Buildings through Electrification.

Beyond achieving the energy and GHG emissions reductions essential for preventing climate breakdown, electrification of new buildings will produce a range of important co-benefits for the economic well-being, safety, and health of the community. Building electrification offers the potential to lower energy bills, reduce the cost of new construction, improve air quality, public safety, and climate resiliency, as well as create new jobs. Far from being a barrier to new housing, all-electric new construction can enable greater opportunities for affordable housing construction by reducing costs and streamlining mitigation requirements. For disadvantaged populations that pay a disproportionate amount of their income to energy costs, and who are more likely to suffer from asthma due to poor indoor air quality, zero emission homes are an important opportunity to deliver social equity.[15]

A. Lowering Energy Bills and Cost of New Construction

All-electric buildings can lower utility bills for tenants, reduce the cost of construction of new housing in the County, and shield customers from the volatile and increasing costs of gas. A recent report, *Decarbonization of Heating Energy Use in California Buildings*, by Synapse Energy Economics found that electrification could lower utility bills by up to $800 annually and lower the cost of new construction in Los Angeles by roughly $1,500 to $6,000.[16] Other analysis has found that new homes and apartment buildings can cost between $1,000 and $18,000 less to

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[11] *See* Redwood Energy, *Development Projects (A Small Sample)*, https://www.redwoodenergy.tech/development-projects/.

[12] University of California, *UC sets higher standards, greater goals for sustainability* (Sept. 4, 2018), https://www.universityofcalifornia.edu/press-room/uc-sets-higher-standards-greater-goals-sustainability.

[13] City of Hayward, *Hayward Downtown Specific Plan DEIR, Greenhouse Gas Emissions Chapter* at 4.6-40 (Jan. 7, 2019), https://www.hayward-ca.gov/sites/default/files/documents/dtsp-eir-greenhouse-gas-emissions.pdf.

[14] *See, e.g.*, Redwood Energy, *Zero Carbon Commercial Construction: An Electrification Guide for Large Commercial Buildings and Campuses* (2019), https://drive.google.com/file/d/1L5IBsSmT-p8he6dmrW565l6ZB_dkXya9/view.

[15] Kelly Vaugh, *Social Equity, Affordable Housing, and the Net-Zero Energy Opportunity*, Rocky Mountain Institute (May 9, 2018), https://rmi.org/social-equity-affordable-housing-and-the-net-zero-energy-opportunity/.

[16] Synapse Energy Economics, *Decarbonization of Heating Energy Use in California Buildings* at 2, 39 (Oct. 2018), http://www.synapse-energy.com/sites/default/files/Decarbonization-Heating-CA-Buildings-17-092-1.pdf.

build if they are not connected to gas distribution pipelines.[17] The UC has carefully examined feasibility and costs of all-electric buildings in the report: UC Carbon Neutral Buildings Cost Study. The first key insight offered is that "[a]ll-electric buildings are comparable or slightly less expensive tha[n] gas + electric buildings from a 20-year Life Cycle Cost perspective."[18] The most significant cost savings were found for residential buildings, where the average Life Cycle Cost for all-electric was $5.28/sf lower compared to gas + electric options.[19]

B. A Safer Community

Recent events from Aliso Canyon, San Bruno, and the state of Massachusetts add to the devastating record of hazardous natural gas infrastructure. Between 2015 and 2017, natural gas pipeline explosions and incidents in the country claimed on average 15 fatalities, 57 injuries, and $316,647,907 in property damage *annually*.[20] As climate impacts intensify, the escalating risks of aging natural gas infrastructure will outpace the industry's rate of pipeline replacement. Sea level rise, which promises to be one of the many significant climate impacts affecting the region, especially amplifies the risks of natural gas.[21]

Methane leakage, a pervasive problem with natural gas infrastructure, can be particularly hazardous for families living in earthquake and fire-prone areas since leaking gas exacerbates fires after earthquakes. The California Seismic Safety Commission estimates that 20 to 50 percent of total post-earthquake fires are fires related to gas leaks.[22] Beginning to electrify entire communities is a key precautionary strategy to mitigate the growing risks of California's massive gas system.

C. Improved Air Quality

Gas appliances in buildings make up a quarter of California's nitrogen oxide (NO_x) emissions from natural gas. NO_x is a precursor to ozone and a key pollutant to curb in order to comply with state and federal ambient air quality standards. Electrifying buildings will help the County to reduce NO_x and ground level ozone, improving *outdoor* air quality and benefiting public health. Electrification of fossil fuel appliances will also immediately improve *indoor* air quality and health. On average, Californians spend 68 percent of their time indoors, making

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[17] Stone Energy Associates, *Accounting for Cost of Gas Infrastructure*, CEC Docket 17-BTSD-01 (May 4, 2017), https://efiling.energy.ca.gov/GetDocument.aspx?tn=217420&DocumentContentId=26959.

[18] Point Energy Innovations, *UC Carbon Neutral Buildings Cost Study* at 3 (June 2017), https://www.ucop.edu/sustainability/_files/Carbon%20Neutral%20New%20Building%20Cost%20Study%20FinalReport.pdf.

[19] *Id.*

[20] Pipeline and Hazardous Materials Safety Administration, *Pipeline Incident 20 Year Trends* (Nov. 2018), https://www.phmsa.dot.gov/data-and-statistics/pipeline/pipeline-incident-20-year-trends.

[21] Radke *et al.*, *Assessment of California's Natural Gas Pipeline Vulnerability to Climate Change*, University of California, Berkeley (2016), https://www.energy.ca.gov/2017publications/CEC-500-2017-008/CEC-500-2017-008.pdf.

[22] California Seismic Safety Commission, *Improving Natural Gas Safety in Earthquakes* at 1 (adopted July 11, 2002), http://ssc.ca.gov/forms_pubs/cssc_2002-03_natural_gas_safety.pdf.

indoor air quality a key determinant of human health.[23] The combustion of gas in household appliances produces harmful indoor air pollution, specifically nitrogen dioxide, carbon monoxide, nitric oxide, formaldehyde, acetaldehyde, and ultrafine particles.[24] The California Air Resources Board warns that "cooking emissions, especially from gas stoves, have been associated with increased respiratory disease."[25] Young children and people with asthma are especially vulnerable to indoor air pollution.

D. Pathways to Good, Green Jobs

Electrification of buildings will enable local workforce development for jobs that will be critical in California's broader energy transition. Partnering with local organizations and community colleges, the County can foster training and pipeline programs for new jobs in construction, HVAC installation, electrical work, energy efficiency and load management services, as well as manufacturing.

These jobs will rapidly grow in demand as local governments across the state look to rapidly address the emissions from their building sector. In Sacramento Municipal Utility District territory, where all-electric buildings are quickly becoming the default for new developments, demand for specialized plumbers and HVAC technicians is expected to grow enormously. The region expects to install more than 300,000 heat pump space heaters in the next 15 to 20 years.[26]

The next one to five years will be a critical window of opportunity for the County to jump-start this transition away from gas to clean energy buildings. CEQA is an essential vehicle to take all feasible action to reduce GHGs and limit further expansion of gas infrastructure and we urge incorporation of all-electric building design into the Project.

Please contact Matt Vespa at mvespa@earthjustice.org, Sasan Saadat at ssaadat@earthjustice.org with any questions or concerns, and please include each of us in future notifications on the Project's development.

Sincerely,

Matt Vespa
Staff Attorney

Sasan Saadat
Research and Policy Analyst

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[23] Klepeis *et al.*, *The National Human Activity Pattern Survey (NHAPS): A Resource for Assessing Exposure to Environmental Pollutants*, J. EXPO. ANAL. ENVIRON. EPIDEMIOL., Vol. 11(3), 231-52 (2001).
[24] *See, e.g.*, Logue *et al.*, *Pollutant Exposures from Natural Gas Cooking Burners: A Simulation-Based Assessment for Southern California*, ENVIRON. HEALTH PERSP., Vol. 122(1), 43-50 (2014); Victoria Klug & Brett Singer, *Cooking Appliance Use in California Homes—Data Collected from a Web-based Survey*, LAWRENCE BERKELEY NATIONAL LABORATORY (Aug. 2011); John Manuel, *A Healthy Home Environment?* ENVIRON. HEALTH PERSP., Vol. 107(7), 352-57 (1999); Mullen *et al.*, *Impact of Natural Gas Appliances on Pollutant Levels in California Homes*, LAWRENCE BERKELEY NATIONAL LABORATORY (2012).
[25] California Air Resources Board, *Combustion Pollutants* (last reviewed Jan. 19, 2017), https://www.arb.ca.gov/research/indoor/combustion.htm.
[26] Justin Gerdes, *Experts Discuss the Biggest Barriers Holding Back Building Electrification*, Greentech Media (Sept. 19. 2018), https://www.greentechmedia.com/articles/read/here-are-some-of-the-biggest-barriers-holding-back-building-electrification#gs.fBEBKJy2.

Earthjustice
50 California Street, Suite 500
San Francisco, CA 94111
Email: mvespa@earthjustice.org
Telephone: (415) 217-2123

Earthjustice
50 California Street, Suite 500
San Francisco, CA 94111
Email: ssaadat@earthjustice.org
Telephone: (415) 217-2104

Wheeler, Michael

From: Alicia Sidebottom <asidebottom1@gmail.com>
Sent: Wednesday, June 26, 2019 3:46 PM
To: Wheeler, Michael
Subject: Proposed Development

To whom it may concern,

I am Opposed to the development proposal behind Redwood Fields. This would cause havoc on our infrastructure with the overload of traffic, our water system and school system. This would decrease the value of our homes and deflect from the natural beauty of our community.
Please reject the proposed Development in Cutten.
Thank you
Alicia Sidebottom
2222 Home drive
Eureka Ca 95503
7074442527

Sent from my iPhone

APPENDIX B

Air Assumptions / Modeling

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tons/year

Phase	Year	ROG	Nox	CO	SO2	PM10Fugit	PM10 Exha	PM10 Tota	PM2,5 Fug	PM 2.5 Exh	PM 2.5 Tot	CO2e
Phase 1 & 2	**2021**	**0.36**	**3.24**	**2.78**	**0.01**	**0.45**	**0.16**	**0.61**	**0.22**	**0.15**	**0.36**	**440.91**
Phase 1 & 2	2022	1.29	0.97	1.13	0.00	0.02	0.05	0.07	0.01	0.04	0.05	168.66
Phase 3 & 4	2022	0.21	1.85	1.60	0.00	0.49	0.08	0.57	0.24	0.08	0.32	282.04
Total	**2022**	**1.49**	**2.82**	**2.73**	**0.01**	**0.51**	**0.13**	**0.64**	**0.25**	**0.12**	**0.37**	**450.71**
Phase 3 & 4	**2023**	**0.30**	**2.15**	**2.75**	**0.01**	**0.12**	**0.09**	**0.21**	**0.03**	**0.09**	**0.12**	**450.35**
Phase 3 & 4	**2024**	**0.29**	**2.04**	**2.71**	**0.01**	**0.12**	**0.08**	**0.21**	**0.03**	**0.08**	**0.11**	**450.48**
Phase 3 & 4	2025	3.47	0.74	1.07	0.00	0.05	0.03	0.07	0.01	0.03	0.04	175.65
Phase 5 & 6	2025	0.11	1.05	1.09	0.00	0.35	0.04	0.39	0.19	0.04	0.23	185.56
Total	**2025**	**3.58**	**1.79**	**2.16**	**0.00**	**0.39**	**0.07**	**0.46**	**0.20**	**0.07**	**0.26**	**361.21**
Phase 5 & 6	**2026**	**0.19**	**1.66**	**2.16**	**0.00**	**0.01**	**0.07**	**0.08**	**0.00**	**0.06**	**0.07**	**320.02**
Phase 5 & 6	2027	0.65	0.52	0.72	0.00	0.01	0.02	0.03	0.00	0.02	0.02	105.07
Phase 7, 8, & 9	2027	0.15	1.36	1.36	0.00	0.45	0.05	0.51	0.22	0.05	0.27	268.75
Total	**2027**	**0.80**	**1.88**	**2.08**	**0.00**	**0.46**	**0.08**	**0.53**	**0.22**	**0.07**	**0.29**	**373.82**
Phase 7, 8, & 9	**2028**	**0.22**	**1.75**	**2.31**	**0.00**	**0.06**	**0.07**	**0.13**	**0.02**	**0.07**	**0.08**	**372.17**
Phase 7, 8, & 9	**2029**	**2.95**	**1.76**	**2.32**	**0.00**	**0.06**	**0.07**	**0.13**	**0.02**	**0.07**	**0.08**	**375.50**
Phase 7, 8, & 9	**2030**	**0.17**	**0.95**	**1.91**	**0.00**	**0.05**	**0.02**	**0.07**	**0.01**	**0.02**	**0.03**	**338.08**

lbs/day

2021	2.77	24.81	21.33	0.04	3.47	1.21	4.68	1.66	1.12	2.79	3,378.63
2022	11.43	21.62	20.92	0.04	3.93	0.99	4.92	1.88	0.92	2.81	3,453.70
2023	2.33	16.50	21.08	0.04	0.94	0.71	1.65	0.25	0.67	0.92	3,450.98
2024	2.21	15.60	20.73	0.04	0.95	0.63	1.57	0.26	0.59	0.84	3,451.92
2025	27.45	13.70	16.52	0.03	3.01	0.55	3.56	1.52	0.51	2.03	2,767.91
2026	1.44	12.69	16.52	0.03	0.11	0.53	0.64	0.03	0.50	0.53	2,452.23
2027	6.14	14.42	15.90	0.03	3.50	0.58	4.08	1.69	0.54	2.24	2,864.52
2028	1.66	13.41	17.70	0.03	0.48	0.53	1.01	0.13	0.50	0.63	2,851.90
2029	22.60	13.52	17.79	0.03	0.48	0.53	1.02	0.13	0.50	0.63	2,877.41
2030	1.31	7.31	14.67	0.03	0.38	0.14	0.52	0.10	0.14	0.24	2,590.63

Assumptions

261 days of work per year

2000 lbs/ton

McKay Ranch Phase 1 & Phase 2
Humboldt County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Apartments Low Rise	69.00	Dwelling Unit	12.26	69,000.00	197
Single Family Housing	3.00	Dwelling Unit	1.07	5,400.00	9

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	103
Climate Zone	1			**Operational Year**	2022
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Acreages based on Table 2.2-2 in Project Description

Construction Phase - Extended site prep to account for tree removal activities

Trips and VMT - Hauling assumes 200 trees/acre to be removed from the site and 10 trees per truck load. 13.33 acres X 200 = 2,666 trees total / 10

Area Coating - Only buildings would require arch coating, not entire acreage.

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_Residential_Exterior	50220	20000
tblAreaCoating	Area_Residential_Interior	150660	50000
tblConstructionPhase	NumDays	10.00	30.00

tblConstructionPhase	PhaseStartDate	1/30/2021	1/4/2021
tblLandUse	LotAcreage	4.31	12.26
tblLandUse	LotAcreage	0.97	1.07
tblTripsAndVMT	HaulingTripLength	20.00	30.00
tblTripsAndVMT	HaulingTripNumber	0.00	267.00

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	0.3612	3.2381	2.7830	5.0000e-003	0.4532	0.1574	0.6107	0.2170	0.1468	0.3637	0.0000	438.3482	438.3482	0.1025	0.0000	440.9114
2022	1.2850	0.9701	1.1326	1.9200e-003	0.0242	0.0473	0.0715	6.5000e-003	0.0445	0.0510	0.0000	167.7627	167.7627	0.0361	0.0000	168.6643
Maximum	**1.2850**	**3.2381**	**2.7830**	**5.0000e-003**	**0.4532**	**0.1574**	**0.6107**	**0.2170**	**0.1468**	**0.3637**	**0.0000**	**438.3482**	**438.3482**	**0.1025**	**0.0000**	**440.9114**

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	0.3612	3.2381	2.7830	5.0000e-003	0.4532	0.1574	0.6107	0.2170	0.1468	0.3637	0.0000	438.3478	438.3478	0.1025	0.0000	440.9109
2022	1.2850	0.9701	1.1326	1.9200e-003	0.0242	0.0473	0.0715	6.5000e-003	0.0445	0.0510	0.0000	167.7625	167.7625	0.0361	0.0000	168.6642
Maximum	**1.2850**	**3.2381**	**2.7830**	**5.0000e-003**	**0.4532**	**0.1574**	**0.6107**	**0.2170**	**0.1468**	**0.3637**	**0.0000**	**438.3478**	**438.3478**	**0.1025**	**0.0000**	**440.9109**

	ROG	NOx	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	1-4-2021	4-3-2021	1.5168	1.5168
2	4-4-2021	7-3-2021	0.6839	0.6839
3	7-4-2021	10-3-2021	0.6916	0.6916
4	10-4-2021	1-3-2022	0.6941	0.6941
5	1-4-2022	4-3-2022	0.6130	0.6130
6	4-4-2022	7-3-2022	1.1170	1.1170
7	7-4-2022	9-30-2022	0.5062	0.5062
		Highest	1.5168	1.5168

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Trenching	Trenching	2/15/2021	3/19/2021	5	25	
2	Architectural Coating	Architectural Coating	6/18/2022	7/15/2022	5	20	
3	Paving	Paving	5/21/2022	6/17/2022	5	20	
4	Building Construction	Building Construction	3/27/2021	5/20/2022	5	300	
5	Grading	Grading	2/13/2021	3/26/2021	5	30	
6	Site Preparation	Site Preparation	1/4/2021	2/12/2021	5	30	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 75

Acres of Paving: 0

Residential Indoor: 150,660; Residential Outdoor: 50,220; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor

Architectural Coating	Air Compressors	1	6.00	78	0.48
Grading	Excavators	2	8.00	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	2	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
Grading	Scrapers	2	8.00	367	0.48
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
Trenching			0.00	0.00	10.80	7.30				
Site Preparation	7	18.00	0.00	267.00	10.80	7.30	30.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	51.00	8.00	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	10.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Trenching - 2021

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
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
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
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**

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
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
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
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**

3.3 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	1.1639					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.0500e-003	0.0141	0.0181	3.0000e-005		8.2000e-004	8.2000e-004		8.2000e-004	8.2000e-004	0.0000	2.5533	2.5533	1.7000e-004	0.0000	2.5574
Total	**1.1659**	**0.0141**	**0.0181**	**3.0000e-005**		**8.2000e-004**	**8.2000e-004**		**8.2000e-004**	**8.2000e-004**	**0.0000**	**2.5533**	**2.5533**	**1.7000e-004**	**0.0000**	**2.5574**

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	7.5000e-004	6.1000e-004	4.9400e-003	1.0000e-005	7.7000e-004	1.0000e-005	7.8000e-004	2.1000e-004	1.0000e-005	2.1000e-004	0.0000	0.6732	0.6732	4.0000e-005	0.0000	0.6742
Total	**7.5000e-004**	**6.1000e-004**	**4.9400e-003**	**1.0000e-005**	**7.7000e-004**	**1.0000e-005**	**7.8000e-004**	**2.1000e-004**	**1.0000e-005**	**2.1000e-004**	**0.0000**	**0.6732**	**0.6732**	**4.0000e-005**	**0.0000**	**0.6742**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	1.1639					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.0500e-003	0.0141	0.0181	3.0000e-005		8.2000e-004	8.2000e-004		8.2000e-004	8.2000e-004	0.0000	2.5533	2.5533	1.7000e-004	0.0000	2.5574
Total	**1.1659**	**0.0141**	**0.0181**	**3.0000e-005**		**8.2000e-004**	**8.2000e-004**		**8.2000e-004**	**8.2000e-004**	**0.0000**	**2.5533**	**2.5533**	**1.7000e-004**	**0.0000**	**2.5574**

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	7.5000e-004	6.1000e-004	4.9400e-003	1.0000e-005	7.7000e-004	1.0000e-005	7.8000e-004	2.1000e-004	1.0000e-005	2.1000e-004	0.0000	0.6732	0.6732	4.0000e-005	0.0000	0.6742
Total	**7.5000e-004**	**6.1000e-004**	**4.9400e-003**	**1.0000e-005**	**7.7000e-004**	**1.0000e-005**	**7.8000e-004**	**2.1000e-004**	**1.0000e-005**	**2.1000e-004**	**0.0000**	**0.6732**	**0.6732**	**4.0000e-005**	**0.0000**	**0.6742**

3.4 Paving - 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	0.0110	0.1113	0.1458	2.3000e-004		5.6800e-003	5.6800e-003		5.2200e-003	5.2200e-003	0.0000	20.0276	20.0276	6.4800e-003	0.0000	20.1895
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0110**	**0.1113**	**0.1458**	**2.3000e-004**		**5.6800e-003**	**5.6800e-003**		**5.2200e-003**	**5.2200e-003**	**0.0000**	**20.0276**	**20.0276**	**6.4800e-003**	**0.0000**	**20.1895**

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	1.1200e-003	9.2000e-004	7.4100e-003	1.0000e-005	1.1600e-003	1.0000e-005	1.1700e-003	3.1000e-004	1.0000e-005	3.2000e-004	0.0000	1.0098	1.0098	6.0000e-005	0.0000	1.0114
Total	**1.1200e-003**	**9.2000e-004**	**7.4100e-003**	**1.0000e-005**	**1.1600e-003**	**1.0000e-005**	**1.1700e-003**	**3.1000e-004**	**1.0000e-005**	**3.2000e-004**	**0.0000**	**1.0098**	**1.0098**	**6.0000e-005**	**0.0000**	**1.0114**

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	0.0110	0.1113	0.1458	2.3000e-004		5.6800e-003	5.6800e-003		5.2200e-003	5.2200e-003	0.0000	20.0275	20.0275	6.4800e-003	0.0000	20.1895
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0110**	**0.1113**	**0.1458**	**2.3000e-004**		**5.6800e-003**	**5.6800e-003**		**5.2200e-003**	**5.2200e-003**	**0.0000**	**20.0275**	**20.0275**	**6.4800e-003**	**0.0000**	**20.1895**

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	1.1200e-003	9.2000e-004	7.4100e-003	1.0000e-005	1.1600e-003	1.0000e-005	1.1700e-003	3.1000e-004	1.0000e-005	3.2000e-004	0.0000	1.0098	1.0098	6.0000e-005	0.0000	1.0114
Total	**1.1200e-003**	**9.2000e-004**	**7.4100e-003**	**1.0000e-005**	**1.1600e-003**	**1.0000e-005**	**1.1700e-003**	**3.1000e-004**	**1.0000e-005**	**3.2000e-004**	**0.0000**	**1.0098**	**1.0098**	**6.0000e-005**	**0.0000**	**1.0114**

3.5 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	0.1901	1.7432	1.6575	2.6900e-003		0.0959	0.0959		0.0901	0.0901	0.0000	231.6373	231.6373	0.0559	0.0000	233.0344
Total	**0.1901**	**1.7432**	**1.6575**	**2.6900e-003**		**0.0959**	**0.0959**		**0.0901**	**0.0901**	**0.0000**	**231.6373**	**231.6373**	**0.0559**	**0.0000**	**233.0344**

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	3.9000e-003	0.0988	0.0266	2.2000e-004	5.1300e-003	4.2000e-004	5.5500e-003	1.4900e-003	4.0000e-004	1.8900e-003	0.0000	21.0859	21.0859	1.0200e-003	0.0000	21.1113
Worker	0.0399	0.0343	0.2784	3.9000e-004	0.0393	3.8000e-004	0.0397	0.0105	3.5000e-004	0.0108	0.0000	35.3771	35.3771	2.3700e-003	0.0000	35.4364
Total	**0.0438**	**0.1330**	**0.3050**	**6.1000e-004**	**0.0445**	**8.0000e-004**	**0.0453**	**0.0120**	**7.5000e-004**	**0.0127**	**0.0000**	**56.4630**	**56.4630**	**3.3900e-003**	**0.0000**	**56.5477**

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	0.1901	1.7432	1.6575	2.6900e-003		0.0959	0.0959		0.0901	0.0901	0.0000	231.6370	231.6370	0.0559	0.0000	233.0341
Total	**0.1901**	**1.7432**	**1.6575**	**2.6900e-003**		**0.0959**	**0.0959**		**0.0901**	**0.0901**	**0.0000**	**231.6370**	**231.6370**	**0.0559**	**0.0000**	**233.0341**

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	3.9000e-003	0.0988	0.0266	2.2000e-004	5.1300e-003	4.2000e-004	5.5500e-003	1.4900e-003	4.0000e-004	1.8900e-003	0.0000	21.0859	21.0859	1.0200e-003	0.0000	21.1113
Worker	0.0399	0.0343	0.2784	3.9000e-004	0.0393	3.8000e-004	0.0397	0.0105	3.5000e-004	0.0108	0.0000	35.3771	35.3771	2.3700e-003	0.0000	35.4364
Total	**0.0438**	**0.1330**	**0.3050**	**6.1000e-004**	**0.0445**	**8.0000e-004**	**0.0453**	**0.0120**	**7.5000e-004**	**0.0127**	**0.0000**	**56.4630**	**56.4630**	**3.3900e-003**	**0.0000**	**56.5477**

3.5 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	0.0853	0.7808	0.8182	1.3500e-003		0.0405	0.0405		0.0381	0.0381	0.0000	115.8626	115.8626	0.0278	0.0000	116.5566
Total	**0.0853**	**0.7808**	**0.8182**	**1.3500e-003**		**0.0405**	**0.0405**		**0.0381**	**0.0381**	**0.0000**	**115.8626**	**115.8626**	**0.0278**	**0.0000**	**116.5566**

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	1.8100e-003	0.0469	0.0122	1.1000e-004	2.5600e-003	1.9000e-004	2.7500e-003	7.4000e-004	1.8000e-004	9.2000e-004	0.0000	10.4698	10.4698	4.9000e-004	0.0000	10.4821
Worker	0.0190	0.0156	0.1260	1.9000e-004	0.0197	1.8000e-004	0.0198	5.2400e-003	1.7000e-004	5.4100e-003	0.0000	17.1664	17.1664	1.0700e-003	0.0000	17.1931
Total	**0.0208**	**0.0625**	**0.1382**	**3.0000e-004**	**0.0222**	**3.7000e-004**	**0.0226**	**5.9800e-003**	**3.5000e-004**	**6.3300e-003**	**0.0000**	**27.6363**	**27.6363**	**1.5600e-003**	**0.0000**	**27.6753**

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	0.0853	0.7808	0.8182	1.3500e-003		0.0405	0.0405		0.0381	0.0381	0.0000	115.8625	115.8625	0.0278	0.0000	116.5564
Total	**0.0853**	**0.7808**	**0.8182**	**1.3500e-003**		**0.0405**	**0.0405**		**0.0381**	**0.0381**	**0.0000**	**115.8625**	**115.8625**	**0.0278**	**0.0000**	**116.5564**

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	1.8100e-003	0.0469	0.0122	1.1000e-004	2.5600e-003	1.9000e-004	2.7500e-003	7.4000e-004	1.8000e-004	9.2000e-004	0.0000	10.4698	10.4698	4.9000e-004	0.0000	10.4821
Worker	0.0190	0.0156	0.1260	1.9000e-004	0.0197	1.8000e-004	0.0198	5.2400e-003	1.7000e-004	5.4100e-003	0.0000	17.1664	17.1664	1.0700e-003	0.0000	17.1931
Total	**0.0208**	**0.0625**	**0.1382**	**3.0000e-004**	**0.0222**	**3.7000e-004**	**0.0226**	**5.9800e-003**	**3.5000e-004**	**6.3300e-003**	**0.0000**	**27.6363**	**27.6363**	**1.5600e-003**	**0.0000**	**27.6753**

3.6 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					0.1301	0.0000	0.1301	0.0540	0.0000	0.0540	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0629	0.6960	0.4632	9.3000e-004		0.0298	0.0298		0.0274	0.0274	0.0000	81.7425	81.7425	0.0264	0.0000	82.4034
Total	**0.0629**	**0.6960**	**0.4632**	**9.3000e-004**	**0.1301**	**0.0298**	**0.1599**	**0.0540**	**0.0274**	**0.0814**	**0.0000**	**81.7425**	**81.7425**	**0.0264**	**0.0000**	**82.4034**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.3500e-003	2.0100e-003	0.0164	2.0000e-005	2.3100e-003	2.0000e-005	2.3400e-003	6.2000e-004	2.0000e-005	6.4000e-004	0.0000	2.0810	2.0810	1.4000e-004	0.0000	2.0845

Total	**2.3500e-003**	**2.0100e-003**	**0.0164**	**2.0000e-005**	**2.3100e-003**	**2.0000e-005**	**2.3400e-003**	**6.2000e-004**	**2.0000e-005**	**6.4000e-004**	**0.0000**	**2.0810**	**2.0810**	**1.4000e-004**	**0.0000**	**2.0845**

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					0.1301	0.0000	0.1301	0.0540	0.0000	0.0540	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0629	0.6960	0.4632	9.3000e-004		0.0298	0.0298		0.0274	0.0274	0.0000	81.7424	81.7424	0.0264	0.0000	82.4033
Total	**0.0629**	**0.6960**	**0.4632**	**9.3000e-004**	**0.1301**	**0.0298**	**0.1599**	**0.0540**	**0.0274**	**0.0814**	**0.0000**	**81.7424**	**81.7424**	**0.0264**	**0.0000**	**82.4033**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.3500e-003	2.0100e-003	0.0164	2.0000e-005	2.3100e-003	2.0000e-005	2.3400e-003	6.2000e-004	2.0000e-005	6.4000e-004	0.0000	2.0810	2.0810	1.4000e-004	0.0000	2.0845
Total	**2.3500e-003**	**2.0100e-003**	**0.0164**	**2.0000e-005**	**2.3100e-003**	**2.0000e-005**	**2.3400e-003**	**6.2000e-004**	**2.0000e-005**	**6.4000e-004**	**0.0000**	**2.0810**	**2.0810**	**1.4000e-004**	**0.0000**	**2.0845**

3.7 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					0.2710	0.0000	0.2710	0.1490	0.0000	0.1490	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0583	0.6075	0.3173	5.7000e-004		0.0307	0.0307		0.0282	0.0282	0.0000	50.1536	50.1536	0.0162	0.0000	50.5591
Total	**0.0583**	**0.6075**	**0.3173**	**5.7000e-004**	**0.2710**	**0.0307**	**0.3017**	**0.1490**	**0.0282**	**0.1772**	**0.0000**	**50.1536**	**50.1536**	**0.0162**	**0.0000**	**50.5591**

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	1.6300e-003	0.0546	8.9500e-003	1.5000e-004	3.2900e-003	2.7000e-004	3.5600e-003	9.1000e-004	2.6000e-004	1.1600e-003	0.0000	14.3980	14.3980	3.3000e-004	0.0000	14.4062
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.1100e-003	1.8100e-003	0.0147	2.0000e-005	2.0800e-003	2.0000e-005	2.1000e-003	5.5000e-004	2.0000e-005	5.7000e-004	0.0000	1.8729	1.8729	1.3000e-004	0.0000	1.8761
Total	**3.7400e-003**	**0.0564**	**0.0237**	**1.7000e-004**	**5.3700e-003**	**2.9000e-004**	**5.6600e-003**	**1.4600e-003**	**2.8000e-004**	**1.7300e-003**	**0.0000**	**16.2709**	**16.2709**	**4.6000e-004**	**0.0000**	**16.2823**

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					0.2710	0.0000	0.2710	0.1490	0.0000	0.1490	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0583	0.6075	0.3173	5.7000e-004		0.0307	0.0307		0.0282	0.0282	0.0000	50.1535	50.1535	0.0162	0.0000	50.5590

Total	**0.0583**	**0.6075**	**0.3173**	**5.7000e-004**	**0.2710**	**0.0307**	**0.3017**	**0.1490**	**0.0282**	**0.1772**	**0.0000**	**50.1535**	**50.1535**	**0.0162**	**0.0000**	**50.5590**

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	1.6300e-003	0.0546	8.9500e-003	1.5000e-004	3.2900e-003	2.7000e-004	3.5600e-003	9.1000e-004	2.6000e-004	1.1600e-003	0.0000	14.3980	14.3980	3.3000e-004	0.0000	14.4062
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.1100e-003	1.8100e-003	0.0147	2.0000e-005	2.0800e-003	2.0000e-005	2.1000e-003	5.5000e-004	2.0000e-005	5.7000e-004	0.0000	1.8729	1.8729	1.3000e-004	0.0000	1.8761
Total	**3.7400e-003**	**0.0564**	**0.0237**	**1.7000e-004**	**5.3700e-003**	**2.9000e-004**	**5.6600e-003**	**1.4600e-003**	**2.8000e-004**	**1.7300e-003**	**0.0000**	**16.2709**	**16.2709**	**4.6000e-004**	**0.0000**	**16.2823**

MaKay Ranch Phase 3 and Phase 4 - Humboldt County, Annual

MaKay Ranch Phase 3 and Phase 4

Humboldt County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	86.00	Dwelling Unit	8.40	154,800.00	246
Apartments Low Rise	44.00	Dwelling Unit	7.60	44,000.00	126
Office Park	22.00	1000sqft	0.51	22,000.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	103
Climate Zone	1			**Operational Year**	2025
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Acreages based on Table 2.2-2 in the Project Description

Construction Phase - Schedule based on Table 2.2-2 in PD

Trips and VMT - 16 acres of disturbance x 200 trees per acre = 3,200 tree removed. Assuming 10 trees hauled per truck load = 320 total haul trips

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	300.00	680.00
tblConstructionPhase	NumDays	10.00	35.00
tblConstructionPhase	PhaseEndDate	1/12/2024	6/27/2025

tblConstructionPhase	PhaseEndDate	11/17/2023	5/2/2025
tblConstructionPhase	PhaseEndDate	12/15/2023	5/30/2025
tblConstructionPhase	PhaseEndDate	8/12/2022	8/19/2022
tblConstructionPhase	PhaseStartDate	12/16/2023	6/2/2025
tblConstructionPhase	PhaseStartDate	11/18/2023	5/5/2025
tblConstructionPhase	PhaseStartDate	7/30/2022	7/4/2022
tblLandUse	LotAcreage	27.92	8.40
tblLandUse	LotAcreage	2.75	7.60
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	HaulingTripNumber	0.00	320.00

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					
2022	0.2063	1.8516	1.5969	3.1800e-003	0.4893	0.0819	0.5711	0.2393	0.0759	0.3152	0.0000	280.3471	280.3471	0.0679	0.0000	282.0434
2023	0.3046	2.1537	2.7510	5.1000e-003	0.1227	0.0922	0.2149	0.0330	0.0868	0.1198	0.0000	448.3808	448.3808	0.0789	0.0000	450.3523
2024	0.2889	2.0352	2.7052	5.1100e-003	0.1236	0.0816	0.2052	0.0333	0.0767	0.1100	0.0000	448.5149	448.5149	0.0784	0.0000	450.4757
2025	3.4692	0.7366	1.0694	1.9900e-003	0.0450	0.0283	0.0733	0.0121	0.0266	0.0387	0.0000	174.8275	174.8275	0.0328	0.0000	175.6473
Maximum	**3.4692**	**2.1537**	**2.7510**	**5.1100e-003**	**0.4893**	**0.0922**	**0.5711**	**0.2393**	**0.0868**	**0.3152**	**0.0000**	**448.5149**	**448.5149**	**0.0789**	**0.0000**	**450.4757**

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					
2022	0.2063	1.8516	1.5969	3.1800e-003	0.4893	0.0819	0.5711	0.2393	0.0759	0.3152	0.0000	280.3469	280.3469	0.0679	0.0000	282.0432
2023	0.3046	2.1537	2.7510	5.1000e-003	0.1227	0.0922	0.2149	0.0330	0.0868	0.1198	0.0000	448.3805	448.3805	0.0789	0.0000	450.3519
2024	0.2889	2.0352	2.7052	5.1100e-003	0.1236	0.0816	0.2052	0.0333	0.0767	0.1100	0.0000	448.5146	448.5146	0.0784	0.0000	450.4753
2025	3.4692	0.7366	1.0694	1.9900e-003	0.0450	0.0283	0.0733	0.0121	0.0266	0.0387	0.0000	174.8273	174.8273	0.0328	0.0000	175.6471
Maximum	**3.4692**	**2.1537**	**2.7510**	**5.1100e-003**	**0.4893**	**0.0922**	**0.5711**	**0.2393**	**0.0868**	**0.3152**	**0.0000**	**448.5146**	**448.5146**	**0.0789**	**0.0000**	**450.4753**

	ROG	NOx	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	**7-4-2022**	**10-3-2022**	1.3750	1.3750
2	**10-4-2022**	**1-3-2023**	0.6873	0.6873
3	**1-4-2023**	**4-3-2023**	0.6129	0.6129
4	**4-4-2023**	**7-3-2023**	0.6110	0.6110
5	**7-4-2023**	**10-3-2023**	0.6180	0.6180
6	**10-4-2023**	**1-3-2024**	0.6256	0.6256
7	**1-4-2024**	**4-3-2024**	0.5815	0.5815
8	**4-4-2024**	**7-3-2024**	0.5733	0.5733
9	**7-4-2024**	**10-3-2024**	0.5799	0.5799
10	**10-4-2024**	**1-3-2025**	0.5868	0.5868
11	**1-4-2025**	**4-3-2025**	0.5365	0.5365
12	**4-4-2025**	**7-3-2025**	3.3992	3.3992
		Highest	3.3992	3.3992

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	7/4/2022	8/19/2022	5	35	
2	Grading	Grading	8/13/2022	9/23/2022	5	30	
3	Building Construction	Building Construction	9/24/2022	5/2/2025	5	680	
4	Paving	Paving	5/5/2025	5/30/2025	5	20	
5	Architectural Coating	Architectural Coating	6/2/2025	6/27/2025	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 75

Acres of Paving: 0

Residential Indoor: 402,570; Residential Outdoor: 134,190; Non-Residential Indoor: 33,000; Non-Residential Outdoor: 11,000; Striped

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Grading	Excavators	2	8.00	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	2	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
Grading	Scrapers	2	8.00	367	0.48
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	320.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	70.00	18.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	14.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 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					
Fugitive Dust					0.3162	0.0000	0.3162	0.1738	0.0000	0.1738	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0555	0.5790	0.3447	6.7000e-004		0.0282	0.0282		0.0260	0.0260	0.0000	58.5189	58.5189	0.0189	0.0000	58.9921
Total	**0.0555**	**0.5790**	**0.3447**	**6.7000e-004**	**0.3162**	**0.0282**	**0.3444**	**0.1738**	**0.0260**	**0.1998**	**0.0000**	**58.5189**	**58.5189**	**0.0189**	**0.0000**	**58.9921**

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	1.3400e-003	0.0450	7.5300e-003	1.3000e-004	2.6300e-003	2.0000e-004	2.8300e-003	7.2000e-004	1.9000e-004	9.1000e-004	0.0000	11.9250	11.9250	3.6000e-004	0.0000	11.9340

Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.3600e-003	2.8600e-003	0.0224	4.0000e-005	3.7800e-003	3.0000e-005	3.8100e-003	1.0100e-003	3.0000e-005	1.0400e-003	0.0000	3.2636	3.2636	2.0000e-004	0.0000	3.2685
Total	**4.7000e-003**	**0.0479**	**0.0299**	**1.7000e-004**	**6.4100e-003**	**2.3000e-004**	**6.6400e-003**	**1.7300e-003**	**2.2000e-004**	**1.9500e-003**	**0.0000**	**15.1885**	**15.1885**	**5.6000e-004**	**0.0000**	**15.2024**

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					0.3162	0.0000	0.3162	0.1738	0.0000	0.1738	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0555	0.5790	0.3447	6.7000e-004		0.0282	0.0282		0.0260	0.0260	0.0000	58.5189	58.5189	0.0189	0.0000	58.9920
Total	**0.0555**	**0.5790**	**0.3447**	**6.7000e-004**	**0.3162**	**0.0282**	**0.3444**	**0.1738**	**0.0260**	**0.1998**	**0.0000**	**58.5189**	**58.5189**	**0.0189**	**0.0000**	**58.9920**

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	1.3400e-003	0.0450	7.5300e-003	1.3000e-004	2.6300e-003	2.0000e-004	2.8300e-003	7.2000e-004	1.9000e-004	9.1000e-004	0.0000	11.9250	11.9250	3.6000e-004	0.0000	11.9340
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.3600e-003	2.8600e-003	0.0224	4.0000e-005	3.7800e-003	3.0000e-005	3.8100e-003	1.0100e-003	3.0000e-005	1.0400e-003	0.0000	3.2636	3.2636	2.0000e-004	0.0000	3.2685
Total	**4.7000e-003**	**0.0479**	**0.0299**	**1.7000e-004**	**6.4100e-003**	**2.3000e-004**	**6.6400e-003**	**1.7300e-003**	**2.2000e-004**	**1.9500e-003**	**0.0000**	**15.1885**	**15.1885**	**5.6000e-004**	**0.0000**	**15.2024**

3.3 Grading - 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					
Fugitive Dust					0.1301	0.0000	0.1301	0.0540	0.0000	0.0540	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0544	0.5827	0.4356	9.3000e-004		0.0245	0.0245		0.0226	0.0226	0.0000	81.8019	81.8019	0.0265	0.0000	82.4633
Total	**0.0544**	**0.5827**	**0.4356**	**9.3000e-004**	**0.1301**	**0.0245**	**0.1546**	**0.0540**	**0.0226**	**0.0765**	**0.0000**	**81.8019**	**81.8019**	**0.0265**	**0.0000**	**82.4633**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.2000e-003	2.7300e-003	0.0213	3.0000e-005	3.6000e-003	3.0000e-005	3.6300e-003	9.6000e-004	3.0000e-005	9.9000e-004	0.0000	3.1081	3.1081	1.9000e-004	0.0000	3.1128
Total	**3.2000e-003**	**2.7300e-003**	**0.0213**	**3.0000e-005**	**3.6000e-003**	**3.0000e-005**	**3.6300e-003**	**9.6000e-004**	**3.0000e-005**	**9.9000e-004**	**0.0000**	**3.1081**	**3.1081**	**1.9000e-004**	**0.0000**	**3.1128**

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					0.1301	0.0000	0.1301	0.0540	0.0000	0.0540	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Off-Road	0.0544	0.5827	0.4356	9.3000e-004		0.0245	0.0245		0.0226	0.0226	0.0000	81.8018	81.8018	0.0265	0.0000	82.4632
Total	**0.0544**	**0.5827**	**0.4356**	**9.3000e-004**	**0.1301**	**0.0245**	**0.1546**	**0.0540**	**0.0226**	**0.0765**	**0.0000**	**81.8018**	**81.8018**	**0.0265**	**0.0000**	**82.4632**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.2000e-003	2.7300e-003	0.0213	3.0000e-005	3.6000e-003	3.0000e-005	3.6300e-003	9.6000e-004	3.0000e-005	9.9000e-004	0.0000	3.1081	3.1081	1.9000e-004	0.0000	3.1128
Total	**3.2000e-003**	**2.7300e-003**	**0.0213**	**3.0000e-005**	**3.6000e-003**	**3.0000e-005**	**3.6300e-003**	**9.6000e-004**	**3.0000e-005**	**9.9000e-004**	**0.0000**	**3.1081**	**3.1081**	**1.9000e-004**	**0.0000**	**3.1128**

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	0.0597	0.5466	0.5727	9.4000e-004		0.0283	0.0283		0.0266	0.0266	0.0000	81.1038	81.1038	0.0194	0.0000	81.5896
Total	**0.0597**	**0.5466**	**0.5727**	**9.4000e-004**		**0.0283**	**0.0283**		**0.0266**	**0.0266**	**0.0000**	**81.1038**	**81.1038**	**0.0194**	**0.0000**	**81.5896**

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	2.7000e-003	0.0705	0.0185	1.6000e-004	3.6500e-003	2.7000e-004	3.9200e-003	1.0600e-003	2.6000e-004	1.3200e-003	0.0000	15.2426	15.2426	7.7000e-004	0.0000	15.2618
Worker	0.0261	0.0223	0.1741	2.8000e-004	0.0294	2.6000e-004	0.0296	7.8300e-003	2.4000e-004	8.0700e-003	0.0000	25.3832	25.3832	1.5300e-003	0.0000	25.4214
Total	**0.0288**	**0.0928**	**0.1926**	**4.4000e-004**	**0.0330**	**5.3000e-004**	**0.0336**	**8.8900e-003**	**5.0000e-004**	**9.3900e-003**	**0.0000**	**40.6258**	**40.6258**	**2.3000e-003**	**0.0000**	**40.6832**

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	0.0597	0.5466	0.5727	9.4000e-004		0.0283	0.0283		0.0266	0.0266	0.0000	81.1037	81.1037	0.0194	0.0000	81.5895
Total	**0.0597**	**0.5466**	**0.5727**	**9.4000e-004**		**0.0283**	**0.0283**		**0.0266**	**0.0266**	**0.0000**	**81.1037**	**81.1037**	**0.0194**	**0.0000**	**81.5895**

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	2.7000e-003	0.0705	0.0185	1.6000e-004	3.6500e-003	2.7000e-004	3.9200e-003	1.0600e-003	2.6000e-004	1.3200e-003	0.0000	15.2426	15.2426	7.7000e-004	0.0000	15.2618
Worker	0.0261	0.0223	0.1741	2.8000e-004	0.0294	2.6000e-004	0.0296	7.8300e-003	2.4000e-004	8.0700e-003	0.0000	25.3832	25.3832	1.5300e-003	0.0000	25.4214
Total	**0.0288**	**0.0928**	**0.1926**	**4.4000e-004**	**0.0330**	**5.3000e-004**	**0.0336**	**8.8900e-003**	**5.0000e-004**	**9.3900e-003**	**0.0000**	**40.6258**	**40.6258**	**2.3000e-003**	**0.0000**	**40.6832**

3.4 Building Construction - 2023

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	0.2045	1.8700	2.1117	3.5000e-003		0.0910	0.0910		0.0856	0.0856	0.0000	301.3462	301.3462	0.0717	0.0000	303.1383
Total	**0.2045**	**1.8700**	**2.1117**	**3.5000e-003**		**0.0910**	**0.0910**		**0.0856**	**0.0856**	**0.0000**	**301.3462**	**301.3462**	**0.0717**	**0.0000**	**303.1383**

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	7.5100e-003	0.2087	0.0592	5.9000e-004	0.0136	3.7000e-004	0.0139	3.9400e-003	3.5000e-004	4.2900e-003	0.0000	55.7250	55.7250	2.1000e-003	0.0000	55.7774
Worker	0.0926	0.0749	0.5801	1.0100e-003	0.1091	9.1000e-004	0.1100	0.0291	8.4000e-004	0.0299	0.0000	91.3097	91.3097	5.0700e-003	0.0000	91.4365
Total	**0.1001**	**0.2836**	**0.6393**	**1.6000e-003**	**0.1227**	**1.2800e-003**	**0.1240**	**0.0330**	**1.1900e-003**	**0.0342**	**0.0000**	**147.0346**	**147.0346**	**7.1700e-003**	**0.0000**	**147.2140**

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	0.2045	1.8700	2.1117	3.5000e-003		0.0910	0.0910		0.0856	0.0856	0.0000	301.3458	301.3458	0.0717	0.0000	303.1380
Total	**0.2045**	**1.8700**	**2.1117**	**3.5000e-003**		**0.0910**	**0.0910**		**0.0856**	**0.0856**	**0.0000**	**301.3458**	**301.3458**	**0.0717**	**0.0000**	**303.1380**

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	7.5100e-003	0.2087	0.0592	5.9000e-004	0.0136	3.7000e-004	0.0139	3.9400e-003	3.5000e-004	4.2900e-003	0.0000	55.7250	55.7250	2.1000e-003	0.0000	55.7774
Worker	0.0926	0.0749	0.5801	1.0100e-003	0.1091	9.1000e-004	0.1100	0.0291	8.4000e-004	0.0299	0.0000	91.3097	91.3097	5.0700e-003	0.0000	91.4365
Total	**0.1001**	**0.2836**	**0.6393**	**1.6000e-003**	**0.1227**	**1.2800e-003**	**0.1240**	**0.0330**	**1.1900e-003**	**0.0342**	**0.0000**	**147.0346**	**147.0346**	**7.1700e-003**	**0.0000**	**147.2140**

3.4 Building Construction - 2024

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	0.1928	1.7611	2.1179	3.5300e-003		0.0803	0.0803		0.0756	0.0756	0.0000	303.7223	303.7223	0.0718	0.0000	305.5179

Total	**0.1928**	**1.7611**	**2.1179**	**3.5300e-003**		**0.0803**	**0.0803**		**0.0756**	**0.0756**	**0.0000**	**303.7223**	**303.7223**	**0.0718**	**0.0000**	**305.5179**

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	7.2200e-003	0.2056	0.0558	5.9000e-004	0.0137	3.4000e-004	0.0140	3.9700e-003	3.3000e-004	4.3000e-003	0.0000	55.8307	55.8307	2.0600e-003	0.0000	55.8822
Worker	0.0889	0.0685	0.5316	9.9000e-004	0.1099	8.7000e-004	0.1108	0.0293	8.0000e-004	0.0301	0.0000	88.9619	88.9619	4.5500e-003	0.0000	89.0756
Total	**0.0961**	**0.2741**	**0.5874**	**1.5800e-003**	**0.1236**	**1.2100e-003**	**0.1248**	**0.0333**	**1.1300e-003**	**0.0344**	**0.0000**	**144.7926**	**144.7926**	**6.6100e-003**	**0.0000**	**144.9578**

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	0.1928	1.7611	2.1179	3.5300e-003		0.0803	0.0803		0.0756	0.0756	0.0000	303.7220	303.7220	0.0718	0.0000	305.5175
Total	**0.1928**	**1.7611**	**2.1179**	**3.5300e-003**		**0.0803**	**0.0803**		**0.0756**	**0.0756**	**0.0000**	**303.7220**	**303.7220**	**0.0718**	**0.0000**	**305.5175**

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	7.2200e-003	0.2056	0.0558	5.9000e-004	0.0137	3.4000e-004	0.0140	3.9700e-003	3.3000e-004	4.3000e-003	0.0000	55.8307	55.8307	2.0600e-003	0.0000	55.8822
Worker	0.0889	0.0685	0.5316	9.9000e-004	0.1099	8.7000e-004	0.1108	0.0293	8.0000e-004	0.0301	0.0000	88.9619	88.9619	4.5500e-003	0.0000	89.0756
Total	**0.0961**	**0.2741**	**0.5874**	**1.5800e-003**	**0.1236**	**1.2100e-003**	**0.1248**	**0.0333**	**1.1300e-003**	**0.0344**	**0.0000**	**144.7926**	**144.7926**	**6.6100e-003**	**0.0000**	**144.9578**

3.4 Building Construction - 2025

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	0.0602	0.5487	0.7077	1.1900e-003		0.0232	0.0232		0.0218	0.0218	0.0000	102.0446	102.0446	0.0240	0.0000	102.6443
Total	**0.0602**	**0.5487**	**0.7077**	**1.1900e-003**		**0.0232**	**0.0232**		**0.0218**	**0.0218**	**0.0000**	**102.0446**	**102.0446**	**0.0240**	**0.0000**	**102.6443**

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	2.3200e-003	0.0676	0.0176	2.0000e-004	4.5900e-003	1.1000e-004	4.7000e-003	1.3300e-003	1.0000e-004	1.4400e-003	0.0000	18.6386	18.6386	6.8000e-004	0.0000	18.6555
Worker	0.0284	0.0211	0.1647	3.2000e-004	0.0369	2.8000e-004	0.0372	9.8400e-003	2.6000e-004	0.0101	0.0000	28.8550	28.8550	1.3800e-003	0.0000	28.8896
Total	**0.0307**	**0.0887**	**0.1823**	**5.2000e-004**	**0.0415**	**3.9000e-004**	**0.0419**	**0.0112**	**3.6000e-004**	**0.0115**	**0.0000**	**47.4935**	**47.4935**	**2.0600e-003**	**0.0000**	**47.5450**

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	0.0602	0.5487	0.7077	1.1900e-003		0.0232	0.0232		0.0218	0.0218	0.0000	102.0444	102.0444	0.0240	0.0000	102.6441
Total	**0.0602**	**0.5487**	**0.7077**	**1.1900e-003**		**0.0232**	**0.0232**		**0.0218**	**0.0218**	**0.0000**	**102.0444**	**102.0444**	**0.0240**	**0.0000**	**102.6441**

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	2.3200e-003	0.0676	0.0176	2.0000e-004	4.5900e-003	1.1000e-004	4.7000e-003	1.3300e-003	1.0000e-004	1.4400e-003	0.0000	18.6386	18.6386	6.8000e-004	0.0000	18.6555
Worker	0.0284	0.0211	0.1647	3.2000e-004	0.0369	2.8000e-004	0.0372	9.8400e-003	2.6000e-004	0.0101	0.0000	28.8550	28.8550	1.3800e-003	0.0000	28.8896
Total	**0.0307**	**0.0887**	**0.1823**	**5.2000e-004**	**0.0415**	**3.9000e-004**	**0.0419**	**0.0112**	**3.6000e-004**	**0.0115**	**0.0000**	**47.4935**	**47.4935**	**2.0600e-003**	**0.0000**	**47.5450**

3.5 Paving - 2025

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	9.1500e-003	0.0858	0.1458	2.3000e-004		4.1900e-003	4.1900e-003		3.8500e-003	3.8500e-003	0.0000	20.0193	20.0193	6.4700e-003	0.0000	20.1811
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**9.1500e-003**	**0.0858**	**0.1458**	**2.3000e-004**		**4.1900e-003**	**4.1900e-003**		**3.8500e-003**	**3.8500e-003**	**0.0000**	**20.0193**	**20.0193**	**6.4700e-003**	**0.0000**	**20.1811**

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	1.3800e-003	1.0300e-003	8.0200e-003	2.0000e-005	1.8000e-003	1.0000e-005	1.8100e-003	4.8000e-004	1.0000e-005	4.9000e-004	0.0000	1.4053	1.4053	7.0000e-005	0.0000	1.4070
Total	**1.3800e-003**	**1.0300e-003**	**8.0200e-003**	**2.0000e-005**	**1.8000e-003**	**1.0000e-005**	**1.8100e-003**	**4.8000e-004**	**1.0000e-005**	**4.9000e-004**	**0.0000**	**1.4053**	**1.4053**	**7.0000e-005**	**0.0000**	**1.4070**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	9.1500e-003	0.0858	0.1458	2.3000e-004		4.1900e-003	4.1900e-003		3.8500e-003	3.8500e-003	0.0000	20.0192	20.0192	6.4700e-003	0.0000	20.1811

Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**9.1500e-003**	**0.0858**	**0.1458**	**2.3000e-004**		**4.1900e-003**	**4.1900e-003**		**3.8500e-003**	**3.8500e-003**	**0.0000**	**20.0192**	**20.0192**	**6.4700e-003**	**0.0000**	**20.1811**

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	1.3800e-003	1.0300e-003	8.0200e-003	2.0000e-005	1.8000e-003	1.0000e-005	1.8100e-003	4.8000e-004	1.0000e-005	4.9000e-004	0.0000	1.4053	1.4053	7.0000e-005	0.0000	1.4070
Total	**1.3800e-003**	**1.0300e-003**	**8.0200e-003**	**2.0000e-005**	**1.8000e-003**	**1.0000e-005**	**1.8100e-003**	**4.8000e-004**	**1.0000e-005**	**4.9000e-004**	**0.0000**	**1.4053**	**1.4053**	**7.0000e-005**	**0.0000**	**1.4070**

3.6 Architectural Coating - 2025

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	3.3648					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.7100e-003	0.0115	0.0181	3.0000e-005		5.2000e-004	5.2000e-004		5.2000e-004	5.2000e-004	0.0000	2.5533	2.5533	1.4000e-004	0.0000	2.5567
Total	**3.3665**	**0.0115**	**0.0181**	**3.0000e-005**		**5.2000e-004**	**5.2000e-004**		**5.2000e-004**	**5.2000e-004**	**0.0000**	**2.5533**	**2.5533**	**1.4000e-004**	**0.0000**	**2.5567**

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	1.2900e-003	9.6000e-004	7.4900e-003	1.0000e-005	1.6800e-003	1.0000e-005	1.6900e-003	4.5000e-004	1.0000e-005	4.6000e-004	0.0000	1.3116	1.3116	6.0000e-005	0.0000	1.3132
Total	**1.2900e-003**	**9.6000e-004**	**7.4900e-003**	**1.0000e-005**	**1.6800e-003**	**1.0000e-005**	**1.6900e-003**	**4.5000e-004**	**1.0000e-005**	**4.6000e-004**	**0.0000**	**1.3116**	**1.3116**	**6.0000e-005**	**0.0000**	**1.3132**

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	3.3648					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.7100e-003	0.0115	0.0181	3.0000e-005		5.2000e-004	5.2000e-004		5.2000e-004	5.2000e-004	0.0000	2.5533	2.5533	1.4000e-004	0.0000	2.5567
Total	**3.3665**	**0.0115**	**0.0181**	**3.0000e-005**		**5.2000e-004**	**5.2000e-004**		**5.2000e-004**	**5.2000e-004**	**0.0000**	**2.5533**	**2.5533**	**1.4000e-004**	**0.0000**	**2.5567**

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	1.2900e-003	9.6000e-004	7.4900e-003	1.0000e-005	1.6800e-003	1.0000e-005	1.6900e-003	4.5000e-004	1.0000e-005	4.6000e-004	0.0000	1.3116	1.3116	6.0000e-005	0.0000	1.3132
Total	**1.2900e-003**	**9.6000e-004**	**7.4900e-003**	**1.0000e-005**	**1.6800e-003**	**1.0000e-005**	**1.6900e-003**	**4.5000e-004**	**1.0000e-005**	**4.6000e-004**	**0.0000**	**1.3116**	**1.3116**	**6.0000e-005**	**0.0000**	**1.3132**

McKay Ranch Phase 5 and Phase 6 - Humboldt County, Annual

McKay Ranch Phase 5 and Phase 6

Humboldt County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	21.00	Dwelling Unit	8.80	37,800.00	60

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	103
Climate Zone	1			**Operational Year**	2027
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Acreages based on Table 2.2-2 in the PD

Construction Phase - Schedule based on Table 2.2-2 in PD

Trips and VMT - 8.8 total acres X 200 trees per acre = 1,760 trees. Assumes 10 tree per truck = 176 haul trips.

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	230.00	405.00
tblConstructionPhase	NumDays	10.00	30.00
tblConstructionPhase	PhaseEndDate	9/25/2026	5/28/2027
tblConstructionPhase	PhaseEndDate	7/31/2026	4/2/2027
tblConstructionPhase	PhaseEndDate	8/28/2026	4/30/2027

tblConstructionPhase	PhaseStartDate	8/29/2026	5/3/2027
tblConstructionPhase	PhaseStartDate	8/1/2026	4/5/2027
tblConstructionPhase	PhaseStartDate	8/2/2025	7/7/2025
tblLandUse	LotAcreage	6.82	8.80
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	HaulingTripLength	20.00	30.00
tblTripsAndVMT	HaulingTripNumber	0.00	176.00

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					
2025	0.1133	1.0509	1.0869	2.1100e-003	0.3479	0.0433	0.3912	0.1857	0.0402	0.2259	0.0000	184.4028	184.4028	0.0465	0.0000	185.5646
2026	0.1883	1.6557	2.1562	3.6900e-003	0.0140	0.0690	0.0830	3.7700e-003	0.0649	0.0687	0.0000	318.2210	318.2210	0.0718	0.0000	320.0157
2027	0.6511	0.5167	0.7159	1.2100e-003	5.5900e-003	0.0222	0.0277	1.5000e-003	0.0208	0.0223	0.0000	104.4479	104.4479	0.0248	0.0000	105.0684
Maximum	**0.6511**	**1.6557**	**2.1562**	**3.6900e-003**	**0.3479**	**0.0690**	**0.3912**	**0.1857**	**0.0649**	**0.2259**	**0.0000**	**318.2210**	**318.2210**	**0.0718**	**0.0000**	**320.0157**

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					
2025	0.1133	1.0509	1.0869	2.1100e-003	0.3479	0.0433	0.3912	0.1857	0.0402	0.2259	0.0000	184.4026	184.4026	0.0465	0.0000	185.5644

2026	0.1883	1.6557	2.1562	3.6900e-003	0.0140	0.0690	0.0830	3.7700e-003	0.0649	0.0687	0.0000	318.2207	318.2207	0.0718	0.0000	320.0154
2027	0.6511	0.5167	0.7159	1.2100e-003	5.5900e-003	0.0222	0.0277	1.5000e-003	0.0208	0.0223	0.0000	104.4478	104.4478	0.0248	0.0000	105.0683
Maximum	**0.6511**	**1.6557**	**2.1562**	**3.6900e-003**	**0.3479**	**0.0690**	**0.3912**	**0.1857**	**0.0649**	**0.2259**	**0.0000**	**318.2207**	**318.2207**	**0.0718**	**0.0000**	**320.0154**

	ROG	NOx	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	7-7-2025	10-6-2025	0.7122	0.7122
2	10-7-2025	1-6-2026	0.4652	0.4652
3	1-7-2026	4-6-2026	0.4547	0.4547
4	4-7-2026	7-6-2026	0.4589	0.4589
5	7-7-2026	10-6-2026	0.4640	0.4640
6	10-7-2026	1-6-2027	0.4648	0.4648
7	1-7-2027	4-6-2027	0.4411	0.4411
8	4-7-2027	7-6-2027	0.6446	0.6446
		Highest	0.7122	0.7122

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	7/7/2025	8/15/2025	5	30	
2	Grading	Grading	8/16/2025	9/12/2025	5	20	
3	Building Construction	Building Construction	9/13/2025	4/2/2027	5	405	
4	Paving	Paving	4/5/2027	4/30/2027	5	20	
5	Architectural Coating	Architectural Coating	5/3/2027	5/28/2027	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 10

Acres of Paving: 0

Residential Indoor: 76,545; Residential Outdoor: 25,515; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking

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	176.00	16.80	6.60	30.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	8.00	2.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	2.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 2025

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					0.2710	0.0000	0.2710	0.1490	0.0000	0.1490	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0371	0.3785	0.2687	5.7000e-004		0.0163	0.0163		0.0150	0.0150	0.0000	50.2005	50.2005	0.0162	0.0000	50.6064
Total	**0.0371**	**0.3785**	**0.2687**	**5.7000e-004**	**0.2710**	**0.0163**	**0.2873**	**0.1490**	**0.0150**	**0.1640**	**0.0000**	**50.2005**	**50.2005**	**0.0162**	**0.0000**	**50.6064**

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	6.7000e-004	0.0213	4.6000e-003	9.0000e-005	2.1700e-003	6.0000e-005	2.2300e-003	6.0000e-004	6.0000e-005	6.6000e-004	0.0000	8.9906	8.9906	1.5000e-004	0.0000	8.9942
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.4900e-003	1.8500e-003	0.0144	3.0000e-005	3.2400e-003	2.0000e-005	3.2600e-003	8.6000e-004	2.0000e-005	8.9000e-004	0.0000	2.5295	2.5295	1.2000e-004	0.0000	2.5325
Total	**3.1600e-003**	**0.0231**	**0.0190**	**1.2000e-004**	**5.4100e-003**	**8.0000e-005**	**5.4900e-003**	**1.4600e-003**	**8.0000e-005**	**1.5500e-003**	**0.0000**	**11.5201**	**11.5201**	**2.7000e-004**	**0.0000**	**11.5268**

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					0.2710	0.0000	0.2710	0.1490	0.0000	0.1490	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0371	0.3785	0.2687	5.7000e-004		0.0163	0.0163		0.0150	0.0150	0.0000	50.2004	50.2004	0.0162	0.0000	50.6063
Total	**0.0371**	**0.3785**	**0.2687**	**5.7000e-004**	**0.2710**	**0.0163**	**0.2873**	**0.1490**	**0.0150**	**0.1640**	**0.0000**	**50.2004**	**50.2004**	**0.0162**	**0.0000**	**50.6063**

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	6.7000e-004	0.0213	4.6000e-003	9.0000e-005	2.1700e-003	6.0000e-005	2.2300e-003	6.0000e-004	6.0000e-005	6.6000e-004	0.0000	8.9906	8.9906	1.5000e-004	0.0000	8.9942
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.4900e-003	1.8500e-003	0.0144	3.0000e-005	3.2400e-003	2.0000e-005	3.2600e-003	8.6000e-004	2.0000e-005	8.9000e-004	0.0000	2.5295	2.5295	1.2000e-004	0.0000	2.5325
Total	**3.1600e-003**	**0.0231**	**0.0190**	**1.2000e-004**	**5.4100e-003**	**8.0000e-005**	**5.4900e-003**	**1.4600e-003**	**8.0000e-005**	**1.5500e-003**	**0.0000**	**11.5201**	**11.5201**	**2.7000e-004**	**0.0000**	**11.5268**

3.3 Grading - 2025

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					0.0655	0.0000	0.0655	0.0337	0.0000	0.0337	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0152	0.1532	0.1454	3.0000e-004		6.2400e-003	6.2400e-003		5.7400e-003	5.7400e-003	0.0000	26.0698	26.0698	8.4300e-003	0.0000	26.2806
Total	**0.0152**	**0.1532**	**0.1454**	**3.0000e-004**	**0.0655**	**6.2400e-003**	**0.0718**	**0.0337**	**5.7400e-003**	**0.0394**	**0.0000**	**26.0698**	**26.0698**	**8.4300e-003**	**0.0000**	**26.2806**

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	1.3800e-003	1.0300e-003	8.0200e-003	2.0000e-005	1.8000e-003	1.0000e-005	1.8100e-003	4.8000e-004	1.0000e-005	4.9000e-004	0.0000	1.4053	1.4053	7.0000e-005	0.0000	1.4070
Total	**1.3800e-003**	**1.0300e-003**	**8.0200e-003**	**2.0000e-005**	**1.8000e-003**	**1.0000e-005**	**1.8100e-003**	**4.8000e-004**	**1.0000e-005**	**4.9000e-004**	**0.0000**	**1.4053**	**1.4053**	**7.0000e-005**	**0.0000**	**1.4070**

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					0.0655	0.0000	0.0655	0.0337	0.0000	0.0337	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0152	0.1532	0.1454	3.0000e-004		6.2400e-003	6.2400e-003		5.7400e-003	5.7400e-003	0.0000	26.0698	26.0698	8.4300e-003	0.0000	26.2806
Total	**0.0152**	**0.1532**	**0.1454**	**3.0000e-004**	**0.0655**	**6.2400e-003**	**0.0718**	**0.0337**	**5.7400e-003**	**0.0394**	**0.0000**	**26.0698**	**26.0698**	**8.4300e-003**	**0.0000**	**26.2806**

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	1.3800e-003	1.0300e-003	8.0200e-003	2.0000e-005	1.8000e-003	1.0000e-005	1.8100e-003	4.8000e-004	1.0000e-005	4.9000e-004	0.0000	1.4053	1.4053	7.0000e-005	0.0000	1.4070
Total	**1.3800e-003**	**1.0300e-003**	**8.0200e-003**	**2.0000e-005**	**1.8000e-003**	**1.0000e-005**	**1.8100e-003**	**4.8000e-004**	**1.0000e-005**	**4.9000e-004**	**0.0000**	**1.4053**	**1.4053**	**7.0000e-005**	**0.0000**	**1.4070**

3.4 Building Construction - 2025

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	0.0533	0.4863	0.6273	1.0500e-003		0.0206	0.0206		0.0194	0.0194	0.0000	90.4486	90.4486	0.0213	0.0000	90.9801
Total	**0.0533**	**0.4863**	**0.6273**	**1.0500e-003**		**0.0206**	**0.0206**		**0.0194**	**0.0194**	**0.0000**	**90.4486**	**90.4486**	**0.0213**	**0.0000**	**90.9801**

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	2.3000e-004	6.6600e-003	1.7300e-003	2.0000e-005	4.5000e-004	1.0000e-005	4.6000e-004	1.3000e-004	1.0000e-005	1.4000e-004	0.0000	1.8356	1.8356	7.0000e-005	0.0000	1.8373
Worker	2.8800e-003	2.1300e-003	0.0167	3.0000e-005	3.7400e-003	3.0000e-005	3.7700e-003	1.0000e-003	3.0000e-005	1.0200e-003	0.0000	2.9230	2.9230	1.4000e-004	0.0000	2.9265

Total	**3.1100e-003**	**8.7900e-003**	**0.0184**	**5.0000e-005**	**4.1900e-003**	**4.0000e-005**	**4.2300e-003**	**1.1300e-003**	**4.0000e-005**	**1.1600e-003**	**0.0000**	**4.7586**	**4.7586**	**2.1000e-004**	**0.0000**	**4.7638**

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	0.0533	0.4863	0.6273	1.0500e-003		0.0206	0.0206		0.0194	0.0194	0.0000	90.4485	90.4485	0.0213	0.0000	90.9800
Total	**0.0533**	**0.4863**	**0.6273**	**1.0500e-003**		**0.0206**	**0.0206**		**0.0194**	**0.0194**	**0.0000**	**90.4485**	**90.4485**	**0.0213**	**0.0000**	**90.9800**

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	2.3000e-004	6.6600e-003	1.7300e-003	2.0000e-005	4.5000e-004	1.0000e-005	4.6000e-004	1.3000e-004	1.0000e-005	1.4000e-004	0.0000	1.8356	1.8356	7.0000e-005	0.0000	1.8373
Worker	2.8800e-003	2.1300e-003	0.0167	3.0000e-005	3.7400e-003	3.0000e-005	3.7700e-003	1.0000e-003	3.0000e-005	1.0200e-003	0.0000	2.9230	2.9230	1.4000e-004	0.0000	2.9265
Total	**3.1100e-003**	**8.7900e-003**	**0.0184**	**5.0000e-005**	**4.1900e-003**	**4.0000e-005**	**4.2300e-003**	**1.1300e-003**	**4.0000e-005**	**1.1600e-003**	**0.0000**	**4.7586**	**4.7586**	**2.1000e-004**	**0.0000**	**4.7638**

3.4 Building Construction - 2026

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	0.1785	1.6273	2.0991	3.5200e-003		0.0689	0.0689		0.0648	0.0648	0.0000	302.6549	302.6549	0.0711	0.0000	304.4335
Total	**0.1785**	**1.6273**	**2.0991**	**3.5200e-003**		**0.0689**	**0.0689**		**0.0648**	**0.0648**	**0.0000**	**302.6549**	**302.6549**	**0.0711**	**0.0000**	**304.4335**

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	7.3000e-004	0.0219	5.5000e-003	6.0000e-005	1.5100e-003	3.0000e-005	1.5500e-003	4.4000e-004	3.0000e-005	4.7000e-004	0.0000	6.1093	6.1093	2.2000e-004	0.0000	6.1148
Worker	9.1600e-003	6.5500e-003	0.0517	1.0000e-004	0.0125	9.0000e-005	0.0126	3.3400e-003	8.0000e-005	3.4200e-003	0.0000	9.4568	9.4568	4.3000e-004	0.0000	9.4675
Total	**9.8900e-003**	**0.0284**	**0.0572**	**1.6000e-004**	**0.0140**	**1.2000e-004**	**0.0142**	**3.7800e-003**	**1.1000e-004**	**3.8900e-003**	**0.0000**	**15.5662**	**15.5662**	**6.5000e-004**	**0.0000**	**15.5822**

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	0.1784	1.6273	2.0991	3.5200e-003		0.0689	0.0689		0.0648	0.0648	0.0000	302.6545	302.6545	0.0711	0.0000	304.4331
Total	**0.1784**	**1.6273**	**2.0991**	**3.5200e-003**		**0.0689**	**0.0689**		**0.0648**	**0.0648**	**0.0000**	**302.6545**	**302.6545**	**0.0711**	**0.0000**	**304.4331**

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	7.3000e-004	0.0219	5.5000e-003	6.0000e-005	1.5100e-003	3.0000e-005	1.5500e-003	4.4000e-004	3.0000e-005	4.7000e-004	0.0000	6.1093	6.1093	2.2000e-004	0.0000	6.1148
Worker	9.1600e-003	6.5500e-003	0.0517	1.0000e-004	0.0125	9.0000e-005	0.0126	3.3400e-003	8.0000e-005	3.4200e-003	0.0000	9.4568	9.4568	4.3000e-004	0.0000	9.4675
Total	**9.8900e-003**	**0.0284**	**0.0572**	**1.6000e-004**	**0.0140**	**1.2000e-004**	**0.0142**	**3.7800e-003**	**1.1000e-004**	**3.8900e-003**	**0.0000**	**15.5662**	**15.5662**	**6.5000e-004**	**0.0000**	**15.5822**

3.4 Building Construction - 2027

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	0.0451	0.4115	0.5308	8.9000e-004		0.0174	0.0174		0.0164	0.0164	0.0000	76.5334	76.5334	0.0180	0.0000	76.9832
Total	**0.0451**	**0.4115**	**0.5308**	**8.9000e-004**		**0.0174**	**0.0174**		**0.0164**	**0.0164**	**0.0000**	**76.5334**	**76.5334**	**0.0180**	**0.0000**	**76.9832**

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	1.8000e-004	5.4400e-003	1.3200e-003	2.0000e-005	3.8000e-004	1.0000e-005	3.9000e-004	1.1000e-004	1.0000e-005	1.2000e-004	0.0000	1.5373	1.5373	5.0000e-005	0.0000	1.5386
Worker	2.2000e-003	1.5200e-003	0.0121	3.0000e-005	3.1700e-003	2.0000e-005	3.1900e-003	8.4000e-004	2.0000e-005	8.6000e-004	0.0000	2.3144	2.3144	1.0000e-004	0.0000	2.3168
Total	**2.3800e-003**	**6.9600e-003**	**0.0134**	**5.0000e-005**	**3.5500e-003**	**3.0000e-005**	**3.5800e-003**	**9.5000e-004**	**3.0000e-005**	**9.8000e-004**	**0.0000**	**3.8517**	**3.8517**	**1.5000e-004**	**0.0000**	**3.8554**

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	0.0451	0.4115	0.5308	8.9000e-004		0.0174	0.0174		0.0164	0.0164	0.0000	76.5333	76.5333	0.0180	0.0000	76.9831
Total	**0.0451**	**0.4115**	**0.5308**	**8.9000e-004**		**0.0174**	**0.0174**		**0.0164**	**0.0164**	**0.0000**	**76.5333**	**76.5333**	**0.0180**	**0.0000**	**76.9831**

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	1.8000e-004	5.4400e-003	1.3200e-003	2.0000e-005	3.8000e-004	1.0000e-005	3.9000e-004	1.1000e-004	1.0000e-005	1.2000e-004	0.0000	1.5373	1.5373	5.0000e-005	0.0000	1.5386

Worker	2.2000e-003	1.5200e-003	0.0121	3.0000e-005	3.1700e-003	2.0000e-005	3.1900e-003	8.4000e-004	2.0000e-005	8.6000e-004	0.0000	2.3144	2.3144	1.0000e-004	0.0000	2.3168
Total	**2.3800e-003**	**6.9600e-003**	**0.0134**	**5.0000e-005**	**3.5500e-003**	**3.0000e-005**	**3.5800e-003**	**9.5000e-004**	**3.0000e-005**	**9.8000e-004**	**0.0000**	**3.8517**	**3.8517**	**1.5000e-004**	**0.0000**	**3.8554**

3.5 Paving - 2027

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	9.1500e-003	0.0858	0.1458	2.3000e-004		4.1900e-003	4.1900e-003		3.8500e-003	3.8500e-003	0.0000	20.0193	20.0193	6.4700e-003	0.0000	20.1811
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**9.1500e-003**	**0.0858**	**0.1458**	**2.3000e-004**		**4.1900e-003**	**4.1900e-003**		**3.8500e-003**	**3.8500e-003**	**0.0000**	**20.0193**	**20.0193**	**6.4700e-003**	**0.0000**	**20.1811**

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	1.2500e-003	8.6000e-004	6.8800e-003	1.0000e-005	1.8000e-003	1.0000e-005	1.8100e-003	4.8000e-004	1.0000e-005	4.9000e-004	0.0000	1.3150	1.3150	6.0000e-005	0.0000	1.3164
Total	**1.2500e-003**	**8.6000e-004**	**6.8800e-003**	**1.0000e-005**	**1.8000e-003**	**1.0000e-005**	**1.8100e-003**	**4.8000e-004**	**1.0000e-005**	**4.9000e-004**	**0.0000**	**1.3150**	**1.3150**	**6.0000e-005**	**0.0000**	**1.3164**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	9.1500e-003	0.0858	0.1458	2.3000e-004		4.1900e-003	4.1900e-003		3.8500e-003	3.8500e-003	0.0000	20.0192	20.0192	6.4700e-003	0.0000	20.1811
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**9.1500e-003**	**0.0858**	**0.1458**	**2.3000e-004**		**4.1900e-003**	**4.1900e-003**		**3.8500e-003**	**3.8500e-003**	**0.0000**	**20.0192**	**20.0192**	**6.4700e-003**	**0.0000**	**20.1811**

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	1.2500e-003	8.6000e-004	6.8800e-003	1.0000e-005	1.8000e-003	1.0000e-005	1.8100e-003	4.8000e-004	1.0000e-005	4.9000e-004	0.0000	1.3150	1.3150	6.0000e-005	0.0000	1.3164
Total	**1.2500e-003**	**8.6000e-004**	**6.8800e-003**	**1.0000e-005**	**1.8000e-003**	**1.0000e-005**	**1.8100e-003**	**4.8000e-004**	**1.0000e-005**	**4.9000e-004**	**0.0000**	**1.3150**	**1.3150**	**6.0000e-005**	**0.0000**	**1.3164**

3.6 Architectural Coating - 2027

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	0.5913					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Off-Road	1.7100e-003	0.0115	0.0181	3.0000e-005		5.2000e-004	5.2000e-004		5.2000e-004	5.2000e-004	0.0000	2.5533	2.5533	1.4000e-004	0.0000	2.5567
Total	**0.5930**	**0.0115**	**0.0181**	**3.0000e-005**		**5.2000e-004**	**5.2000e-004**		**5.2000e-004**	**5.2000e-004**	**0.0000**	**2.5533**	**2.5533**	**1.4000e-004**	**0.0000**	**2.5567**

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	1.7000e-004	1.1000e-004	9.2000e-004	0.0000	2.4000e-004	0.0000	2.4000e-004	6.0000e-005	0.0000	7.0000e-005	0.0000	0.1753	0.1753	1.0000e-005	0.0000	0.1755
Total	**1.7000e-004**	**1.1000e-004**	**9.2000e-004**	**0.0000**	**2.4000e-004**	**0.0000**	**2.4000e-004**	**6.0000e-005**	**0.0000**	**7.0000e-005**	**0.0000**	**0.1753**	**0.1753**	**1.0000e-005**	**0.0000**	**0.1755**

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	0.5913					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.7100e-003	0.0115	0.0181	3.0000e-005		5.2000e-004	5.2000e-004		5.2000e-004	5.2000e-004	0.0000	2.5533	2.5533	1.4000e-004	0.0000	2.5567
Total	**0.5930**	**0.0115**	**0.0181**	**3.0000e-005**		**5.2000e-004**	**5.2000e-004**		**5.2000e-004**	**5.2000e-004**	**0.0000**	**2.5533**	**2.5533**	**1.4000e-004**	**0.0000**	**2.5567**

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	1.7000e-004	1.1000e-004	9.2000e-004	0.0000	2.4000e-004	0.0000	2.4000e-004	6.0000e-005	0.0000	7.0000e-005	0.0000	0.1753	0.1753	1.0000e-005	0.0000	0.1755
Total	**1.7000e-004**	**1.1000e-004**	**9.2000e-004**	**0.0000**	**2.4000e-004**	**0.0000**	**2.4000e-004**	**6.0000e-005**	**0.0000**	**7.0000e-005**	**0.0000**	**0.1753**	**0.1753**	**1.0000e-005**	**0.0000**	**0.1755**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	1.5291	0.0275	1.7823	2.9600e-003		0.2289	0.2289		0.2289	0.2289	21.6921	9.3521	31.0442	0.0203	1.7100e-003	32.0592
Unmitigated	1.5291	0.0275	1.7823	2.9600e-003		0.2289	0.2289		0.2289	0.2289	21.6921	9.3521	31.0442	0.0203	1.7100e-003	32.0592

McKay Ranch Phase 7, 8, & 9
Humboldt County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	97.00	Dwelling Unit	21.50	174,600.00	277

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	103
Climate Zone	1			**Operational Year**	2030
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Acreages based on Table 2.2-2 in PD

Construction Phase - Schedule based on Table 2.2-2 in PD

Trips and VMT - 21.5 total acres of disturbance X 200 tree per acres = 4,300 total trees removed. Assumes 10 trees per truck = 430 haul trips.

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	370.00	786.00
tblConstructionPhase	NumDays	10.00	30.00
tblConstructionPhase	PhaseEndDate	4/26/2029	11/30/2029
tblConstructionPhase	PhaseEndDate	3/1/2029	10/4/2030
tblConstructionPhase	PhaseEndDate	3/29/2029	11/1/2030

tblConstructionPhase	PhaseEndDate	8/12/2027	9/3/2027
tblConstructionPhase	PhaseStartDate	3/30/2029	11/5/2029
tblConstructionPhase	PhaseStartDate	3/2/2029	10/7/2030
tblConstructionPhase	PhaseStartDate	7/30/2027	7/26/2027
tblLandUse	LotAcreage	31.49	21.50
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	HaulingTripLength	20.00	30.00
tblTripsAndVMT	HaulingTripNumber	0.00	430.00

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					
2027	0.1503	1.3648	1.3593	3.0300e-003	0.4513	0.0538	0.5051	0.2196	0.0499	0.2695	0.0000	267.0923	267.0923	0.0664	0.0000	268.7510
2028	0.2172	1.7503	2.3095	4.2500e-003	0.0621	0.0691	0.1312	0.0167	0.0650	0.0817	0.0000	370.3365	370.3365	0.0734	0.0000	372.1725
2029	2.9491	1.7649	2.3221	4.2900e-003	0.0632	0.0698	0.1330	0.0170	0.0657	0.0827	0.0000	373.6598	373.6598	0.0737	0.0000	375.5020
2030	0.1715	0.9544	1.9138	3.9300e-003	0.0493	0.0184	0.0677	0.0133	0.0184	0.0317	0.0000	337.7430	337.7430	0.0133	0.0000	338.0766
Maximum	**2.9491**	**1.7649**	**2.3221**	**4.2900e-003**	**0.4513**	**0.0698**	**0.5051**	**0.2196**	**0.0657**	**0.2695**	**0.0000**	**373.6598**	**373.6598**	**0.0737**	**0.0000**	**375.5020**

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					
2027	0.1503	1.3648	1.3593	3.0300e-003	0.4513	0.0538	0.5051	0.2196	0.0499	0.2695	0.0000	267.0920	267.0920	0.0664	0.0000	268.7507
2028	0.2172	1.7503	2.3095	4.2500e-003	0.0621	0.0691	0.1312	0.0167	0.0650	0.0817	0.0000	370.3362	370.3362	0.0734	0.0000	372.1721
2029	2.9491	1.7649	2.3221	4.2900e-003	0.0632	0.0698	0.1330	0.0170	0.0657	0.0827	0.0000	373.6595	373.6595	0.0737	0.0000	375.5017
2030	0.1715	0.9544	1.9138	3.9300e-003	0.0493	0.0184	0.0677	0.0133	0.0184	0.0317	0.0000	337.7426	337.7426	0.0133	0.0000	338.0763
Maximum	**2.9491**	**1.7649**	**2.3221**	**4.2900e-003**	**0.4513**	**0.0698**	**0.5051**	**0.2196**	**0.0657**	**0.2695**	**0.0000**	**373.6595**	**373.6595**	**0.0737**	**0.0000**	**375.5017**

	ROG	NOx	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	**7-2-2027**	**10-1-2027**	0.9963	0.9963
2	**10-2-2027**	**1-1-2028**	0.5010	0.5010
3	**1-2-2028**	**4-1-2028**	0.4939	0.4939
4	**4-2-2028**	**7-1-2028**	0.4906	0.4906
5	**7-2-2028**	**10-1-2028**	0.4960	0.4960
6	**10-2-2028**	**1-1-2029**	0.4993	0.4993
7	**1-2-2029**	**4-1-2029**	0.4867	0.4867
8	**4-2-2029**	**7-1-2029**	0.4891	0.4891
9	**7-2-2029**	**10-1-2029**	0.4945	0.4945
10	**10-2-2029**	**1-1-2030**	3.0452	3.0452
11	**1-2-2030**	**4-1-2030**	0.3374	0.3374
12	**4-2-2030**	**7-1-2030**	0.3383	0.3383
13	**7-2-2030**	**9-30-2030**	0.3383	0.3383
		Highest	3.0452	3.0452

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	7/26/2027	9/3/2027	5	30	
2	Grading	Grading	8/13/2027	9/30/2027	5	35	
3	Building Construction	Building Construction	10/1/2027	10/4/2030	5	786	
4	Paving	Paving	10/7/2030	11/1/2030	5	20	
5	Architectural Coating	Architectural Coating	11/5/2029	11/30/2029	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 87.5

Acres of Paving: 0

Residential Indoor: 353,565; Residential Outdoor: 117,855; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Grading	Excavators	2	8.00	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	2	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
Grading	Scrapers	2	8.00	367	0.48
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	430.00	16.80	6.60	30.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	35.00	10.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	7.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 2027

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					0.2710	0.0000	0.2710	0.1490	0.0000	0.1490	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0371	0.3785	0.2687	5.7000e-004		0.0163	0.0163		0.0150	0.0150	0.0000	50.2005	50.2005	0.0162	0.0000	50.6064
Total	**0.0371**	**0.3785**	**0.2687**	**5.7000e-004**	**0.2710**	**0.0163**	**0.2873**	**0.1490**	**0.0150**	**0.1640**	**0.0000**	**50.2005**	**50.2005**	**0.0162**	**0.0000**	**50.6064**

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	1.5700e-003	0.0484	0.0110	2.3000e-004	5.3100e-003	1.4000e-004	5.4400e-003	1.4600e-003	1.3000e-004	1.5900e-003	0.0000	21.7255	21.7255	3.5000e-004	0.0000	21.7341

Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.2500e-003	1.5500e-003	0.0124	3.0000e-005	3.2400e-003	2.0000e-005	3.2600e-003	8.6000e-004	2.0000e-005	8.8000e-004	0.0000	2.3670	2.3670	1.0000e-004	0.0000	2.3695
Total	**3.8200e-003**	**0.0500**	**0.0234**	**2.6000e-004**	**8.5500e-003**	**1.6000e-004**	**8.7000e-003**	**2.3200e-003**	**1.5000e-004**	**2.4700e-003**	**0.0000**	**24.0925**	**24.0925**	**4.5000e-004**	**0.0000**	**24.1036**

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					0.2710	0.0000	0.2710	0.1490	0.0000	0.1490	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0371	0.3785	0.2687	5.7000e-004		0.0163	0.0163		0.0150	0.0150	0.0000	50.2004	50.2004	0.0162	0.0000	50.6063
Total	**0.0371**	**0.3785**	**0.2687**	**5.7000e-004**	**0.2710**	**0.0163**	**0.2873**	**0.1490**	**0.0150**	**0.1640**	**0.0000**	**50.2004**	**50.2004**	**0.0162**	**0.0000**	**50.6063**

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	1.5700e-003	0.0484	0.0110	2.3000e-004	5.3100e-003	1.4000e-004	5.4400e-003	1.4600e-003	1.3000e-004	1.5900e-003	0.0000	21.7255	21.7255	3.5000e-004	0.0000	21.7341
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.2500e-003	1.5500e-003	0.0124	3.0000e-005	3.2400e-003	2.0000e-005	3.2600e-003	8.6000e-004	2.0000e-005	8.8000e-004	0.0000	2.3670	2.3670	1.0000e-004	0.0000	2.3695
Total	**3.8200e-003**	**0.0500**	**0.0234**	**2.6000e-004**	**8.5500e-003**	**1.6000e-004**	**8.7000e-003**	**2.3200e-003**	**1.5000e-004**	**2.4700e-003**	**0.0000**	**24.0925**	**24.0925**	**4.5000e-004**	**0.0000**	**24.1036**

3.3 Grading - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1518	0.0000	0.1518	0.0629	0.0000	0.0629	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0508	0.4890	0.4608	1.0900e-003		0.0198	0.0198		0.0182	0.0182	0.0000	95.3859	95.3859	0.0309	0.0000	96.1571
Total	**0.0508**	**0.4890**	**0.4608**	**1.0900e-003**	**0.1518**	**0.0198**	**0.1716**	**0.0629**	**0.0182**	**0.0812**	**0.0000**	**95.3859**	**95.3859**	**0.0309**	**0.0000**	**96.1571**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.9200e-003	2.0100e-003	0.0161	3.0000e-005	4.2000e-003	3.0000e-005	4.2200e-003	1.1200e-003	3.0000e-005	1.1400e-003	0.0000	3.0683	3.0683	1.3000e-004	0.0000	3.0716
Total	**2.9200e-003**	**2.0100e-003**	**0.0161**	**3.0000e-005**	**4.2000e-003**	**3.0000e-005**	**4.2200e-003**	**1.1200e-003**	**3.0000e-005**	**1.1400e-003**	**0.0000**	**3.0683**	**3.0683**	**1.3000e-004**	**0.0000**	**3.0716**

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					0.1518	0.0000	0.1518	0.0629	0.0000	0.0629	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Off-Road	0.0508	0.4890	0.4608	1.0900e-003		0.0198	0.0198		0.0182	0.0182	0.0000	95.3858	95.3858	0.0309	0.0000	96.1570
Total	**0.0508**	**0.4890**	**0.4608**	**1.0900e-003**	**0.1518**	**0.0198**	**0.1716**	**0.0629**	**0.0182**	**0.0812**	**0.0000**	**95.3858**	**95.3858**	**0.0309**	**0.0000**	**96.1570**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.9200e-003	2.0100e-003	0.0161	3.0000e-005	4.2000e-003	3.0000e-005	4.2200e-003	1.1200e-003	3.0000e-005	1.1400e-003	0.0000	3.0683	3.0683	1.3000e-004	0.0000	3.0716
Total	**2.9200e-003**	**2.0100e-003**	**0.0161**	**3.0000e-005**	**4.2000e-003**	**3.0000e-005**	**4.2200e-003**	**1.1200e-003**	**3.0000e-005**	**1.1400e-003**	**0.0000**	**3.0683**	**3.0683**	**1.3000e-004**	**0.0000**	**3.0716**

3.4 Building Construction - 2027

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	0.0451	0.4115	0.5308	8.9000e-004		0.0174	0.0174		0.0164	0.0164	0.0000	76.5334	76.5334	0.0180	0.0000	76.9832
Total	**0.0451**	**0.4115**	**0.5308**	**8.9000e-004**		**0.0174**	**0.0174**		**0.0164**	**0.0164**	**0.0000**	**76.5334**	**76.5334**	**0.0180**	**0.0000**	**76.9832**

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	9.0000e-004	0.0272	6.6200e-003	8.0000e-005	1.9100e-003	4.0000e-005	1.9600e-003	5.6000e-004	4.0000e-005	5.9000e-004	0.0000	7.6863	7.6863	2.7000e-004	0.0000	7.6930
Worker	9.6400e-003	6.6300e-003	0.0530	1.1000e-004	0.0139	9.0000e-005	0.0139	3.6900e-003	9.0000e-005	3.7800e-003	0.0000	10.1255	10.1255	4.3000e-004	0.0000	10.1362
Total	**0.0105**	**0.0338**	**0.0596**	**1.9000e-004**	**0.0158**	**1.3000e-004**	**0.0159**	**4.2500e-003**	**1.3000e-004**	**4.3700e-003**	**0.0000**	**17.8117**	**17.8117**	**7.0000e-004**	**0.0000**	**17.8292**

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	0.0451	0.4115	0.5308	8.9000e-004		0.0174	0.0174		0.0164	0.0164	0.0000	76.5333	76.5333	0.0180	0.0000	76.9831
Total	**0.0451**	**0.4115**	**0.5308**	**8.9000e-004**		**0.0174**	**0.0174**		**0.0164**	**0.0164**	**0.0000**	**76.5333**	**76.5333**	**0.0180**	**0.0000**	**76.9831**

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	9.0000e-004	0.0272	6.6200e-003	8.0000e-005	1.9100e-003	4.0000e-005	1.9600e-003	5.6000e-004	4.0000e-005	5.9000e-004	0.0000	7.6863	7.6863	2.7000e-004	0.0000	7.6930
Worker	9.6400e-003	6.6300e-003	0.0530	1.1000e-004	0.0139	9.0000e-005	0.0139	3.6900e-003	9.0000e-005	3.7800e-003	0.0000	10.1255	10.1255	4.3000e-004	0.0000	10.1362
Total	**0.0105**	**0.0338**	**0.0596**	**1.9000e-004**	**0.0158**	**1.3000e-004**	**0.0159**	**4.2500e-003**	**1.3000e-004**	**4.3700e-003**	**0.0000**	**17.8117**	**17.8117**	**7.0000e-004**	**0.0000**	**17.8292**

3.4 Building Construction - 2028

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	0.1778	1.6211	2.0910	3.5000e-003		0.0686	0.0686		0.0645	0.0645	0.0000	301.4953	301.4953	0.0709	0.0000	303.2671
Total	**0.1778**	**1.6211**	**2.0910**	**3.5000e-003**		**0.0686**	**0.0686**		**0.0645**	**0.0645**	**0.0000**	**301.4953**	**301.4953**	**0.0709**	**0.0000**	**303.2671**

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	3.4200e-003	0.1054	0.0250	3.2000e-004	7.5400e-003	1.5000e-004	7.7000e-003	2.1900e-003	1.5000e-004	2.3300e-003	0.0000	30.1836	30.1836	1.0300e-003	0.0000	30.2094
Worker	0.0361	0.0238	0.1935	4.3000e-004	0.0546	3.5000e-004	0.0549	0.0145	3.2000e-004	0.0149	0.0000	38.6576	38.6576	1.5400e-003	0.0000	38.6960
Total	**0.0395**	**0.1292**	**0.2185**	**7.5000e-004**	**0.0621**	**5.0000e-004**	**0.0626**	**0.0167**	**4.7000e-004**	**0.0172**	**0.0000**	**68.8412**	**68.8412**	**2.5700e-003**	**0.0000**	**68.9054**

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	0.1778	1.6211	2.0910	3.5000e-003		0.0686	0.0686		0.0645	0.0645	0.0000	301.4949	301.4949	0.0709	0.0000	303.2667
Total	**0.1778**	**1.6211**	**2.0910**	**3.5000e-003**		**0.0686**	**0.0686**		**0.0645**	**0.0645**	**0.0000**	**301.4949**	**301.4949**	**0.0709**	**0.0000**	**303.2667**

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	3.4200e-003	0.1054	0.0250	3.2000e-004	7.5400e-003	1.5000e-004	7.7000e-003	2.1900e-003	1.5000e-004	2.3300e-003	0.0000	30.1836	30.1836	1.0300e-003	0.0000	30.2094
Worker	0.0361	0.0238	0.1935	4.3000e-004	0.0546	3.5000e-004	0.0549	0.0145	3.2000e-004	0.0149	0.0000	38.6576	38.6576	1.5400e-003	0.0000	38.6960
Total	**0.0395**	**0.1292**	**0.2185**	**7.5000e-004**	**0.0621**	**5.0000e-004**	**0.0626**	**0.0167**	**4.7000e-004**	**0.0172**	**0.0000**	**68.8412**	**68.8412**	**2.5700e-003**	**0.0000**	**68.9054**

3.4 Building Construction - 2029

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	0.1785	1.6273	2.0991	3.5200e-003		0.0689	0.0689		0.0648	0.0648	0.0000	302.6549	302.6549	0.0711	0.0000	304.4335

Total	**0.1785**	**1.6273**	**2.0991**	**3.5200e-003**		**0.0689**	**0.0689**		**0.0648**	**0.0648**	**0.0000**	**302.6549**	**302.6549**	**0.0711**	**0.0000**	**304.4335**

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	3.3400e-003	0.1043	0.0241	3.2000e-004	7.5700e-003	1.5000e-004	7.7200e-003	2.2000e-003	1.4000e-004	2.3300e-003	0.0000	30.2170	30.2170	1.0000e-003	0.0000	30.2420
Worker	0.0338	0.0215	0.1781	4.2000e-004	0.0548	3.3000e-004	0.0551	0.0146	3.0000e-004	0.0149	0.0000	37.6576	37.6576	1.3800e-003	0.0000	37.6922
Total	**0.0372**	**0.1258**	**0.2022**	**7.4000e-004**	**0.0623**	**4.8000e-004**	**0.0628**	**0.0168**	**4.4000e-004**	**0.0172**	**0.0000**	**67.8746**	**67.8746**	**2.3800e-003**	**0.0000**	**67.9341**

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	0.1784	1.6273	2.0991	3.5200e-003		0.0689	0.0689		0.0648	0.0648	0.0000	302.6545	302.6545	0.0711	0.0000	304.4331
Total	**0.1784**	**1.6273**	**2.0991**	**3.5200e-003**		**0.0689**	**0.0689**		**0.0648**	**0.0648**	**0.0000**	**302.6545**	**302.6545**	**0.0711**	**0.0000**	**304.4331**

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	3.3400e-003	0.1043	0.0241	3.2000e-004	7.5700e-003	1.5000e-004	7.7200e-003	2.2000e-003	1.4000e-004	2.3300e-003	0.0000	30.2170	30.2170	1.0000e-003	0.0000	30.2420
Worker	0.0338	0.0215	0.1781	4.2000e-004	0.0548	3.3000e-004	0.0551	0.0146	3.0000e-004	0.0149	0.0000	37.6576	37.6576	1.3800e-003	0.0000	37.6922
Total	**0.0372**	**0.1258**	**0.2022**	**7.4000e-004**	**0.0623**	**4.8000e-004**	**0.0628**	**0.0168**	**4.4000e-004**	**0.0172**	**0.0000**	**67.8746**	**67.8746**	**2.3800e-003**	**0.0000**	**67.9341**

3.4 Building Construction - 2030

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	0.1303	0.7895	1.6076	3.0800e-003		0.0147	0.0147		0.0147	0.0147	0.0000	261.5467	261.5467	0.0105	0.0000	261.8090
Total	**0.1303**	**0.7895**	**1.6076**	**3.0800e-003**		**0.0147**	**0.0147**		**0.0147**	**0.0147**	**0.0000**	**261.5467**	**261.5467**	**0.0105**	**0.0000**	**261.8090**

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	2.4700e-003	0.0784	0.0177	2.4000e-004	5.7700e-003	1.0000e-004	5.8800e-003	1.6700e-003	1.0000e-004	1.7700e-003	0.0000	22.9918	22.9918	7.4000e-004	0.0000	23.0103
Worker	0.0239	0.0147	0.1247	3.1000e-004	0.0418	2.3000e-004	0.0420	0.0111	2.1000e-004	0.0113	0.0000	27.9031	27.9031	9.4000e-004	0.0000	27.9267
Total	**0.0264**	**0.0931**	**0.1423**	**5.5000e-004**	**0.0475**	**3.3000e-004**	**0.0479**	**0.0128**	**3.1000e-004**	**0.0131**	**0.0000**	**50.8949**	**50.8949**	**1.6800e-003**	**0.0000**	**50.9369**

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	0.1303	0.7895	1.6076	3.0800e-003		0.0147	0.0147		0.0147	0.0147	0.0000	261.5464	261.5464	0.0105	0.0000	261.8087
Total	**0.1303**	**0.7895**	**1.6076**	**3.0800e-003**		**0.0147**	**0.0147**		**0.0147**	**0.0147**	**0.0000**	**261.5464**	**261.5464**	**0.0105**	**0.0000**	**261.8087**

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	2.4700e-003	0.0784	0.0177	2.4000e-004	5.7700e-003	1.0000e-004	5.8800e-003	1.6700e-003	1.0000e-004	1.7700e-003	0.0000	22.9918	22.9918	7.4000e-004	0.0000	23.0103
Worker	0.0239	0.0147	0.1247	3.1000e-004	0.0418	2.3000e-004	0.0420	0.0111	2.1000e-004	0.0113	0.0000	27.9031	27.9031	9.4000e-004	0.0000	27.9267
Total	**0.0264**	**0.0931**	**0.1423**	**5.5000e-004**	**0.0475**	**3.3000e-004**	**0.0479**	**0.0128**	**3.1000e-004**	**0.0131**	**0.0000**	**50.8949**	**50.8949**	**1.6800e-003**	**0.0000**	**50.9369**

3.5 Paving - 2030

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	0.0139	0.0712	0.1585	2.8000e-004		3.3100e-003	3.3100e-003		3.3100e-003	3.3100e-003	0.0000	24.0995	24.0995	1.1300e-003	0.0000	24.1278
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0139**	**0.0712**	**0.1585**	**2.8000e-004**		**3.3100e-003**	**3.3100e-003**		**3.3100e-003**	**3.3100e-003**	**0.0000**	**24.0995**	**24.0995**	**1.1300e-003**	**0.0000**	**24.1278**

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	1.0300e-003	6.3000e-004	5.3700e-003	1.0000e-005	1.8000e-003	1.0000e-005	1.8100e-003	4.8000e-004	1.0000e-005	4.9000e-004	0.0000	1.2019	1.2019	4.0000e-005	0.0000	1.2029
Total	**1.0300e-003**	**6.3000e-004**	**5.3700e-003**	**1.0000e-005**	**1.8000e-003**	**1.0000e-005**	**1.8100e-003**	**4.8000e-004**	**1.0000e-005**	**4.9000e-004**	**0.0000**	**1.2019**	**1.2019**	**4.0000e-005**	**0.0000**	**1.2029**

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	0.0139	0.0712	0.1585	2.8000e-004		3.3100e-003	3.3100e-003		3.3100e-003	3.3100e-003	0.0000	24.0995	24.0995	1.1300e-003	0.0000	24.1277

Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0139**	**0.0712**	**0.1585**	**2.8000e-004**		**3.3100e-003**	**3.3100e-003**		**3.3100e-003**	**3.3100e-003**	**0.0000**	**24.0995**	**24.0995**	**1.1300e-003**	**0.0000**	**24.1277**

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	1.0300e-003	6.3000e-004	5.3700e-003	1.0000e-005	1.8000e-003	1.0000e-005	1.8100e-003	4.8000e-004	1.0000e-005	4.9000e-004	0.0000	1.2019	1.2019	4.0000e-005	0.0000	1.2029
Total	**1.0300e-003**	**6.3000e-004**	**5.3700e-003**	**1.0000e-005**	**1.8000e-003**	**1.0000e-005**	**1.8100e-003**	**4.8000e-004**	**1.0000e-005**	**4.9000e-004**	**0.0000**	**1.2019**	**1.2019**	**4.0000e-005**	**0.0000**	**1.2029**

3.6 Architectural Coating - 2029

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	2.7313					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.7100e-003	0.0115	0.0181	3.0000e-005		5.2000e-004	5.2000e-004		5.2000e-004	5.2000e-004	0.0000	2.5533	2.5533	1.4000e-004	0.0000	2.5567
Total	**2.7330**	**0.0115**	**0.0181**	**3.0000e-005**		**5.2000e-004**	**5.2000e-004**		**5.2000e-004**	**5.2000e-004**	**0.0000**	**2.5533**	**2.5533**	**1.4000e-004**	**0.0000**	**2.5567**

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	5.2000e-004	3.3000e-004	2.7300e-003	1.0000e-005	8.4000e-004	0.0000	8.4000e-004	2.2000e-004	0.0000	2.3000e-004	0.0000	0.5771	0.5771	2.0000e-005	0.0000	0.5777
Total	**5.2000e-004**	**3.3000e-004**	**2.7300e-003**	**1.0000e-005**	**8.4000e-004**	**0.0000**	**8.4000e-004**	**2.2000e-004**	**0.0000**	**2.3000e-004**	**0.0000**	**0.5771**	**0.5771**	**2.0000e-005**	**0.0000**	**0.5777**

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	2.7313					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.7100e-003	0.0115	0.0181	3.0000e-005		5.2000e-004	5.2000e-004		5.2000e-004	5.2000e-004	0.0000	2.5533	2.5533	1.4000e-004	0.0000	2.5567
Total	**2.7330**	**0.0115**	**0.0181**	**3.0000e-005**		**5.2000e-004**	**5.2000e-004**		**5.2000e-004**	**5.2000e-004**	**0.0000**	**2.5533**	**2.5533**	**1.4000e-004**	**0.0000**	**2.5567**

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	5.2000e-004	3.3000e-004	2.7300e-003	1.0000e-005	8.4000e-004	0.0000	8.4000e-004	2.2000e-004	0.0000	2.3000e-004	0.0000	0.5771	0.5771	2.0000e-005	0.0000	0.5777
Total	**5.2000e-004**	**3.3000e-004**	**2.7300e-003**	**1.0000e-005**	**8.4000e-004**	**0.0000**	**8.4000e-004**	**2.2000e-004**	**0.0000**	**2.3000e-004**	**0.0000**	**0.5771**	**0.5771**	**2.0000e-005**	**0.0000**	**0.5777**

Mckay_ranch operations

Humboldt County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	22.00	1000sqft	0.51	22,000.00	0
Apartments Low Rise	174.00	Dwelling Unit	19.00	174,000.00	498
Single Family Housing	146.00	Dwelling Unit	41.00	262,800.00	418

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	103
Climate Zone	1			**Operational Year**	2030
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Non default values based on Table 2.2-1 and Table 2.2-2 in PD

Vehicle Trips - Trip lengths reduced assuming project would serve adjacent communties

Woodstoves - Catalytic coverters for all wood stoves

Consumer Products -

Area Coating - Assumes low VOC

Land Use Change -

Mobile Land Use Mitigation -

Area Mitigation -

Energy Mitigation -

Fleet Mix - Fleet mix updated to reflect

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_EF_Nonresidential_Exterior	250	150
tblAreaCoating	Area_EF_Nonresidential_Interior	250	150
tblAreaCoating	Area_EF_Parking	250	150
tblAreaCoating	Area_EF_Residential_Exterior	250	150
tblAreaCoating	Area_EF_Residential_Interior	250	150
tblAreaMitigation	UseLowVOCPaintParkingCheck	False	True
tblFireplaces	NumberGas	95.70	0.00
tblFireplaces	NumberGas	80.30	0.00
tblFireplaces	NumberWood	60.90	0.00
tblFireplaces	NumberWood	51.10	0.00
tblLandUse	LotAcreage	10.88	19.00
tblLandUse	LotAcreage	47.40	41.00
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblVehicleTrips	CC_TL	6.60	3.30
tblVehicleTrips	CNW_TL	6.60	3.30
tblVehicleTrips	CW_TL	14.70	7.20
tblVehicleTrips	HO_TL	7.90	4.00
tblVehicleTrips	HO_TL	7.90	4.00
tblVehicleTrips	HS_TL	7.10	3.50
tblVehicleTrips	HS_TL	7.10	3.50
tblVehicleTrips	HW_TL	16.80	8.00
tblVehicleTrips	HW_TL	16.80	8.00
tblWoodstoves	NumberCatalytic	8.70	174.00
tblWoodstoves	NumberCatalytic	7.30	146.00
tblWoodstoves	NumberNoncatalytic	8.70	0.00
tblWoodstoves	NumberNoncatalytic	7.30	0.00

2.0 Emissions Summary

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	5.9111	0.5104	27.5863	0.0967		4.9405	4.9405		4.9405	4.9405	646.8357	3.8816	650.7173	2.5455	0.0000	714.3539
Energy	0.0220	0.1892	0.0892	1.2000e-003		0.0152	0.0152		0.0152	0.0152	0.0000	897.8477	897.8477	0.0349	0.0104	901.8062
Mobile	0.7253	3.6541	6.5606	0.0205	1.7531	0.0157	1.7688	0.4712	0.0147	0.4859	0.0000	1,887.6158	1,887.6158	0.0799	0.0000	1,889.6122
Waste						0.0000	0.0000		0.0000	0.0000	57.7347	0.0000	57.7347	3.4120	0.0000	143.0353
Water						0.0000	0.0000		0.0000	0.0000	7.8550	54.7977	62.6527	0.8093	0.0196	88.7140
Total	**6.6584**	**4.3537**	**34.2361**	**0.1185**	**1.7531**	**4.9714**	**6.7245**	**0.4712**	**4.9704**	**5.4416**	**712.4254**	**2,844.1428**	**3,556.5682**	**6.8815**	**0.0299**	**3,737.5215**

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	5.9111	0.5104	27.5863	0.0967		4.9405	4.9405		4.9405	4.9405	646.8357	3.8816	650.7173	2.5455	0.0000	714.3539
Energy	0.0220	0.1892	0.0892	1.2000e-003		0.0152	0.0152		0.0152	0.0152	0.0000	557.7331	557.7331	0.0196	7.1700e-003	560.3589
Mobile	0.7245	3.6470	6.5398	0.0204	1.7444	0.0156	1.7600	0.4689	0.0146	0.4835	0.0000	1,879.5947	1,879.5947	0.0797	0.0000	1,881.5860
Waste						0.0000	0.0000		0.0000	0.0000	57.7347	0.0000	57.7347	3.4120	0.0000	143.0353

Water						0.0000	0.0000		0.0000	0.0000	7.8550	54.7977	62.6527	0.8093	0.0196	88.7140
Total	**6.6575**	**4.3466**	**34.2154**	**0.1184**	**1.7444**	**4.9713**	**6.7157**	**0.4689**	**4.9703**	**5.4392**	**712.4254**	**2,496.0071**	**3,208.4324**	**6.8660**	**0.0267**	**3,388.0481**

	ROG	NOx	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	**0.01**	**0.16**	**0.06**	**0.08**	**0.50**	**0.00**	**0.13**	**0.50**	**0.00**	**0.04**	**0.00**	**12.24**	**9.79**	**0.23**	**10.63**	**9.35**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Improve Pedestrian Network

Implement NEV 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	0.7245	3.6470	6.5398	0.0204	1.7444	0.0156	1.7600	0.4689	0.0146	0.4835	0.0000	1,879.5947	1,879.5947	0.0797	0.0000	1,881.5860
Unmitigated	0.7253	3.6541	6.5606	0.0205	1.7531	0.0157	1.7688	0.4712	0.0147	0.4859	0.0000	1,887.6158	1,887.6158	0.0799	0.0000	1,889.6122

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Low Rise	1,146.66	1,245.84	1056.18	2,075,677	2,065,298
General Office Building	242.66	54.12	23.10	251,911	250,652
Single Family Housing	1,389.92	1,446.86	1258.52	2,494,066	2,481,595
Total	2,779.24	2,746.82	2,337.80	4,821,654	4,797,545

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Low Rise	8.00	3.50	4.00	42.30	19.60	38.10	86	11	3
General Office Building	7.20	3.30	3.30	33.00	48.00	19.00	77	19	4
Single Family Housing	8.00	3.50	4.00	42.30	19.60	38.10	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments Low Rise	0.540583	0.031873	0.213590	0.119676	0.019621	0.003714	0.012904	0.046753	0.003981	0.001017	0.004400	0.001421	0.000466
General Office Building	0.540583	0.031873	0.213590	0.119676	0.019621	0.003714	0.012904	0.046753	0.003981	0.001017	0.004400	0.001421	0.000466
Single Family Housing	0.540583	0.031873	0.213590	0.119676	0.019621	0.003714	0.012904	0.046753	0.003981	0.001017	0.004400	0.001421	0.000466

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Percent of Electricity Use Generated with Renewable Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	340.1146	340.1146	0.0154	3.1800e-003	341.4473
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	680.2292	680.2292	0.0308	6.3600e-003	682.8946
NaturalGas Mitigated	0.0220	0.1892	0.0892	1.2000e-003		0.0152	0.0152		0.0152	0.0152	0.0000	217.6185	217.6185	4.1700e-003	3.9900e-003	218.9117
NaturalGas Unmitigated	0.0220	0.1892	0.0892	1.2000e-003		0.0152	0.0152		0.0152	0.0152	0.0000	217.6185	217.6185	4.1700e-003	3.9900e-003	218.9117

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					
Apartments Low Rise	1.87913e+006	0.0101	0.0866	0.0369	5.5000e-004		7.0000e-003	7.0000e-003		7.0000e-003	7.0000e-003	0.0000	100.2774	100.2774	1.9200e-003	1.8400e-003	100.8733
General Office Building	429880	2.3200e-003	0.0211	0.0177	1.3000e-004		1.6000e-003	1.6000e-003		1.6000e-003	1.6000e-003	0.0000	22.9400	22.9400	4.4000e-004	4.2000e-004	23.0764
Single Family Housing	1.76901e+006	9.5400e-003	0.0815	0.0347	5.2000e-004		6.5900e-003	6.5900e-003		6.5900e-003	6.5900e-003	0.0000	94.4011	94.4011	1.8100e-003	1.7300e-003	94.9620
Total		**0.0220**	**0.1892**	**0.0892**	**1.2000e-003**		**0.0152**	**0.0152**		**0.0152**	**0.0152**	**0.0000**	**217.6185**	**217.6185**	**4.1700e-003**	**3.9900e-003**	**218.9117**

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					
Apartments Low Rise	1.87913e+006	0.0101	0.0866	0.0369	5.5000e-004		7.0000e-003	7.0000e-003		7.0000e-003	7.0000e-003	0.0000	100.2774	100.2774	1.9200e-003	1.8400e-003	100.8733
General Office Building	429880	2.3200e-003	0.0211	0.0177	1.3000e-004		1.6000e-003	1.6000e-003		1.6000e-003	1.6000e-003	0.0000	22.9400	22.9400	4.4000e-004	4.2000e-004	23.0764
Single Family Housing	1.76901e+006	9.5400e-003	0.0815	0.0347	5.2000e-004		6.5900e-003	6.5900e-003		6.5900e-003	6.5900e-003	0.0000	94.4011	94.4011	1.8100e-003	1.7300e-003	94.9620
Total		**0.0220**	**0.1892**	**0.0892**	**1.2000e-003**		**0.0152**	**0.0152**		**0.0152**	**0.0152**	**0.0000**	**217.6185**	**217.6185**	**4.1700e-003**	**3.9900e-003**	**218.9117**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e

Land Use	kWh/yr	MT/yr			
Apartments Low Rise	828075	240.8964	0.0109	2.2500e-003	241.8403
General Office Building	243320	70.7846	3.2000e-003	6.6000e-004	71.0619
Single Family Housing	1.26687e+006	368.5482	0.0167	3.4500e-003	369.9923
Total		**680.2292**	**0.0308**	**6.3600e-003**	**682.8946**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Low Rise	414037	120.4482	5.4500e-003	1.1300e-003	120.9202
General Office Building	121660	35.3923	1.6000e-003	3.3000e-004	35.5310
Single Family Housing	633437	184.2741	8.3300e-003	1.7200e-003	184.9961
Total		**340.1146**	**0.0154**	**3.1800e-003**	**341.4473**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Residential Interior

Use Low VOC Paint - Residential Exterior

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

	ROG	NOx	CO	SO2	Fugitive 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	5.9111	0.5104	27.5863	0.0967		4.9405	4.9405		4.9405	4.9405	646.8357	3.8816	650.7173	2.5455	0.0000	714.3539
Unmitigated	5.9111	0.5104	27.5863	0.0967		4.9405	4.9405		4.9405	4.9405	646.8357	3.8816	650.7173	2.5455	0.0000	714.3539

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	0.4253					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.7918					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	3.6230	0.4831	25.2164	0.0966		4.9273	4.9273		4.9273	4.9273	646.8357	0.0000	646.8357	2.5418	0.0000	710.3798
Landscaping	0.0709	0.0273	2.3700	1.3000e-004		0.0132	0.0132		0.0132	0.0132	0.0000	3.8816	3.8816	3.7000e-003	0.0000	3.9741
Total	**5.9111**	**0.5104**	**27.5863**	**0.0967**		**4.9405**	**4.9405**		**4.9405**	**4.9405**	**646.8357**	**3.8816**	**650.7173**	**2.5455**	**0.0000**	**714.3539**

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	0.4253					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.7918					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	3.6230	0.4831	25.2164	0.0966		4.9273	4.9273		4.9273	4.9273	646.8357	0.0000	646.8357	2.5418	0.0000	710.3798
Landscaping	0.0709	0.0273	2.3700	1.3000e-004		0.0132	0.0132		0.0132	0.0132	0.0000	3.8816	3.8816	3.7000e-003	0.0000	3.9741
Total	**5.9111**	**0.5104**	**27.5863**	**0.0967**		**4.9405**	**4.9405**		**4.9405**	**4.9405**	**646.8357**	**3.8816**	**650.7173**	**2.5455**	**0.0000**	**714.3539**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	62.6527	0.8093	0.0196	88.7140
Unmitigated	62.6527	0.8093	0.0196	88.7140

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			

Apartments Low Rise	11.3368 / 7.14711	28.7193	0.3706	8.9600e-003	40.6523
General Office Building	3.91014 / 2.39654	9.8357	0.1278	3.0900e-003	13.9512
Single Family Housing	9.51249 / 5.997	24.0978	0.3109	7.5200e-003	34.1105
Total		**62.6527**	**0.8093**	**0.0196**	**88.7140**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Low Rise	11.3368 / 7.14711	28.7193	0.3706	8.9600e-003	40.6523
General Office Building	3.91014 / 2.39654	9.8357	0.1278	3.0900e-003	13.9512
Single Family Housing	9.51249 / 5.997	24.0978	0.3109	7.5200e-003	34.1105
Total		**62.6527**	**0.8093**	**0.0196**	**88.7140**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	57.7347	3.4120	0.0000	143.0353

Unmitigated	57.7347	3.4120	0.0000	143.0353

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Low Rise	80.04	16.2474	0.9602	0.0000	40.2522
General Office Building	20.46	4.1532	0.2455	0.0000	10.2894
Single Family Housing	183.92	37.3341	2.2064	0.0000	92.4937
Total		**57.7347**	**3.4120**	**0.0000**	**143.0353**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Low Rise	80.04	16.2474	0.9602	0.0000	40.2522
General Office Building	20.46	4.1532	0.2455	0.0000	10.2894
Single Family Housing	183.92	37.3341	2.2064	0.0000	92.4937
Total		**57.7347**	**3.4120**	**0.0000**	**143.0353**

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 C1

Biological Report, Wetland Delineation, Mitigation, Monitoring, and Reporting Plan, and Aquatic Resources Delineation

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APPENDIX A Biological Report

McKay Ranch Subdivision
Eureka, California

Prepared for:

Kramer Properties Inc.

SHN Engineers & Geologists

812 W. Wabash Ave.
Eureka, CA 95501-2138
707-441-8855

November 2016
016148.100

CONSULTING ENGINEERS & GEOLOGISTS, INC.
812 W. Wabash • Eureka, CA 95501-2138 • 707-441-8855 • FAX: 707-441-8877 •shninfo@shn-engr.com

Reference: 016148.100

November 15, 2016

Chris Mikkelsen
Kramer Properties Inc.
1589 Myrtle Avenue, Suite B
Eureka, CA 95501

Subject: Biological Report, McKay Ranch Subdivision, Eureka, California

Dear Chris:

SHN Consulting Engineers & Geologists, Inc. has prepared this Biological Report for the McKay Ranch Subdivision in Eureka on behalf of Kramer Properties Inc. This Report addresses potential impacts to habitat found on-site and special status species potentially present. Recommended mitigation measures and conclusions are included at the end of the Report.

No special status species were documented within the project area. After implementation of the suggested mitigation the project will have less of an impact on the habitat found within the project area

If you have any comments or concerns, call me at (707) 822-5785 and I will be happy to discuss them with you.

Sincerely,

SHN Consulting Engineers & Geologists, Inc.

Joseph Saler
Biologist/Botanist

JLS:ceg

Enclosures: Biological Report

Reference: 016148.100

Biological Report

McKay Ranch Subdivision
Eureka, California

Prepared for:

Kramer Properties Inc.
1589 Myrtle Avenue, Suite B
Eureka, CA 95501

Prepared by:

Consulting Engineers & Geologists, Inc.
812 W. Wabash Ave.
Eureka, CA 95501-2138
707-441-8855

November 2016

QA/QC: JLS___

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Abbreviations and Acronyms

°F	degrees Fahrenheit
ACOE	Army Corps of Engineers
BIOS	Biogeographical Information and Observation System
C	candidate species status
CCH	Consortium of California Herbaria
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFGC	California Fish and Game Code
CFR	Code of Federal Regulations
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CRPR	California Rare Plant Rank
CT	candidate threatened species status
CWA	Clean Water Act
D	delisted species status
DPS	Northern California distinct population segment/species status
E	endangered species status
EPA	Environmental Protection Agency
ESU	evolutionarily significant unit/species status
FESA	Federal Endangered Species Act
FP	fully protected species status
G1/S1	critically imperiled species heritage rank
G2/S2	imperiled species heritage rank
G3/S3	vulnerable species heritage rank
G4/S4	apparently secure species heritage rank
G5/S5	secure species heritage rank
HCP	habitat conservation plan
IPaC	Information for Planning and Conservation
MBTA	Migratory Bird Treaty Act
MMRP	mitigation monitoring and reporting plan
NCCP	Natural Community Conservation Planning Act
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NPPA	Native Plant Protection Act
NRA	natural resource assessment
NWI	National Wetland Inventory
PT	proposed threatened species status
RWQCB	Regional Water Quality Control Boards
SAA	Streambed Alteration Agreement
SHN	SHN Engineers & Geologists
SMAO	Streamside Management Area Ordinance
SSC	species of special concern
SWRCB	State Water Resources Control Board
T	threatened species status
U.S.	United States
U.S.C.	U.S. Code
USFWS	United States Fish and Wildlife Service
U.S.GS	United States Geological Survey
VegCAMP	Vegetation Classification and Mapping Program
WDR	Waste Discharge Requirement
WL	watch list species status

1.0 Introduction, Background, and Project Understanding

Kramer Properties Inc. is proposing the subdivision and development of 81 acres into 154 lots called the McKay Ranch Subdivision. The McKay Ranch Subdivision, hereon referred to as "the project" will consist of a mixture of single family homes, affordable housing, condominiums, commercial space and open space, including necessary access roads, utilities and stormwater infrastructure. Redwood and Arbutus Streets are proposed to be extended east, with Arbutus Street curving north and eventually intersecting with Redwood Street. Additional side streets will be constructed southeast and northwest of Redwood and Arbutus Streets. All Development is proposed to occur on the flat upper terrace portion of the property. Development will have an approximate 100-foot buffer from the 30% break in slope to protect steep slopes from erosion, thereby protecting Ryan Creek and accompanying wetlands. Steep slopes and drainages will remain in protected open space area, in addition to stands of trees to protect adjacent viewsheds and provide habitat. The project is located in the unincorporated area of Humboldt County, California (Township 5 North, Range 1 West, in the Northwest quarter of Section 36) and is within the United States Geological Survey (USGS) 7.5 minute Eureka topographic quadrangle (Figure 1). Elevation at the site is between 150 and 200 feet above mean sea level.

Project components affecting biological resources within the project include:

-The removal of forest habitat across the site, and conversion of forest to urban development
-Crossing tributaries of Ryan Creek by the Redwood Street extension.
-Destruction of potential listed plant species habitat, or populations of listed plant species

The purpose of this report is to discuss the results of a botanical/biological survey conducted May 24 and 25, and July 26, 2016, and to evaluate the potential impacts the project may have on the biological communities located within the area of potential effects from the proposed project. The survey was conducted in order to determine the presence or absence of listed species and potential habitat across the entire proposed project area, and to record the species and vegetation communities found within the project area.

2.0 Methodology

Database queries of listed species and special habitats known from the area were performed during May 2016. The following references were reviewed:

- California Natural Diversity Database (CNDDB) query for the Eureka and surrounding USGS 7.5 minute topographic quadrangles (Tyee City, Arcata North, Arcata South, McWhinney Creek, Fields Landing, and Cannibal Island) (CDFW, 2016a);
- CNDDB Rarefind Tool for the Eureka and surrounding USGS 7.5 minute topographic quadrangles (BIOS; CDFW, 2016b);
- Electronic Inventory of Rare and Endangered Vascular Plants of California (California Native Plant Society [CNPS], 2016) query for a list of all plant species reported for the Eureka and surrounding USGS 7.5 minute topographic quadrangles;

- United States Fish and Wildlife Service (USFWS) Listed/Proposed Threatened and Endangered Species for the Eureka and surrounding USGS 7.5 minute topographic quadrangles (Candidates Included; USFWS, 2016);
- United States Fish and Wildlife Service (USFWS) Information for Planning and Conservation (IPaC)

From the database queries, a list of potential target species for the study area was compiled. Table A-1, A-2, and A-3 in Appendix A includes species reported by the CNDDB, CNPS Lists 1B through 4 and USFWS.

Additionally, USFWS's Critical Habitat Portal was queried for habitat designated as critical for species listed under the Federal Endangered Species Act. Ryan Creek is listed as critical habitat for the threatened Northern California Distinct Population Segment (DPS) for Steelhead (*Oncorhynchus mykiss*) and the California Coastal Evolutionarily Significant Unit (ESU) of Chinook salmon (*Oncorhynchus tshawytscha*).

Each species was evaluated for its potential to occur on the study area according to the following criteria:

- **None**. Species listed as having "none" are those species for which:
  - there is no suitable habitat present in the study area (that is, habitats in the study area are unsuitable for the species requirements [for example, elevation, hydrology, plant community, disturbance regime, etc.]).
- **Low**. Species listed as having a "low" potential to occur in the study area are those species for which:
  - there is no known record of occurrence in the vicinity, and
  - there is marginal or very limited suitable habitat present within the study area.
- **Moderate**. Species listed as having a "moderate" potential to occur in the study area are those species for which:
  - there are known records of occurrence in the vicinity, and
  - there is suitable habitat present in the study area.
- **High**. Species listed as having a "high" potential to occur on the study area are those species for which:
  - there are known records of occurrence in the vicinity (there are many records and/or records in close proximity), and
  - there is highly suitable habitat present in the study area.
- **Present**. Species listed as "present" in the study area are those species for which:
  - the species was observed in the study area.

SHN's biologist conducted a site visit on May 24 and 25, and July 26, 2016, for an assessment of the habitat, plant and animal species, and vegetation communities found within the project area and the potential for the occurrence of any listed plant or animal species or associated habitat. The survey was floristic in nature, with an attempt to identify all species present, including possible

species of special concern (CDFW, 2009). The entire area of potential disturbance from the project was surveyed, including the Arbutus Street right of way (ROW), the tributaries of Ryan Creek to be crossed by Redwood Street, the area around the baseball fields, and throughout the forested remainder of the property, with additional attention given to potential habitat of listed species. Regions beyond the property line were not surveyed, as well as the area proposed as open space between the main project off of Redwood Street and the few lots proposed off of Manzanita Avenue, as these areas will not be directly disturbed by the project. In addition to surveying for target species, a list of all botanical and animal species encountered was compiled (Table A-4 and A-5, in Appendix A). Plants were identified to the lowest taxonomic level possible to distinguish special status species from others. Botanical nomenclature follows *The Jepson Manual, Vascular Plants of California* (Baldwin et al., 2012) and subsequent taxonomic revisions made to the Jepson eflora (Jepson Flora Project, 2015).

Site photographs from the site visits are included in Appendix B.

3.0 Regulatory Setting

Regulatory authority over biological resources is shared by federal, state, and local authorities under a variety of legislative acts. The following section summarizes the federal, state, and local regulations for special status species, jurisdiction waters of the United States and State of California, and other sensitive biological resources. This section provides a listing and overview of these federal and state laws; only select regulations will be applicable to this project.

3.1 Federal Laws

3.1.1 Clean Water Act Sections 404 and 401

Under Section 404 (33 U.S. Code (U.S.C.) 1344) of the Clean Water Act (CWA), as amended, the Army Corps of Engineers (ACOE) retains primary responsibility for permits to discharge dredged or fill material into waters of the U.S. All discharges of dredged or fill material into jurisdictional waters of the U.S. that result in permanent or temporary losses of waters of the U.S. are regulated by the ACOE. A permit from the ACOE must be obtained before placing fill or grading in wetlands or other waters of the U.S., unless the activity is exempt from CWA Section 404 regulation (for example, certain farming and forestry activities).

The ACOE defines wetlands as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions"(ACOE Environmental Laboratory, 1987). In other words, the ACOE defines wetlands by the presence of all three wetland indicators: hydrophytic vegetation, hydric soils, and wetlands hydrology.

Waters of the U.S. are defined at 33 Code of Federal Regulations (CFR) Part 328. They include traditional navigable waters; relatively permanent, non-navigable tributaries of traditional navigable waters; and certain wetlands. Following recent court cases, the U.S. Environmental Protection Agency (EPA) and ACOE published a memorandum entitled Clean Water Act Jurisdiction (U.S. EPA/U.S. ACOE, 2008) to guide the determination of jurisdiction over waters of the U.S., especially for wetlands. The applicability of Section 404 permitting over discharges to

wetlands is, therefore, a two-step process: 1) determining the areas that are wetlands, and 2) where a wetland is present, assessing the wetland's connection to traditional navigable waters and non-navigable tributaries to determine whether the wetland is jurisdictional under the CWA. A wetland is considered jurisdictional if it meets certain specified criteria.

The ACOE is required to consult with the USFWS and/or National Marine Fisheries Service (NMFS) under Section 7 of the Federal Endangered Species Act (FESA) if the action subject to CWA permitting could result in "Take" of federally listed species or an adverse effect to designated critical habitat. The project is within the jurisdiction of the Sacramento District of the ACOE.

Section 401 of the CWA (33 U.S.C. 1341) requires any applicant for a federal license or permit to conduct any activity that may result in a discharge of a pollutant into waters of the U.S. to obtain a certification from the state in which the discharge originates or would originate, or, if appropriate, from the interstate water pollution control agency having jurisdiction over the affected waters at the point where the discharge originates or would originate, that the discharge will comply with the applicable effluent limitations and water quality standards. A certification obtained for the construction of any facility must also pertain to the subsequent operation of the facility. The responsibility for the protection of water quality in California rests with the State Water Resources Control Board (SWRCB) and its nine Regional Water Quality Control Boards (RWQCB). The project is within the jurisdiction of the North Coast RWQCB.

3.1.2 Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act (16 U.S.C. Sections 661-667e, March 10, 1994, as amended 1946, 1958, 1978, and 1995) requires that whenever waters or channel of a stream or other body of water are proposed or authorized to be modified by a public or private agency under a federal license or permit, the federal agency must first consult with the USFWS and/or NMFS and with the head of the agency exercising administration over the wildlife resources of the state where construction will occur (in this case the CDFW), with a view to conservation of birds, fish, mammals and all other classes of wild animals and all types of aquatic and land vegetation upon which wildlife is dependent.

If direct permanent impacts occur to waters of the U.S. from a proposed project, then a permit from ACOE under CWA Section 404 is required for the construction of the proposed project. ACOE is required to consult with USFWS and/or NMFS as appropriate regarding potential impacts to federally listed species under FESA. Such action may prompt consultation with CDFW, which would review the project pursuant to California Endangered Species Act (CESA) and issue a consistency letter with USFWS and/or NMFS, if required.

3.1.3 Federal Endangered Species Act

The United States Congress passed the FESA in 1973 to protect species that are endangered or threatened with extinction. The FESA is intended to operate in conjunction with the National Environmental Policy Act (NEPA) to help protect the ecosystems upon which endangered and threatened species depend and within which they live. The USFWS and the NMFS are the designated federal agencies responsible for administering the FESA.

The FESA prohibits the "Take" of endangered or threatened wildlife species. A "Take" is defined as harassing, harming (including significantly modifying or degrading habitat), pursuing, hunting, shooting, wounding, killing, trapping, capturing, or collecting wildlife species, or any attempt to engage in such conduct (16 U.S.C. 1531, 50 CFR 17.3). An activity can be defined as a "Take" even if it is unintentional or accidental. Taking can result in civil or criminal penalties. Activities that could result in "Take" of a federally listed species require an incidental "Take" authorization resulting from FESA Section 7 consultation or FESA Section 10 consultation. Plants are legally protected under the FESA only if "Take" occurs on federal land or from federal actions, such as issuing a wetland fill permit.

A federal endangered species is one that is considered in danger of becoming extinct throughout all, or a significant portion, of its range. A federal threatened species is one that is likely to become endangered in the foreseeable future. The USFWS also maintains a list of species proposed for listing as threatened or endangered. Proposed species are those for which a proposed rule to list as endangered or threatened has been published in the Federal Register. In addition to endangered, threatened, and proposed species, the USFWS maintains a list of candidate species. Candidate species are those for which the USFWS has on file sufficient information to support issuance of a proposed listing rule.

Pursuant to the requirements of the FESA, an agency reviewing a proposed project within its jurisdiction must determine whether any federally listed endangered or threatened species may be present in the project area and determine whether the proposed project will have a potentially significant impact on such a species. In addition, the agency is required to determine whether the project is likely to jeopardize the continued existence of any species proposed to be listed under the FESA or result in the destruction or adverse modification of critical habitat designated or proposed to be designated for such species (16 U.S.C. 1536[3], [4]). Project-related impacts to species on the FESA endangered or threatened list would be considered significant and would require mitigation.

3.1.4 Migratory Bird Treaty Act

The federal Migratory Bird Treaty Act (MBTA) of 1918 makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed in CFR Part 10, including feather or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 CFR 21). The MBTA also prohibits disturbance and harassment of nesting migratory birds at any time during their breeding season. The USFWS is responsible for enforcing the MBTA (16 U.S.C. 703). The migratory bird nesting season is generally considered to be between March 15 and August 1 within the study region.

3.2 State Laws

3.2.1 Porter-Cologne Water Quality Act

The state and RWQCB also maintain independent regulatory authority over the placement of waste, including fill, into waters of the State under the Porter-Cologne Act. Waters of the State are defined by the Porter-Cologne Act as "any surface water or groundwater, including saline waters, within the boundaries of the state." The SWRCB protects all waters in its regulatory scope, but has special responsibility for isolated wetlands and headwaters. These water bodies might not be regulated by other programs, such as Section 404 of the CWA. Waters of the State are regulated by

the RWQCBs under the State Water Quality Certification Program, which regulates discharges of dredged and fill material under Section 401 of the CWA and the Porter-Cologne Water Quality Control Act. Projects that require an ACOE permit, or fall under other federal jurisdiction, and have the potential to impact waters of the State are required to comply with the terms of the Water Quality Certification Program. If a proposed project does not require a federal license or permit, but does involve activities that may result in a discharge of harmful substances to waters of the State, the RWQCBs have the option to regulate such activities under their state authority in the form of Waste Discharge Requirements (WDRs) or certification of WDRs.

3.2.2 California Endangered Species Act

The State of California enacted the CESA in 1984. The CESA is similar to the FESA but pertains to state-listed endangered and threatened species. Under the CESA, the CDFW has the responsibility for maintaining a list of threatened and endangered species designated under state law (California Fish and Game Code [CFGC] 2070). Section 2080 of the CFGC prohibits "Take" of any species that the commission determines to be an endangered or threatened species. "Take" is defined in Section 86 of the CFGC as "to hunt, purse, catch, capture, or kill, or attempt to hunt, purse, catch, capture, or kill."

The state and federal lists of threatened and endangered species are generally similar; however, a species present on one list may be absent from the other. CESA regulations are also somewhat different from the FESA in that the State regulations included threatened, endangered, and candidate plants on non-federal lands within the definition of "Take." CESA allows for "Take" incidental to otherwise lawful development projects.

Pursuant to the requirements of the CESA, an agency reviewing a proposed project within its jurisdiction must determine whether any state-listed endangered or threatened species may be present in the project area and determine whether the proposed project will have a potentially significant impact on such species. Project-related impacts to species on the CESA endangered or threatened list (or, in addition, designated by the CDFW as a "Species of Special Concern," which is a level below threatened or endangered status) would be considered significant and would require mitigation.

3.2.3 California Environmental Quality Act

California Environmental Quality Act (CEQA) Guidelines Sections 15125(c) and 15380(d) provide that a species not listed on the federal or state list of protected species may be considered rare or endangered if the species can be shown to meet certain specified criteria. Thus, CEQA provides the ability to protect a species from potential project impacts until the respective government agencies have an opportunity to designate the species as protected, if warranted.

The California Native Plant Society (CNPS) maintains a list of plant species native to California whose populations that are significantly reduced from historical levels, occur in limited distribution, or are otherwise rare or threatened with extinction. This information is published in the Inventory of Rare and Endangered Plants of California (CNPS, 2015). Taxa with a California Rare Plant Rank (CRPR) of 1A, 1B, 2A, 2B, and 3 in the CNPS inventory consist of plants that meet the definitions of the CESA of the CFGC, are eligible for state listing, and meet the definition of Rare or Endangered under CEQA Guidelines Sections 15125 (c) and 15380(d). Some taxa with a

CRPR 4 may meet the definitions of the CESA of the CFGC. CRPR 4 populations may qualify for consideration under CEQA if they are peripheral or disjunct populations; represent the type locality of the species; or exhibit unusual morphology and/or occur on unusual substrates.

Additionally, CDFW maintains lists of special animals and plants. These lists include a species conservation ranking status from multiple sources, including FESA, CESA, federal departments with unique jurisdictions, CNPS, and other non-governmental organizations. Based on these sources, CDFW assigns a heritage rank to each species according to their degree of imperilment (as measured by rarity, trends, and threats). These ranks follow NatureServe's Heritage Methodology, in which all species are listed with a G (global) and S (state) rank. Species with state ranks of S1-S3 are also considered highly imperiled.

CEQA checklist IV (b) calls for the consideration of riparian habitats and sensitive natural communities. Sensitive vegetation communities are natural communities and habitats that are either unique, of relatively limited distribution in the region, or of particularly high wildlife value. However, these communities may or may not necessarily contain special-status species. Sensitive natural communities are usually identified in local or regional plans, policies, or regulations, or by the CDFW (i.e., the CNDDB and VegCAMP programs) or the USFWS. Impacts to sensitive natural communities and habitats must be considered and evaluated under the CEQA (California Code of Regulations [CCR]: Title 14, Div. 6, Chap. 3, Appendix G).

Although sensitive natural communities do not (at present) have legal protection, CEQA calls for an assessment of whether any such resources would be affected, and requires a finding of significance if there will be substantial losses. High quality occurrences of natural communities with heritage ranks of 3 or lower are considered by CDFW to be significant resources and fall under the CEQA Guidelines for addressing impacts. Local planning documents (such as, general plans) often identify these resources as well. Avoidance, minimizations, or mitigation measures should be implemented if project-affected stands of rare vegetation types or natural communities are considered high-quality occurrences of the given community.

As a trustee agency under CEQA, CDFW reviews potential project impacts to biological resources, including wetlands. In accordance with the CEQA thresholds of significance for biological resources, areas that meet the state criteria of wetlands and could be impacted by a project must be analyzed. Pursuant to CFGC Section 2785, CDFW defines wet areas as "lands which may be covered periodically or permanently with shallow water and which include saltwater marshes, freshwater marshes, open or closed brackish water marshes, swamps, mudflats, fens, and vernal pools."

3.2.4 California Fish and Wildlife Code Section 1600

Streams, lakes, and riparian vegetation as habitat for fish and other wildlife species, are subject to jurisdiction by the CDFW under Sections 1600-1616 of the CFGC. Any activity that will do one or more of the following: 1) substantially obstruct or divert the natural flow of a river, stream, or lake; 2) substantially change or use any material from the bed, channel, or bank of a river, stream, or lake; or 3) deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into a river, stream, or lake generally require a Streambed Alteration Agreement (SAA).

The term "stream," which includes creeks and rivers, is defined in the CCR as follows: "a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life." This includes watercourses having a surface or subsurface flow that supports or has supported riparian vegetation (14 CCR 1.72).

In addition, the term stream can include ephemeral streams, dry washes, watercourses with subsurface flows, canals, aqueducts, irrigation ditches, and other means of water conveyance if they support aquatic life, riparian vegetation, or stream-dependent terrestrial wildlife. Riparian is defined as "on, or pertaining to, the banks of a stream"; therefore, riparian vegetation is defined as, "vegetation which occurs in and/or adjacent to a stream and is dependent on, and occurs because of, the stream itself" (CDFW, 1994). Removal of riparian vegetation also requires an SAA from the CDFW.

3.2.5 California Fish and Wildlife Code Sections 3503 and 3513

According to Section 3503 of the CFGC it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird (except English sparrows [*Passer domesticus*] and European starlings [*Sturnus vulgaris*]). Section 3503.5 specifically protects birds in the orders Falconiformes and Strigiformes (birds-of-prey). Section 3513 essentially overlaps with the MBTA, prohibiting the "Take" or possession of any migratory non-game bird. Disturbance that causes nest abandonment and/or loss of reproductive effort is considered "Take" by the CDFW.

3.2.6 Fully Protected Species and Species of Special Concern

The classification of "fully protected" was the CDFW's initial effort to identify and provide additional protection to those animals that were rare or faced with possible extinction. Lists were created for fish, amphibian and reptiles, birds, and mammals. Most of the species on these lists have subsequently been listed under CESA and/or FESA. The CFGC sections (fish at Sec. 5515, amphibian and reptiles at Sec. 5050, birds at Sec. 3511, and mammals at Sec. 4700) dealing with "fully protected" species states that these species "...may not be taken or possessed at any time and no provision of this code or any other law shall be construed to authorize the issuance of permits or licenses to take any fully protected species," (CDFW, 1998) although "Take" may be authorized for necessary scientific research. This language makes the "fully protected" designation the strongest and most restrictive regarding the "Take" of these species. In 2003, the code sections dealing with fully protected species were amended to allow the CDFW to authorize "Take" resulting from recovery activities for state-listed species.

Species of special concern (SSC) are broadly defined as animals not listed under the CESA, but that are nonetheless of concern to the CDFW because they are declining at a rate that could result in listing or historically occurred in low numbers and known threats to their persistence currently exist. This designation is intended to result in special consideration for these animals by the CDFW, land managers, consulting biologists, and others, and is intended to focus attention on the species to help avert the need for costly listing under CESA and cumbersome recovery efforts that might ultimately be required. This designation also is intended to stimulate collection of additional information on the biology, distribution, and status of poorly known at-risk species, and focus research and management attention on them. Although the SSC designation provides no special legal status, they are given special consideration under CEQA during project review.

Table 2 (Section 5) includes potentially occurring federal and state listed species and SSC animals that may occur in the project area.

3.2.7 Native Plant Protection Act of 1973

The Native Plant Protection Act (NPPA) of 1973 (Sec.1900-1913 of the CFGC) includes provisions that prohibit the taking of endangered or rare native plants from the wild and a salvage requirement for landowners. The CDFW administers the NPPA and generally regards as "rare" many plant species included on Lists 1A, 1B, 2A, 2B, 3, and 4 of the CNPS Inventory of Rare and Endangered Vascular Plants of California (CNPS, 2015).

Table 1 (Section 5) includes potentially occurring endangered or rare native plants that may occur in the project area (including CNPS lists).

3.2.8 Natural Community Conservation Planning Act

The Natural Community Conservation Planning (NCCP) Act of 1991 is an effort by the State of California, and numerous private and public partners that is broader in its orientation and objectives than the CESA and FESA (refer to discussions above). The primary objective of the NCCP Act is to conserve natural communities at the ecosystem scale while accommodating compatible land use. The NCCP Act seeks to anticipate and prevent the controversies and gridlock caused by species listings by focusing on the long-term stability of wildlife and plant communities and including key interests in the process.

No regionally occurring natural community or associated plan is listed by the state for the project area.

3.3 Other Statutes, Codes, and Policies Affording Limited Species Protection—Humboldt County Streamside Management Area Ordinance

Riparian and wetland habitats receive protection under Humboldt County's Streamside Management Area Ordinance (SMAO); as defined in Title 3, Section 314-61.1 of the Humboldt County Code. Development and work within Streamside Management Areas (SMAs) requires a special permit from the County, if those activities are not exempt.

The purpose of the SMAO is to provide oversight in the use and development of land located within wet areas such as rivers, creeks, springs, and other wetland types. This includes natural resource areas along both sides of streams containing the channel and adjacent land. In areas outside of urban development and expansion areas, SMAs are identified as a 100-foot setback from the stream transition line of perennial streams and 50-foot setback for streams with seasonal intermittent flow. In areas inside of urban development and expansion areas, SMAs are identified as a 50-foot setback from perennial streams and 25-foot setback for streams with seasonal intermittent flow. The stream transition line is defined in the Humboldt County General Plan as, "that line closest to a stream where riparian vegetation is permanently established," which is typically interpreted in riparian areas as the closest rooted tree to the water course.

Routine maintenance activities are permitted under the SMAO, if trees that are more than 12 inches in diameter are not cut, and that no more than 6,000 cumulative square feet of woody vegetation is removed. Additionally, activities are not considered routine maintenance if they could result in a significant environmental impact. Significance with regard to environmental impact can be difficult to qualify on a case-by-case level. However, the California Department of Fish and Wildlife generally considers the removal of riparian woody vegetation greater than 4 inches in diameter as an activity that requires compensatory mitigation. Mitigation measures for projects within SMAs can include retaining snags and trees that support nesting birds, replanting of disturbed areas equal to the development area, and other potential site-specific habitat improvements.

4.0 Results and Discussion

4.1 Existing Site Conditions

There are 68 special status species reported within the region consisting of the study area's quadrangle (Eureka) and the surrounding topographic quadrangles (CDFW, 2016a; CDFW, 2016b (Table A-1); USFWS, 2016 (Table A-3)). A CNPS query for the Eureka and the surrounding topographic quadrangles (Table A-2) reported 9 additional special status plant species (CNPS, 2016) for a total of 77 special-status plant and animal species reported within the Eureka and surrounding 7.5 minute quadrangles. Of the 77 special-status species reported: 4 were amphibians, 15 were bird species, 6 fish species, 3 insect species, 5 mammal species, 1 reptile species, and 43 plant species, including the results from the CNPS query. Seventeen of the species listed in Table A-1, A-2 and A-3 of Appendix A are considered to have a moderate or high potential to occur within the project area. In addition to the listed species reported as potentially occurring within the project area, 19 migratory non-listed bird species were reported as potentially utilizing the project area during some point of the year (USFWS IPaC 2016), with two showing moderate or higher potential of occurring on site.

A total of 154 non-listed plant species were documented during the survey as well as 15 non-listed bird species, 5 non-listed mammal species, 1 non-listed reptile species, and 2 non-listed insect species (see table A-4, and A-5, Appendix A). No amphibians were observed during the survey; however the dry conditions at the time of the survey likely kept amphibians from being readily observed for the duration of the survey.

The majority of the development will be confined to the flat portions of the property, on the top of the terrace. All development, except the extension of Redwood Street, will be constructed at least 100 feet from the 30% break in slope. This will prevent erosion of the steep slopes that drain to Ryan Slough, critical habitat for threatened Northern California Distinct Population Segment (DPS) for steelhead (*Oncorhynchus mykiss*) and the California Coastal Evolutionarily Significant Unit (ESU) of Chinook salmon (*Oncorhynchus tshawytscha*). In addition, the 100-foot buffer ensures that tree cover is not removed from the slopes, maintaining the existing view shed, and habitat surrounding the project. The buffer insures that environmental impacts will not extend past the 30% break in slope. The Redwood Street crossing of the tributaries of Ryan Creek could affect fish habitat if not installed properly.

Currently, habitat on the site is characterized primarily by third-growth redwood forest. *Sequoia sempervirens* Forest Alliance consists of a forest canopy with greater than 50% relative cover provided by the Coast Redwood (*Sequoia sempervirens*)(see photos 1-6, Appendix B). This forest type has a rarity ranking of G3 S3.2, meaning 10-50,000 acres of this community type within California and is considered threatened. The redwood forest habitat found across the survey area is of low quality, reflecting the history of disturbance and continued disturbance across the site. The majority of the trees on site are young, estimated at between 25-35 years of age, and are densely spaced preventing much undergrowth over a large portion of the survey area. The parcel has been logged a minimum of two times, which included the development of roads. Disturbance continues today with many ungraded paths crisscrossing the parcel (see Photos 1 and 2, Appendix B), and evidence of continued uncontrolled recreational use of the survey area, including transient camps in places throughout the property. It is unknown when the area was logged, and how long it has been used as it is today.

Additional vegetation communities found on site include grassland, drainage swales dominated by red alder (*Alnus rubra*), and slough sedge (*Carex obnupta*), as well as *Rubus* alliances. Grassland was found on the perimeter of the baseball fields, within the Arbutus Street right of way (ROW) and utility service ROW (See Photo 1, Appendix B). The grassland vegetation community was characterized by non-native grass and shrub species, reflecting the disturbed nature of these areas and proximity to urban development with heavy non-native species cover. These areas are periodically mowed which prevents many Rare, Threatened, or Endangered species from occurring within the area. Grassland areas represented low quality listed species habitat, however, they represent breaks in the forest canopy, and are used as grazing and foraging areas for many species as evidenced by deer and numerous bird species being observed there.

Drainage swales with red alder and slough sedge were observed along the break of slope primarily outside of the area of proposed development. While these areas represent unique habitat the majority of these areas are becoming shaded by the expanding coast redwood canopy. The majority of theses patches exist outside of the development area; however those within the potential project area were scrutinized for additional plant species and were ultimately delineated for the Mckay Ranch Subdivision in a separate report.

Many Rubus patches exist across the survey area (see Photos 3 and 4). These represent patches of Rubus (parviflorus, spectabilis, ursinus) Shrubland alliance within forest openings. The Rubus shrubland alliance has a rarity ranking of G4S3, meaning globally secure, but somewhat threatened/rare in the state of California. Rubus species observed within the thickets included California blackberry (*Rubus ursinus*), thimbleberry (*Rubus parviflorus*), salmonberry (*Rubus spectabilis*), and Himalayan blackberry (*Rubus armeniacus*). Due to the expanding canopy and intrusion of Himalayan blackberry, the rubus patches do not represent high quality examples of the Rubus (parviflorus, spectabilis, ursinus) Shrubland alliance, and most likely represent transient vegetation communities remaining from the last timber harvest that will be shaded by the expanding redwood canopy in the coming years. Currently the thicket areas represent high quality habitat for many bird species within the forest as an area for food, shelter and protection from predators.

Vegetation within the survey area is characterized by a mix of non-native weedy species and native redwood forest species. Due to the site's close proximity to the urban development of Eureka, the survey area has a high percentage of non-native species. Of the 154 plant species observed within

the survey area, 43% of them were non-native species. While most of these species were not invasive, a number of them such as the Scotch broom (*Cytisus scoparius*), Spanish Heather (*Erica lusitanica*), Himalayan blackberry, and cotoneaster species were exhibiting invasiveness by covering large areas of land to the exclusion of most other plant species.

4.2 Special Status Plant Species

During the May and July field surveys, all special status species potentially present (Appendix A, Table A-1, A-2, A-3) in the project area were targeted. Forty-three (43) plant species were reported as existing within the Eureka and surrounding quadrangles (CNDDB, CNPS 2016). Of the 43 species reported within the area, eight had a moderate or higher potential to exist on the property. The botanical surveys were floristic and seasonally appropriate to detect all of the special status plant species with a moderate to high potential for occurrence within the project area. Potential habitat for the pacific golden saxifrage (*Chrysosplenium glechomifolium*), heart leaved twayblade (*Listera cordata*), running pine (*Lycopodium clavatum*), leafy stemmed miterwort (*Mitellastra caulescens*), ghost pipe (*Monotropa uniflora*), Howell's montia (*Montia howellii*), trailing black currant (*Ribes laxiflorum*), and the maple-leaved checkerbloom (*Sidalcea malachroides*) were present throughout the project area.

The pacific golden saxifrage (*Chrysosplenium glechomifolium*) is a perennial herb in the family Saxifragaceae. Its elevation range is reported from 10 to 220 meters in California, and has a bloom period from February through June within its range in California. It is most commonly found within riparian forests and within the north coast coniferous forest, sometimes along seeps and roadsides. Although habitat may exist locally for this species, it was not detected within the study area.

The heart leaf twayblade (*Listera cordata*) is a perennial herb in the family Orchidaceae. Its elevation range is reported from 30 to 1,180 meters in California, however it is seldom seen lower than 40 meters. It has a wide bloom period from February through July within its range in California. It is usually found within freshwater wetlands within coniferous forests however it can also be found on drier sites within conifer duff. Although habitat may exist locally for this species, it was not detected within the study area.

The running pine (*Lycopodium clavatum*) is a rhizomatous fern in the family Lycopodiaceae. Its elevation range is reported from 45 to 1800 meters in California, and has a bloom period from June through August. It is most common along edges, openings, and roadsides in mesic sites within coniferous forests, and can also be found in marshes and swamps. Although habitat may exist locally for this species, it was not detected within the study area.

The leafy stemmed miterwort (*Mitellastra caulescens*) is a perennial rhizomatous herb in the Saxifragaceae family. Its elevation range is reported from 5 to 1,700 meters above sea level. Within its range state-wide, its blooming period is reported as April through October. This species is reported from broadleafed upland forests, lower montane coniferous forests, meadows and seeps, mesic North Coast coniferous forests, and sometimes roadside habitats. Although habitat may exist locally for this species, it was not detected within the study area.

Ghost pipe (*Monotropa uniflora*) is an achlorophyllous parasitic perennial herb in the Ericaceae family. Its elevation range is reported from 10-550 meters in California, and has a bloom period from June through August. It is found within mixed evergreen forests and redwood forest, usually on non-wetland sites. It's hosts are mycorrhizal fungi. Although this species was observed approximately a half-mile away in 1971 and habitat may exist locally for this species, it was not detected within the study area.

Howell's montia (*Montia howellii*) is an annual herb in the Montiaceae family. Its elevation range is reported from 0 to 835 meters above sea level. Within its range state-wide, its blooming period is reported as March through May. This species is reported from vernally mesic meadows and seeps, North Coast coniferous forests, and sometimes roadsides habitats. Although habitat may exist locally for this species, it was not detected within the study area.

Trailing black currant (*Ribes laxiflorum*) is perennial deciduous shrub in the family Grossulariaceae. Its elevation range is reported from 5-1,395 meters in California, and has a bloom period from March through July in California. It is primarily found within north coast coniferous forest. Although habitat may exist locally for this species, it was not detected within the study area.

The maple-leaved checkerbloom (*Sidalcea malachroides*) is a perennial herb in the Malvaceae family. Its elevation range is reported from 0 to 730 meters above sea level. Within its range state-wide, its blooming period is reported as April through August. This species is reported from broadleafed upland forest, coastal prairie, coastal scrub, North Coast coniferous forests, and riparian woodlands; often in disturbed areas. Although habitat may exist locally for this species, it was not detected within the study area.

The project area was scrutinized for these species and other species listed as potentially occurring within the project area. While habitat for these species did exist within the project area, none of these species were observed during the surveys. This is most likely due to the fact that the habitat found on-site is of low quality, and has been heavily manipulated in the not too distant past. Large portions of the project area are forested in dense third-growth redwood forest. The forest floor under the dense canopy receives almost no direct sunlight, and in many places was completely devoid of understory vegetation growth. The conditions within the forested habitat throughout the project area may preclude the existence of some of these species.

Forest openings, trails, the area around the baseball fields and the powerline ROW present habitat area for the maple-leaf checkerbloom, as it requires disturbed openings. No maple-leaf checkerbloom plants were found on-site, nor is it expected that there were any missed, due to the high level of brush and competing vegetation within the available forest openings. Many of the seeps and small drainages were scrutinized during the survey for potential habitat of the pacific golden saxifrage, leafy stemmed miterwort, Howell's montia, heart-leaf twayblade and the running pine, however none of these species were observed in any of the seeps or drainages within the project area. Potential habitat was present, however many of the wet areas were becoming increasingly shaded by young coast redwood canopy, with many of the seep areas supporting little vegetation.

An observation of the ghost pipe has been recorded approximately a half-mile northwest of the nearest corner of the project area. The observation was recorded in 1971, prior to the latest timber harvest. The survey was conducted within the appropriate blooming period of this species, and this

species was not observed, and is not expected to exist on-site, due to the history of disturbance within the project area.

The botanical surveys were conducted within the appropriate bloom period of all the previously mentioned listed species with potential habitat within the project area. No listed botanical species were observed within the project area during the 2016 botanical surveys, nor are they expected to exist within the project area due to the disturbed nature of the area, and lack of high quality habitat.

4.3 Special Status Animal Species

During the May and July field surveys, all special status species potentially present (Appendix A, Table A-1, A-2, A-3) in the project area were targeted. A total of 33 special status animal species were reported as occurring within the Eureka and six surrounding 7.5 minute quadrangles, in addition to 19 migratory birds. Of these species, ten have a moderate or higher potential of occurring within the project area, and two of the migratory birds have a moderate or higher potential of occurring within the project area. The majority of the species recorded for the Eureka and surrounding 7.5 minute quadrangles do not have habitat present on site, or the habitat on-site is of such low quality that it is not expected to support individuals of the species. The species with a moderate or higher potential of occurring within the project area include the red legged frog (*Rana aurora*), southern torrent salamander (*Rhyacotriton variegatus*), sharp shinned hawk (*Accipiter striatus*), great egret (*Ardea alba*), great blue heron (*Ardea Herodias*), marbled murrelet (*Brachyramphus marmoratus*), snowy egret (*Egretta thula*), bald eagle (*Haliaetus leucocephalus*), osprey (*Pandion haliaetus*), and the spotted owl (*Strix occidentalis caurina*). Habitat for some of these species was present within the survey area, however the great egret, great blue heron, marbled murrelet, snowy egret, bald eagle, and osprey do not have habitat present within the project area, and have a moderate potential of occurring on-site due to the possibility of flyover, while flying from nesting/roosting sites to foraging locations. No listed species reported as occurring within the Eureka and surrounding 7.5 minute quadrangles or those with moderate or higher potential of occurring on-site were observed during the surveys.

Amphibians

The red-legged frog is known to inhabit moist forests, woodlands and streamsides in northwestern California. Habitat for this species is present within the project area and it is highly likely to occur on-site. Red-legged frogs are usually found near permanent water, but can be found far from water in damp woods during non-breeding seasons. Draws and seeps were scrutinized for this species, however it was not observed during the surveys, possibly due to drier conditions at the time of the surveys. Two drainages exist at the northwestern edge of the project that are proposed to have portions filled for an extension of Redwood Street. This area is the highest quality habitat for the red-legged frog, and the filling of these drainages will represent a slight decrease in habitat. Examination of the drainages showed that they dried up during the summer months; however the eastern-most of the two drainages had a trickle of water present in July. Substrate within the drainages was fine silt, mud, and sand, with no rocky substrate. Herbaceous vegetation cover was dense within the clearing for the power line ROW, with herbaceous cover diminishing within the dense cover of redwood on either side of the ROW. Larger drainages and waterways downslope from the project represent higher quality habitat for the red-legged frog.

There is moderate potential for the southern torrent salamander to occur within the project area, due to the presence of marginal habitat, and the proximity of the site to high quality habitat within

Ryan Creek and some of its larger tributaries. Southern torrent salamanders are primarily aquatic, but are capable of terrestrial activity during moist days and nights. They are principally found within mixed conifer or redwood forests, and prefer old growth conditions. Cold, well-shaded permanent streams and seepages or within splash zones or moss covered substrate within trickling water are its primary habitats. Marginal habitat for this species is represented by the two drainages within the northwestern edge of the project area. The western-most drainage dries up in the summer, precluding it from being year round habitat for this species. The eastern drainage maintains a trickle of water through the summer months, potentially allowing it to sustain the southern torrent salamander throughout the year. The lack of old growth forest structure and lack of rocky substrate make it unlikely that this species exists within these drainages, or within the project area. Excellent habitat for this species does exist nearby within Ryan Creek, the Ryan Creek wetland complex, and its larger tributaries. To minimize the impacts of the project on these two amphibian species of special concern, the drainages will be left as forested open space and the Redwood Street crossing of the two drainages will be designed to facilitate wildlife crossing and access. The proposed one hundred-foot buffer from the 30% break in slope should ensure that this project will have no impact on the habitat contained within those lower drainages by preventing erosion of the slope, and the encroachment of development onto the hillside (see Recommendations).

Birds

The marbled murrelet feeds near shore of the Pacific Ocean with a range along the pacific coast of California north into Alaska. It nests in old-growth redwood and Douglas fir forests within Humboldt County and requires large branches to provide a horizontal surface on which to build a nest. The marbled murrelet is known to travel from old-growth nesting sites over six miles from the coast to feeding grounds in the early morning returning in the evening. There is no nesting habitat within the project area and any occurrence of this species on site would be during flight to and from its nest within appropriate old-growth forest inland. There is no appropriate habitat for the marbled murrelet within the project area and it would only fly over this site to and from its nest, therefore the proposed project would have no effect on the marbled murrelet.

The great egret, great blue heron, and snowy egret do not have habitat within the project area, and would only be known in the area from flyover to and from feeding locations. These species require marshy wetland habitats that are submerged by water for some period of time; in addition, they require large trees near water for roosting and nesting. Habitat for these species is not present within or near the project area, with the nearest foraging habitat being in Ryan's Slough. Ryan's Slough and Ryan's Creek represent potential feeding habitat for these species, and it is likely that these species flyover the project area enroute to feeding habitat. Because there is no habitat for these species within the project area, there will be no impact.

The bald eagle and the osprey do not have habitat within the project area, and would only be seen in the project area during flyover to and from different feeding locations. Bald eagles and osprey are known to nest around Humboldt Bay. Ospreys hunt fish almost exclusively and require large dead snags overlooking a water body on which to construct their nest. No large water bodies or large dead snags exist within the project area, precluding the existence of this species on-site. There is the potential for this species to flyover the project area enroute to Humboldt Bay or Ryan's Slough, however due to the lack of habitat within the project area the construction of the proposed project will have no effect on the osprey. The bald eagle has broader foraging habits than the osprey. They are known to nest in large live trees with thick branches that can support a nest

weighing up to several tons. Habitat for the bald eagle is not present within the project area, with no open hunting areas, or water bodies large enough to support the bald eagle. In addition, the third growth trees present across the project area are not large enough to provide suitable nesting habitat. As such there is still potential for this species to fly over the project area while hunting or on the way to preferred hunting grounds around Humboldt Bay. Because suitable habitat for the bald eagle does not exist on site, the proposed project will have no effect on this species.

Sharp-shinned hawk prefer forest edges, and deep conifer forest habitat for nesting. Sharp-shinned hawks hunt within forests and are adept at swiftly maneuvering through a forest canopy while pursuing their prey of smaller song birds. Although the sharp-shinned hawk was not observed during the surveys, habitat for this species did exist within the project area; however the dense forest growth may prevent the species from being present within some of the project area. While the project will result in a reduction of habitat for this species, the creation of forest edges associated with the project and the introduction of suburban features may actually increase the habitat available to the sharp-shinned hawk. Sharp-shinned hawks are known to thrive in forested areas near suburban development, as this hawk will hunt around backyard bird feeders, on bird species associated with more suburban settings. Because this project proposes forested setbacks and forested open space, the project could potentially improve habitat for this species, but more accurately will likely have little effect on the sharp-shinned hawk populations within the area.

The northern spotted owl is known to inhabit the old growth redwood forests of northern California. The spotted owl hunts primarily rodents within complex forest canopies. The spotted owl prefers old growth forests with multiple canopy layers; they nest in cavities within large old trees. As the species has been studied, it has been seen to nest even in second growth stands. While early seral stage forests represent marginal habitat, there is still the potential for the spotted owl to inhabit them. Habitat for the spotted owl is not present within the project area, and no spotted owls have been observed within a half-mile of the project area (CNDDB 2016). The dense third-growth redwood forest does not have the conditions necessary to support the spotted owl, with a dense single canopy preventing hunting by this species. Even though it is unlikely that this species exists within the project area, no clearing of the project area will begin before a seasonally appropriate northern spotted owl survey has occurred across the entire project area.

Migratory Birds

Of the 19 migratory birds listed as potentially nesting within the project area, only two species had appropriate nesting habitat represented within the project area. The purple finch (*Carpodacus purpureus*) and the yellow warbler (*Dendroica petechia ssp. brewsteri*) have potential nesting habitat within the project area. The purple finch is known to nest within shrubby areas, cool moist evergreen forests and suburban backyards. Nest placement is typically at the tip of conifer branches in a place that is protected by overhead branches. The yellow warbler is known to nest in thickets and other revegetating areas. While nesting habitat for both of these species will be disturbed during the construction of the project, the completed project will potentially increase the nesting habitat available to these species with the increased forest edge and shrubby growth. In order to avoid Take of any nesting species, any clearing associated with the project will occur outside of the nesting period for migratory birds typically from March 1 through August 15 (CDFW Fish and Game code 3503, 3503.5, and 3513 and Federal Migratory Bird Act 16 U.S. code 703 et seq.). If clearing is to occur within the nesting window of migratory birds, the California Department of Fish and Wildlife (CDFW) and the United States Fish and Wildlife Service (USFWS) will be consulted to assess the potential for Take of active nests, or a focused nesting bird survey will need

to take place immediately prior to and within the area of the proposed clearing. Surveys will also occur within a 100-foot buffer area around the clearing area, and a 200-foot buffer area for raptor nesting surveys.

4.4 Offsite Conditions

The habitats adjacent to the project area include additional third-growth redwood forest, red alder, and willow-dominated seeps and drainages, suburban development, and at the base of the slope, Ryan Creek and associated wetlands. The adjacent third-growth redwood forest is very similar to that which occurs within the area of the project that was surveyed. Until recently, the adjacent redwood forest was managed by the Green Diamond Resource Company for timber, and has recently been turned into the Eureka Community Forest, which will maintain sustainable harvest across the area, while managing the forest for the enhancement of forest habitat and access for recreation.

4.5 Development Effects

The proposed project is expected to drastically change portions of the habitat found across the site, changing a young upland forest into a suburban development with necessary access roads, utilities, trails, and services. While this represents a large change within the survey area, the forest found on-site has a history of disturbance and does not represent high quality habitat for any of the listed species. Given the projects proximity to the City of Eureka and existing development, this location will continue to experience encroachment by human development and the associated impacts of being near a large population center. Because high quality habitat is not present for any of the listed species within the Eureka and surrounding 7.5 minute quadrangles, the conversion of this land does not represent a significant impact to the natural community of Humboldt County. The habitat found across the project is very common across Humboldt County, following timber harvest and regeneration of stands. Forest structure is simple, and habitat value is low; however this forest type represents a transition into an older forest structure that can eventually become more complex and begin to have a higher habitat value for more species.

The project will have minimal impact on Ryan Creek and the Ryan Creek wetland complex, as project construction will maintain a 100-foot buffer from the 30% break in slope, preventing erosion and removal of trees within the steep slope above the creek. In addition, the two drainages proposed to be crossed by Redwood Street will have appropriate crossings to minimize impacts to wildlife that utilize the habitat found in the drainages surrounding the project area. Forested open space corridors will be maintained throughout the project area that will facilitate wildlife movement, will maintain nesting sites for birds within the project area, and will minimize the impacts to the species found within the project area; by providing refugia within the project area.

4.6 Recommendations

Since no special status species were documented during our field investigations, no species specific recommendations are provided for implementation during construction activities. However, to ensure that the project does not result in substantial impacts to the habitat and species found within and adjacent to the project area the following mitigation measures are recommended:

- 100-foot setback from the 30% break in slope designated as non-buildable to reduce erosion and removal of trees thereby reducing impacts to Ryan Creek and associated wetlands.
- Install Redwood Street crossings over drainages large enough to accommodate wildlife movement within the drainages, utilize Better Management Practices(BMPs) to eliminate sediment introduction into the drainages during construction of the crossings.
- Use Low-Impact Designs (LIDs) to catch rainwater and potential runoff from the project area, to reduce impacts from the project when completed.
- To avoid potential impacts to nesting birds one of the following shall be implemented.
    - Conduct vegetation removal and other ground disturbance activities associated with any construction activities during August through mid-March, when birds are not typically nesting.
    - If vegetation removal or ground-disturbing activity is to take place during the nesting season (March 15 through August 1 for most birds), a qualified biologist shall conduct a pre-construction nesting bird survey. Pre-construction surveys for nesting pairs, nests, and eggs shall occur within the construction limits and within 100 feet (200 feet for raptors) of the construction limits. If active nests are encountered, species specific measures shall be prepared by a qualified biologist in consultation with the USFWS and CDFW, and implemented to prevent abandonment of the active nest.
- Focused survey for spotted owls within the nesting season prior to site clearing.
- Focused survey for amphibians during appropriate weather conditions.
- Remediate degraded areas from past use of the project area within slopes above Ryan Creek, and within forested open space areas proposed within the project area.
- Project activities in areas near riparian and seasonally wet areas that provide amphibian habitat shall occur from July 15 through October 31, to minimize potential impacts to these species.

5.0 Summary of Findings and Conclusions

No special status species were documented within the project area. The lack of habitat present within the project area, and the implementation of the mitigation measures ensure that the proposed project will not have substantial impacts on any listed species. Conducting the clearing of the site outside of the nesting period for migratory birds will eliminate any Take or destruction of bird nests by the construction of the project. The widespread existence of third-growth redwood forest throughout Humboldt County and the relative size of this project will not result in substantial cumulative reduction in third-growth upland redwood forest habitat.

6.0 References

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Species Lists

Table A-4
Plant Species Observed 5/24,25 and 7/26/2016
McKay Ranch Eureka, CA

Scientific Name	Common Name	Family	Native?
Tree Layer			
Abies grandis	grand fir	Pinaceae	Y
Acer macrophyllum	bigleaf maple	Aceraceae	Y
Alnus rubra	red alder	Betulaceae	Y
Frangula purshiana	cascara	Rhamnaceae	Y
Ilex aquifolium	English holly	Aquifoliaceae	N
Morella californica	California wax myrtle	Myricaeae	Y
Picea sitchensis	Sitka spruce	Pinaceae	Y
Pittosporum tenuifolium	tawhiwhi tree	Pittosporaceae	N
Populus trichocarpa	black cottonwood	Salicaceae	Y
Prunus laurocerasus	English laurel	Rosaceae	N
Pseudotsuga menziesii	Douglas fir	Pinaceae	Y
Pyrus calleryana	flowering pear	Rosaceae	N
Salix lasiandra	pacific willow	Salicaceae	Y
Salix lasiolepis	arroyo willow	Salicaceae	Y
Sequoia sempervirens	coast redwood	Cupressaceae	Y
Sorbus californica	California mtn. ash	Rosaceae	Y
Thuja plicata	western red cedar	Cupressaceae	Y
Grasses			
Anthoxanthum occidentale	vanilla grass	Poaceae	Y
Anthoxanthum odoratum	sweet vernal grass	Poaceae	N
Avena fatua	wild oat	Poaceae	N
Briza major	large quaking grass	Poaceae	N
Briza minor	small quaking grass	Poaceae	N
Bromus carinatus	California brome	Poaceae	Y
Bromus diandrus	ripgut brome	Poaceae	N
Bromus hordeacus	soft chess	Poaceae	N
Cortaderia selloana	pampas grass	Poaceae	N
Dactylis glomerata	orchard grass	Poaceae	N
Fectuca microstachys	small fescue	Poaceae	Y
Festuca arundinacea	Tall Fescue	Poaceae	N
Festuca perenne	Italian wildrye	Poaceae	N
Festuca rubra	red fescue	Poaceae	Y
Holcus lanatus	velvet grass	Poaceae	N
Hordeum murinum	foxtail barley	Poaceae	N
Poa annua	annual grass	Poaceae	N
Poa pratensis	Kentucky bluegrass	Poaceae	N
Trisetum cernuum	nodding trisetum	Poaceae	Y
Sedges and Rushes			
Carex harfordii	Harford's sedge	Cyperaceae	Y
Carex hendersonii	Henderson's sedge	Cyperaceae	Y
Carex leptopoda	slender-footed sedge	Cyperaceae	Y
Carex obnupta	slough sedge	Cyperaceae	Y
Isolepis cernua	low clubrush	Cyperaceae	Y
Juncus bufonius	toad rush	Juncaceae	Y

Scientific Name	Common Name	Family	Native?
Juncus effuses	common rush	Juncaceae	Y
Juncus occidentalis	western rush	Juncaceae	Y
Juncus patens	spreading rush	Juncaceae	Y
Juncus phaeocephalus	brownheaded rush	Juncaceae	Y
Luzula comosa	hairy woodrush	Juncaceae	Y
Scirpus microcarpus	panicled bulrush	Cyperaceae	Y
Ferns and Allies			
Athyrium filix-femina	lady fern	Woodsiaceae	Y
Blechnum spicant	deer fern	Blechnaceae	Y
Dryopteris arguta	wood fern	Dryopteridaceae	Y
Dryopteris expansa	common wood-fern	Dryopteridaceae	Y
Equisetum arvense	horsetail	Equisetaceae	Y
Equisetum telmateia	giant horsetail	Equisetaceae	Y
Polypodium glycyrrhiza	licorice fern	Polypodiaceae	Y
Polystichum munitum	sword fern	Dryopteridaceae	Y
Pteridium aquilinum	bracken fern	Dennstaedtiaceae	Y
Shrubs			
Baccharis pilularis	coyote bush	Asteraceae	Y
Berberis darwinii	Darwin's berberis	Berberidaceae	N
Cotoneaster franchetii	Franchett's cotoneaster	Rosaceae	N
Cotoneaster lacteus	milkleaf cotoneaster	Rosaceae	N
Crataegus monogyna	English hawthorn	Rosaceae	N
Cytisus scoparius	Scotchbroom	Fabaceae	N
Erica lusitanica	Spanish heather	Ericaceae	N
Fuchsia magellanica	hardy fuschia	Onagraceae	N
Gaultheria shallon	salal	Ericaceae	Y
Genista monspessulana	French broom	Fabaceae	N
Lonicera involucrata	twinberry	Caprifoliaceae	Y
Ribes menziesii	canyon gooseberry	Grossulariaceae	Y
Ribes sanguineum	flowering currant	Grossulariaceae	Y
Rosa californica	California wild rose	Rosaceae	Y
Rubus parviflorus	thimbleberry	Rosaceae	Y
Rubus spectabilis	salmonberry	Rosaceae	Y
Sambucus racemosa	red elderberry	Caprifoliaceae	Y
Spiraea douglasii	Douglas spirea	Rosaceae	Y
Vaccinium ovatum	black huckleberry	Ericaceae	Y
Vaccinium parviflora	red huckleberry	Ericaceae	Y
Vines			
Hedera helix	English ivy	Araliaceae	N
Lonicera etrusca	honeysuckle	Caprifoliaceae	N
Lonicera hispidula	pink honeysuckle	Caprifoliaceae	Y
Rubus armeniacus	Himalayan blackberry	Rosaceae	N
Rubus ursinus	California blackberry	Rosaceae	Y
Herbs			
Achillea millefolium	common yarrow	Asteraceae	Y
Adenocaulon bicolor	trail plant	Asteraceae	Y
Allium triquetrum	wild onion	Alliaceae	N
Anaphalis margaritacea	pearly everlasting	Asteraceae	Y

Scientific Name	Common Name	Family	Native?
Asarum caudatum	wild ginger	Aristolochiaceae	Y
Bellis perennis	English daisy	Asteraceae	N
Cardamine californica	milkmaids	Brassicaceae	Y
Cardamine oligosperma	bittercress	Brassicaceae	Y
Cerastium glomeratum	mouse-eared chickweed	Caryophyllaceae	N
Chamerion angustifolium	fireweed	Onagraceae	Y
Cirsium vulgare	bullthistle	Asteraceae	N
Claytonia perfoliata	miner's lettuce	Montiaceae	Y
Clintonia andrewsiana	blue beed lily	Liliaceae	Y
Conium maculatum	poison hemlock	Apiaceae	N
Convolvulus arvensis	field bindweed	Convolvulaceae	N
Crocosmia x crocosmiiflora	montbretia	Iridaceae	N
Daucus carota	Queen Anne's lace	Apiaceae	N
Erodium botrys	storks bill	Geraniaceae	N
Galium aparine	cleaver plant	Rubiaceae	Y
Galium triflorum	sweetscented bedstraw	Rubiaceae	Y
Geranium dissectum	cutleaf geranium	Geraniaceae	N
Geranium robertianum	Robert geranium	Geraniaceae	N
Hieracium albiflorum	hawksbeard	Asteraceae	N
Hirschfeldia incana	Mediterranean hoary mustard	Brassicaceae	N
Hydrophyllum tenuipes	pacific waterleaf	Boraginaceae	Y
Hypochaeris radicata	hairy cats-ear	Asteraceae	N
Iris douglasiana	Douglas iris	Iridaceae	Y
Lamiastrum galeobdolon	yellow archangel	Lamiaceae	N
Lemna valdiviana	valdivia duckweed	Araceae	Y
Leucanthemum vulgare	oxeye daisy	Asteraceae	N
Linum bienne	flax	Linaceae	N
Lysichiton americanus	western skunk cabbage	Araceae	Y
Lysimachia latifolia	pacific star flower	Myrsinaceae	Y
Maianthemum dilatatum	false lily of the valley	Ruscaceae	Y
Maianthemum racemosum	false Solomon's seal	Ruscaceae	Y
Marah oregana	coast man-root	Curcubitaceae	Y
Matricaria discoidea	pineapple weed	Asteraceae	Y
Medicago polymorpha	bur-clover	Fabaceae	N
Mentha pulegium	pennyroyal	Lamiaceae	N
Mimulus dentatus	coastal monkey-flower	Phrymaceae	Y
Myosotis scorpioides	forget-me-nots	Boraginaceae	N
Oenanthe sarmentosa	water parsley	Apiaceae	Y
Osmorhiza berteroi	sweet cicely	Apiaceae	Y
Oxalis oregana	redwood sorrel	Oxalidaceae	Y
Pectiantia ovalis	coastal miterwort	Saxifragaceae	Y
Petasites frigidus	arctic sweet colt's-foot	Asteraceae	Y
Plantago lanceolata	English plantain	Plantaginaceae	N
Plantago major	common plantain	Plantaginaceae	N
Prunella vulgaris	selfheal	Lamiaceae	Y
Pseudognaphalium luteoalbum	Jersey cudweed	Asteraceae	N
Ranunculus parviflorus	small-flowered buttercup	Ranunculaceae	N
Ranunculus repens	creeping buttercup	Ranunculaceae	N

Scientific Name	Common Name	Family	Native?
Raphanus sativa	wild radish	Onagraceae	N
Rumex acetosella	sheep sorrel	Polygonaceae	N
Rumex crispus	curly dock	Polygonaceae	N
Rumex obtusifolius	bitter dock	Polygonaceae	N
Sanicula crassicaulis	pacific sanicle	Apiaceae	Y
Scrophularia californica	California bee plant	Scrophulariaceae	Y
Sisyrinchium bellum	blue-eyed grass	Iridaceae	Y
Sonchus oleraceus	sow thistle	Asteraceae	N
Stachys ajugoides	bugle hedgenettle	Lamiaceae	Y
Stachys chamissonis	coast hedgenettle	Lamiaceae	Y
Taraxicum officianale	dandelion	Asteraceae	N
Tellima grandiflora	fringecups	Saxifragaceae	Y
Trifolium dubium	shamrock clover	Fabaceae	N
Trifolium hybridum	aslike clover	Fabaceae	N
Trifolium repens	white clover	Fabaceae	N
Trillium sp.	trillium species	Melanthiaceae	Y
Vancouveria planipetala	inside-out flower	Berberidaceae	Y
Veronica beccabunga	European speedwell	Plantaginaceae	N
Vicia sativa	spring vetch	Fabaceae	N
Vicia sativa ssp. nigra	common vetch	Fabaceae	N
Viola sempervirens	redwood violet	Violiaceae	Y
			57% Native

Table A-5
Animal Species Observed 5/24,25 and 7/26/2016
McKay Ranch Eureka, CA

Scientific Name	Common Name	Family	Nesting Habit	Listed?
Birds				
Aphelocoma californica	scrub jay	Corvidae	6-14' high till mid-summer	NL
Calypte anna	Anna's hummingbird	Trochilidae	Horizontal branches, open woodlands	NL
Catharus ustalatus	Swainson's thrush	Turdidae	conifer forest understory in brush	NL
Corvus brachyrhynchos	American crow	Corvidae	In tree canopy, March-July	NL
Corvus corax	common raven	Corvidae	Wide variety of habitats	NL
Cyanocitta stelleri	stellar jay	Corvidae	Nests in conifers, near the top of trees	NL
Empidonax difficilis	pacific slope flycatcher	Tyrannidae	Dense second growth cavity nester	NL
Hirundo rustica	barn swallow	Hirundinidae	Mud nests on structures May-July	NL
Poecile atricapillus	black capped chickadee	Paridae	Cavity nester, variety of woodland	NL
Regulus satrapa	golden crowned kinglet	Regulidae	60 ft off ground in conifer canopy	NL
Sayornis nigricans	black phoebe	Tyrannidae	Associated with water, mud nests	NL
Troglodytes pacificus	pacific wren	Troglodytidae	cavity nester in underbrush	NL
Turdus migratorius	American robin	Turdidae	Within lower canopy, April-July	NL
Zenaida macroura	mourning dove	Columbidae	evergreen trees, wide variety of area	NL
Zonotrichia leucophrys	white crowned sparrow	Emberizidae	open shrub habitat, alpine/tundra	NL
Mammals				
Tamiasciurus douglasii	Douglas' squirrel	Sciuridae	N/A	NL
Odocoileus hemionus columbianus	Columbian black-tailed deer	Cervidae	N/A	NL
Thomomys bottae	Botta's pocket gopher	Geomyidae	N/A	NL
Urocyon cinereoargenteus	gray fox	Canidae	N/A	NL
Ursus americanus	black bear	Ursidae	N/A	NL
Reptiles				
Thamnophis elegans terrestris	coast garter snake	Colubridae	N/A	NL

B

Site Photographs



Photo 1. Looking West in Utilities ROW. Note Crude trails, past logging debris and non-native grass habitat. Photo taken July 26, 2016.



Photo 2. Logging road and existing trail within project area. Note growth of shrubby species in forest opening. Photo taken May 25, 2016.

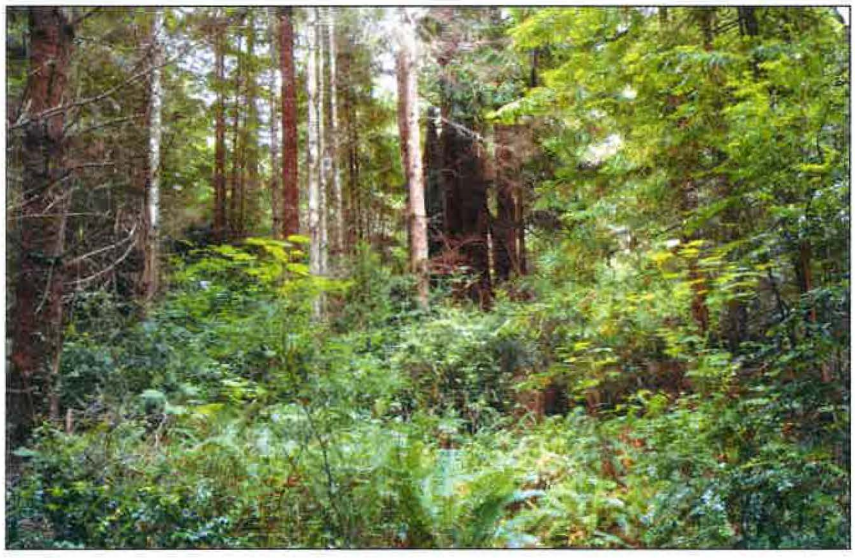


Photo 3. A typical forest opening within the project area. Note dominance by huckleberry, sword fern, and rubus species. Photo taken May 24, 2016.

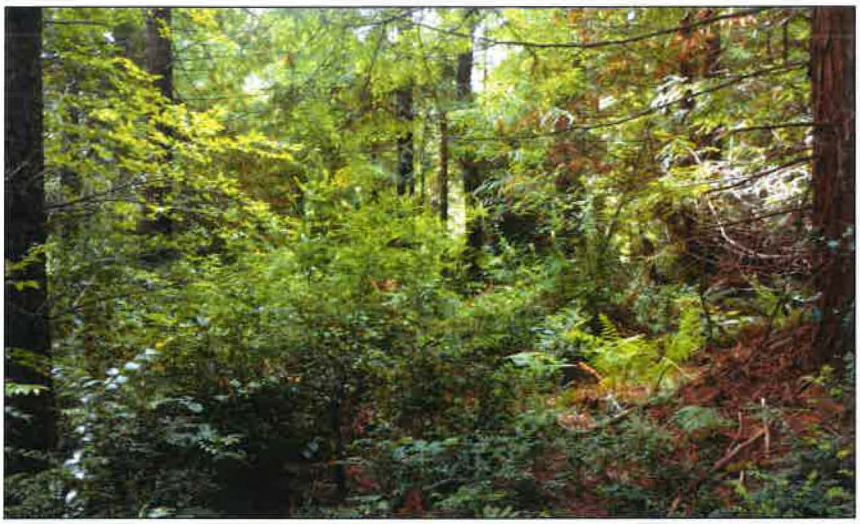


Photo 4. Forest opening, with closing canopy. Note dominance by huckleberry and sword fern. Photo taken May 24, 2016.

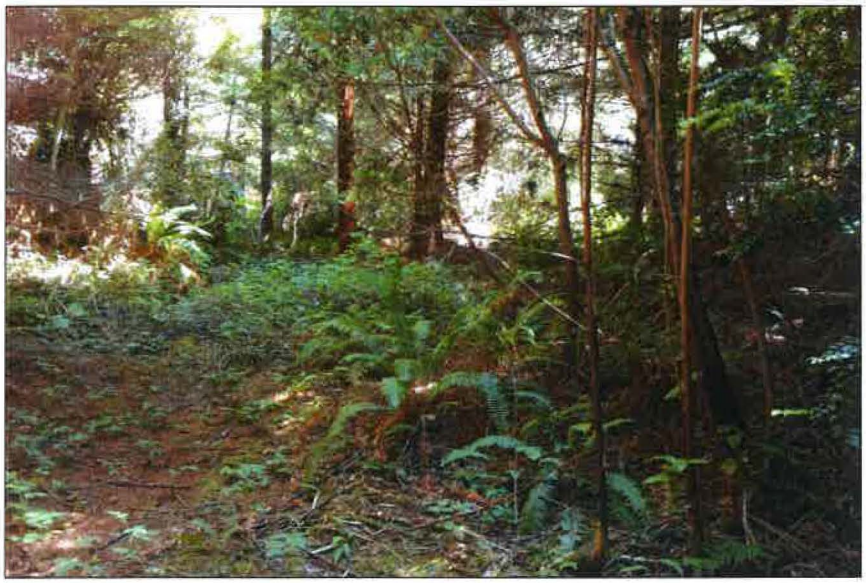
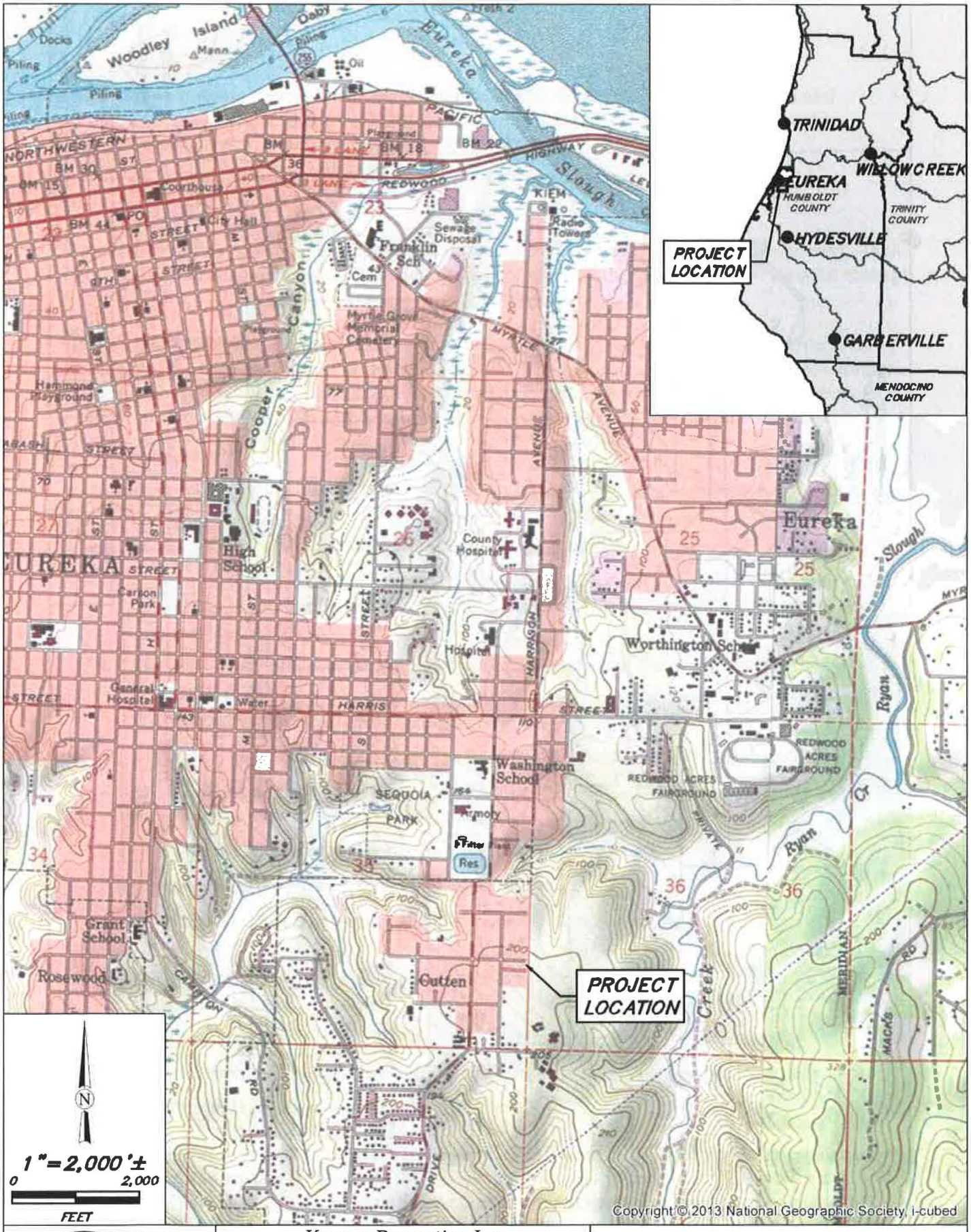
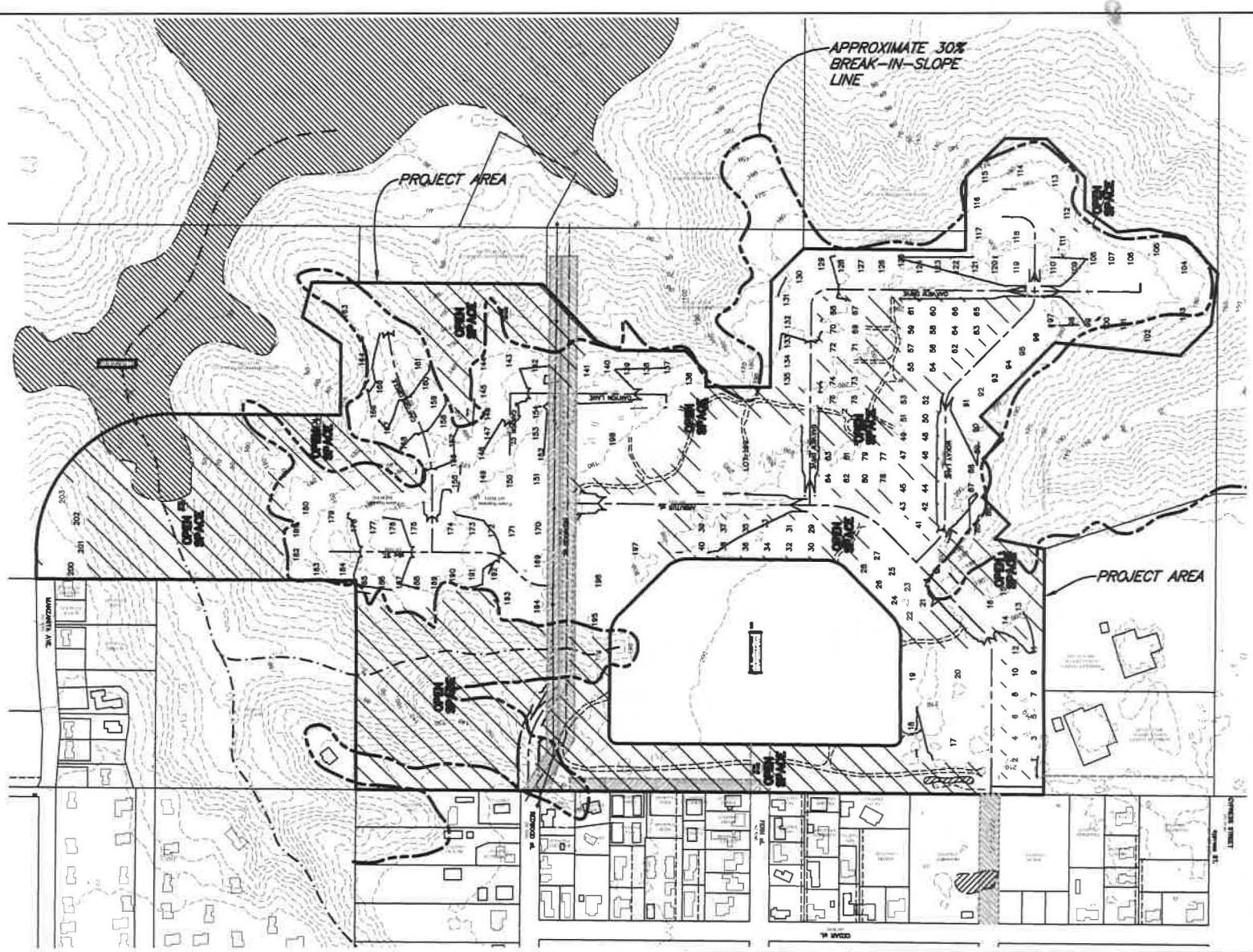


Photo 5. Overgrown logging road, with typical forest understory of sword fern and rubus. Photo taken May 25, 2016.



Consulting Engineers & Geologists, Inc.	Kramer Properties, Inc. McKay Ranch Subdivision Cutten, California	Project Location SHN 016148
November 2016	Figure1_ProjectLocation	Figure 1



SHN Consulting Engineers & Geologists, Inc.

Kramer Properties, Inc.
McKay Ranch Subdivision
Cutten, California

Project Area
(showing 30% break-in-slope)
SHN 0161-48

November 2016 | 0161-48-FIGURE-2-PROJECT-AREA | Figure 2

Mitigation, Monitoring, and Reporting Plan

McKay Ranch Subdivision
Eureka, California

Prepared for:

Kramer Properties, Inc

SHN Engineers & Geologists

1062 G Street, Suite I
Arcata, CA 95521
707-822-5785

March 2018
016148

CONSULTING ENGINEERS & GEOLOGISTS, INC.
1062 G Street, Suite I • Arcata, CA 95521 • 707-822-5785 • FAX: 707-822-5786 •arcatainfo@ shn-engr.com

Reference: 016148

March 7, 2018

Kurt Kramer
Kramer Properties, Inc
1589 Myrtle Avenue, Suite B
Eureka, CA 95501

Subject: Mitigation, Monitoring, and Reporting Plan for the McKay Ranch Subdivision

Dear Mr. Kramer:

SHN Engineers & Geologists has prepared this Mitigation, Monitoring, and Reporting Plan to accompany the wetland delineation that will be submitted to support permit applications to various regulatory agencies. The project involves the subdivision and development of 81 acres with potential impacts to wetlands. This Mitigation, Monitoring and Reporting Plan proposes mitigation for the impacts to wetlands and waters associated with this project.

Please call me at 707-822-5785 if you have any additional comments or questions.

Sincerely,

SHN Engineers & Geologists

Joseph Saler
Botanist/Biologist

JLS:ceg

Enclosure: Mitigation, Monitoring, and Reporting Plan

Reference: 016148

Mitigation, Monitoring, and Reporting Plan

McKay Ranch Subdivision
Eureka, California

Prepared for:

Kramer Properties, Inc

Prepared By:

Engineers & Geologists
1062 G Street, Suite I
Arcata, CA 95521
707-822-5785

March 2018

QA/QC:SEC

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Abbreviations and Acronyms

sqft	square feet
BMP	best management practices
CDFW	California Department of Fish and Wildlife
FAC	facultative wetland species
FACW	facultative wet wetland species
GPS	global positioning system
OBL	obligate wetland species
SHN	SHN Engineers & Geologists
SMA	streamside management area
SMAO	Streamside Management Area Ordinance
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

1.0 Introduction

This Mitigation, Monitoring, and Reporting Plan (MMRP) is submitted by SHN Engineers & Geologists on behalf of Kramer Properties, Inc. and outlines the mitigation, monitoring and reporting plan for the McKay Ranch Subdivision Proposed Wetland Mitigation. The goals of this MMRP are to:

1) develop self-sustaining wetland habitat adjacent to the McKay Ranch subdivision to compensate for the loss of wetlands as a result of the development of the proposed project, and
2) stabilize, recontour, and develop habitat on a failing logging road as mitigation for crossing two tributaries of Ryan Creek and for wetland setback reductions.

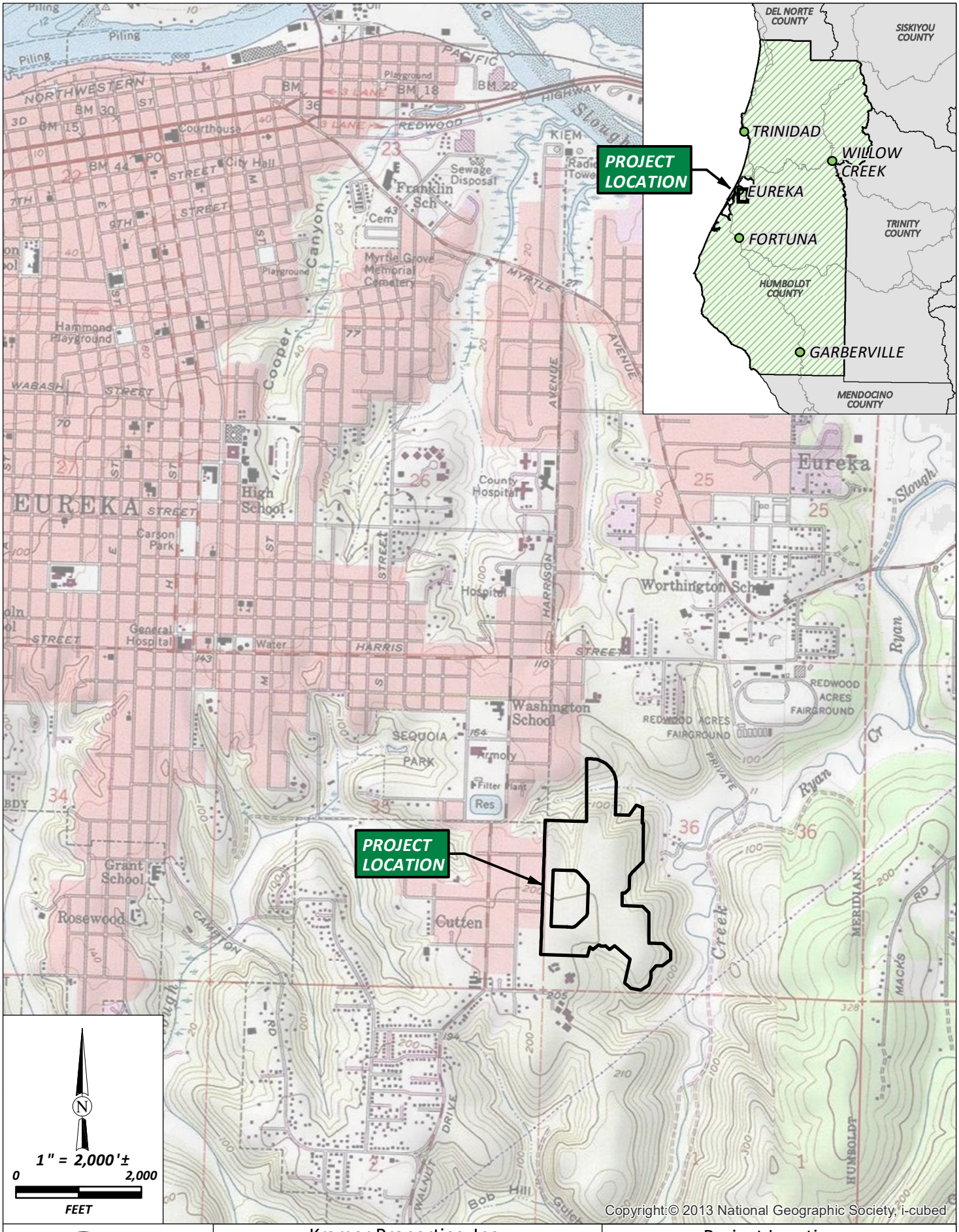
2.0 Project Background

Kramer Properties Inc. is proposing the subdivision and development of 81 acres into 154 lots called the McKay Ranch Subdivision. The McKay Ranch Subdivision herein referred to as "the project" will consist of a mixture of single-family homes, affordable housing, condominiums, commercial space, and open space, including necessary access roads, utilities, and stormwater infrastructure. Redwood and Arbutus Streets are proposed to be extended east, with Arbutus Street curving north and eventually intersecting with Redwood Street. Additional side streets will be constructed southeast and northwest of Redwood and Arbutus Streets. All development is proposed to occur on the flat upper terrace portion of the property. Development will have an approximate 100-foot buffer from the 30% break in slope to protect steep slopes from erosion, thereby protecting Ryan Creek and accompanying wetlands. Steep slopes and drainages will remain in protected open space area, in addition to stands of trees to protect adjacent viewsheds and provide habitat. The project is located in the unincorporated area of Humboldt County, California (Township 5 North, Range 1 West, in the Northwest quarter of Section 36) and is within the United States Geological Survey (USGS, Google Earth, 2016) 7.5-minute Eureka topographic quadrangle (see Figure 1). Elevation at the site is between 150 and 200 feet above mean sea level.

Wetlands and waters potentially impacted by the project include (see Figure 2):

-Two small isolated wetlands in the northern portion of the project,
-A large wetland draining Arbutus Street, at the proposed location of the Arbutus Street extension, and
-Crossing tributaries of Ryan Creek by the Redwood Street extension.

Wetlands and riparian habitats receive protection under Humboldt County's Streamside Management Area Ordinance (SMAO); as defined in Title 3, Section 314-61.1 of the Humboldt County Code (County of Humboldt, 2013). Development and work within streamside management areas (SMAs) requires a special permit from the County if those activities are not exempt. In areas within urban development and expansion areas, SMAs are defined as extending 50 feet from either side of the stream transition line for perennial streams, and 25 feet from the transition line of intermittent streams. The Humboldt County General Plan defines the stream transition line as, "[t]hat line closest to a stream where riparian vegetation is permanently established."



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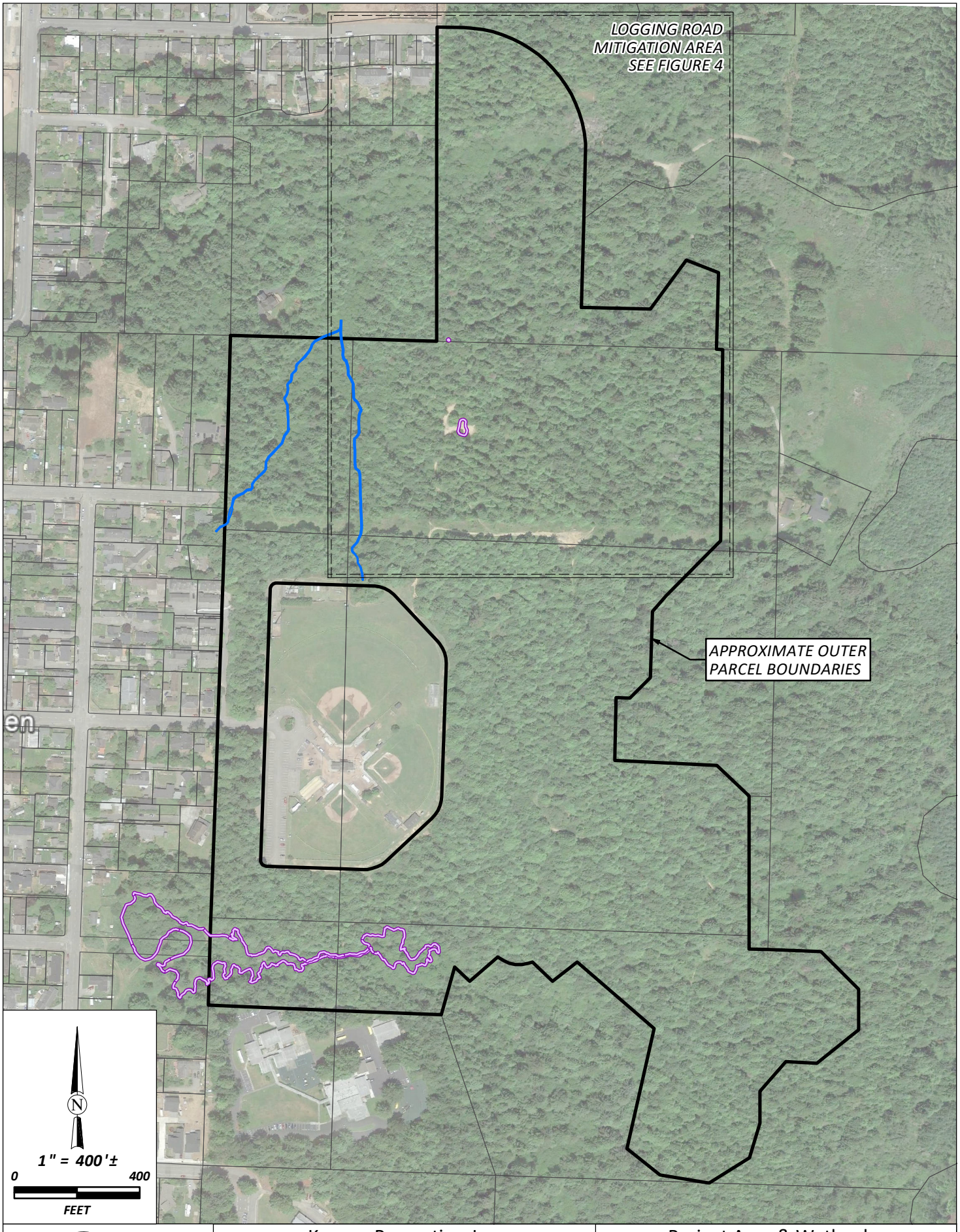
Consulting Engineers & Geologists, Inc.

Kramer Properties, Inc.
Mitigation, Monitoring, & Reporting Plan
McKay Ranch Subdivision, Cutten, California

Project Location

SHN 016148

March 2018 | MIT_Fig1_ProjectLocation | Figure 1



\\Arcata\Projects\2016\016148A-McKay-Ranch\GIS\PROJ_MXD\ USER: jsousa DATE: 3/7/18, 12:01PM

Consulting Engineers & Geologists, Inc.

Kramer Properties, Inc.
Mitigation, Monitoring, & Reporting Plan
McKay Ranch Subdivision, Cutten, California

Project Area & Wetlands

SHN 016148

March 2018 | MIT_Fig2_ProjectAreaAndWetlands | Figure 2

3.0 Proposed Project Mitigation Requirements

Approximately 1.8 acres (78,147 square feet) of wetlands exist within the project area (SHN, 2017). An estimated 0.84 acres (36,617 square feet) of the wetlands (47%) will be impacted by the project and project-related activities. This includes two isolated wetlands within the northern section of the project area, and a large wetland draining Arbutus Street in the southern portion of the project (see Figure 2). The larger of the two wetlands in the northern section is within an ATV turnaround area and totals 1,089 square feet, while the smaller of the two wetlands covers a total of 22 square feet and collects runoff from a logging road. These two wetlands will be filled as part of the project. The large wetland draining Arbutus Street in the southern portion of the project area totals 1.794 acres (78,147 square feet). Portions of this wetland area are proposed to be filled as part of the project. The Arbutus Street extension alignment and multi-family units are proposed over a large portion of this wetland and will impact approximately 0.82 acres (35,506 square feet). Wetlands to be impacted include freshwater emergent wetland as well as freshwater forested/shrub wetland within the large wetland and manipulated/disturbed isolated freshwater emergent wetland within the small wetlands in the northern portion of the project (SHN, 2016; SHN, 2017).

The project applicant, Kramer Properties Inc., is proposing to mitigate wetland impacts at a 1:1 replacement ratio. Wetlands expected to be impacted by the project and project-related activities are estimated as being 36,617 square feet. A 1:1 replacement ratio would result in the creation of 36,617 square feet of wetlands. Wetland mitigation areas will be contoured and planted with native wetland vegetation to create wetlands of equal or greater value than those being lost as a result of the project. Any wetland mitigation will be created within upland areas to ensure that additional wetland area is not lost. Wetlands created will be of the same type as those lost. Loss of wetland buffer around the southern wetland as a result of the Arbutus Street extension will be mitigated through existing wetland enhancement and revegetating the highly eroded logging road within the northern portion of the project area. Existing wetlands should be enhanced with the removal of non-native vegetation and planting of native hydrophytes. In addition, temporary fencing should be installed prior to construction to prevent additional wetland disturbance or accidental encroachment during construction. Wildlife friendly fencing should be installed to prevent accidental human encroachment into wetlands following completion of the project.

Two tributaries of Ryan Creek are proposed to be crossed by an extension of Redwood Street. It is estimated that each crossing will cover an average of 68 linear feet of the tributaries for a total impact of 136 linear feet.

The Ryan Creek tributary crossing impacts should be minimized by using large half-round culverts and mitigated by recontouring the deteriorating logging road within the northern portion of the project.

4.0 Mitigation Goals

The goals of this mitigation plan are to:

1) mitigate for wetland impacts resulting from the McKay Ranch subdivision,
2) create wetland habitat that works with planned urban development,
3) improve habitat within remaining wetlands, and

4) improve water quality in Ryan Creek by recontouring, planting, and creating habitat on a highly eroded former logging road.

Specifically, wetlands will be created within an upland area associated with the ball fields that is currently partially forested with third-growth redwoods, and partially covered in gravel. Wetland creation will replace wetlands impacted by the project at a 1:1 ratio as proposed by Kramer Properties Inc., with wetlands of equal or better quality. Wetlands would be designed to provide habitat within an urbanized setting. This would include proper fencing, vegetation screening, and signage. The wetland mitigation would be situated within an open space area (see Figure 3) and would enhance the habitat value of the open space lands. Existing wetlands currently have high levels of invasive species dominance, and in many places have historic fill placement. Part of the mitigation would include restoration of the remaining wetlands onsite following installation of the Arbutus Street extension. This would include invasive species removal, native plant installation, and where appropriate, removal of historic fill. In addition, existing wetlands would be connected to the proposed mitigation wetlands for habitat connectivity. This would include stormwater and wildlife crossing culverts in locations were the wetland would be crossed by the proposed Arbutus Street extension (see Figure 3).

Two stream crossings are proposed as part of the project. Crossings will be designed to facilitate wildlife movement and will be designed to minimize impacts to the streams. The crossings are anticipated to impact 68 linear feet of each stream, for a total of 136 linear feet of impacts. Crossings will be mitigated by the recontouring and stabilization of a former logging road, which contains approximately 727 linear feet of highly eroded terrain. In addition, the former roadway will be planted with native vegetation to facilitate habitat creation on the slope as mitigation for reduced wetland buffers along the Arbutus Street access. See Figure 4 and following sections for details on wetland and stream crossing mitigation.

5.0 Responsible Parties

The following participants are responsible for the installation, maintenance, and monitoring of this mitigation program. The responsibilities of each party are described below.

5.1 Project Proponent

The project proponent, Kramer Properties Inc., will be ultimately responsible to ensure that the approved mitigation plan is implemented and successful. Kramer Properties Inc. will be responsible for financing the preparation, maintenance, and monitoring of the mitigation areas.

5.2 Project Biologist

Monitoring of the mitigation area will be the responsibility of a qualified biologist. The project proponent is responsible for retaining the project biologist. The project biologist will coordinate with Kramer Properties Inc. staff to assist with interpreting mitigation goals and performance standards.

After each annual monitoring event, the project biologist will provide Kramer Properties Inc. with a written list of items in need of attention. The project biologist will be responsible for identifying habitat areas requiring remedial measures and for directing the implementation of such measures.

VEGETATION SCREEN (UPLAND)

WILDLIFE FRIENDLY FENCING

20'

SLOPING FRESHWATER FOREST/SHRUB

15'

WET FLAT OBLIGATE VEGETATION

20'

SLOPING WETLAND

DESIGNATE AS FOREST-WILDLIFE AREA

STORM AND WILDLIFE CROSSING CULVERT

EXISTING WETLAND

EXISTING WETLAND

COUNTY GIS PARCELS

FRESHWATER EMERGENT WETLAND MITIGATION AREA

FRESHWATER FOREST/SHRUB WETLAND MITIGATION AREA

UPLAND BUFFER AREA

WILDLIFE FRIENDLY FENCING

EXISTING WETLAND

CROSSING CULVERT

PHOTO SOURCE: GOOGLE EARTH, 5/26/2016

1" = 60'±

0 60

FEET

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Consulting Engineers & Geologists, Inc.

Kramer Properties, Inc.
Mitigation, Monitoring, & Reporting Plan
McKay Ranch Subdivision, Cutten, California

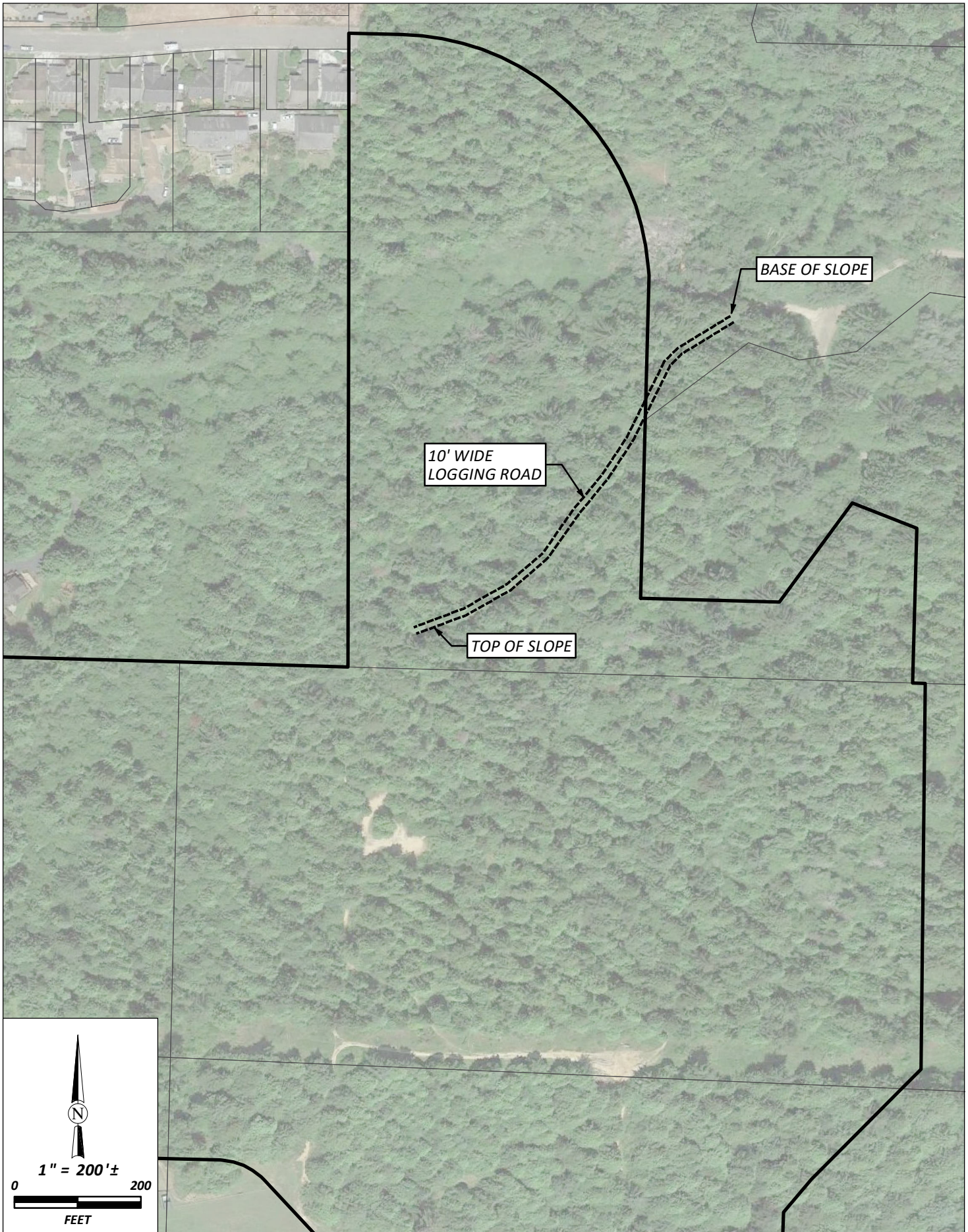
Wetland Mitigation Area

SHN 016148

March 2018

MIT_Fig3_WetlandMitigationArea

Figure 3



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SHN Consulting Engineers & Geologists, Inc.

Kramer Properties, Inc.
Mitigation, Monitoring, & Reporting Plan
McKay Ranch Subdivision, Cutten, California

Logging Road Mitigation Area

SHN 016148

March 2018 | MIT_Fig4_LoggingRoadMitigation | Figure 4

6.0 Wetland Mitigation Plan

6.1 Wetland Creation and Improvement Plan

Approximately 36,617 square feet (sqft) of wetland habitat is estimated to be permanently impacted by the project (Figure 2). Currently this area is characterized as freshwater emergent wetland, as well as freshwater forested/shrub wetland (SHN, 2017). Dominant tree species throughout the wetland area consist primarily of red alder (*Alnus rubra*), Sitka spruce (*Picea sitchensis*), and coast redwood (*Sequoia sempervirens*) (typically at the transition to upland), with lesser dominance by Pacific willow (*Salix lasiandra*), and cascara (*Frangula purshiana* ssp. *purshiana*). The shrub layer is composed of salmon berry (*Rubus spectabilis*), and California blackberry (*Rubus ursinus*), with varying densities and overall low percentage of relative cover, not over 20 percent. Dominant herbaceous species included slough sedge (*Carex obnupta*), common rush (*Juncus effusus* ssp. *pacificus*), and sword fern (*Polystichum munitum*) (Sawyer, 2009; Calflora, 2018; Baldwin, 2012). The entire wetland area is sloping; however, slopes rarely exceed 5 percent, and are approximately 2 percent within the wetland areas (see Appendix 2 Photos 2-1 through 2-6 for existing conditions).

Many non-native species were observed within the wetland, with varying degrees of dominance. This included: creeping buttercup (*Ranunculus repens*), pampas grass (*Cortaderia selloana*), tall fescue (*Festuca arundinacea*), pennyroyal (*Mentha pulegium*), English ivy (*Hedera helix*), velvet grass (*Holcus lanatus*), Himalayan blackberry (*Rubus armeniacus*), and creeping bentgrass (*Agrostis stolonifera*).

6.1.1 Wetland Mitigation Plan

An area south of Fern Street, between the existing ball fields and adjacent suburban development to the west, was determined to be the best location for wetland creation (see Figure 3). This location was selected for a number of reasons. Most importantly, it is adjacent to the existing wetlands and wetland area proposed for removal. Because of the proximity of this site to the existing wetlands, the created wetlands can be connected to and incorporated into the existing wetland area. This will allow for habitat connectivity and will facilitate wildlife movement. Additionally, topography of the site will facilitate water movement into the proposed mitigation area without the need for extensive excavation. The proposed location is partially located within a disturbed upland gravel access road and former staging area remaining from the construction of the ball fields. Using this area for mitigation will minimize the forested area needing to be removed for wetland creation. The proposed wetland mitigation area is large enough to accommodate the 36,617 sqft of wetland creation proposed by the project applicant. Lastly, the proposed location will be contiguous with proposed forested open space buffer and will add to the value of the habitat remaining in the open space conservation zones.

Currently, the proposed mitigation location is characterized by a mixture of disturbed gravel access road and third-growth redwood forest. The gravel access road and former staging area are characterized by low growing non-native herbaceous plants subject to disturbance and are regularly mowed. The area is compacted and flat with little to no habitat value. In order to make the site viable as a successful mitigation area, the compacted soil will have to be broken up and loosened to allow the successful growth of trees and shrubs that are specified in this Plan. The forested portion of the mitigation area is a transition between open and forested areas and therefore has a higher percentage of shrubby vegetation and low branches. Many redwood trees would need to be removed to accommodate the wetland mitigation plan; however, the mitigation would be designed to minimize redwood removal, and would be placed as much as possible

within the gravel access road. A specific number of redwood trees to be removed to accommodate the wetland mitigation has not yet been determined, however all trees to be removed are third growth, and are less than 30 years old (Biological report, SHN, 2016). As part of the wetland mitigation plan, an upland buffer area is proposed that would include coast redwood trees to replace those lost between the ball field parking lot and the proposed wetland mitigation area.

The proposed mitigation site will need to be graded, and some areas may need to be excavated to create wetland conditions. The site is primarily flat and will need to be excavated at a slight downward slope from the existing wetland to encourage water movement and retention within the proposed wetland mitigation location. Ground water levels and soil structure will need to be investigated prior to the construction of the wetland mitigation area. The wetland basin needs to retain water for several months at a time but must drain for some portion of the year to prevent the creation of American bull frog (*Lithobates catesbeianus*) habitat. Establishing groundwater levels and soil permeability will aid in the design and depth of the wetland mitigation basin.

The wetland detention basin will be designed to create wetland habitat that most closely resembles the wetlands being removed. Wetlands being impacted by the proposed project are sloping between 2 and 5 percent. Wetlands to be created will include sloping areas that will experience various lengths of inundation, as well as relatively flat areas that will be inundated for longer periods (see Figure 3). If it is determined that the wetland mitigation basin depth is to exceed a one-foot depth, then a 3:1 slope will be excavated to drop the elevation of the wetland mitigation area to where water can pool. The 3:1 slope will be considered upland and will not be used in the wetland mitigation calculation.

Vegetation will be planted in three distinct zones. The lowest elevation will encompass approximately 7,800 sqft and would have standing water for the longest period of time. Freshwater emergent wetlands would be created within the low elevation areas to replace freshwater emergent wetlands lost. Species to be planted in this location include obligate (OBL) and Facultative Wet (FACW) wetland plant species. The mid-elevation zone will be the largest wetland area encompassing approximately 29,915 sqft and will be sloping with a 2 to5 percent slope. This area will drain more quickly and will mitigate for the freshwater forested/shrub wetland habitat being lost. Species to be planted within this location include FACW and facultative (FAC) wetland plant species. The final planting area is considered upland buffer and will not count toward wetland creation. This area will be designed primarily for habitat screening to protect the wetland habitat from disturbance. Species appropriate for this location include evergreen upland species planted with appropriate spacing for screening (see Attachment 1, Table 1-1 for plant numbers and spacing).

6.1.1.1 Freshwater Emergent (Low Elevation) Wetland Mitigation Area

The lowest elevation will encompass approximately 7,800 sqft and would have standing water for the longest period of time. Species to be planted in this location include OBL and FACW wetland plant species. Species recommended for planting within the lowest elevation include:

1. Trees: Pacific willow, Arroyo willow (*Salix lasiolepis*)
2. Shrubs: Douglas spirea (*Spirea douglasii*), salmon berry
3. Herbs: Skunk cabbage (*Lysichiton americanus*), common rush, spreading rush *(Juncus patens*), panicled bulrush (*Scirpus microcarpus*), tall flatsedge (*Cyperus eragrostis*),

bugle hedgenettle (*Stachys ajugoides*), slough sedge, brownhead rush (*Juncus phaeocephalus*), Harford sedge (*Carex harfordii*), and arctic sweet colt's foot (*Petasites frigidus* var. *palmatus*)

Freshwater emergent wetland plants should be planted at sufficient densities to facilitate the creation of wetland habitat, and to ensure that vegetation coverage nears 100 percent to prevent the encroachment of invasive species.

1. Trees should be planted at 20-foot centers for a total of **20** trees
2. Shrubs should be planted at 10-foot centers for a total of **78** shrubs
3. Herbs should be planted at 5-foot centers for a total of **300** herbs
4. Total plants planted in low elevation wetland: **398**

Plant species would be randomly planted within the freshwater emergent wetland area are to mimic natural wetland conditions, although care should be taken to maximize vegetation cover, and prevent overcrowding of planted wetland vegetation. Willow staking will be used for the planting of any willows at this location (see Attachment 1, Table 1-1 for plant numbers and spacing within the freshwater emergent wetland area, and Appendix 3 for willow sprigging details).

6.1.2 Freshwater Forested/Shrub (Mid-Elevation) Wetland Mitigation Area

The mid-elevation zone will be the largest wetland area encompassing approximately 29,915 sqft and will be sloping with a 2-5 percent slope. This area will drain more quickly and will most closely resemble the wetland habitat being lost. Species to be planted within this location include FACW and FAC wetland plant species. Species recommended for planting within the mid-elevation wetland mitigation area include:

1. Trees: red alder, cascara, western red cedar (*Thuja plicata*), Sitka spruce, black cottonwood (*Populus trichocarpa*), Pacific willow, and arroyo willow.
2. Shrubs: California blackberry, thimbleberry (*Rubus parviflorus*), red elderberry (*Sambucus racemosa*), twinberry (*Lonicera involucrata* var. *involucrata*), and salmon berry.
3. Herbs: vanilla leaf (*Hydrophyllum tenuipes*), arctic sweet coltsfoot, blue eyed grass (*Sisyrinchium bellum*), common rush, spreading rush, western rush (*Juncus occidentalis*), coast miterwort (*Pectiantia ovalis*), slough sedge, lady fern (*Athyrium filix-femina* var. *cyclosorum*)

Freshwater Forested/Shrub wetland plants should be planted at sufficient densities to facilitate the creation of wetland habitat, and to ensure that vegetation coverage nears 100 percent to prevent the encroachment of invasive species.

1. Trees should be planted at 10-foot centers for a total of **300** trees
2. Shrubs should be planted at 7-foot centers for a total of **600** shrubs
3. Herbs should be planted at 5-foot centers for a total of **1,197** herbs
4. Total plants planted within sloping wetland: 2**,097**

Plant species would be randomly planted within the mid-elevation area to mimic natural wetland conditions, although care should be taken to maximize vegetation cover, and prevent overcrowding of planted wetland vegetation. Willow staking will be used for the planting of any willows at this location (see Attachment 1, Table 1-1 for plant numbers and spacing within the freshwater Forested/Shrub wetland mitigation area).

6.1.3 Upland Buffer Area

The upland buffer area encompasses approximately 4,070 sqft and will not count toward wetland creation. This area will be designed primarily for habitat screening to protect the wetland habitat from disturbance. Species appropriate for this location include evergreen upland species planted with appropriate spacing for screening. Species recommended for planting within the upland buffer area include:

1. Trees: coast redwood, Douglas fir (*Pseudotsuga menziesii*), and bigleaf maple (*Acer macrophyllum*).
2. Shrubs: coyote brush (*Baccharis pilularis* ssp. *consanguinea*), salal (*Gaultheria shallon*), evergreen huckleberry (*Vaccinium ovatum*), california wax-myrtle (*Morella californica*), and California blackberry.
3. Herbs: yarrow (*Achillea millefolium*), California brome (*Bromus carinatus* var. *carinatus*), and Douglas iris (*Iris douglasiana*).

Upland buffer plants should be planted at sufficient densities to create screening for the proposed wetland habitat, and to ensure that vegetation coverage nears 100 percent to prevent the encroachment of invasive species.

1. Trees should be planted at 10-foot centers for a total of **40** trees
2. Shrubs should be planted at 5-foot centers for a total of **160** shrubs
3. Herbs should be planted at 7-foot centers for a total of **82** herbs
4. Total plants planted within upland buffer: **282**

See Attachment 1, Table 1-1 for plant numbers and spacing within the upland buffer.

7.0 Stream Crossing and Buffer Reduction Mitigation Plan

7.1 Logging Road Stabilization and Habitat Creation Plan

Two stream crossings are proposed as part of the project. Crossings will be designed to facilitate wildlife movement and will be designed to minimize impacts to the streams. This should include a small bridge or large (10-foot diameter or greater) half round culvert that will provide passage for wildlife, and will minimize impacts to the streams, flows, and bank width (CDFW, 2015). Work will be conducted in a manner that is least impactful the streams including using temporary construction fencing to minimize encroachment during construction of the crossings. The crossings are anticipated to impact 68 linear feet of each stream, for a total of 136 linear feet of impacts. Crossings will be mitigated by decommissioning, recontouring, and stabilizing a former logging

road, which amounts to approximately 727 linear feet of highly eroded terrain. In addition, the former roadway will be planted with native vegetation to facilitate habitat creation on the slope as mitigation for reduced wetland buffers along the Arbutus Street access.

7.1.1 Logging Road Existing Conditions

Currently, the logging road drops steeply from the top of the terrace to the flat land along Ryan Creek. The road was incorrectly constructed with a steep grade, and improper drainage. Consequently, stormwater from the top of the terrace collects within the roadway and flows uncontrolled to the bottom of the slope. As a result of stormwater flows, the roadway has become deeply eroded with ravines several feet across and several feet deep into the underlying clay soils. Trails within and along the road used by off-road bikers and ATV drivers have further exacerbated the problem. This has left the majority of the former road unvegetated and has contributed sediment to Ryan Creek and associated wetlands. Recontouring, revegetating, and restoration of this former logging road will contribute to the overall health of the Ryan Creek watershed and will mitigate for the Ryan Creek tributary crossings for the Redwood Street extension and wetland buffer reductions along the Arbutus Street extension.

7.1.2 Logging Road Mitigation Plan

The portion of the logging road to be decommissioned and restored consists of approximately 727 linear feet, with an average width of approximately 10 feet, for a total of 7,270 sqft. The first aspect to be addressed in restoring the former logging road is the removal of stormwater flows from the slope. The proposed project will redirect stormwater flows away from the former logging road into detention basins and rock armored, engineered outfall locations. After the redirection of stormwater flows and prior to revegetation, the former logging road will be recontoured to match the natural hill side. This will require earth movement to excavate areas filled for the creation of the road and placement of soil within gullies and areas excavated for the creation of the road. Proper timing of the work during dry summer months, and the use of best management practices (BMPs) will ensure that additional erosion will not occur as a result of the restoration work. Following recontouring, downed woody debris will be added to the site, to create habitat for amphibians and other wildlife, as well as discouraging trail creation within the mitigation area. Downed woody debris will further stabilize the slope and direct stormwater off of the recontoured slope. Logs obtained from the project area and clearing associated with the project would be ideal for use at this location and should be somewhat imbedded into the soil, as well as randomly placed along the length of the mitigation area.

7.2 Logging Road Planting Plan

Revegetation planting will occur following recontouring of the former logging road and placement of downed woody debris. The logging road revegetation area encompasses approximately 7,270 sqft. This area will be replanted to resemble the redwood forest that occurs on the terrace slope above Ryan Creek. Large portions of the former logging road are shaded by adjacent redwood trees, and many of the species recommended for planting must be drought and shade tolerant and will reflect the species composition seen in the surrounding forest. Species recommended for planting within the former logging road mitigation area include:

1. Trees: coast redwood, Douglas fir, red alder and bigleaf maple.
2. Shrubs: salal, evergreen huckleberry, red huckleberry (*Vaccinium parviflora*), pink flowering currant (*Ribes sanguinium* var. *glutinosum*), and California rose (*Rosa californica*).
3. Herbs: redwood sorrel (*Oxalis oregana*), sword fern, common wood fern (*Dryopteris expansa*), wild ginger (*Asarum caudatum*), blue bead lily (*Clintonia andrewsiana*), and vanilla grass (*Anthoxanthum occidentale*).

Logging road revegetation plants should be planted at sufficient densities to create redwood forest habitat similar to that surrounding the mitigation area to ensure stabilization of soils and to prevent trail establishment and encroachment of invasive species.

1. Trees should be planted at 7-foot centers for a total of **50** trees. Locations and spacing dependent upon openings within the adjacent canopy.
2. Shrubs should be planted at 5-foot centers for a total of **300** shrubs
3. Herbs should be planted at 4-foot centers for a total of **400** herbs
4. Total plants planted within logging road mitigation area: **750**

See Attachment 1, Table 1-2 for plant numbers and spacing within the logging road mitigation area.

7.3 Habitat Establishment



Figure 5: Split Rail Fencing Example
(source: http://firewoodonline.net/redwood_split_rail_fencing__log_posts)

Split rail fencing (Figure 5), or similar wildlife-friendly deterrent barriers, shall be placed in areas where foot or vehicle traffic could interfere with the establishment of planting areas (Figures 3 and 4), primarily between the ball field parking lot and the wetland mitigation area, in addition to the area along the proposed Arbutus Street extension (see Figure 3). Not only will the fence act as a deterrent to foot traffic, but it will also add to the aesthetics of the ball park area. Additional temporary fencing should be considered during the plant establishment period if vegetation shows high levels of herbivory.

Once the newly planted vegetation begins to become established, structural complexity within the mitigation area will increase, allowing for the development of a mosaic of native vegetation that will support diverse assemblages of plant and animal communities. Monitoring of the mitigation areas will record the success of the development of habitat within the mitigation areas.

8.0 Monitoring and Reporting Program

8.1 Performance Standards

Success of the mitigation program is defined as creating in-kind wetland habitat, as well as wetland habitat improvement to mitigate for a loss of wetlands as a result of the McKay Ranch subdivision. A total of 36,617 sqft of in-kind wetland habitat will be created and planted with native wetland vegetation species. An additional 4,070 sqft of upland buffer habitat will be planted to buffer the wetland mitigation area from disturbance. The logging road mitigation area will improve 7,270 sqft of eroding hillside to improve water quality and sediment load within Ryan Creek (Appendix 1, Table 1-1 and Table 1-2). The success of the wetland mitigation planting areas may be achieved with a combination of success criteria that includes:

- A minimum of 36,617 sqft of wetlands are created
- 75 percent survival of planted trees, shrubs, and herbaceous plants (including wild recruitment of native species) within the created wetlands,
- 75 percent survival of planted trees, shrubs, and herbaceous plants (including wild recruitment of native species) within the upland buffer, and logging road mitigation area,
- Live vegetation throughout all revegetated area (some minor gaps are expected),
- Invasive species are removed and reduced within remaining wetland areas and are prevented from becoming established within the new wetland and planting areas,
- Revegetation plants are not substantially suppressed from herbivory, competition from weeds, or encroachment by humans, and
- Supplemental irrigation, or replacement plantings have not been needed in the preceding growing season to meet the 75 percent survival threshold.

8.2 Monitoring and Reporting Program

As part of the monitoring program, both quantitative and qualitative (visual assessment) sampling will be performed by a qualified ecologist/biologist. This assessment will be used to make maintenance recommendations in annual reports, which will evaluate the success of the mitigation plan. An "as planted" report will be produced after planting and grading to verify which species were planted and where. This will be created immediately after the planting of the site and will be used to assess the success target for percent survival. It will also aid in monitoring in the future as vegetation grows and site conditions change. Any change in the number of plants and species planted will be recorded within the "as planted" report and will be approved by the project biologist prior to planting. Vegetation monitoring shall be conducted at the mitigation sites for a minimum of three years, or a total of five years if success criteria are not met within the first three years of monitoring.

8.2.1 Quantitative Sampling

Quantitative comparative vegetation data will be collected annually in the late spring/early summer, although some flexibility in the monitoring schedule is acceptable to account for seasonal

variation in weather conditions. The large area to be monitored and the high number of plants to be planted prohibits the use of direct count methods and necessitates the use of random sampling to estimate vegetative cover and survival.

Results will determine if plant cover and survival meet the prescribed success criteria as described in Section 7.1 Performance Standards. Monitoring results will be compiled into annual reports and submitted following each year of monitoring. Monitoring reports, including an evaluation of success, are due annually by December 31 and will be submitted to CDFW, the County of Humboldt, and other applicable permitting agencies.

Absolute percent cover of native and non-native plant species will be collected from randomly placed quadrats within the mitigation sites from which cover and survival percentages of planted vegetation will be calculated and used for statistical comparison. Quadrat methods will be used to estimate absolute vegetative cover, native cover, hydrophytic vegetation cover, and non-native vegetation cover. Monitoring will be used to determine whether mitigation areas are meeting set success criteria for vegetative cover and survival. Within any site, methods should remain consistent throughout the monitoring period.

8.2.1.1 Vegetation Monitoring Methodology

Absolute percent cover of native and non-native plant species will be collected from randomly placed quadrats within each wetland type and mitigation area. Mitigation monitoring will be divided into four areas called macroplots: freshwater emergent wetland (low elevation), freshwater forested/shrub wetland (mid elevation), upland buffer, and logging road slope (see Figures 3 and 4). These macroplots will define the boundaries of the populations to be sampled. Sampling will occur within these areas established in year one, and the same areas will be monitored each year. The establishment of permanent monitoring polygons within similar habitat types allows for a direct qualitative comparison from year to year for tracking trends in vegetation changes and developing remedial recommendations if necessary.

Within each monitoring macroplot area, a simple random coordinate method will be utilized to sample mitigation areas. Baselines, X and Y axis, will be oriented within the wetlands with the X axis running the longitudinal length of the wetland and the Y axis running latitudinally. These transects will provide the base from which random monitoring plots will be generated by using random number generator software. For each sampling plot, a random value will be chosen for the X axis and a random number will be generated for the Y axis. The point at which these intersect specifies the location of the sampling quadrat. Coordinates that fall out of the macroplot area will be rejected. It must be noted that the freshwater emergent macroplot exists within the freshwater forest/shrub wetland macroplot. When generating random sampling numbers for the freshwater forest/shrub wetland macroplot, the random X or Y axis length should subtract the length of the freshwater emergent macroplot and should be considered continuous.

Each macroplot will have a permanent monument placed using wood or metal stakes for ease of reestablishing the location of the macroplot and X and Y axis in future monitoring efforts. Each monument should be labeled and located using a sub-meter global positioning system (GPS), and photos taken at each monument at the conclusion of monitoring to aid in finding the monument in future monitoring efforts.

The number of sampling points required to adequately evaluate the percent cover within the mitigation area will be developed following completion of the planting and establishment of the monitoring points and will be included within the "as planted" report.

8.2.2 Qualitative Visual Assessment

During each monitoring event, visual observations of habitat conditions will be noted. The qualitative visual assessment will be the primary tool by which habitat development is evaluated and the need for any remedial measures is identified and will determine if data from sampling transects is an accurate representation of site conditions. Qualitative visual assessment will help assess the overall functioning of the site as a whole and will help to identify localized or low-level trends such as new invasive species encroachment, localized changes in species abundance, and other changes that might be overlooked if only transect monitoring is used.

Particular attention will be paid to the following:

- native species recruitment and habitat development in the wetland mitigation and logging road mitigation areas,
- evidence of viable plant reproduction in the wetland area,
- the presence of birds and other wildlife in the mitigation areas,
- introduction and infestation of exotic species; species encroachment and spread will be recorded,
- erosion within the logging road mitigation and wetland mitigation areas, and
- evidence of continued herbivory or human encroachment into the mitigation areas.

8.3 Photo Documentation

In addition to the general qualitative assessment and transect sampling, several permanent stations for photo documentation will be established in the mitigation areas. Photos will be taken prior to implementation of the proposed project and will be included as part of each annual monitoring report. Photo stations will be established during the first site visit and the locations will be recorded in the "as planted" report, to be used in each successive monitoring report. Photos will include direction of view, and a reference to the photo monitoring location.

8.4 Annual Reports

An "as planted" report will be produced after planting and grading to verify which species were planted and where. This will be created immediately after the planting of the site and will be used to assess the success target for percent survival. It will also aid in monitoring in the future as vegetation grows and site conditions change. Any change in the number of plants and species planted will be recorded within the "as planted" report and will be approved by the project biologist prior to planting. Vegetation monitoring shall be conducted at the mitigation sites for a minimum of three years, or a total of five years if success criteria are not met within the first three years of monitoring. The first annual monitoring event will occur one year following plant installation. Recommendations for any corrective action necessary to ensure the continued success of the mitigation plan will be included in the report, as well as results from the quantitative and qualitative monitoring.

9.0 Maintenance Plan

9.1 Schedule

The project proponent is proposing to construct the mitigation areas prior to the development of the project to avoid temporal loss of habitat associated with this project. The project timeline has not been developed for the project at the time of writing, however the project proponent is advocating for development of mitigation areas prior to the development of the entire project. It is unclear when work on the project will begin due to funding and permitting, and no date has been set for the development of the mitigation areas.

Timing of mitigation work must take the following seasons into account:

Vegetation removal and other ground-disturbing activities associated with any construction or mitigation activities will occur between September and February when birds are not typically nesting.

If vegetation removal or ground-disturbing activity is to occur during the nesting season (March 1 to August 15 for most birds), a qualified biologist shall conduct a pre-construction nesting bird survey. Pre-construction surveys for nesting pairs, nests, and eggs shall occur within the construction limits and within 100 feet (200 feet for raptors) of the construction limits. If active nests are encountered, species-specific measures shall be prepared by a qualified biologist in consultation with California Department of Fish and Wildlife (CDFW) and implemented to prevent abandonment of the active nest.

Project activities in areas near riparian and seasonally wet areas that provide amphibian habitat (such as the Redwood and Arbutus Street crossings) shall occur from July 15 through October 31, to minimize potential impacts to these species.

9.2 Maintenance During the Three- to Five-Year Monitoring Period

9.2.1 Initial Maintenance Measures

Weed eradication will be conducted as necessary to minimize competition that could prevent the establishment of native species within the mitigation area. Invasive species shall be removed by hand or other manual means. The use of herbicide for weed control shall not be permitted, except in extraordinary circumstances, and only with approval from CDFW.

Planting areas may need protection by fencing or protective barriers to prevent herbivory and trampling. If the mitigation area is showing evidence of human encroachment, then additional fencing and/or signage shall be installed to prevent further disturbance of the mitigation areas. Additional woody debris or plants can be installed within encroachment areas to deter people from entering the mitigation areas.

If the success of tree plantings falls below 75 percent survival within the monitoring period, then replanting will occur to ensure correct mitigation for habitat loss. Replanting will be seasonally appropriate and will consist of the same species that died and are being replaced. Note that if replanting occurs within the second or third year of monitoring, then five years of monitoring will be required. Replanting cannot occur for the last two years of monitoring to achieve success.

In order to ensure a 75 percent survival of the revegetation plants, it is recommended that summer watering occur at least within the first summer/fall after planting. This has been shown to increase the likelihood of survival greatly, especially in drier areas where there is currently no habitat value. It is recommended that watering occur monthly during the dry months of the first year between July and the first soaking rains. Watering cannot occur the last year of monitoring as the revegetation plants must be self-sustaining.

As part of the maintenance program, erosion and slope stability within the logging road mitigation area will be monitored and maintained. This will include noting any new erosion features and reporting any new erosion within the sloping mitigation area. Erosion maintenance will be conducted by the project proponent, and any large-scale erosion control or repair will be the responsibility of the project proponent during the years of monitoring.

9.2.2 Maintenance Schedule

Maintenance will be conducted as necessary to meet final performance standards and will be conducted based on the findings and recommendations contained within the monitoring reports. As native habitat develops within the mitigation area, the need for maintenance activities (for example, watering and weed control) should decrease.

9.2.3 Invasive Species Removal

Invasive species prevention and management is central to the success of this mitigation plan. Encroachment of invasive plant species into mitigation areas will limit the potential habitat value of these features and can limit the success of revegetation plantings through direct competition. Invasive species such as the American bull frog are leading to the decline of native amphibians, and poorly designed wetland mitigation areas are creating additional habitat for this species. Invasive species encroachment and spread will be managed through monitoring and removal, in addition to wetland design and dense native vegetation planting.

The wetland will be designed to dry out toward the end of the dry season, typically in August. Drying of the wetland will allow native amphibians to breed successfully, while preventing the establishment of American bullfrogs which require perennial stagnant waters (Fuller, 2010). Native plants will be densely planted to ensure that native vegetation is well established up front within the mitigation areas. This will give native vegetation the ability to outcompete invasive vegetation within the mitigation areas. Lastly, the mitigation areas will be monitored and maintained to prevent the establishment of invasive species within the mitigation areas within the first three to five years of establishment. Monitoring will include noting invasive species occurrences and will suggest methods for removal if the occurrence is too large to address by the monitor. Should the mitigation areas become infested with invasive species, it may affect the ability of the mitigation areas to meet success criteria.

Invasive species within the existing wetland and throughout the site that may become established within the mitigation areas include:

English holly (*Ilex aquifolium*), Cotoneaster species (*Cotoneaster* sp.), French broom (*Genista monspessulana*), Spanish heather (*Erica lusitanica*), Hardy fuchsia (*Fuchsia magellanica*), Scotch broom (*Cytisus scoparius*), English ivy, Himalayan blackberry, Crocosmia (*Crocosmia* X *crocosmiiflora*),

poison hemlock (*Conium maculatum*), pampas grass, and creeping buttercup (California Invasive Plant Council, 2018).

It should be noted that the list of target invasive species may change as soil is moved and equipment is used in construction of the project, which may introduce seeds from other invasive species not currently on site. A monitoring and maintenance plan should be developed following the installation of revegetation plants, detailing the removal of invasive species. Monitoring reports will document invasive species establishment and ongoing removal during the monitoring period.

9.2 Adaptive Management Maintenance

The adaptive management maintenance is proposed to ensure the successful establishment and persistence of habitat within the mitigation areas.

Adaptive management is used to better achieve success within mitigation areas. It allows for the inherent changes and instability experienced in natural habitats and the ecological processes that define them. Adaptive management allows the results and observations of the monitoring visits to drive the maintenance plan and the solutions to problems that may arise. This allows the project proponent and project biologist to learn by experience within site-specific environments and apply solutions to remedy deficiencies using a controlled and scientific approach.

Adaptive management procedures will be recommended on a case by case basis and will be reported within the Annual Reports. Adaptive management actions could include:

- Adjust weeding methods to reduce weeds around the mitigation areas to decrease competition from non-native grasses and forbs. This includes adjusting the timing of removal and the methods of removal dependant on the species encountered;
- Supplemental planting in areas that have deficiencies in the planted material;
- Supplemental replacement of species (may be in-kind, or if a specific species is not successful within a particular area, a suitable replacement species can be supplemented for the original plant species);
- Supplemental watering (for plants doing poorly, or supplemental plantings); and
- Additional erosion control.

Unpredictable natural conditions could potentially alter the mitigation areas and necessitate changing the goals, objectives, strategies, and actions set forth in this plan. Unpredictable natural conditions that could impact the mitigation areas include:

- Unusual weather patterns, such as extended drought, or excessive rainfall;
- Changes in plant compositions, such as through invasion of a new non-native invasive plant or wildlife species to the site;
- Erosion or deposition of sediments;
- Excessive human encroachment or disturbance of the mitigation areas.

Should any changes be deemed necessary to achieve creation of wetlands and successful planting of the mitigation areas, then the project biologist shall meet with the project proponent to revise the adaptive management plan. Any changes will be recorded within the Annual Reports submitted to the applicable permitting agencies.

10.0 Completion of Mitigation

The project proponent will notify the County of Humboldt, CDFW, and other applicable permitting agencies upon completion of the three- or five-year mitigation program through the submittal of a final monitoring report. If the project meets performance standards at the end of the three-year monitoring period, the mitigation will be considered a success; if not, problems will be evaluated and further addressed, and the maintenance and monitoring program will be extended to five years of monitoring. Monitoring extensions will be done only for areas that fail to meet final success criteria. This process will continue until all standards are met or until the agencies determine that other mitigation measures are appropriate. If the mitigation effort meets all goals prior to the end of the three-year monitoring period the County of Humboldt, CDFW, and other applicable permitting agencies may terminate the monitoring effort at their discretion.

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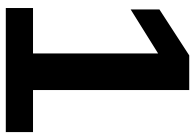
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Summary of the SMA Ordinance

Riparian habitats receive protection under Humboldt County's Streamside Management Area Ordinance (SMAO); as defined in Title 3, Section 314-61.1 of the Humboldt County Code. The purpose of the SMAO is to provide oversight in the use and development of land located within wet areas such as rivers, creeks, springs, and other wetland types. This includes natural resource areas along both sides of streams containing the channel and adjacent land.

In areas within the Urban Development and Expansion Areas, Streamside Management Areas are identified as a 50-foot setback from perennial streams that begins at the "stream transition line" on either side of the stream. Additionally, streams with seasonal intermittent flow receive a 25-foot setback. The stream transition line is defined in the Humboldt County General Plan as, "that line closest to a stream where riparian vegetation is permanently established," which is typically interpreted in riparian areas as the closest rooted tree to the water course.

Routine maintenance activities are permitted under the SMAO if trees over 12 inches in diameter are not cut and no more than 6,000 cumulative square feet of woody vegetation are removed. Additionally, activities are not considered routine maintenance if they could result in significant environmental impacts. Significance of environment impacts can be a difficult to qualify on a case by case level. However, the California Department of Fish and Wildlife generally considers the removal of woody vegetation greater than 4 inches in diameter as an activity that requires compensatory mitigation. Mitigation measures for projects within SMAs include retaining snags and trees that support nesting birds, replanting of disturbed areas equal to the development area, and other potential site-specific habitat improvements.



Plant Lists

Table 1-1 Planting List McKay Ranch Wetland Mitigation					
Latin Name	**Common Name**	**# of[1] Plants**	**Min[1] Spacing (feet)**	**Plant Size**	**Placement**
Low Elevation Wetland Planting Area (7,800 sqft)					
Trees					
Salix lasiandra var. *lasiandra*	pacific willow	7	20	live stake	random
Salix lasiolepis	Arroyo willow	13	20	live stake	cluster
Shrubs					
Spirea douglasii	Douglas spirea	32	10	4″/1 gallon	random
Rubus spectabilis	salmon berry	46	10	1 gallon	cluster
Herbs					
Lysichiton americanus	skunk cabbage	28	5	4″ or 1 gallon	random
Juncus effusus ssp. *pacificus*	common rush	26	5	4″ plug	random
Juncus patens	spreading rush	34	5	4″ plug	random
Scirpus microcarpus	panicled bulrush	30	5	4″ plug	cluster
Cyperus eragrostis	tall flatsedge	30	5	4″ plug	cluster
Stachys ajugoides	bugle hedgenettle	15	5	4″ plug	cluster
Carex obnupta	slough sedge	40	5	4″ plug	random and cluster
Juncus phaeocephalus	brownhead rush	36	5	4″ plug	cluster
Carex harfordii	Harford sedge	34	5	4″ plug	cluster
Petasites frigidus var. *palmatus*	arctic sweet coltsfoot	27	5	4″ plug	random and cluster
Total Number of Plants Low Elevation Area		**398**			
Mid-Elevation Wetland Planting Area (29,925 sqft)					
Trees					
Alnus rubra	red alder	92	10	1 gallon	random and cluster
Frangula purshiana ssp. *purshiana*	cascara	65	10	1 gallon	cluster
Thuja plicata	western red cedar	16	10	1 gallon	random and cluster
Picea sitchensis	Sitka spruce	35	10	1 gallon	random and cluster
Populus trichocarpa	black cottonwood	27	10	1gallon or live stake	random
Salix lasiandra var. *lasiandra*	pacific willow	25	10	live stake	random
Salix lasiolepis	arroyo willow	40	10	live stake	cluster
Shrubs					
Lonicera involucrata var. *ledebourii*	twinberry	165	7	1 gallon	random and cluster
Rubus spectabilis	salmonberry	245	7	1 gallon	random
Rubus parviflorus	thimbleberry	75	7	1 gallon	random
Rubus ursinus	CA blackberry	85	7	1 gallon	random

Table 1-1 Planting List McKay Ranch Wetland Mitigation					
Latin Name	**Common Name**	**# of[1] Plants**	**Min[1] Spacing (feet)**	**Plant Size**	**Placement**
Sambucus racemosa	red elderberry	30	7	1 gallon	cluster
Herbs					
Hydrophyllum tenuipes	vanilla leaf	145	5	4″ plug	random
Petasites frigidus var. *palmatus*	arctic sweet colt's foot	117	5	4″ plug	random and cluster
Sisyrinchium bellum	blue-eyed grass	60	5	4″ plug	cluster
Juncus effuses ssp. *pacificus*	common rush	135	5	4″ plug	random
Carex obnupta	slough sedge	175	5	4″ plug	random and cluster
Juncus patens	spreading rush	85	5	4″ plug	cluster
Juncus occidentalis	western rush	50	5	4″ plug	cluster
Pectiantia ovalis	coast mitrewort	280	5	4″ plug	random
Equisetum arvense	horsetail	85	5	4″ plug	random
Athyrium filix-femina var. *cyclosorum*	lady fern	65	5	1 gallon	random
Total Number of Plants Mid-Elevation Area		**2,097**			
Upland Buffer Planting Area					
Trees					
Acer macrophyllum	big-leaf maple	8	10	1 gallon	random
Pseudotsuga menziesii	Douglas fir	10	10	1 gallon	random
Sequoia sempervirens	coast redwood	22	10	1 gallon	random
Shrubs					
Baccharis pilularis ssp. *consanguinea*	coyote brush	25	5	1 gallon	random and cluster
Gaultheria shallon	salal	48	5	1 gallon or 4″ plug	cluster
Vaccinium ovatum	evergreen huckleberry	42	5	1 gallon	cluster
Morella californica	California wax-myrtle	16	5	1 gallon	random
Rubus ursinus	CA blackberry	29	5	4″ plug	cluster
Herbs					
Achillea millefolium	yarrow	22	7	4″ plug	cluster
Bromus carinatus	California brome	44	7	4″ plug	random and cluster
Iris douglasiana	Douglas iris	16	7	4″ plug	cluster
Total Number of Plants Upland Buffer		**282**			
Total Wetland Mitigation Plants		**2,777**			

1. Spacing on center. Size substitutions acceptable, at appropriate compensation ratio, if specified size not available. Example: 4 in. can be similar size such as deep pot, tree tube, quart, etc. Per contractor discretion.

Table 1-2 Planting List McKay Ranch Logging Road Mitigation					
Latin Name	**Common Name**	**# of[1] Plants**	**Min[1] Spacing (feet)**	**Plant Size**	**Placement**
Logging Road Planting Area (7,270 sqft)					
Trees					
Acer macrophyllum	big-leaf maple	12	7	1 gallon	random, dependant on openings
Alnus rubra	red alder	16	7	1 gallon	cluster, dependant on openings
Pseudotsuga menziesii	Douglas fir	8	7	1 gallon	random, dependant on openings
Sequoia sempervirens	coast redwood	14	7	1 gallon	random, dependant on openings
Shrubs					
Gaultheria shallon	salal	100	5	4"/1 gallon	cluster, sun and full shade
Ribes sanguineum var. *glutinosum*	pink flowering currant	30	5	1 gallon	random and cluster, sun and shade tolerant.
Rosa californica	California rose	35	5	1 gallon	cluster, sun and full shade
Rubus ursinus	California blackberry	65	5	4" or 1 gallon	cluster, sun and shade tolerant
Vaccinium ovatum	evergreen huckleberry	50	5	1 gallon	cluster and random, sun and full shade.
Vaccinium parviflora	red huckleberry	20	5	1 gallon	cluster, shade to full shade
Herbs					
Oxalis oregana	redwood sorrel	100	4	4" plug	random and cluster. Full shade.
Polystichum munitum	sword fern	75	4	1 gallon	random, shade
Dryopteris expansa	wood fern	45	4	1 gallon	random, shade
Asarum caudatum	wild ginger	85	4	4" plug	cluster, shade
Clintonia andrewsiana	blue bead lily	38	4	4" plug	cluster and random, shade
Anthoxanthum occidentale	vanilla grass	57	4	4" plug	cluster, shade
Total Logging Road Mitigation Plants		**750**			

1. Spacing on center. Size substitutions acceptable, at appropriate compensation ratio, if specified size not available. Example: 4 in. can be similar size such as deep pot, tree tube, quart, etc. Per contractor discretion.

Table 1-3
Plant Species Observed 5/24,25 and 7/26/2016
McKay Ranch Eureka, CA

Scientific Name	Common Name	Family	Native?
Tree Layer			
Abies grandis	grand fir	Pinaceae	Y
Acer macrophyllum	bigleaf maple	Aceraceae	Y
Alnus rubra	red alder	Betulaceae	Y
Frangula purshiana ssp. *purshiana*	cascara	Rhamnaceae	Y
Ilex aquifolium	English holly	Aquifoliaceae	N
Morella californica	California wax myrtle	Myricaeae	Y
Picea sitchensis	Sitka spruce	Pinaceae	Y
Pittosporum tenuifolium	tawhiwhi tree	Pittosporaceae	N
Populus trichocarpa	black cottonwood	Salicaceae	Y
Prunus laurocerasus	English laurel	Rosaceae	N
Pseudotsuga menziesii	Douglas fir	Pinaceae	Y
Pyrus calleryana	flowering pear	Rosaceae	N
Salix lasiandra var. *lasiandra*	pacific willow	Salicaceae	Y
Salix lasiolepis	arroyo willow	Salicaceae	Y
Sequoia sempervirens	coast redwood	Cupressaceae	Y
Sorbus californica	California mtn. ash	Rosaceae	Y
Thuja plicata	western red cedar	Cupressaceae	Y
Grasses			
Anthoxanthum occidentale	vanilla grass	Poaceae	Y
Anthoxanthum odoratum	sweet vernal grass	Poaceae	N
Avena fatua	wild oat	Poaceae	N
Briza major	large quaking grass	Poaceae	N
Briza minor	small quaking grass	Poaceae	N
Bromus carinatus	California brome	Poaceae	Y
Bromus diandrus	ripgut brome	Poaceae	N
Bromus hordeaceus	soft chess	Poaceae	N
Cortaderia jubata	pampas grass	Poaceae	N
Dactylis glomerata	orchard grass	Poaceae	N
Fectuca microstachys	small fescue	Poaceae	Y
Festuca arundinacea	Tall Fescue	Poaceae	N
Festuca perennis	Italian wildrye	Poaceae	N
Festuca rubra	red fescue	Poaceae	Y
Holcus lanatus	velvet grass	Poaceae	N
Hordeum murinum	foxtail barley	Poaceae	N
Poa annua	annual grass	Poaceae	N
Poa pratensis	Kentucky bluegrass	Poaceae	N
Trisetum cernuum	nodding trisetum	Poaceae	Y
Sedges and Rushes			
Carex harfordii	Harford's sedge	Cyperaceae	Y
Carex hendersonii	Henderson's sedge	Cyperaceae	Y
Carex leptopoda	slender-footed sedge	Cyperaceae	Y
Carex obnupta	slough sedge	Cyperaceae	Y
Isolepis cernua	low clubrush	Cyperaceae	Y
Juncus bufonius	toad rush	Juncaceae	Y
Juncus effuses	common rush	Juncaceae	Y

Table 1-3
Plant Species Observed 5/24,25 and 7/26/2016
McKay Ranch Eureka, CA

Scientific Name	Common Name	Family	Native?
Juncus occidentalis	western rush	Juncaceae	Y
Juncus patens	spreading rush	Juncaceae	Y
Juncus phaeocephalus	brownheaded rush	Juncaceae	Y
Luzula comosa	hairy woodrush	Juncaceae	Y
Scirpus microcarpus	panicled bulrush	Cyperaceae	Y
Ferns and Allies			
Athyrium filix-femina var. *cyclosorum*	lady fern	Woodsiaceae	Y
Blechnum spicant	deer fern	Blechnaceae	Y
Dryopteris arguta	wood fern	Dryopteridaceae	Y
Dryopteris expansa	common wood-fern	Dryopteridaceae	Y
Equisetum arvense	horsetail	Equisetaceae	Y
Equisetum telmateia	giant horsetail	Equisetaceae	Y
Polypodium glycyrrhiza	licorice fern	Polypodiaceae	Y
Polystichum munitum	sword fern	Dryopteridaceae	Y
Pteridium aquilinum var. *pubescens*	bracken fern	Dennstaedtiaceae	Y
Shrubs			
Baccharis pilularis ssp. *pilularis*	coyote bush	Asteraceae	Y
Berberis darwinii	Darwin's berberis	Berberidaceae	N
Cotoneaster franchetii	Franchett's cotoneaster	Rosaceae	N
Cotoneaster lacteus	milkleaf cotoneaster	Rosaceae	N
Crataegus monogyna	English hawthorn	Rosaceae	N
Cytisus scoparius	Scotchbroom	Fabaceae	N
Erica lusitanica	Spanish heather	Ericaceae	N
Fuchsia magellanica	hardy fuschia	Onagraceae	N
Gaultheria shallon	salal	Ericaceae	Y
Genista monspessulana	French broom	Fabaceae	N
Lonicera involucrata var. *ledebourii*	twinberry	Caprifoliaceae	Y
Ribes menziesii var. *menziesii*	canyon gooseberry	Grossulariaceae	Y
Ribes sanguineum var. *glutinosum*	flowering currant	Grossulariaceae	Y
Rosa californica	California wild rose	Rosaceae	Y
Rubus parviflorus	thimbleberry	Rosaceae	Y
Rubus spectabilis	salmonberry	Rosaceae	Y
Sambucus racemosa	red elderberry	Caprifoliaceae	Y
Spiraea douglasii	Douglas spirea	Rosaceae	Y
Vaccinium ovatum	black huckleberry	Ericaceae	Y
Vaccinium parviflora	red huckleberry	Ericaceae	Y
Vines			
Hedera helix	English ivy	Araliaceae	N
Lonicera etrusca	honeysuckle	Caprifoliaceae	N
Lonicera hispidula	pink honeysuckle	Caprifoliaceae	Y
Rubus armeniacus	Himalayan blackberry	Rosaceae	N
Rubus ursinus	California blackberry	Rosaceae	Y

Table 1-3
Plant Species Observed 5/24,25 and 7/26/2016
McKay Ranch Eureka, CA

Scientific Name	Common Name	Family	Native?
Herbs			
Achillea millefolium	common yarrow	Asteraceae	Y
Adenocaulon bicolor	trail plant	Asteraceae	Y
Allium triquetrum	wild onion	Alliaceae	N
Anaphalis margaritacea	pearly everlasting	Asteraceae	Y
Asarum caudatum	wild ginger	Aristolochiaceae	Y
Bellis perennis	English daisy	Asteraceae	N
Cardamine californica	milkmaids	Brassicaceae	Y
Cardamine oligosperma	bittercress	Brassicaceae	Y
Cerastium glomeratum	mouse-eared chickweed	Caryophyllaceae	N
Chamerion angustifolium	fireweed	Onagraceae	Y
Cirsium vulgare	bullthistle	Asteraceae	N
Claytonia perfoliata ssp. *perfoliata*	miner's lettuce	Montiaceae	Y
Clintonia andrewsiana	blue beed lily	Liliaceae	Y
Conium maculatum	poison hemlock	Apiaceae	N
Convolvulus arvensis	field bindweed	Convolvulaceae	N
Crocosmia x crocosmiiflora	montbretia	Iridaceae	N
Daucus carota	Queen Anne's lace	Apiaceae	N
Erodium botrys	storks bill	Geraniaceae	N
Galium aparine	cleaver plant	Rubiaceae	Y
Galium triflorum	sweetscented bedstraw	Rubiaceae	Y
Geranium dissectum	cutleaf geranium	Geraniaceae	N
Geranium robertianum	Robert geranium	Geraniaceae	N
Hieracium albiflorum	hawksbeard	Asteraceae	N
Hirschfeldia incana	hoary mustard	Brassicaceae	N
Hydrophyllum tenuipes	pacific waterleaf	Boraginaceae	Y
Hypochaeris radicata	hairy cats-ear	Asteraceae	N
Iris douglasiana	Douglas iris	Iridaceae	Y
Lamiastrum galeobdolon	yellow archangel	Lamiaceae	N
Lemna valdiviana	valdivia duckweed	Araceae	Y
Leucanthemum vulgare	oxeye daisy	Asteraceae	N
Linum bienne	flax	Linaceae	N
Lysichiton americanus	western skunk cabbage	Araceae	Y
Lysimachia latifolia	pacific star flower	Myrsinaceae	Y
Maianthemum dilatatum	false lily of the valley	Ruscaceae	Y
Maianthemum racemosum	false Solomon's seal	Ruscaceae	Y
Marah oregana	coast man-root	Curcubitaceae	Y
Matricaria discoidea	pineapple weed	Asteraceae	Y
Medicago polymorpha	bur-clover	Fabaceae	N
Mentha pulegium	pennyroyal	Lamiaceae	N
Mimulus dentatus	coastal monkey-flower	Phrymaceae	Y
Myosotis scorpioides	forget-me-nots	Boraginaceae	N
Oenanthe sarmentosa	water parsley	Apiaceae	Y
Osmorhiza berteroi	sweet cicely	Apiaceae	Y
Oxalis oregana	redwood sorrel	Oxalidaceae	Y
Pectiantia ovalis	coastal miterwort	Saxifragaceae	Y
Petasites frigidus var.	arctic sweet colt's-foot	Asteraceae	Y

Table 1-3
Plant Species Observed 5/24,25 and 7/26/2016
McKay Ranch Eureka, CA

Scientific Name	Common Name	Family	Native?
palmatus			
Plantago lanceolata	English plantain	Plantaginaceae	N
Plantago major	common plantain	Plantaginaceae	N
Prunella vulgaris var. *lanceolata*	selfheal	Lamiaceae	Y
Pseudognaphalium luteoalbum	Jersey cudweed	Asteraceae	N
Ranunculus parviflorus	small-flowered buttercup	Ranunculaceae	N
Ranunculus repens	creeping buttercup	Ranunculaceae	N
Raphanus sativa	wild radish	Onagraceae	N
Rumex acetosella	sheep sorrel	Polygonaceae	N
Rumex crispus	curly dock	Polygonaceae	N
Rumex obtusifolius	bitter dock	Polygonaceae	N
Sanicula crassicaulis	pacific sanicle	Apiaceae	Y
Scrophularia californica	California bee plant	Scrophulariaceae	Y
Sisyrinchium bellum	blue-eyed grass	Iridaceae	Y
Sonchus oleraceus	sow thistle	Asteraceae	N
Stachys ajugoides Stachys ajugoides var. *rigida*	bugle hedgenettle	Lamiaceae	Y
Stachys chamissonis	coast hedgenettle	Lamiaceae	Y
Taraxicum officianale	dandelion	Asteraceae	N
Tellima grandiflora	fringecups	Saxifragaceae	Y
Trifolium dubium	shamrock clover	Fabaceae	N
Trifolium hybridum	aslike clover	Fabaceae	N
Trifolium repens	white clover	Fabaceae	N
Trillium sp.	trillium species	Melanthiaceae	Y
Vancouveria planipetala	inside-out flower	Berberidaceae	Y
Veronica americana	American speedwell	Plantaginaceae	Y
Vicia sativa	spring vetch	Fabaceae	N
Vicia sativa ssp. nigra	common vetch	Fabaceae	N
Viola sempervirens	redwood violet	Violiaceae	Y
			57% Native



Photos



Photo 2-1. Looking northeast across freshwater forested/shrub wetland to be impacted by the project. The majority of the wetland mitigation area has been designed to create in-kind replacement of this habitat. Not high dominance by native *Rubus* species.

Photo taken March 6, 2017.



Photo 2-2. Looking west into a portion of the freshwater emergent wetland on-site. Some of this habitat will be impacted by the project. The area pictured is outside of the proposed project and will not be directly impacted by the project. Note non-native *crocosmia*, Himalayan blackberry, and creeping buttercup.

Photo taken March 6, 2017.



Photo 2-3. Looking north across freshwater forested/shrub wetland surrounded by third-growth redwoods. Note willow species and red alder surrounded by redwood trees.

Photo taken March 6, 2017.



Photo 2-4. Edge of freshwater forested/shrub wetland. Note transition of wetland alders to upland redwood trees with upland sword fern cover.

Photo taken March 6, 2017.



Photo 2-5. Small isolated wetland in the northern portion of the project area used as an ATV turnaround area. Note non-native vegetation cover, and lack of functional habitat at this location. Wetland occupies approximately 1,089 sqft.

Photo taken May 24, 2016.

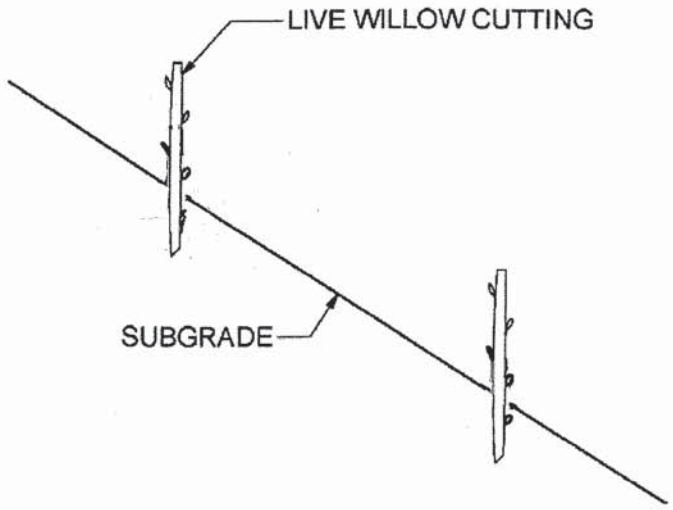


Photo 2-6. Location of the proposed Redwood Street crossing. Photo of the western stream crossing. Note OHWM and high level of herbaceous plants as a result of clearing for overhead power lines.

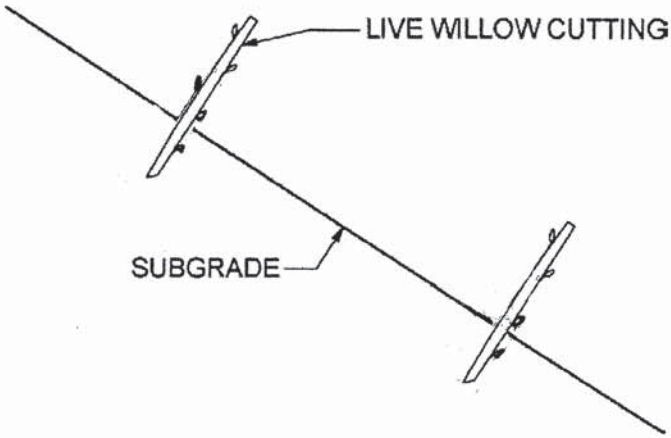
Photo taken March 13, 2017.

3

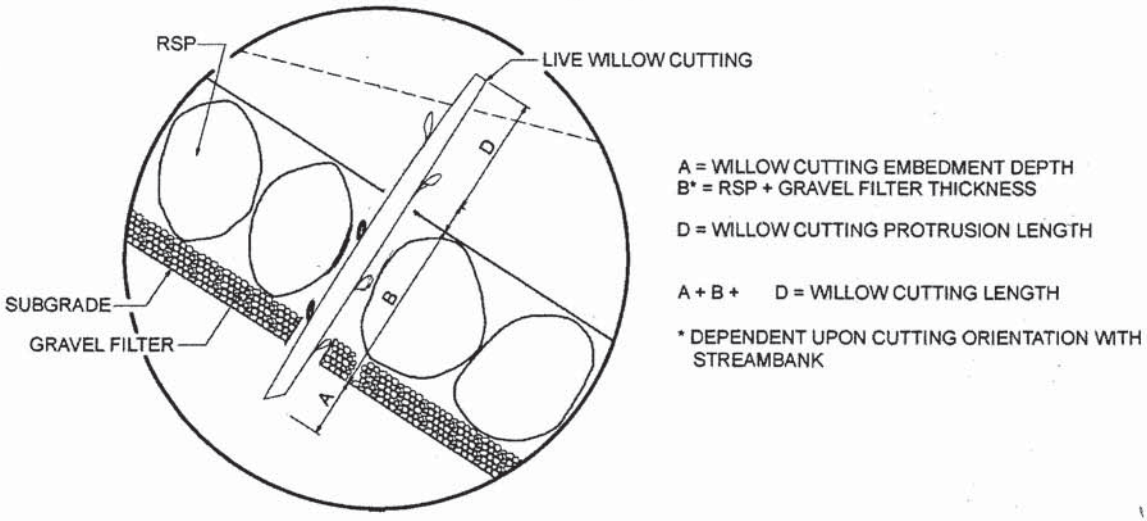
Willow Sprigging



- Live Cutting Vertical Orientation

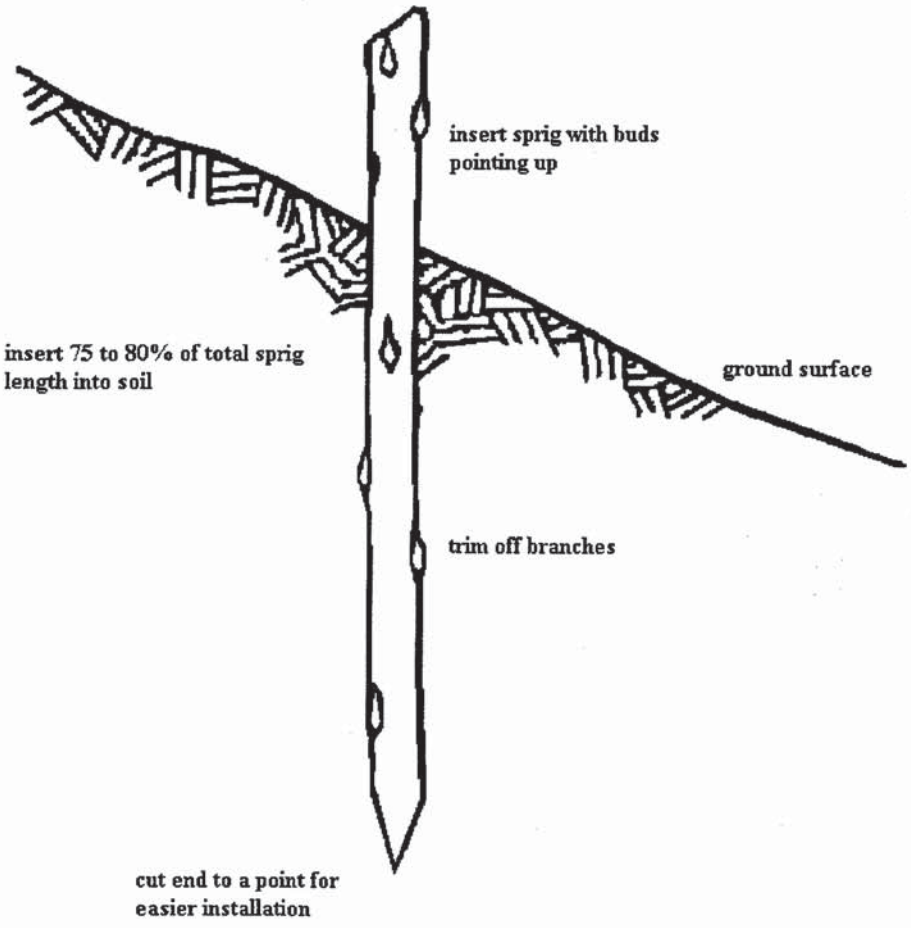


- Live Cutting Perpendicular Orientation



- Live Cutting Detail

Figure 3-2


insert sprig with buds pointing up
insert 75 to 80% of total sprig length into soil
ground surface
trim off branches
cut end to a point for easier installation

North McKay Ranch Subdivision Project

Aquatic Resources Survey Report

October 23, 2019

Prepared for:

Kramer Investment Corporation
1589 Myrtle Avenue
Eureka, CA 95501

Prepared by:

Stantec Consulting Services Inc.
1340 Treat Boulevard, Suite 300
Walnut Creek, CA 94597

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Acronyms and Abbreviations

ac	acres
APN	Assessor's Parcel Number
Arrow	Arrow™ Global Positioning Service Unit
CDFW	California Department of Fish and Wildlife
CNPS	California Native Plant Society
Collector	Collector for ArcGIS™
FAC	facultative species
FACU	Facultative upland species
FACW	facultative wetland species
MCV	Manual of California Vegetation, second edition
NRCS	National Resource Conservation Service
OBL	obligate wetland species
OHWM	ordinary high water mark
project	McKay Ranch Subdivision Project
RWQCB	North Coast Regional Water Quality Control Board
SHN	SHN, Inc.
Stantec	Stantec Consulting Inc
TOB	top-of-bank
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WGS84	World Geodetic System of 1984

1.0 INTRODUCTION

Kramer Properties, Inc. is proposing the subdivision and development of 81 acres into 154 logs called the McKay Ranch Subdivision Project (project). The project will consist of a mixture of single-family homes, affordable housing, condominiums, commercial space, and open space, including necessary access roads, utilities, and stormwater infrastructure. Redwood and Arbutus Streets are proposed to be extended east, with Arbutus Street curving north and eventually intersecting with Redwood Street. Additional side streets will be constructed southeast and northwest of Redwood and Arbutus streets.

Aquatic resource surveys were conducted for the project in a defined study area on September 18, 2019. Based on proposed project activities, some aquatic resources beyond the study area were also surveyed on September 18, 2019. These surveys support project permitting for resources that may fall within the following jurisdictions:

- The U.S. Army Corps of Engineers (USACE), pursuant to Section 404 of the Clean Water Act
- The North Coast Regional Water Quality Control Board (RWQCB), pursuant to the Porter-Cologne Water Quality Control Act (California Water Code, Chapter 2, § 13050) or Section 401 of the Clean Water Act
- The California Department of Fish and Wildlife (CDFW), pursuant to section 1600 of the California Fish and Game Code

This Aquatic Resources Survey Report summarizes the methods and results of the survey of aquatic resources, which are herein referred to as “jurisdictional waters.”

1.1 PROJECT LOCATION

The project is in Cutten, California, an unincorporated community within Humboldt County immediately south of the City of Eureka (Figure 1). The study area includes seven parcels and encompasses approximately 81.34 acres. The aquatic resources delineation took place across the seven parcels (Assessor’s parcel numbers 017-032-003, 017-071-004,017-071-009,017-072-002,017-072-003,017-073-007, and 017-073-009) centered on latitude 40.769735 º and longitude -124.136079 º World Geodetic System of 1984 (WGS 84). The study area was approximately 2.5 miles south of Arcata Bay at its nearest point, 2.5 miles southeast of downtown Eureka and U.S. Highway 101, 1,800 feet southeast of Sequoia Park at its nearest point, and approximately 500 feet west of Ryan Slough/Creek at its nearest point.

2.0 METHODS

2.1 DESKTOP REVIEW

Prior to conducting fieldwork, the following resources were reviewed:

- U.S. Fish and Wildlife Service National Wetland Inventory (USFWS 2019)
- Google Earth color aerial imagery dating back to 1990
- U.S. Geological Survey (USGS) 7.5-minute topographic map for the Eureka quadrant (USGS 1980)
- USGS National Hydrography Dataset (USGS 2017)

These resources were used to identify potential aquatic features based on changes in vegetation, topographic changes, or visible drainage patterns. Prior to field surveys, a previous delineation conducted in 2016 and 2017 (SHN 2017) was reviewed, and potential features were digitized into a working field map that was then used as a reference during field surveys.

2.2 AQUATIC RESOURCES FIELD ASSESSMENT

The aquatic resources field assessment was conducted by Stantec Consulting Inc. (Stantec) biologists on September 17 and 18, 2019. The last appreciable rainfall prior to the start of the field assessment as recorded by the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Climate Analysis for Wetlands Table Eureka 2.2 S weather station was 0.42 inch and occurred on September 16, 2019. On September 18, 2019 during the field assessment, 0.93 inch of rain was also recorded (NRCS 2019a). Plant species observed during field surveys were recorded (Appendix A) using botanical nomenclature following *The Jepson Manual: Vascular Plants of California, Second Edition* (Baldwin et al. 2012). Nomenclatural changes made after the publication date of the Jepson Manual follow the Jepson eFlora (Jepson Flora Project 2019).

2.2.1 Wetlands Mapping

Potential wetlands under the jurisdiction of USACE and RWQCB and riparian canopy under the jurisdiction of CDFW were mapped within the study area. Wetland delineation followed the routine determination method given in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and the revised procedures in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)* (USACE 2010). The USACE methodology entails examination of specific sample points in both wetlands and uplands (i.e., paired points) to determine the boundaries of wetland features. Sample points are examined for hydrophytic vegetation, hydric soils, and wetland hydrology. All three parameters must be present for an area to be considered a wetland. Riparian canopy potentially under the jurisdiction of CDFW was mapped when a shrub or forest community associated with a drainage passed the USACE criterion for hydrophytic vegetation.

Eight sample points were established within the study area, and a USACE wetland determination data form was completed for each (Appendix AB). Soil pits were excavated at each point and were evaluated for hydric soils (NRCS 2017) and hydrology indicators. Vegetation and indicators of wetland soils and hydrology in a 1-meter-radius plot surrounding the sample point were also sampled and recorded. Wetland indicator status for plant species was confirmed using *The National Wetland Plant List* (Lichvar et al. 2016), and the “50/20 Rule” or “Prevalence Index”

was applied to determine plant dominance (USACE 2010). Presence of primary and secondary wetland hydrology indicators were documented for potential aquatic resources. Soil pits were dug to a depth sufficient to document the presence or confirm the absence of hydric soil or wetland hydrology indicators. Soils were examined to assess field indicators of hydric soils. Stantec evaluated soils for positive indicators of hydric soils in the field following the criteria outlined in *Field Indicators of Hydric Soils in the United States* (Vasilas et al. 2018). Soil colors were determined using a Munsell® soil color chart. The hydric status of each soil map unit occurring in the study area was reviewed using the Web Soil Survey (NRCS 2019).In situations where adjacent wetland features supported similar vegetation composition and visible indicators of hydrology, one set of sample points was excavated for one wetland feature and then applied to the similar adjacent features.

Sample pits and wetland boundaries were mapped using a sub-meter-accurate Arrow™ Global Positioning Service Unit (Arrow) paired with Apple™ iPad loaded with Collector for ArcGIS™ (Collector). All spatial data was collected in the WGS84 datum. Representative photographs were also taken of sample points and features (Appendix C). All potential wetland areas were evaluated to identify their connection to onsite and offsite hydrologic resources; all potentially jurisdictional wetland areas were mapped if they met all three USACE-required parameters. For aquatic features where sample pits were not collected but contained similar characteristics as adjacent aquatic features, wetland boundaries were determined by following a combination of the limits of hydrophytic vegetation, limits of observed wetland hydrology or topographic breaks. Boundaries of CDFW jurisdictional riparian canopy were also mapped using aerial imagery or, in circumstances where riparian canopy was not discernible from aerial imagery, with the Arrow.

All wetland features were assigned a Manual for California Vegetation, Second Edition (MCV) community based on overall vegetation within each delineated feature (i.e., using vegetation beyond the sample plot). Several vegetation communities within the delineated wetlands are not described in the MCV. In these situations, a new vegetation alliance was described and named, following MCV convention.

2.2.2 Drainage Mapping

Drainages (i.e., “other waters” of the United States) are defined as traditional navigable waters and their tributaries (33 CFR 329). Delineation of other waters was based on presence of an ordinary high water mark (OHWM) as defined in Corps regulations (33 CFR 328.3 and 33 CFR 328.4). Physical characteristics of an OHWM include but are not limited to the following conditions: a natural line impressed on the bank, shelving, changes in the character of the soil, destruction of terrestrial vegetation, presence of litter and debris, leaf litter disturbed or washed away, scour, deposition, presence of bed and bank, and water staining. At least one data point was selected to best represent the OHWM of other waters for each other waters type.

Drainages potentially under the jurisdiction of USACE and RWQCB were delineated and mapped in accordance with *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) Delineation for Non-Perennial Streams in the Western Mountain, Valley and Coast Region of the United States* (USACE 2014). Assessment of the hydrological regime (i.e., ephemeral, intermittent, perennial) followed guidance also included in the USACE 2014 guide. Top-of-bank (TOB) measurements were noted for each drainage to delineate features potentially under the jurisdiction of CDFW under Section 1600 of the California Fish and Game Code. In locations that were accessible, linear features and culverts were mapped using an Arrow paired with Collector.

A custom data dictionary in Collector was used to ensure consistent data collection in the field, and all spatial data was collected in the WGS84 datum. The following attributes were collected or measured for each mapped drainage:

average OHWM width and depth; average TOB width and depth; hydrologic regime; OHWM indicators; substrate below OHWM; and depth of water (if present). Representative photographs of features were also taken (Appendix C). In some instances, drainages were obscured by thick brush or inaccessible due to steep terrain. In these cases, full-color aerial imagery and/or topographic maps were used to assist mapping the jurisdictional features. All potentially jurisdictional drainages with primary or secondary indicators of OHWM were mapped and assumed to have either connectivity in some capacity (subsurface, adjacent, etc.) or a significant nexus with traditionally navigable waters as defined by the Clean Water Act.

3.0 ENVIRONMENTAL SETTING

The study area has been used for commercial timber harvest and has remained undeveloped. The entire site has been harvested at least two times, beginning with old-growth forest and more recently, the second-growth forest. The last timber harvest appears to have occurred approximately 30 years ago according to historic aerial photography (Google Earth) and the uniform size and age of trees across the site. Currently, much of the site is dominated by dense third-growth redwood and mixed conifer forest, with drainages occasionally dominated by red alder (*Alnus rubra*). A large baseball field complex of approximately 10.8 acres exists within the center of the study area. Due to historical and relatively recent logging along with all-terrain vehicle use, the hydrology and soils have been manipulated in some areas as a result of these activities. These include frequent soil disturbance, changes in hydrology pattern or flow direction, and changes in surface topography.

3.1 TOPOGRAPHY AND HYDROLOGY

The study area is situated at approximately 150- to 200-foot elevation above mean sea level. Much of the study area is located atop a marine terrace sloping gently to the north, northeast, and northwest, with steep slopes down to Ryan Slough and wetlands surrounding Ryan Slough. The study area contains seasonal drainages, and first order streams originate within the flat elevated portions of the terrace and have eroded steep drainages into the terrace (Figure 12).

The study area is in the Northern California Coastal Hydrologic Region, which extends from southern Oregon to the northern San Francisco Bay and encompasses 16,744,264 acres (USGS 2019). The entire study area is within the Humboldt Bay-Frontal Pacific Ocean watershed (hydrologic unit code 180101020602) and the Eureka Plain hydrologic unit which covers 141,191 acres (USGS 2019). The study area includes two unnamed drainages and several small wetlands, as well as a small portion of Ryan Creek located just north of the study area. From a hydrologic perspective, the study area drains north, with two unnamed tributaries feeding Ryan Creek and ultimately to Humboldt Bay. Hydrologic sources in the study area include primarily precipitation and groundwater.

3.2 VEGETATION COMMUNITIES

Vegetation communities within the study area were described in a previously conducted biological survey (SHN 2016) and are listed below:

- Redwood forest
- Non-native grassland
- Drainage swales dominated by red alder (*Alnus rubra*), slough sedge (*Carex obnupta*) and,
- Blackberry patches
- Urban

Nomenclature for vegetation communities contained within aquatic resources follows the alliances and associations used in the MCV, Second Edition and updated in the online edition (Sawyer et al. 2009, CNPS 2019). Several of the vegetation types within mapped aquatic resources are not described in the MCV. In these instances, a new vegetation alliance and/or association was described and named, following MCV convention. Detailed descriptions applicable at the aquatic resource survey level (i.e., vegetation for each delineated feature) are provided in Section 4.0, Results. A complete list of observed vegetation is in Appendix A.

3.3 SOILS

The study area is located within the Coast Ranges Geomorphic Province, which is mainly composed mainly of the Franciscan Complex, with schists, sand, and other alluvial deposits associated with the coast. Three soil map units within the study area have been mapped by the USDA NRCS (NRCS 2019b) (Table 1, Figure 3). One of the soil map units is rated as hydric or contains hydric components: Weott, 0 to 2 percent slopes, is a soil type found on back swamps, depressions, and flood-plain steps. All delineated features are within the Hookton-Tablebluff complex, 2 to 9 percent slopes.

Table 1: Soil Map Units within the Study Area

Map Unit Name	Map Unit Symbol	Hydric Rating Status
Weott, 0 to 2 percent slopes	110	Y
Hookton-Tablebluff complex, 2 to 9 percent slopes	230	N
Lepoil-Espa-Candymountain complex, 15 to 50 percent slopes	258	N

Source: Natural Resources Conservation Service. 2019b. USDA Web Soil Survey. Available: http://websoilsurvey.nrcs.usda.gov. Accessed September 2019.

4.0 RESULTS

A total of 1.053-acre of wetlands and other waters (drainages) potentially under the jurisdiction of RWQCB, USACE and/or CDFW were mapped in the study area(Figure 4, Table 2, Appendix D Table D-1 and Table D-2). This includes 0.101 acre (56 linear feet) of riparian canopy potentially under the jurisdiction of CDFW were also mapped. Wetland delineation forms are in Appendix B and representative site photographs are provided in Appendix C.

Table 2: Summary of Potentially Jurisdictional Aquatic Features within the Study Area

Feature Type	USACE and RWQCB		CDFW	
	Acres[1]	Linear Feet	Acres[2]	Linear Feet
Wetlands	0.338	--	--	--
Subtotal - Wetlands	**0.338**	--	--	--
Ephemeral Drainages	0.106	1,969	0.609	1,969
Subtotal – Drainages	**0.106**	**1,969**	**0.609**	**1,969**
Total Jurisdictional Area	**0.444**	**1,969**	**0.609**	**1,969**

Notes:

1. Acreage was calculated using the area within the OHWM.

2. CDFW-jurisdictional acreage was calculated as follows: drainages used the area within TOB including riparian canopy beyond TOB.

4.1 WETLANDS

A total of eight wetlands that are potentially under the jurisdiction of USACE and/or RWQCB within the study area (Appendix D Table D-1). The wetlands are categorized as either palustrine emergent or palustrine scrub-shrub (Cowardin et al. 1979).

4.1.1 Vegetation

The wetlands identified in the study area consist of six different vegetation alliances (Table 3, Appendix D Table D-1). The most abundant vegetation type by feature is western rush (*Juncus occidentalis*) marshes, which are present in two wetlands and cover 0.042 acre. The second most abundant vegetation type is hedge nettle (*Stachys ajugoides*) marshes, which are present in two wetlands and cover 0.027 acre. One Pacific willow thicket (*Salix lasiandra*) was identified beyond the southwestern portion of the study area covering 0.227 acre. The wetland indicator status for the dominant species in each vegetation/wetland type is provided below (Lichvar et al. 2016).

Table 3: Summary of Wetlands by Vegetation Community

Scientific Name	Common Name	Cowardin Code(s)[1]	Acres
Palustrine Emergent			
Stachys ajugoides	Hedge nettle marshes	PEM1b	0.027
Juncus occidentalis	Western rush marsh	PEM1b	0.042
Cyperus eragrostis	Tall flat sedge marsh	PEM1b	0.007

Scientific Name	Common Name	Cowardin Code(s)[1]	Acres
Scirpus microcarpus	Panicled bulrush marsh	PEM1b	0.024
Juncus bufonius	Toad rush marsh	PEM1b	0.011
		Subtotal	**0.111**
Palustrine Scrub-Shrub			
Salix lasiandra	Pacific willow thicket	PSS1a	0.227
		Subtotal	**0.227**
		Total	**0.338**

Notes:

1. PEM1b = palustrine, emergent, persistent, temporarily flooded; PSS1 = palustrine, scrub-shrub, broad-leaved deciduous, and temporarily flooded. Codes based on Cowardin, L. M., V. Carter, F. C. Golet, and E. T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Fish and Wildlife Service Report No. FWS/OBS/-79/31.Washington, D.C.

Palustrine Emergent Wetlands

Hedge Nettle Marshes

Two wetlands are classified as hedge nettle marshes. Both features are dominated by hedge nettle (obligate wetland species [OBL]) with minimal abundance of creeping buttercup (*Ranunculus repens*) (facultative species [FAC]), blue wildrye (*Elymus glaucus*) (facultative upland species [FACU]), and blackberry (FACU).

Western Rush Marshes

Two wetlands are classified as western rush marshes. All were dominated by western rush (facultative wetland species [FACW]), with a mixture of hedge nettle (OBL) and velvet grass (*Holcus lanatus*) (FAC).

Tall Flat Sege Marsh

One wetland is classified as a tall flat sedge (*Cyperus eragrostis*) marsh. This feature was dominated by tall flat sedge (FACW) and co-dominated by hedge nettle (OBL), with a mixture of slender rush (*Juncus occidentalis*) (FAC) and curly dock (*Rumex crispus*) (FAC).

Panicled Bulrush Marsh

One wetland is classified as a panicled bulrush (*Scirpus microcarpus*) marsh. This feature was dominated by panicled bulrush (FACW) with a mixture of Italian rye grass (*Festuca perennis*) (FAC), creeping buttercup (FAC), and smaller populations of blackberry (*Rubus ursinus*) (FACU) and blue wildrye (FACU).

Toad Rush Marsh

One wetland is classified as a toad rush marsh (*Juncus bufonius*). This feature was dominated by toad rush (FACW) with bare ground as it was along an earthen access road.

Palustrine Scrub-Shrub Wetlands

Pacific Willow Thickets

One wetland is classified as a Pacific willow (*Salix lasiandra*) thicket. This shrub community is dominated by Pacific willow (FACW) and this stand is associated with a National Wetlands Inventory mapped freshwater pond; however, this area should be mapped as a fresh emergent wetland because there is no open water, which was also reported during the 2017 delineation (SHN 2017). This feature is located just beyond the southwestern portion of the study area but was surveyed based on proposed project activities and its proximity to adjacent aquatic features.

4.1.2 Hydric Soils

Eight sample points within the study area were established where soils were excavated and evaluated for the presence of hydric soil and hydrology indicators. These eight sample points make up four paired sets of upland and wetland points associated with mapped wetland features. Wetland soil samples were predominantly classified as silty loam and clay loam, while upland soil samples were predominantly classified as silty loam. The predominant hydric soil indicator was redox dark surface. Soil matrix colors in wetland areas were predominantly 10YR 2/1. Redox concentrations within the soil matrix of hydric soils were predominantly 7.5YR 5/8 and 2.5YR 3/6. Soil matrix colors in upland areas were predominantly 10YR 2/2. No redox concentrations or depletions were observed within upland soils.

4.1.3 Hydrology

Most wetland features within the study area contained drift deposits, supported oxidized rhizospheres along living roots or “Other” because they were previously mapped in 2017 as holding water as the primary indicator of wetland hydrology. In addition, surface soil cracks were observed within two wetland features that did not have sample points associated with them since they were adjacent to similar wetland features.

4.2 DRAINAGES

A total of two ephemeral drainages were identified in the study area and are potentially under the jurisdiction of the USACE, RWQCB, and CDFW. Detailed information associated with these features, including OHWM depth, OHWM width, top of bank depth and top of bank depth are located in Appendix C Table D-2. Based on topography and database research, all drainages mapped eventually drain into Ryan Creek. Both drainages are first order tributaries to Ryan Creek that ultimately drains into Humboldt Bay, which is a traditionally navigable water.

4.2.1 Riparian Canopy

A total of two riparian canopies were mapped, one along each drainage features for a total of 0.101 acre. Both areas were dominated by cascara buckthorn (*Frangula purshiana*) (FAC) patches. The riparian canopy vegetation was located along the top of bank but also extended beyond the top of bank and OHWM. Other vegetation observed within the riparian canopies included red elderberry (*Sambucus racemose*) and western brackenfern (*Pteridium aquilinum*).

4.3 CONCLUSION

A total of 0.338 acre of potential waters of the U.S. (wetlands) and 0.106 acre of potential other waters of the U.S. (drainage features) subject to USACE and RWQCB jurisdiction were identified. A total of 0.609 acre (including other waters of the U.S.) of potential CDFW jurisdictional features including riparian canopy were identified. Determinations of waters of the U.S., including wetlands, are based on current conditions, (i.e., normal circumstances) were made in accordance with relevant U.S. Environmental Protection Agency and Corps guidance. Determinations are subject to verification by the USACE. Stantec advises all interested parties to treat the information contained herein as preliminary pending written verification of jurisdictional boundaries by the USACE.

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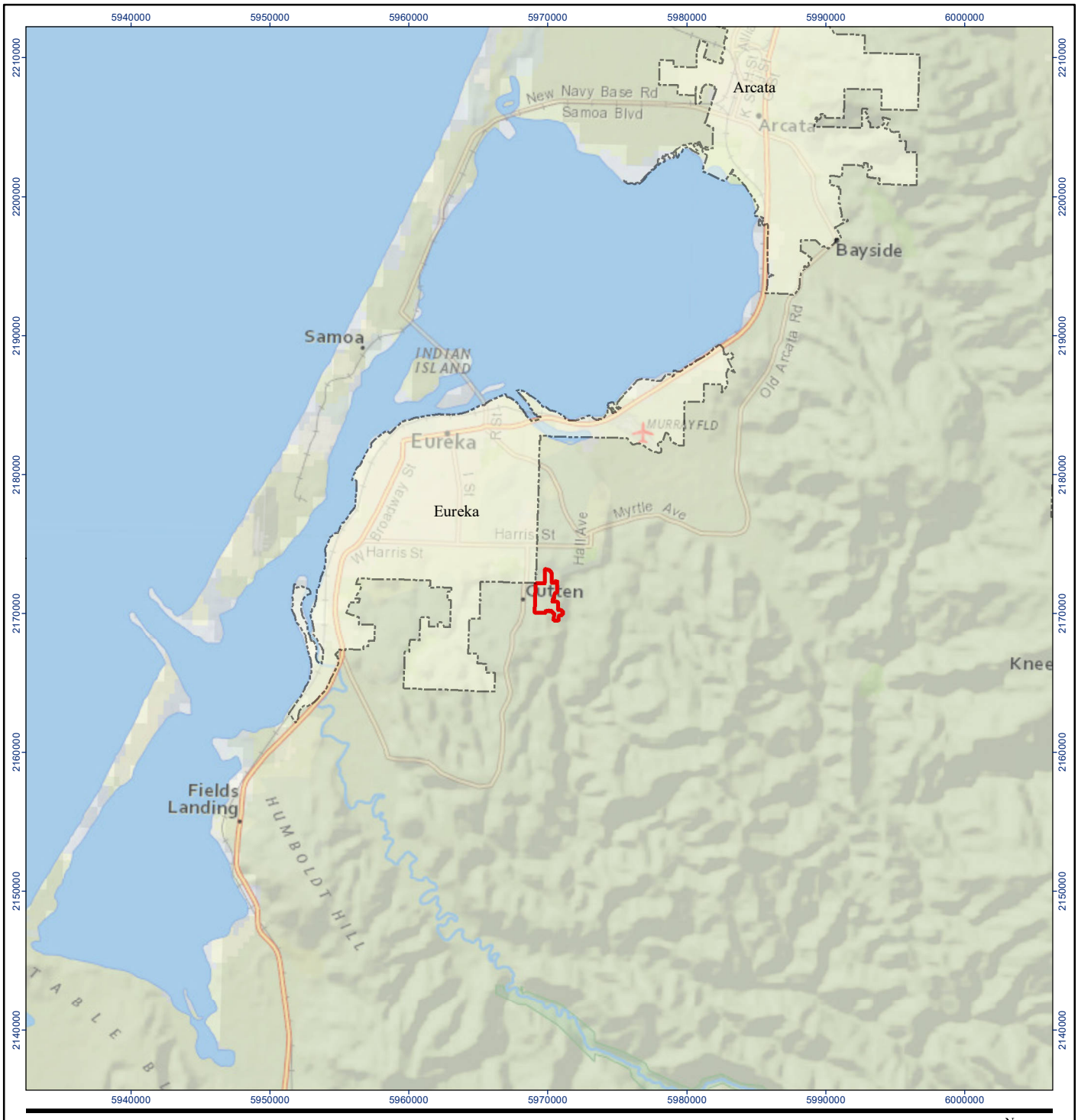
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FIGURES





North McKay Ranch Subdivision Project

0 1 2 Miles

(At original document size of 8.5x11)
1:126,720

N

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Notes

1. Coordinate System: NAD 1983 StatePlane California I FIPS 0401 Feet
2. Data Sources: City boundary from CAL FIRE, 2017. Project Area from Stantec and Kramer Investment Corp., 2019.
3. Background: National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.

Project Location
Near City of Eureka
Humboldt, CA

Prepared by SET on 2019-10-10
TR by
IR by

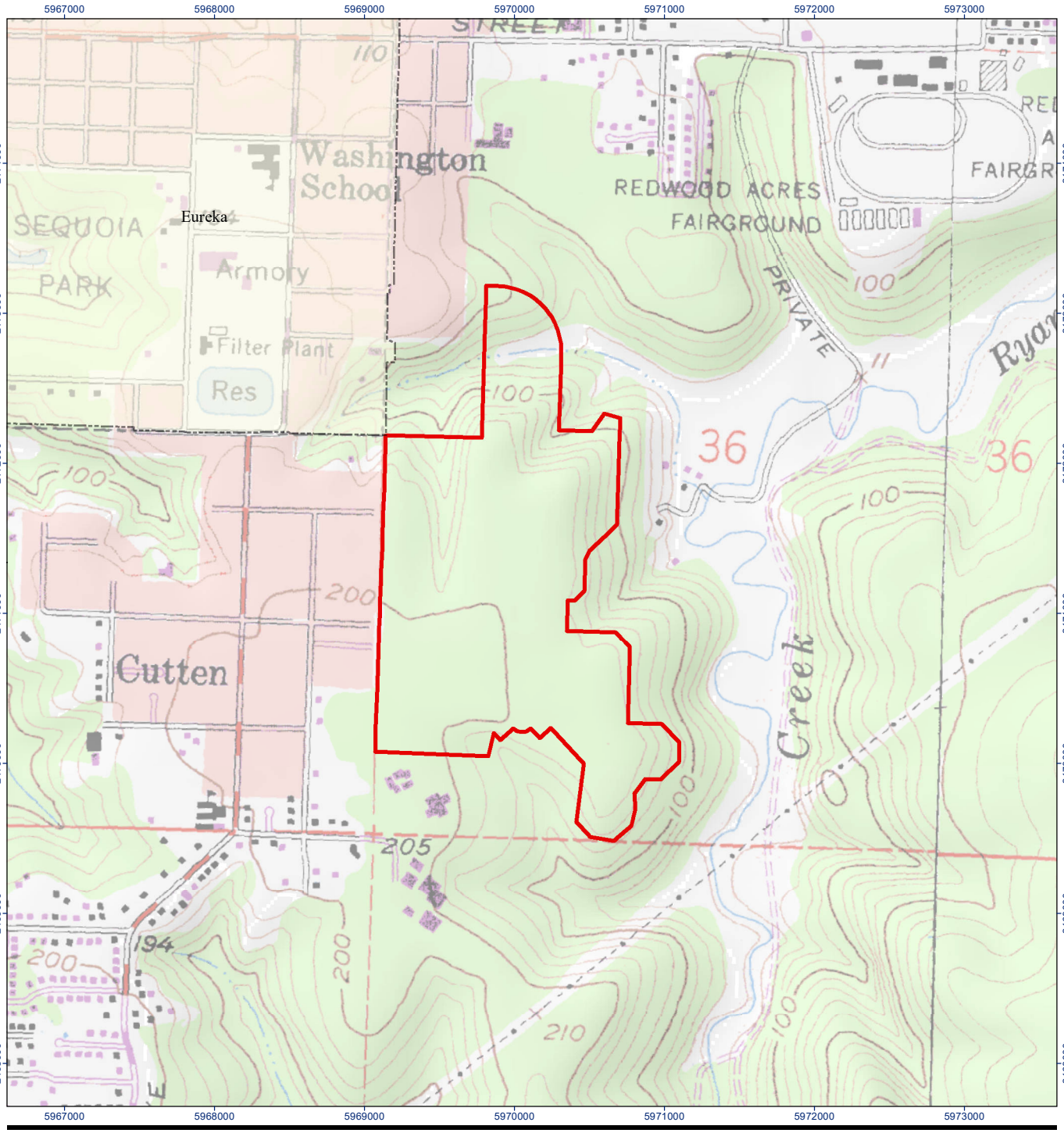
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Kramer Investment Corporation
North McKay Ranch Subdivision Project

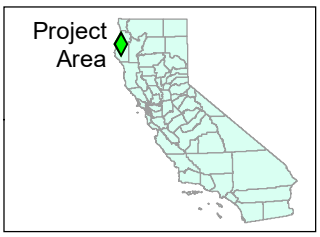
Figure No.
1

Title
McKay Ranch Project Location

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North McKay Ranch Subdivision Project

0 500 1,000 Feet

(At original document size of 8.5x11)
1:12,000

N

Stantec

Notes

1. Coordinate System: NAD 1983 StatePlane California I FIPS 0401 Feet
2. Data Sources: City boundary from CAL FIRE, 2017. Project Area from Stantec and Kramer Investment Corp., 2019.
3. Background: USGS 7.5' 1:24,000 Topographic Quadrangles Eureka and Arcata South (1972).

Project Location
Near City of Eureka
Humboldt, CA

Prepared by SET on 2019-10-10
TR by
IR by

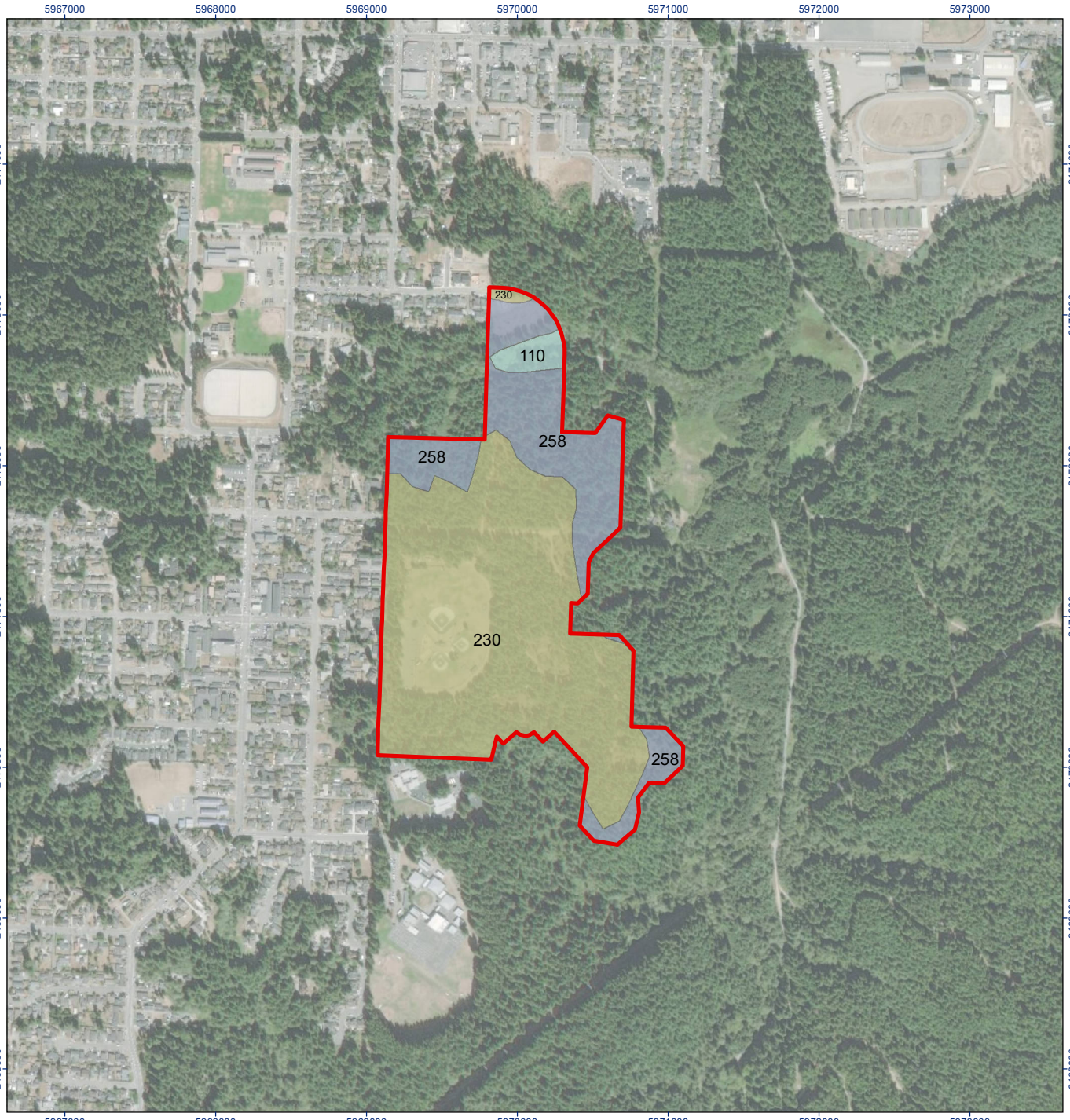
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Kramer Investment Corporation
North McKay Ranch Subdivision Project

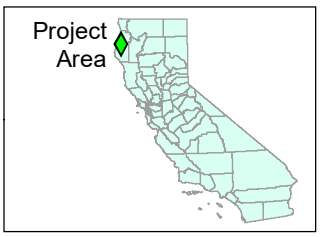
Figure No.
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Title
North McKay Ranch Subdivision Project Topography

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North McKay Ranch Subdivision Project

Soils

- 110: Weott, 0 to 2 percent slopes
- 230: Hookton-Tablebluff complex, 2 to 9 percent slopes
- 258: Lepoil-Espa-Candymountain complex, 15 to 50 percent slopes

0 500 1,000 Feet

(At original document size of 8.5x11)
1:12,000

N

Notes

1. Coordinate System: NAD 1983 StatePlane California I FIPS 0401 Feet

2. Data Sources: Soils from SSURGO, 2018. Project Area from Stantec and Kramer Investment Corp., 2019.

3. Background: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User

Stantec

Project Location
Near City of Eureka
Humboldt, CA

Prepared by SET on 2019-10-10
TR by
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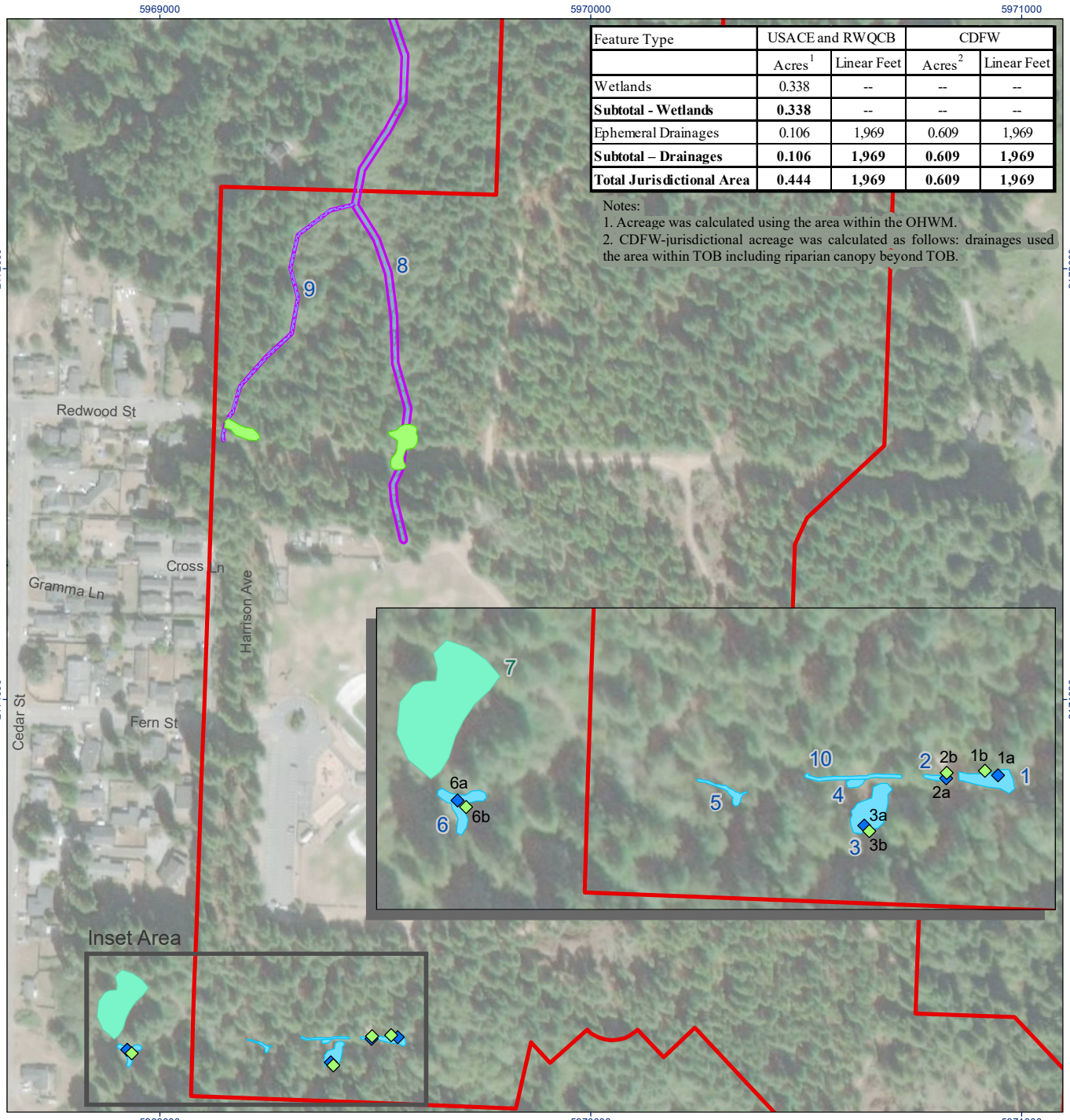
Client/Project
185704660_003
Kramer Investment Corporation
North McKay Ranch Subdivision Project

Figure No.
3

Title
North McKay Ranch Subdivision Project Soils

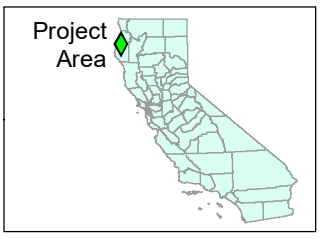
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Feature Type	USACE and RWQCB		CDFW	
	Acres[1]	Linear Feet	Acres[2]	Linear Feet
Wetlands	0.338	--	--	--
Subtotal - Wetlands	**0.338**	--	--	--
Ephemeral Drainages	0.106	1,969	0.609	1,969
Subtotal – Drainages	**0.106**	**1,969**	**0.609**	**1,969**
Total Jurisdictional Area	**0.444**	**1,969**	**0.609**	**1,969**

Notes:
1. Acreage was calculated using the area within the OHWM.
2. CDFW-jurisdictional acreage was calculated as follows: drainages used the area within TOB including riparian canopy beyond TOB.



- Upland Test Pit
- Wetland Test Pit
- North McKay Ranch Subdivision Project
- PSS1 Wetland (0.227 acres)
- PEM1 Wetland (0.111 acres)
- Riparian Canopy (0.101 acres)
- Ephemeral Drainage OHWM (0.106 acres)
- Ephemeral Drainage TOB (0.508 acres)

0 175 350 Feet

(At original document size of 8.5x11)
1:4,200

N

Notes
1. Coordinate System: NAD 1983 StatePlane California I FIPS 0401 Feet
2. Data Sources: City boundary from CAL FIRE, 2017. Project Area from Stantec and Kramer Investment Corp., 2019.
3. Background: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User

Stantec

Project Location
Near City of Eureka
Humboldt, CA

Prepared by SET on 2019-10-10
TR by JE on 2019-10-14
IR by

Client/Project
Kramer Investment Corporation
North McKay Ranch Subdivision Project

185704660_004

Figure No.
4

Title
North McKay Ranch Subdivison Aquatic Resource Survey Results

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APPENDICES

Appendix A PLANT SPECIES OBSERVED

Table A-1. Plant Species Observed

Scientific Name	Common Name	Wetland Indicator Status[1]	Origin
ADOXACEAE (Moschatel family)			
Sambucus racemosa	Red elderberry	FACU	native
Araceae (Arum Family)			
Lemna minor	smaller duckweed	OBL	native
Araliaceae (Ginseng Family)			
Hedera helix	English ivy	FACU	non-native (invasive)
Betulaceae (Birch Family)			
Alnus rubra	red alder	FAC	native
Cupressaceae (Cypress Family)			
Sequoia sempervirens	coast redwood	-	native
Cyperaceae (Sedge Family)			
Cyperus eragrostis	tall flatsedge	FACW	native
Isolepis cernua	low bulrush	OBL	native
Scirpus microcarpus	panicled bulrush	OBL	native
Dennstaedtiaceae (Bracken Family)			
Pteridium aquilinum var. *pubescens*	western bracken fern	FACU	native
Dryopteridaceae (Wood Fern Family)			
Polystichum munitum	western sword fern	FACU	native
Equisetaceae (Horsetail Family)			
Equisetum arvense	common horsetail	FAC	native
Equisetum telmateia ssp. *braunii*	giant horsetail	FACW	native
Iridaceae (Iris Family)			
Iris douglasiana	Douglas iris	-	native
Juncaceae (Rush Family)			
Juncus balticus ssp. *ater*	Baltic rush	FACW	native
Juncus bolanderi	Bolander's rush	OBL	native
Juncus bufonius	common toad rush	FACW	native
Juncus effusus	common bog rush	FACW	native
Juncus occidentalis	slender juncus	FACW	native
Juncus patens	rush	FACW	native
Juncus tenuis	slender rush	FAC	native
Juncus xiphioides	iris leaved rush	OBL	native
Lamiaceae (Labiateae) (Mint Family)			
Mentha pulegium	pennyroyal	OBL	non-native (invasive)
Onagraceae (Evening-Primrose Family)			
Epilobium ciliatum	Fringed willowherb	FACW	native-
Poaceae (Gramineae) (Grass Family)			
Elymus glaucus	blue wild rye	FACU	native
Festuca perennis	Italian rye grass	FAC	non-native
Holcus lanatus	common velvet grass	FAC	non-native (invasive)
Poa bulbous	Bulbous blue grass	FACU	non-native
Polygonaceae (Buckwheat Family)			
Rumex crispus	curly dock	FAC	non-native (invasive)

Scientific Name	Common Name	Wetland Indicator Status[1]	Origin
RHAMNACEAE (Buckthorn Family)			
Frangula purshiana	Cascara buckthorn	FAC	native
Ranunculaceae (Buttercup Family)			
Ranunculus repens	creeping buttercup	FAC	non-native (invasive)
Rosaceae (Rose Family)			
Rubus armeniacus	Himalayan blackberry	FAC	non-native (invasive)
Rubus parviflorus	thimbleberry	FACU	native
Rubus ursinus	California blackberry	FACU	native
Salicaceae (Willow Family)			
Salix lasiandra	Pacific willow	FACW	native
Sapindaceae (Soapberry Family)			
Acer macrophyllum	bigleaf maple	FACU	native
Themidaceae (Brodiaea Family)			
Brodiaea elegans ssp. *elegans*	harvest brodiaea	FACU	native
Woodsiaceae (Cliff Fern Family)			
Athyrium filix-femina var. *cyclosorum*	western lady fern	FAC	native
Pteridium aquilinum	Western brackenfern	FACU	native

[1] FAC = facultative. FACU = facultative upland, FACW = facultative wetland, OBL = obligate, UPL = upland. Status based on Lichvar, R. W., D. L. Banks, W. N. Kirchner, and N. C. Melvin. 2016. The National Wetland Plant List: 2016 wetland ratings. Phytoneuron 2016-30: 1-17. Published 28 April 2016. ISSN 2153 733X.

Appendix B WETLAND DETERMINATION DATA FORMS

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: McKay Ranch City/County: Eureka/Humboldt Sampling Date: 9/18/19
Applicant/Owner: Kramer State: CA Sampling Point: 1a
Investigator(s): J. Elia, S. Elder Section, Township, Range: S36 T5N R1W
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): concave Slope (%): 3
Subregion (LRR): A – Northwestern Forest Lat: 40.7678196 Long: -124.138036 Datum: WGS 84
Soil Map Unit Name: Hookton - Tablebluff complex, 2-9% slope NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ___
Hydric Soil Present? Yes X No ___
Wetland Hydrology Present? Yes X No ___

Is the Sampled Area within a Wetland? Yes X No ___

Remarks:
0.5" of rainfall in the past 24 hours.
Sample point taken within bed of wetland feature

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ___)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	___ = Total Cover		

Sapling/Shrub Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
5.			
	___ = Total Cover		

Herb Stratum (Plot size: 5 ft. r)			
1. Stachys ajugoides	70	Y	OBL
2. Ranunculus repens	5		FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	75 = Total Cover		

Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	___ = Total Cover		

% Bare Ground in Herb Stratum 25

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	___	x 1 =	___
FACW species	___	x 2 =	___
FAC species	___	x 3 =	___
FACU species	___	x 4 =	___
UPL species	___	x 5 =	___
Column Totals:	___ (A)		___ (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:
___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:
Bare ground includes some thatch

SOIL

Sampling Point: 1a

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-8	10YR 2/2	100					Silty loam	Roots
8-14	10YR 4/3	95	10YR 6/8	5	C	M	Sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- X Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): _____

Water Table Present? Yes ___ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): _____

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: McKay Ranch City/County: Eureka/Humboldt Sampling Date: 9/18/19
Applicant/Owner: Kramer State: CA Sampling Point: 1b
Investigator(s): J. Elia, S. Elder Section, Township, Range: S36 T5N R1W
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): convex Slope (%): 3
Subregion (LRR): A – Northwestern Forest Lat: 40.76783403 Long: 124.1380894 Datum: WGS 84
Soil Map Unit Name: Hookton-Tablebluff complex, 2-9% slope NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___	**Is the Sampled Area within a Wetland?** Yes ___ No X
Hydric Soil Present?	Yes ___	No X	
Wetland Hydrology Present?	Yes ___	No X	

Remarks:
0.5" rainfall in the last 24 hours.
Sample point taken on mid bank of wetland swale

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ___)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	___ = Total Cover		

Sapling/Shrub Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
5.			
	___ = Total Cover		

Herb Stratum (Plot size: 5 ft. r)			
1. Stachys ajugoides	30	Y	OBL
2. Bubus parviflorus	10	Y	FACU
3. Rubus ursinus	10	Y	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	50 = Total Cover		

Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	___ = Total Cover		

% Bare Ground in Herb Stratum 90

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: ___ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	30	x 1 =	30
FACW species	___	x 2 =	___
FAC species	___	x 3 =	___
FACU species	20	x 4 =	80
UPL species	___	x 5 =	___
Column Totals:	50 (A)		110 (B)

Prevalence Index = B/A = 2.20

Hydrophytic Vegetation Indicators:
___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:
Bare ground includes thatch.
No hydric soil or wetland hydrology indicators present.

SOIL

Sampling Point: 1b

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-12	10YR 2/2	100					Silty loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): _____

Water Table Present? Yes ___ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): _____

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: McKay Ranch City/County: Eureka/Humboldt Sampling Date: 9/18/19
Applicant/Owner: Kramer State: CA Sampling Point: 2a
Investigator(s): J. Elia, S. Elder Section, Township, Range: S36 T5N R1W
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 0
Subregion (LRR): A – Northwestern Forest Lat: 40.76780666 Long: 124.13825518 Datum: WGS 84
Soil Map Unit Name: Hookton-Tablebluff complex, 2-9% slope NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ___
Hydric Soil Present? Yes X No ___
Wetland Hydrology Present? Yes X No ___

Is the Sampled Area within a Wetland? Yes X No ___

Remarks:
0.5" of rain in the past 24 hours
bed of wetland swale

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ___)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		

Herb Stratum (Plot size: 5 ft. r)			
1. Stachys ajugoides	10		OBL
2. Ranunculus repens	40	Y	FAC
3. Holcus lanatus	5		FAC
4. Rubus ursinus	5		FACU
5. Epilobium ciliatum	10		FACW
6. Elymus glaucus	15		FACU
7.			
8.			
9.			
10.			
11.			
	85 = Total Cover		

Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 15

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	10	x 1 =	10
FACW species	10	x 2 =	20
FAC species	45	x 3 =	135
FACU species	20	x 4 =	80
UPL species		x 5 =	
Column Totals:	85 (A)		245 (B)

Prevalence Index = B/A = 2.88

Hydrophytic Vegetation Indicators:
___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:
Bare ground includes thatch

SOIL

Sampling Point: 2a

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 3/1	90	7.5YR 5/8	7	C	M	clay loam	
			10R 3/6	3	C	M	clay loam	
10-14	2.5Y 5/4	80	7.5YR 5/8	20	C	M	Sandy clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks:

10-14" = moist soils

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- X Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): _____

Water Table Present? Yes ___ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): _____

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: McKay Ranch City/County: Eureka/Humboldt Sampling Date: 9/18/19
Applicant/Owner: Kramer State: CA Sampling Point: 26
Investigator(s): J. Elia, S. Elder Section, Township, Range: S36 T5N R1W
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 0
Subregion (LRR): A – Northwestern Forest Lat: 40.76782406 Long: 124.1382495 Datum: WGS 84
Soil Map Unit Name: Hoolcton-Tablebluff complex, 2-9% slope NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___	**Is the Sampled Area within a Wetland?** Yes ___ No X
Hydric Soil Present?	Yes ___	No X	
Wetland Hydrology Present?	Yes ___	No X	

Remarks:
0.5" of rain in past 24 hours
Sample point taken on berm between road & wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ___)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	___ = Total Cover		

Sapling/Shrub Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
5.			
	___ = Total Cover		

Herb Stratum (Plot size: 5 ft r)			
1. Stachys ajugoides	50	Yes	OBL
2. Rubus parviflorus	5		FACU
3. Ranunculus repens	15		FAC
4. Poa bulbosa	5		FACU
5. Rubus ursinus	10		FACU
6. Elymus glaucus	15		FACU
7.			
8.			
9.			
10.			
11.			
	100 = Total Cover		

Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	___ = Total Cover		

% Bare Ground in Herb Stratum ___

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species ___	x 1 =	___
FACW species ___	x 2 =	___
FAC species ___	x 3 =	___
FACU species ___	x 4 =	___
UPL species ___	x 5 =	___
Column Totals: ___ (A)		___ (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:
___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

50% = 50
20% = 20

SOIL

Sampling Point: 2b

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0 - 12	10YR 2/2	100					Sandy loam	woody debris

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ___ No X

Remarks:

Test pit taken on berm between wetland and access road. Soils contain thatch and woody debris deposits

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): _____

Water Table Present? Yes ___ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): _____

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Berm area with no hydrologic flow pattern

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: McKay Ranch City/County: Eureka/Humboldt Sampling Date: 9/18/19
Applicant/Owner: Kramer State: CA Sampling Point: 3a
Investigator(s): J. Elia, S. Elder Section, Township, Range: S36 T5N R1W
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): concave Slope (%): 0
Subregion (LRR): A – Northwestern Forest Lat: 40.76765016 Long: 124.1385891 Datum: WGS 84
Soil Map Unit Name: Hookton-Tablebluff complex, 2-9% slope NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___	**Is the Sampled Area within a Wetland?** Yes X No ___
Hydric Soil Present?	Yes X	No ___	
Wetland Hydrology Present?	Yes X	No ___	

Remarks: 0.5" of rainfall in past 24 hrs. Sample point taken within closed depression.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ___)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	___ = Total Cover		

Sapling/Shrub Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
5.			
	___ = Total Cover		

Herb Stratum (Plot size: 5 ft. r)			
1. Juncus occidentalis	50	Y	FACW
2. Holcus lanatus	25	Y	FAC
3. Stachys ajugoides	20	Y	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	95 = Total Cover		

Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	___ = Total Cover		

% Bare Ground in Herb Stratum 5

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	___	x 1 =	___
FACW species	___	x 2 =	___
FAC species	___	x 3 =	___
FACU species	___	x 4 =	___
UPL species	___	x 5 =	___
Column Totals:	___ (A)		___ (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:
___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

SOIL

Sampling Point: 3a

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-1	10YR 2/2	100	M				silty loam	
1-2	2.5Y 5/4	90	2.5YR 3/6	10	C	M	silty clay	
2-8	10YR 2/2	100					silty loam	
8-12	10YR 2/2	5	2.5YR 3/6	15	C	M	clay loam	
	2.5Y 2.5/1	80						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks:

Moist soils

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- X Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): _____

Water Table Present? Yes ___ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): _____

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Closed depression. Ponded water during 2017 delineation and positive indicators of hydrophytic vegetation and hydric soils.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: McKay Ranch City/County: Eureka/Humboldt Sampling Date: 9/18/19
Applicant/Owner: Kramer State: CA Sampling Point: 36
Investigator(s): J. Elia, S. Elder Section, Township, Range: S36 T5N R1W
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): concave Slope (%): 3
Subregion (LRR): A – Northwestern Forest Lat: 40.76763256 Long: 124.13855682 Datum: WGS 84
Soil Map Unit Name: Hoolcton-Tablebluff complex, 2-9% slope NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ___
Hydric Soil Present? Yes ___ No X
Wetland Hydrology Present? Yes ___ No X

Is the Sampled Area within a Wetland? Yes ___ No X

Remarks:
0.5" of rainfall in past 24 hrs, sample point taken at change in veg.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ___)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		

Herb Stratum (Plot size: 5 ft. r)			
1. Stachys ajugoides	35	Y	OBL
2. Holcus lanatus	45	Y	FAC
3. Elymus glaucous	5		FACU
4. Rubus ursinus	5		FACU
5. Scrophularia californica	5		FAC
6.			
7.			
8.			
9.			
10.			
11.			
	95 = Total Cover		

Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 5

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	___	x 1 =	___
FACW species	___	x 2 =	___
FAC species	___	x 3 =	___
FACU species	___	x 4 =	___
UPL species	___	x 5 =	___
Column Totals:	___ (A)		___ (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:
___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

SOIL

Sampling Point: 36

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-12	10YR 2/2	100					silty loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): _____

Water Table Present? Yes ___ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): _____

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: McKay Ranch City/County: Eureka/Humboldt Sampling Date: 9/18/19
Applicant/Owner: Kramer State: CA Sampling Point: 6a
Investigator(s): J. Elia, S. Elder Section, Township, Range: S36 T5N R1W
Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 2
Subregion (LRR): A – Northwestern Forest Lat: 40.7676978 Long: 124.140295T Datum: WGS 84
Soil Map Unit Name: Hookton - Tablebluff complex, 2-9% slope NWI classification: Freshwater pond
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil X, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ___
Hydric Soil Present? Yes X No ___
Wetland Hydrology Present? Yes X No ___

Is the Sampled Area within a Wetland? Yes X No ___

Remarks:
0.5" of rainfall in past 24 hrs.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ___)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	___ = Total Cover		
Sapling/Shrub Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
5.			
	___ = Total Cover		
Herb Stratum (Plot size: 5 ft. r)			
1. Scirpus microcarpus	30	Y	OBL
2. Festuca Perennis	5		FAC
3. Rubus ursinus	10		FACU
4. Ranunculus repens	5		FAC
5. Elymus glaucus	20	Y	FACU
6.			
7.			
8.			
9.			
10.			
11.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	___ = Total Cover		

% Bare Ground in Herb Stratum ___

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	30	x 1 =	30
FACW species	___	x 2 =	___
FAC species	10	x 3 =	30
FACU species	30	x 4 =	120
UPL species	___	x 5 =	___
Column Totals:	70 (A)		180 (B)

Prevalence Index = B/A = 2.57

Hydrophytic Vegetation Indicators:
___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:
Test pit taken along disturbed ATV road.

SOIL

Sampling Point: 6a

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-12	10YR 2/1	98	2.5Y 5/4	2	D	M	silty loam	Soils Dry

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks:

ATV tracks travel through area creating depressional features and altering surface topography. These problematic soils fall under recently developed wetlands.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: McKay Ranch City/County: Eureka/Humboldt Sampling Date: 9/18/19
Applicant/Owner: Kramer State: CA Sampling Point: 6b
Investigator(s): J. Elia, S. Elder Section, Township, Range: S36 T5N R1W
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 2
Subregion (LRR): A – Northwestern Forest Lat: 40.76767728 Long: 124.1402596 Datum: WGS 84
Soil Map Unit Name: Hookton - Tablebluff complex, 2-9% slope NWI classification: Freshwater pond
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No X	**Is the Sampled Area within a Wetland?** Yes ___ No X
Hydric Soil Present?	Yes ___	No X	
Wetland Hydrology Present?	Yes ___	No X	

Remarks:
0.5" of rainfall in past 24 hrs. Sample point taken at change in Veg.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ___)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5ft. r)			
1. Rubus ursinus	75	Y	FACU
2. Juncus occidentalis	7		FACW
3. Scirpus microcarpus	3		OBL
4. Elymus glaucus	5		FACU
5. Iris douglasiana	10		NL
6.			
7.			
8.			
9.			
10.			
11.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum ___

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	3	x 1 =	3
FACW species	7	x 2 =	14
FAC species		x 3 =	
FACU species	80	x 4 =	320
UPL species	10	x 5 =	50
Column Totals:	100 (A)		387 (B)

Prevalence Index = B/A = 3.87

Hydrophytic Vegetation Indicators:
___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks:

SOIL

Sampling Point: 66

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-12	10YR 2/1	100						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ___ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): _____

Water Table Present? Yes ___ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): _____

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

OHWM Delineation Cover Sheet Page 1 of 3

Project: McKay Ranch **Date:** 9/18/19

Location: Eureka, CA **Investigator(s):** J. Elia, S. Elder

Project Description:
Housing development

Describe the river or stream's condition (disturbances, in-stream structures, etc.):
Natural First order tributaries to Ryan Creek. Creeks are steeply sloped, incised and erodable due to thier soil conditions.

Off-site Information

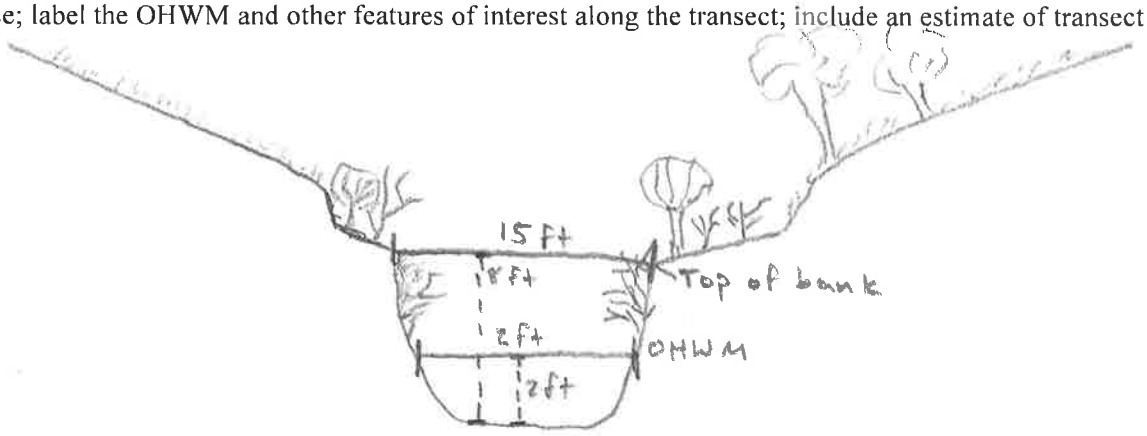
Remotely sensed image(s) acquired? ☒ **Yes** ☐ **No** [If yes, attach image(s) to datasheet(s) and indicate approx. locations of transects, OHWM, and any other features of interest on the image(s); describe below] Description:
OHWM and top of bank information collected.

Hydrologic/hydraulic information acquired? ☐ **Yes** ☒ **No** [If yes, attach information to datasheet(s) and describe below.] Description:

List and describe any other supporting information received/acquired:
See sheets 2 & 3

Instructions: Complete one cover sheet and one or more datasheets for each project site. Each datasheet should capture the dominant characteristics of the OHWM along some length of a given stream. Complete enough datasheets to adequately document up- and/or downstream variability in OHWM indicators, stream conditions, etc. Transect locations can be marked on a recent aerial image or their GPS coordinates noted on the datasheet.

Transect (cross-section) drawing: (choose a location that is representative of the dominant stream characteristics over some distance; label the OHWM and other features of interest along the transect; include an estimate of transect length)



Break in Slope at OHWM: ☐ Sharp (> 60°) | ☐ Moderate (30–60°) | ☐ Gentle (< 30°) | ☒ None

Notes/Description: OHWM was identified by a break in vegetation and a scour line. Channel is incised with vertical banks below top of bank

Sediment Texture: Estimate percentages to describe the general sediment texture above and below the OHWM

	Clay/Silt <0.05mm	Sand 0.05 – 2mm	Gravel 2mm – 1cm	Cobbles 1 – 10cm	Boulders >10cm	Developed Soil Horizons (Y/N)
Above OHWM	100					
Below OHWM	100					

Notes/Description:

Creek bed highly unstable. Section of creek bank sluffed into channel. Water was flowing below sluffed material. Several scour holes or niche points were observed.

Vegetation: Estimate absolute percent cover to describe general vegetation characteristics above and below the OHWM

	Tree (%)	Shrub (%)	Herb (%)	Bare (%)
Above OHWM	10	10	80	
Below OHWM			5	95

Notes/Description:

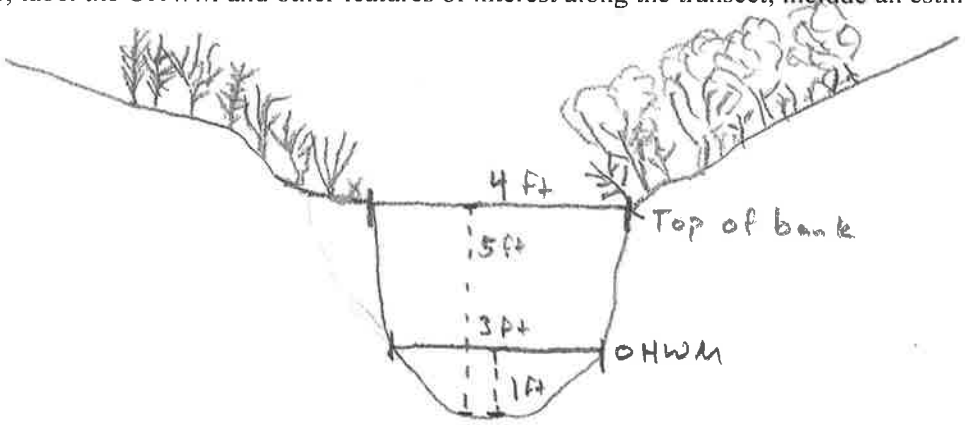
Vegetation consisted primarily of grasses, horse tail, Ferns, with other shrubs including blackberry. Large riparian trees consisted of Cascara buckthorn.

Other Evidence: List/describe any additional field evidence and/or lines of reasoning used to support your delineation

This feature is a direct tributary to Ryan Creek which discharges into Eureka slough.

Datasheet # Feature 9 | **OHWM Delineation Datasheet** | Page 3 of 3

Transect (cross-section) drawing: (choose a location that is representative of the dominant stream characteristics over some distance; label the OHWM and other features of interest along the transect; include an estimate of transect length)



Break in Slope at OHWM: ☐ Sharp (> 60°) | ☐ Moderate (30–60°) | ☐ Gentle (< 30°) | ☒ None

Notes/Description: channel is incised with vertical banks below top of bank. OHWM was identified by a break in vegetation and scour line.

Sediment Texture: Estimate percentages to describe the general sediment texture above and below the OHWM

	Clay/Silt <0.05mm	Sand 0.05 – 2mm	Gravel 2mm – 1cm	Cobbles 1 – 10cm	Boulders >10cm	Developed Soil Horizons (Y/N)
Above OHWM	100					
Below OHWM	100					

Notes/Description:
Creek bed is highly unstable. Section of creek bank sluffed into channel. Exposed PG&E gasline within the bed of channel. Nick point observed just downstream.

Vegetation: Estimate absolute percent cover to describe general vegetation characteristics above and below the OHWM

	Tree (%)	Shrub (%)	Herb (%)	Bare (%)
Above OHWM	20	60	20	
Below OHWM				100

Notes/Description:
Vegetation consisted primarily of western bracken fern and horsetail sp. Riparian trees consisted of Cascara buckthorn.

Other Evidence: List/describe any additional field evidence and/or lines of reasoning used to support your delineation

Feature is a direct tributary to Ryan Creek which discharges into Eureka Slough.

Appendix C REPRESENTATIVE PHOTOGRAPHS



Photo 1. Wetland (W-) 1, Sample Point (SP-) 1 upland (u). A seasonal, palustrine emergent (PEM1) hedge nettle marsh.



Photo 2. W-3, a seasonal, palustrine emergent (PEM1) western rush marsh.



Photo 3. W-4, seasonal, palustrine emergent (PEM1) western rush marsh in the top center of photo with W-10, toad rush marsh along right side of earthen roadway.



Photo 4. W-5, seasonal, palustrine emergent (PEM1) tall flat sedge marsh along the earthen access road and adjacent to a walking trail.



Photo 5. W-6, seasonal, palustrine emergent (PEM1) panicled bulrush marsh. A slight depressional feature with ATV trails within it. This area is mapped as a freshwater pond in NWI.



Photo 6. W-7, a palustrine scrub-shrub (PSS) Pacific willow thicket. This feature is also within the NWI map shown as a freshwater pond and is hydraulically connected to W-6.



Photo 7. Ephemeral drainage (ED-) 8. A small tributary leading to Ryan Creek.



Photo 8. ED-9. A small tributary leading to Ryan Creek.

Appendix D AQUATIC RESOURCE SURVEY RESULTS

Table D-1. Wetlands

Feature ID	Vegetation Community	Cowardin Classification[1]	USACE/ RWQCB Area (acres)	Feature Description
1^	Hedge nettle marsh	PEM1	0.023	Seasonal wetland swale; hydraulically connected with W-2.
2^	Hedge nettle marsh	PEM1	0.004	Seasonal wetland swale; hydraulically connected with W-1.
3^	Western rush marsh	PEM1	0.038	Seasonal wetland. Small depression located on terrace above W-4.
4	Western rush marsh	PEM1	0.004	Seasonal wetland located along the earthen access road. Fed by roadside runoff. It's an enclosed depression with an earthen berm caused from roadside disturbance. Hydraulically connected to W-5 and W-10.
5	Tall flat sedge marsh	PEM1	0.007	Seasonal wetland located along the earthen access road and adjacent to a walking trail. Fed by roadside runoff. It's an enclosed depression with an earthen berm caused from roadside disturbance like W-4. Hydraulically connected to W-4 and W-10.
6^	Panicled bulrush marsh	PEM1	0.024	Seasonal wetland. A slight depressional feature with all-terrain vehicle trails within it. This area is mapped as a freshwater pond in NWI. Ponding water shown in the 2017 delineation conducted by SHN, Inc.
7	Pacific willow marsh	PSS1	0.227	Scrub-shrub wetland consisting of Pacific willows. This feature is also within the NWI map shown as a freshwater pond and is hydraulically connected to W-6.
10	Toad rush marsh	PEM1	0.011	Seasonal wetland. This feature is located within the disturbed roadside and is fed by runoff with tire ruts retaining water. This feature is hydraulically connected to W-6 and W-7 and contained hydrophytic vegetation.
Total			**0.338**	**--**

[1] PEM = palustrine, emergent, persistent. PSS = palustrine scrub-shrub. Codes based on Cowardin, L. M., V. Carter, F. C. Golet, and E. T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Fish and Wildlife Service Report No. FWS/OBS/-79/31.Washington, D.C.

^ sample upland and wetland points were established for this feature.

CDFW = California Department of Fish and Wildlife

NWI = National Wetlands Inventory

RWQCB = Regional Water Quality Control Board

USACE = U.S. Army Corps of Engineers

Table D-2. Drainages

Feature ID	Hydrological Regime	Linear Feet	USACE/RWQCB			CDFW				Feature Description
			Average OHWM Width (feet)	Average OHWM Depth (feet)	Area (acres)	Average TOB Width (feet)	Average TOB Depth (feet)	Area (acres)	Riparian Canopy (acres)	
8	ephemeral	689	2	2	0.058	15	8	0.445	0.058	Headwaters of a small tributary leading to Ryan Creek.
9	ephemeral	1,280	3	1	0.048	4	5	0.064	0.043	Headwaters of a small tributary leading to Ryan Creek.
Total		**1,969**	**--**	**--**	**.106**	**--**	**--**	**.509**	**0.101**	**--**

Notes:

CDFW = California Department of Fish and Wildlife

OHWM = ordinary high water mark

RWQCB = Regional Water Quality Control Board

TOB = top-of-bank

USACE = U.S. Army Corps of Engineers

Stantec

Biological Survey: McKay Ranch EIR

March 5, 2020, Eureka, Humboldt County CA. Humboldt Community Services District Ridgewood Tank Site

Iris Koski, MS

Biologist, Stantec

Survey duration: 75 min

Conducted a pedestrian survey of a proposed water tank location within Humboldt Community Services District. Present onsite were Iris Koski- Stantec, Travis Green- Kramer properties, and Mickey Hulstrom- Humboldt Community Services District. The area surveyed included the proposed tank location, surrounding areas, and the access road from the city street up to the tanks (distance of approximately 0.3 miles). No special status species, species of special concern (SSC), sensitive habitats, or jurisdictional features were identified during this survey.

The proposed tank location is primarily disturbed, dominated by invasive pampas grass (*Cortaderia selloana),* salal *(Gaultheria shallon*), evergreen huckleberry (*Vaccinium ovatum*), and native blackberry *(Rubus ursinus*). The proposed tank location would require the removal of approximately three redwood trees *(Sequoia sempervirens*) that are **≤** 20 inches dbh.

The access road is an easement through Green Diamond Resource company and is well-maintained and rocked, approximately 10 feet in width. Road improvements and vegetation removal to support equipment associated with water tank installation would be minimal. There are a few small areas adjacent to the access road that appear to remain wet during periods of precipitation and are dominated by colt's foot (*Petasites frigidus).* Other species observed along the access road were sitka spruce (*Picea sitchensis*), red alder (*Alnus rubra*) and blue elderberry (*Sambucus nigra*).

No amphibians were observed during the site visit. No birds were seen; birds detected by auditory methods included stellar's jay, common raven, brown creeper, and Ana's hummingbird.

Based on a 1-quad query of CNDDB, some special status species with potential to occur include Cooper's and sharp-shinned hawk, northern red-legged frog, western lily, coast checkerbloom, Howell's montia, heart-leafed twayblade and bristle-stalked sedge. None of the above SSC were observed during the survey.

Please see attached photos for additional site details and information. Feel free to contact me with any questions.

Photos 1: Access road to proposed tank location



Photos 2: Access road to proposed tank location



Photo 3. Looking east towards prospective tank location, 3 trees to be removed.



Photo 4. Current water tank site



Photo 5. Vegetation (primarily papmas grass) in prospective water tank site.



Photo 6. Prospective water tank site.



APPENDIX C2

California Department of Fish and Wildlife
California Natural Diversity Database

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Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (Eureka (4012472) OR Tyee City (4012482) OR Arcata North (4012481) OR Arcata South (4012471) OR McWhinney Creek (4012461) OR Fields Landing (4012462) OR Cannibal Island (4012463))
 AND Taxonomic Group IS (Ferns OR Gymnosperms OR Monocots OR Dicots OR Lichens OR Bryophytes)

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Abronia umbellata var. breviflora pink sand-verbena	PDNYC010N4	None	None	G4G5T2	S2	1B.1
Astragalus pycnostachyus var. pycnostachyus coastal marsh milk-vetch	PDFAB0F7B2	None	None	G2T2	S2	1B.2
Bryoria spiralifera twisted horsehair lichen	NLTEST5460	None	None	G1G2	S1S2	1B.1
Cardamine angulata seaside bittercress	PDBRA0K010	None	None	G4G5	S3	2B.1
Carex arcta northern clustered sedge	PMCYP030X0	None	None	G5	S1	2B.2
Carex leptalea bristle-stalked sedge	PMCYP037E0	None	None	G5	S1	2B.2
Carex lyngbyei Lyngbye's sedge	PMCYP037Y0	None	None	G5	S3	2B.2
Carex praticola northern meadow sedge	PMCYP03B20	None	None	G5	S2	2B.2
Castilleja ambigua var. humboldtiensis Humboldt Bay owl's-clover	PDSCR0D402	None	None	G4T2	S2	1B.2
Castilleja litoralis Oregon coast paintbrush	PDSCR0D012	None	None	G3	S3	2B.2
Chloropyron maritimum ssp. palustre Point Reyes salty bird's-beak	PDSCR0J0C3	None	None	G4?T2	S2	1B.2
Collinsia corymbosa round-headed Chinese-houses	PDSCR0H060	None	None	G1	S1	1B.2
Erysimum menziesii Menzies' wallflower	PDBRA160R0	Endangered	Endangered	G1	S1	1B.1
Erythronium revolutum coast fawn lily	PMLIL0U0F0	None	None	G4G5	S3	2B.2
Fissidens pauperculus minute pocket moss	NBMUS2W0U0	None	None	G3?	S2	1B.2
Gilia capitata ssp. pacifica Pacific gilia	PDPLM040B6	None	None	G5T3	S2	1B.2
Gilia millefoliata dark-eyed gilia	PDPLM04130	None	None	G2	S2	1B.2
Hesperevax sparsiflora var. brevifolia short-leaved evax	PDASTE5011	None	None	G4T3	S2	1B.2

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Lasthenia californica ssp. macrantha perennial goldfields	PDAST5L0C5	None	None	G3T2	S2	1B.2
Lathyrus japonicus seaside pea	PDFAB250C0	None	None	G5	S2	2B.1
Lathyrus palustris marsh pea	PDFAB250P0	None	None	G5	S2	2B.2
Layia carnosa beach layia	PDAST5N010	Endangered	Endangered	G2	S2	1B.1
Lilium occidentale western lily	PMLIL1A0G0	Endangered	Endangered	G1	S1	1B.1
Lycopodium clavatum running-pine	PPLYC01080	None	None	G5	S3	4.1
Mitellastra caulescens leafy-stemmed mitrewort	PDSAX0N020	None	None	G5	S4	4.2
Monotropa uniflora ghost-pipe	PDMON03030	None	None	G5	S2	2B.2
Montia howellii Howell's montia	PDPOR05070	None	None	G3G4	S2	2B.2
Oenothera wolfii Wolf's evening-primrose	PDONA0C1K0	None	None	G2	S1	1B.1
Puccinellia pumila dwarf alkali grass	PMPOA531L0	None	None	G4?	SH	2B.2
Sidalcea malachroides maple-leaved checkerbloom	PDMAL110E0	None	None	G3	S3	4.2
Sidalcea malviflora ssp. patula Siskiyou checkerbloom	PDMAL110F9	None	None	G5T2	S2	1B.2
Sidalcea oregana ssp. eximia coast checkerbloom	PDMAL110K9	None	None	G5T1	S1	1B.2
Silene scouleri ssp. scouleri Scouler's catchfly	PDCAR0U1MC	None	None	G5T4T5	S2S3	2B.2
Spergularia canadensis var. occidentalis western sand-spurrey	PDCAR0W032	None	None	G5T4	S1	2B.1
Trichodon cylindricus cylindrical trichodon	NBMUS7N020	None	None	G4G5	S2	2B.2
Usnea longissima Methuselah's beard lichen	NLLEC5P420	None	None	G4	S4	4.2
Viola palustris alpine marsh violet	PDVIO041G0	None	None	G5	S1S2	2B.2

Record Count: 37

Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (Eureka (4012472) OR Tyee City (4012482) OR Arcata North (4012481) OR Arcata South (4012471) OR McWhinney Creek (4012461) OR Fields Landing (4012462) OR Cannibal Island (4012463))
 AND Taxonomic Group IS (Fish OR Amphibians OR Reptiles OR Birds OR Mammals OR Mollusks OR Arachnids OR Crustaceans OR Insects)

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Accipiter striatus sharp-shinned hawk	ABNKC12020	None	None	G5	S4	WL
Acipenser medirostris green sturgeon	AFCAA01030	Threatened	None	G3	S1S2	SSC
Anodonta californiensis California floater	IMBIV04020	None	None	G3Q	S2?	
Aplodontia rufa humboldtiana Humboldt mountain beaver	AMAFA01017	None	None	G5TNR	SNR	
Arborimus albipes white-footed vole	AMAFF23010	None	None	G3G4	S2	SSC
Arborimus pomo Sonoma tree vole	AMAFF23030	None	None	G3	S3	SSC
Ardea alba great egret	ABNGA04040	None	None	G5	S4	
Ardea herodias great blue heron	ABNGA04010	None	None	G5	S4	
Ascaphus truei Pacific tailed frog	AAABA01010	None	None	G4	S3S4	SSC
Bombus caliginosus obscure bumble bee	IIHYM24380	None	None	G4?	S1S2	
Bombus occidentalis western bumble bee	IIHYM24250	None	Candidate Endangered	G2G3	S1	
Brachyramphus marmoratus marbled murrelet	ABNNN06010	Threatened	Endangered	G3G4	S1	
Charadrius alexandrinus nivosus western snowy plover	ABNNB03031	Threatened	None	G3T3	S2S3	SSC
Charadrius montanus mountain plover	ABNNB03100	None	None	G3	S2S3	SSC
Cicindela hirticollis gravida sandy beach tiger beetle	IICOL02101	None	None	G5T2	S2	
Circus hudsonius northern harrier	ABNKC11011	None	None	G5	S3	SSC
Corynorhinus townsendii Townsend's big-eared bat	AMACC08010	None	None	G3G4	S2	SSC
Coturnicops noveboracensis yellow rail	ABNME01010	None	None	G4	S1S2	SSC

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Egretta thula snowy egret	ABNGA06030	None	None	G5	S4	
Elanus leucurus white-tailed kite	ABNKC06010	None	None	G5	S3S4	FP
Emys marmorata western pond turtle	ARAAD02030	None	None	G3G4	S3	SSC
Entosphenus tridentatus Pacific lamprey	AFBAA02100	None	None	G4	S4	SSC
Erethizon dorsatum North American porcupine	AMAFJ01010	None	None	G5	S3	
Eucyclogobius newberryi tidewater goby	AFCQN04010	Endangered	None	G3	S3	SSC
Haliaeetus leucocephalus bald eagle	ABNKC10010	Delisted	Endangered	G5	S3	FP
Lampetra richardsoni western brook lamprey	AFBAA02090	None	None	G4G5	S3S4	SSC
Margaritifera falcata western pearlshell	IMBIV27020	None	None	G4G5	S1S2	
Martes caurina humboldtensis Humboldt marten	AMAJF01012	None	Endangered	G5T1	S1	SSC
Myotis evotis long-eared myotis	AMACC01070	None	None	G5	S3	
Nycticorax nycticorax black-crowned night heron	ABNGA11010	None	None	G5	S4	
Oncorhynchus clarkii clarkii coast cutthroat trout	AFCHA0208A	None	None	G4T4	S3	SSC
Oncorhynchus kisutch pop. 2 coho salmon - southern Oregon / northern California ESU	AFCHA02032	Threatened	Threatened	G4T2Q	S2?	
Oncorhynchus mykiss irideus pop. 16 steelhead - northern California DPS	AFCHA0209Q	Threatened	None	G5T2T3Q	S2S3	
Pandion haliaetus osprey	ABNKC01010	None	None	G5	S4	WL
Pekania pennanti fisher - West Coast DPS	AMAJF01021	None	Threatened	G5T2T3Q	S2S3	SSC
Phalacrocorax auritus double-crested cormorant	ABNFD01020	None	None	G5	S4	WL
Rallus obsoletus obsoletus California Ridgway's rail	ABNME05011	Endangered	Endangered	G5T1	S1	FP
Rana aurora northern red-legged frog	AAABH01021	None	None	G4	S3	SSC
Rana boylii foothill yellow-legged frog	AAABH01050	None	Candidate Threatened	G3	S3	SSC

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Rhyacotriton variegatus southern torrent salamander	AAAAJ01020	None	None	G3G4	S2S3	SSC
Riparia riparia bank swallow	ABPAU08010	None	Threatened	G5	S2	
Spirinchus thaleichthys longfin smelt	AFCHB03010	Candidate	Threatened	G5	S1	
Thaleichthys pacificus eulachon	AFCHB04010	Threatened	None	G5	S3	

Record Count: 43

Scientific Name	Common Name	Family	Lifeform	CRPR	GRank	SRank	CESA	FESA	Blooming Period	Elevation Low (m)	Elevation Low (ft)	Elevation High (m)	Elevation High (ft)
Abronia umbellata var. breviflora	pink sand-verbena	Nyctaginaceae	perennial herb	1B.1	G4G5T2	S2	None	None	Jun-Oct	0	0	10	35
Angelica lucida	sea-watch	Apiaceae	perennial herb	4.2	G5	S3	None	None	May-Sep	0	0	150	490
Astragalus pycnostachyus var. pycnostachyus	coastal marsh milk-vetch	Fabaceae	perennial herb	1B.2	G2T2	S2	None	None	(Apr)Jun-Oct	0	0	30	100
Astragalus rattanii var. rattanii	Rattan's milk-vetch	Fabaceae	perennial herb	4.3	G4T4	S4	None	None	Apr-Jul	30	95	825	2705
Bryoria pseudocapillaris	false gray horsehair lichen	Parmeliaceae	fruticose lichen (epiphytic)	3.2	G3	S2	None	None		0	0	90	295
Bryoria spiralifera	twisted horsehair lichen	Parmeliaceae	fruticose lichen (epiphytic)	1B.1	G3	S1S2	None	None		0	0	30	100
Cardamine angulata	seaside bittercress	Brassicaceae	perennial herb	2B.2	G4G5	S3	None	None	(Jan)Mar-Jul	25	80	915	3000
Carex arcta	northern clustered sedge	Cyperaceae	perennial herb	2B.2	G5	S1	None	None	Jun-Sep	60	195	1400	4595
Carex leptalea	bristle-stalked sedge	Cyperaceae	perennial rhizomatous herb	2B.2	G5	S1	None	None	Mar-Jul	0	0	700	2295
Carex lyngbyei	Lyngbye's sedge	Cyperaceae	perennial rhizomatous herb	2B.2	G5	S3	None	None	Apr-Aug	0	0	10	35
Carex praticola	northern meadow sedge	Cyperaceae	perennial herb	2B.2	G5	S2	None	None	May-Jul	0	0	3200	10500
Castilleja ambigua var. humboldtiensis	Humboldt Bay owl's-clover	Orobanchaceae	annual herb (hemiparasitic)	1B.2	G4T2	S2	None	None	Apr-Aug	0	0	3	10
Castilleja litoralis	Oregon coast paintbrush	Orobanchaceae	perennial herb (hemiparasitic)	2B.2	G3	S3	None	None	Jun-Jul	15	45	100	330
Chloropyron maritimum ssp. palustre	Point Reyes bird's-beak	Orobanchaceae	annual herb (hemiparasitic)	1B.2	G4?T2	S2	None	None	Jun-Oct	0	0	10	35
Chrysosplenium glechomifolium	Pacific golden saxifrage	Saxifragaceae	perennial herb	4.3	G5?	S3	None	None	Feb-Jun(Jul)	10	30	640	2100
Collinsia corymbosa	round-headed Chinese-houses	Plantaginaceae	annual herb	1B.2	G1	S1	None	None	Apr-Jun	0	0	20	65
Erysimum menziesii	Menzies? wallflower	Brassicaceae	perennial herb	1B.1	G1	S1	CE	FE	Mar-Sep	0	0	35	115
Erythronium revolutum	coast fawn lily	Liliaceae	perennial bulbiferous herb	2B.2	G4G5	S3	None	None	Mar-Jul(Aug)	0	0	1600	5250
Fissidens pauperculus	minute pocket moss	Fissidentaceae	moss	1B.2	G3?	S2	None	None		10	30	1024	3360
Gilia capitata ssp. pacifica	Pacific gilia	Polemoniaceae	annual herb	1B.2	G5T3	S2	None	None	Apr-Aug	5	15	1665	5465
Gilia millefoliata	dark-eyed gilia	Polemoniaceae	annual herb	1B.2	G2	S2	None	None	Apr-Jul	2	5	30	100
Glehnia littoralis ssp. leiocarpa	American glehnia	Apiaceae	perennial herb	4.2	G5T5	S2S3	None	None	May-Aug	0	0	20	65
Hesperevax sparsiflora var. brevifolia	short-leaved evax	Asteraceae	annual herb	1B.2	G4T3	S2	None	None	Mar-Jun	0	0	215	705
Lasthenia californica ssp. macrantha	perennial goldfields	Asteraceae	perennial herb	1B.2	G3T2	S2	None	None	Jan-Nov	5	15	520	1705
Lathyrus japonicus	seaside pea	Fabaceae	perennial rhizomatous herb	2B.1	G5	S2	None	None	May-Aug	1	0	30	100
Lathyrus palustris	marsh pea	Fabaceae	perennial herb	2B.2	G5	S2	None	None	Mar-Aug	1	0	100	330
Layia carnosa	beach layia	Asteraceae	annual herb	1B.1	G2	S2	CE	FE	Mar-Jul	0	0	60	195
Lilium kelloggii	Kellogg's lily	Liliaceae	perennial bulbiferous herb	4.3	G3	S3	None	None	May-Aug	3	5	1300	4265
Lilium occidentale	western lily	Liliaceae	perennial bulbiferous herb	1B.1	G1	S1	CE	FE	Jun-Jul	2	5	185	605
Listera cordata	heart-leaved twayblade	Orchidaceae	perennial herb	4.2	G5	S4	None	None	Feb-Jul	5	15	1370	4495
Lycopodium clavatum	running-pine	Lycopodiaceae	perennial rhizomatous herb	4.1	G5	S3	None	None	Jun-Aug(Sep)	45	145	1225	4020
Mitellastra caulescens	leafy-stemmed mitrewort	Saxifragaceae	perennial rhizomatous herb	4.2	G5	S4	None	None	(Mar)Apr-Oct	5	15	1700	5575
Monotropa uniflora	ghost-pipe	Ericaceae	perennial herb (achlorophyllous)	2B.2	G5	S2	None	None	Jun-Aug(Sep)	10	30	550	1805
Montia howellii	Howell's montia	Montiaceae	annual herb	2B.2	G3G4	S2	None	None	(Jan-Feb)Mar-May	0	0	835	2740
Oenothera wolfii	Wolf's evening-primrose	Onagraceae	perennial herb	1B.1	G2	S1	None	None	May-Oct	3	5	800	2625
Pityopus californicus	California pinefoot	Ericaceae	perennial herb (achlorophyllous)	4.2	G4G5	S4	None	None	(Mar-Apr)May-Aug	15	45	2225	7300
Pleuropogon refractus	nodding semaphore grass	Poaceae	perennial rhizomatous herb	4.2	G4	S4	None	None	(Mar)Apr-Aug	0	0	1600	5250
Puccinellia pumila	dwarf alkali grass	Poaceae	perennial herb	2B.2	G4?	SH	None	None	Jul	1	0	10	35
Ribes laxiflorum	trailing black currant	Grossulariaceae	perennial deciduous shrub	4.3	G5?	S3	None	None	Mar-Jul(Aug)	5	15	1395	4575
Sidalcea malachroides	maple-leaved checkerbloom	Malvaceae	perennial herb	4.2	G3	S3	None	None	(Mar)Apr-Aug	0	0	730	2395
Sidalcea malviflora ssp. patula	Siskiyou checkerbloom	Malvaceae	perennial rhizomatous herb	1B.2	G5T2	S2	None	None	(Apr)May-Aug	15	45	880	2885
Sidalcea oregana ssp. eximia	coast checkerbloom	Malvaceae	perennial herb	1B.2	G5T1	S1	None	None	Jun-Aug	5	15	1340	4395
Silene scouleri ssp. scouleri	Scouler's catchfly	Caryophyllaceae	perennial herb	2B.2	G5T4T5	S2S3	None	None	(Mar-May)Jun-Aug(Sep)	0	0	600	1970
Spergularia canadensis var. occidentalis	western sand-spurrey	Caryophyllaceae	annual herb	2B.1	G5T4	S1	None	None	Jun-Aug	0	0	3	10
Trichodon cylindricus	cylindrical trichodon	Ditrichaceae	moss	2B.2	G4	S2	None	None		50	160	2002	6570
Usnea longissima	Methuselah's beard lichen	Parmeliaceae	fruticose lichen (epiphytic)	4.2	G4	S4	None	None		50	160	1460	4790
Viola palustris	alpine marsh violet	Violaceae	perennial rhizomatous herb	2B.2	G5	S1S2	None	None	Mar-Aug	0	0	150	490

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

Humboldt County, California



NOT FOR CONSULTATION

Local office

Arcata Fish And Wildlife Office

(707) 822-7201
(707) 822-8411

1655 Heindon Road
Arcata, CA 95521-4573

NOT FOR CONSULTATION

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] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

NOT FOR CONSULTATION

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.
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Fisher Pekania pennanti No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/3651	Proposed Threatened

Birds

NAME	STATUS
Marbled Murrelet Brachyramphus marmoratus There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/4467	Threatened
Northern Spotted Owl Strix occidentalis caurina There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/1123	Threatened
Western Snowy Plover Charadrius nivosus nivosus There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/8035	Threatened
Yellow-billed Cuckoo Coccyzus americanus There is **proposed** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/3911	Threatened

NOT FOR CONSULTATION

Fishes

NAME	STATUS
Tidewater Goby Eucyclogobius newberryi There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/57	Endangered

Flowering Plants

NAME	STATUS
Beach Layia Layia carnosa No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6728	Endangered
Menzies' Wallflower Erysimum menziesii No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/2935	Endangered
Western Lily Lilium occidentale No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/998	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

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Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider 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.

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 birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON

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YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)

Allen's Hummingbird Selasphorus sasin — Breeds Feb 1 to Jul 15

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9637

Bald Eagle Haliaeetus leucocephalus — Breeds Jan 1 to Sep 30

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.
https://ecos.fws.gov/ecp/species/1626

Black Oystercatcher Haematopus bachmani — Breeds Apr 15 to Oct 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9591

Black Turnstone Arenaria melanocephala — Breeds elsewhere

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Clark's Grebe Aechmophorus clarkii — Breeds Jan 1 to Dec 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

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Great Blue Heron Ardea herodias fannini — Breeds Mar 15 to Aug 15
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Lesser Yellowlegs Tringa flavipes — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9679

Long-billed Curlew Numenius americanus — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/5511

Marbled Godwit Limosa fedoa — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9481

Olive-sided Flycatcher Contopus cooperi — Breeds May 20 to Aug 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/3914

Red-throated Loon Gavia stellata — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Rufous Hummingbird selasphorus rufus — Breeds Apr 15 to Jul 15
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/8002

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Short-billed Dowitcher Limnodromus griseus — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9480

Western Screech-owl Megascops kennicottii kennicottii — Breeds Mar 1 to Jun 30
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Whimbrel Numenius phaeopus — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9483

Willet Tringa semipalmata — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

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. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps 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:

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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.

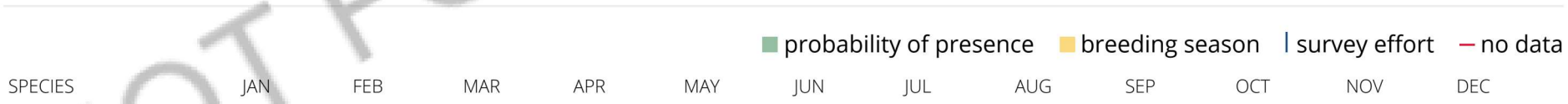
Breeding Season (▪)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. 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. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



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Allen's Hummingbird
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

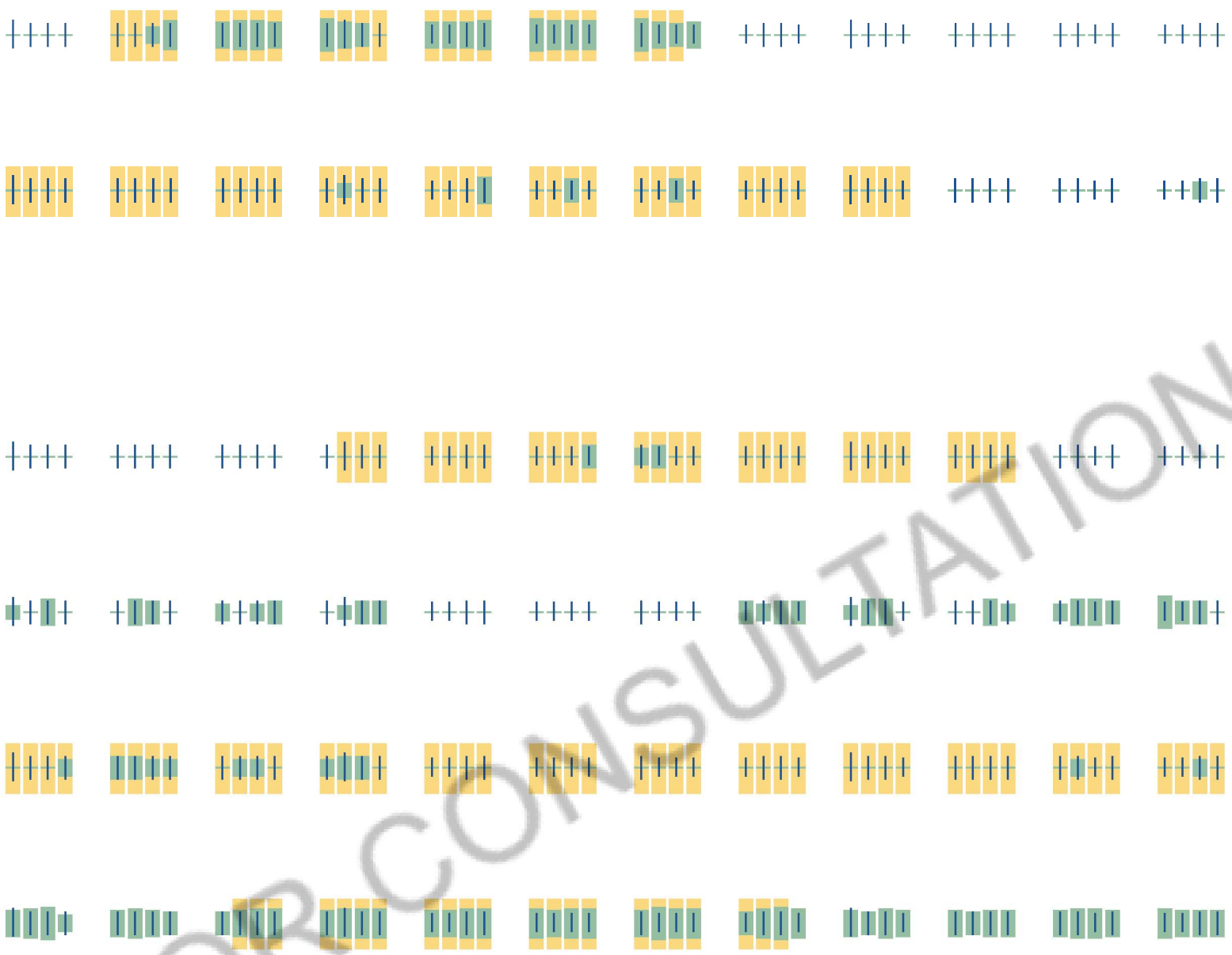
Bald Eagle
Non-BCC Vulnerable (This is not a Bird of Conservation Concern (BCC) in this area, but *warrants attention* because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.)

Black Oystercatcher
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

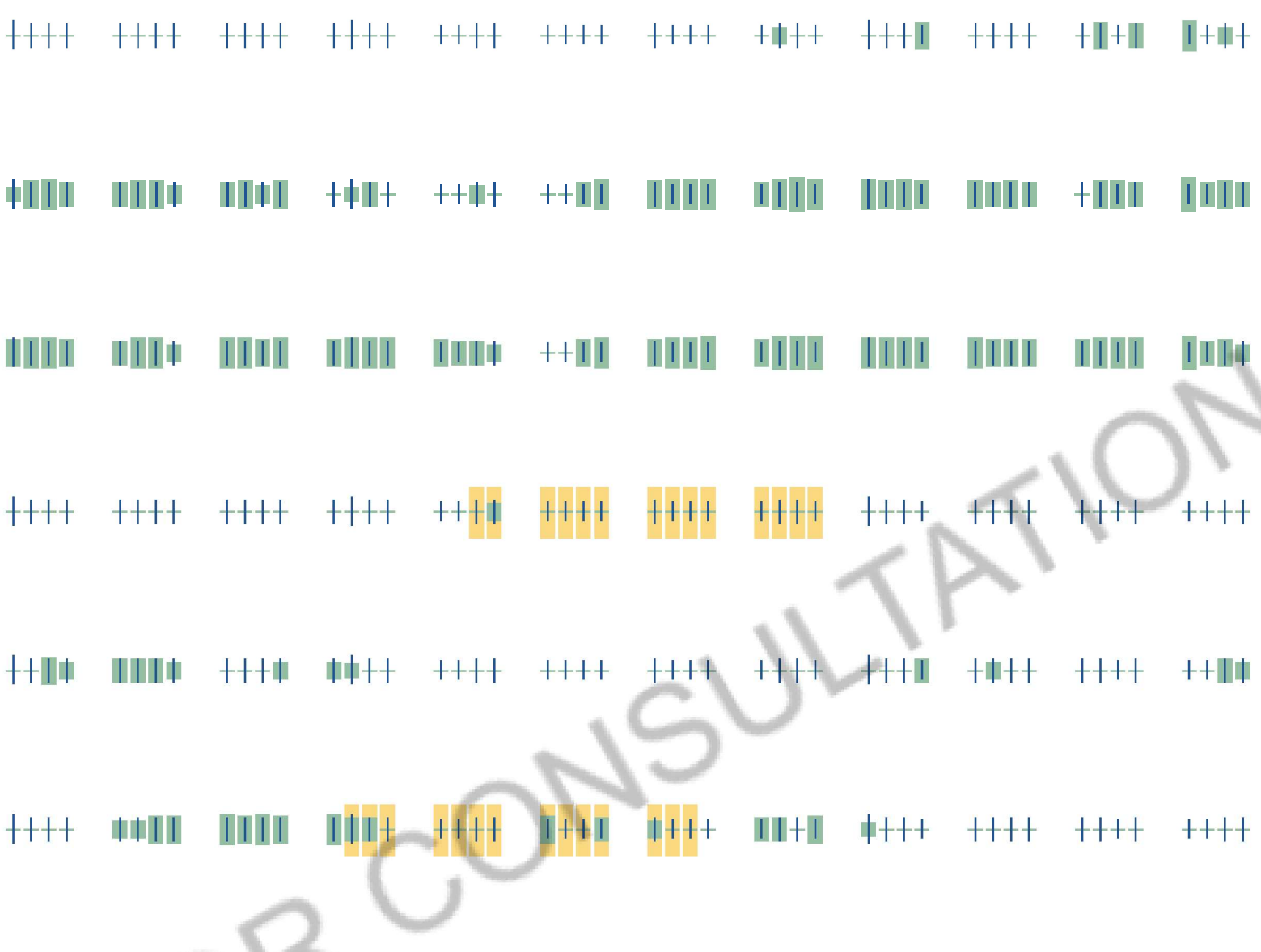
Black Turnstone
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Clark's Grebe
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Great Blue Heron
BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)



NOT FOR CONSULTATION

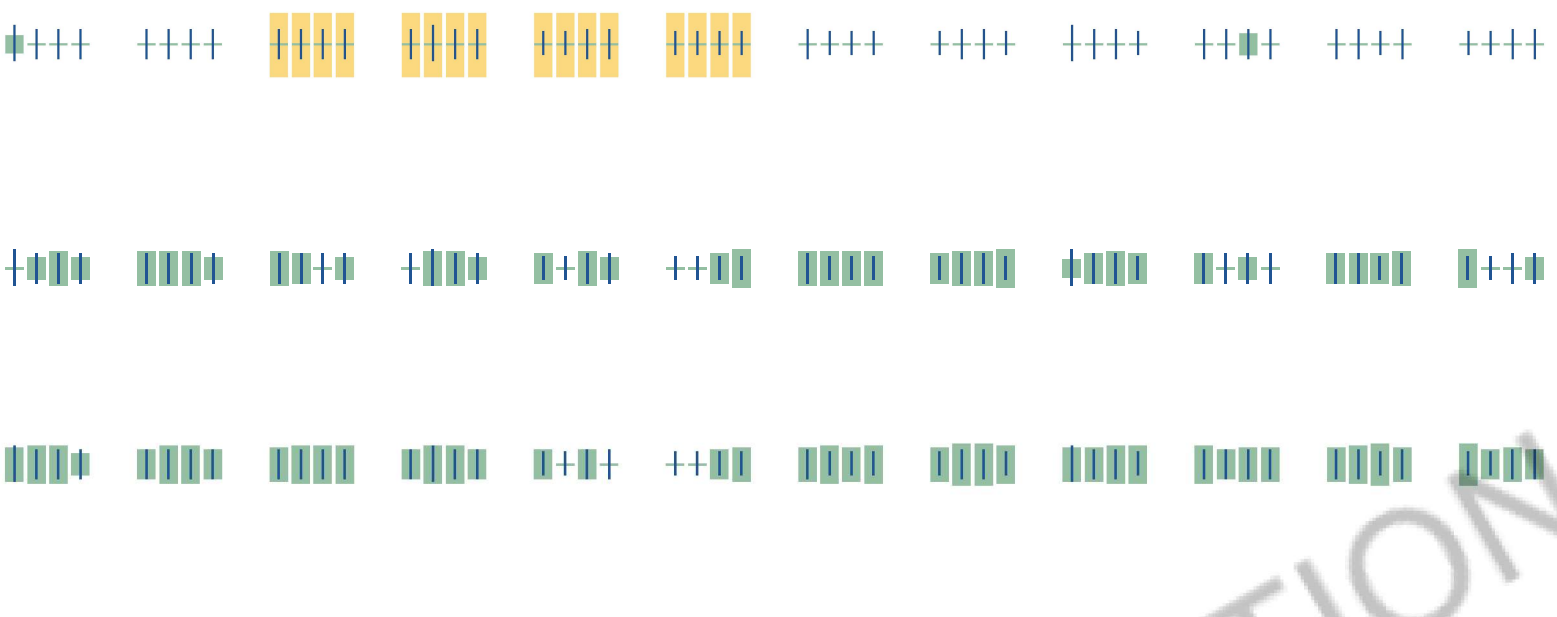


NOT FOR CONSULTATION

Western Screech-owl
BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)

Whimbrel
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Willet
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



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. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. 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) and other species that may warrant special attention in your project location.

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 and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

NOT FOR CONSULTATION

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. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

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 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 on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

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Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

NOT FOR CONSULTATION

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.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

FRESHWATER FORESTED/SHRUB WETLAND

Palustrine

RIVERINE

Riverine

A full description for each wetland code can be found at the National Wetlands Inventory website

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.

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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.

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Special-Status Plant Species

Species	Status[1] (Federal/ State/CRPR)	General Habitat Description and Blooming Period	Potential to Occur within Project Area
Bryophytes			
Minute pocket moss (*Fissidens pauperculus*)	NL/NL/1B.2	North Coast coniferous forest (damp coastal soil). Elevation: 30–3,360 feet.	**None**. No suitable habitat for this species within the project area.
Cylindrical trichodon (*Trichodon cylindricus*)	NL/NL/2B.2	Broadleafed upland forest, meadows and seeps, upper montane coniferous forest. Sandy, exposed soil, roadbanks. Elevation: 164-6,568 feet	**None**. No suitable habitat for this species within the project area.
Lichens			
False gray horsehair lichen (*Bryoria pseudocapillaris*)	NL/NL/3.2	Coastal dunes in San Luis Obispo County, North Coast coniferous forest (immediate coast). Usually on conifers. Elevation: 0–300 feet.	**None**. No suitable habitat for this species within the project area.
Twisted horsehair lichen (*Bryoria spiralifera*)	NL/NL/1B.1	North Coast coniferous forest (immediate coast). Usually on conifers. Elevation: 0–100 feet.	**None**. No suitable habitat for this species within the project area.

Species	Status[1] (Federal/ State/CRPR)	General Habitat Description and Blooming Period	Potential to Occur within Project Area
Methuselah's beard lichen (*Usnea longissima*)	NL/NL/4.2	Broadleaf upland forest, North Coast coniferous forest/on tree branches; usually on old growth hardwoods and conifers. Elevation: 160–4,790 feet.	**None**. No suitable habitat for this species within the project area.
Vascular Plants			
Pink sand verbena (*Abronia umbellata* var. *breviflora*)	NL/NL/1B.1	Costal dunes. Elevation: 0–40 feet. Bloom: Jun.–Oct.	**None**. No suitable habitat occurs in the project area.
Sea-watch (*Angelica lucida*)	NL/NL/4.2	Coastal scrub, coastal dunes, salt marshes and swamps. Elevation: 0 feet Bloom: May–Sep.	**None**. No suitable habitat occurs in the project area.
Coastal marsh milk-vetch (*Astragalus pycnostachyus* var. *pycnostachyus*)	NL/NL/1B.2	Coastal dunes (mesic), coastal scrub, coastal salt marshes and swamps and streamside's. Elevation 0-100 feet. Blooms: Apr-Oct	**None**. No suitable habitat occurs in the project area.
Rattan's milk-vetch (*Astragalus rattanii* var. *rattanii*)	NL/NL/4.3	Chaparral, cismontane woodland, lower montane coniferous forest/gravelly streambanks. Elevation: 100–2,710 feet. Bloom: Apr–Jul.	**Low**. Suitable habitat occurs in the project area; however, this species was not observed during the 2016 botanical surveys.

Species	Status[1] (Federal/ State/CRPR)	General Habitat Description and Blooming Period	Potential to Occur within Project Area
Seaside bittercress (*Cardamine angulata*)	NL/NL/2B.2	Lower montane coniferous forest, North Coast coniferous forest/Wet areas, streambanks. Elevation: 80–3,000 feet. Bloom: (Jan), Mar–Jul.	**Low**. Suitable habitat occurs in the project area; however, this species was not observed during the 2016 botanical surveys.
Northern clustered sedge (*Carex arcta*)	NL/NL/2B.2	Bogs and fens, North Coast coniferous forest (mesic). Elevation: 200–4,590 feet. Bloom: Jun–Sep.	**None**. No suitable habitat occurs in the project area.
Bristle-stalked sedge (*Carex leptalea*)	NL/NL/2B.2	Bogs and fens, meadows and seeps (mesic), marshes and swamps. Elevation: 0–2,300 feet. Bloom: Mar–Jul.	**None**. No suitable habitat occurs in the project area.
Lyngbye's sedge (*Carex lyngbyei*)	NL/NL/2B.2	Marshes and swamps (brackish or freshwater). Elevation: 0–30 feet. Bloom: Apr–Aug.	**None**. No suitable habitat occurs in the project area.
Northern meadow sedge (*Carex praticola*)	NL/NL/2B.2	Meadows and seeps (mesic). Elevation: 0–10,500 feet. Bloom: May–Jul.	**Low**. Marginal suitable habitat occurs in the project area and the species was not observed during the 2016 botanical surveys.
Humboldt Bay owl's-clover (*Castilleja ambigua* var. *humboldtiensis*)	NL/NL/1B.2	Marshes and swamps (coastal salt). Elevation: 0–10 feet. Bloom: Apr–Aug.	**None**. No suitable habitat occurs in the project area.
Oregon coast paintbrush (*Castilleja litoralis*)	NL/NL/2B.2	Sandy areas in coastal bluff scrub, coastal dunes, or coastal scrub. Elevation: 50–330 feet. Bloom: Jun.	**None**. No suitable habitat occurs in the project area.

Species	Status[1] (Federal/ State/CRPR)	General Habitat Description and Blooming Period	Potential to Occur within Project Area
Point Reyes bird's-beak (*Chloropyron maritimum* ssp. *palustre*)	NL/NL/1B.2	Marshes and swamps (coastal salt). Elevation: 0-30 feet. Bloom: Apr–Aug.	**None**. No suitable habitat occurs in the project area.
Pacific golden saxifrage (*Chrysosplenium glechomifolium*)	NL/NL/4.3	North Coast coniferous forest, riparian forest/streambanks, sometimes seeps, sometimes roadsides. Elevation: 30–720 feet. Bloom: Feb–Jun.	**Moderate**. Suitable habitat occurs in the project area; however, this species was not observed during the 2016 botanical surveys.
Round-headed Chinese-houses (*Collinsia corymbosa*)	NL/NL/1B.2	Coastal Dunes Elevation: 0-65 feet Bloom: Apr-June	**None**. No suitable habitat occurs in the project area.
Menzies' wallflower (*Erysimum menziesii*)	SE/FE/1B.1	Coastal dunes. Elevation: 0-100 feet. Bloom: Mar–Jul.	**None**. No suitable habitat occurs in the project area.
Coast fawn lily (*Erythronium revolutum*)	NL/NL/2B.2	Bogs and fens, broadleaf upland forest, North Coast coniferous forest/mesic, streambanks. Elevation: 0–5,250 feet. Bloom: Mar–Jul (Aug).	**Low**. Suitable habitat exists in the project area; however, the species was not observed during the 2016 botanical survey.
American glehnia (*Glehnia littoralis* ssp. *Leiocarpa*)	NL/NL/4.2	Coastal dunes. Elevation: 0-65 feet. Bloom: May-Aug	**None**. No suitable habitat occurs in the project area.
Pacific gilia (*Gilia capitata* ssp. *pacifica*)	NL/NL/1B.2	Coastal bluff scrub, chaparral (openings), coastal prairie, valley and foothill grassland. Elevation: 20–1,300 feet. Bloom: Apr–Aug.	**Low**. Suitable habitat occurs in the project area; however, the species was not observed during the 2016 botanical surveys.

Species	Status[1] (Federal/ State/CRPR)	General Habitat Description and Blooming Period	Potential to Occur within Project Area
Dark-eyed gilia (*Gilia millefoliata*)	NL/NL/1B.2	Coastal dunes. Elevation: 0–100 feet. Bloom: Apr–Jul.	**None**. No suitable habitat occurs in the project area.
Short-leaved evax (*Hesperevax sparsiflora* var. *brevifolia*)	NL/NL/1B.2	Coastal bluff scrub (sandy), coastal dunes, coastal prairie. Elevation: 0–710 feet. Bloom: Mar–Jun.	**None**. No suitable habitat occurs in the project area.
Perennial goldfields (*Lasthenia californica* ssp. *Macrantha*)	NL/NL/1B.2	Coastal bluff scrub, coastal dunes, coastal scrub. Elevation: 16-1,706 feet Bloom: Jan-Nov	**None**. No suitable habitat occurs in the project area.
Seaside pea (*Lathyrus japonicus*)	NL/NL/2B.1	Coastal dunes. Elevation: 1-100 feet Bloom: May-Aug	**None**. No suitable habitat occurs in the project area.
Marsh pea (*Lathyrus palustris*)	NL/NL/2B.2	Coastal prairie and scrub-marshes and swamps. Elevation: 0-300 feet. Bloom: Mar-Aug.	**None**. No suitable habitat occurs in the project area.
Beach layia (*Layia carnosa*)	FE/SE/1B.1	Coastal dunes or sandy coastal scrub. Elevation: 0–200 feet. Bloom: Mar–Jul.	**None**. No suitable habitat occurs in the project area.
Kellogg's lily (*Lilium kelloggii*)	NL/NL/4.3	Lower montane coniferous forest, North Coast coniferous forest/openings, roadsides. Elevation: 10–4,260 feet. Bloom: May–Aug.	**Low**. Suitable habitat occurs in the project area; however, the species was not observed during the 2016 botanical surveys.

Species	Status[1] (Federal/ State/CRPR)	General Habitat Description and Blooming Period	Potential to Occur within Project Area
Western lily (*Lilium occidentale*)	FE/SE/1B.1	Bogs and fens, coastal bluff scrub, coastal prairie, coastal scrub, marshes and swamps (freshwater), North Coast coniferous forest dominated by Sitka spruce or shore pine. Elevation: 10–610 feet. Bloom: Jun–Jul.	**None**. No suitable habitat occurs in the project area.
Heart-leaved twayblade (*Listera cordata*)	NL/NL/4.2	Bogs and fens, lower montane coniferous forest, North Coast coniferous forest. Elevation: 20–4,490 feet. Bloom: Feb–Jul.	**Moderate**. Suitable habitat exists in the project area; however, the species was not observed during the 2016 botanical survey.
Running-pine (*Lycopodium clavatum*)	NL/NL/4.1	Lower montane coniferous forest (mesic), marshes and swamps, North Coast coniferous forest (mesic)/often edges, openings, and roadsides. Elevation: 150–4,020 feet. Bloom: Jun–Aug (Sep).	**Moderate**. Suitable habitat exists in the project area; however, the species was not observed during the 2016 botanical survey.
Leafy-stemmed mitrewort (*Mitellastra caulescens*)	NL/NL/4.2	Broadleaf upland forest, lower montane coniferous forest, meadows and seeps, North Coast coniferous forest/mesic, sometimes roadsides. Elevation: 20–5,580 feet. Bloom: (Mar), Apr–Oct.	**Moderate**. Suitable habitat exists in the project area; however, the species was not observed during the 2016 botanical survey.
Ghost-pipe (*Monotropa uniflora*)	NL/NL/2B.2	Broadleaf upland forest, North Coast coniferous forest. Elevation: 30–1,800 feet. Bloom: Jun–Aug (Sep).	**Moderate**. Suitable habitat exists in the project area; however, the species was not observed during the 2016 botanical survey.

Species	Status[1] (Federal/ State/CRPR)	General Habitat Description and Blooming Period	Potential to Occur within Project Area
Howell's montia (*Montia howellii*)	NL/NL/2B.2	Meadows and seeps, North Coast coniferous forest, vernal pools/vernally mesic, sometimes roadsides. Elevation: 0–2,740 feet. Bloom: (Feb), Mar–May.	**Moderate**. Suitable habitat exists in the project area; however, the species was not observed during the 2016 botanical survey.
Wolf's evening-primrose (*Oenothera wolfii*)	NL/NL/1B.1	Coastal bluff scrub, coastal dunes, coastal prairie, lower montane coniferous forest/sandy, usually mesic. Elevation: 10–2,620 feet. Bloom: May–Oct.	**None**. No suitable habitat occurs in the project area.
California pinefoot (*Pityopus californicus*)	NL/NL/4.2	Broadleaf upland forest, lower montane coniferous forest, North Coast coniferous forest, upper montane coniferous forest/mesic. Elevation: 50–7,300 feet. Bloom: (Mar), (Apr), May–Aug.	**Low**. Suitable habitat exists in the project area; however, the species was not observed during the 2016 botanical survey.
Nodding semaphore grass (*Pleuropogon refractus*)	NL/NL/4.2	Lower montane coniferous forest, meadows and seeps, North Coast coniferous forest, riparian forest/Mesic. Elevation: 0–5,250 feet. Bloom: (Mar), Apr–Aug.	**None**. No suitable habitat occurs in the project area.
Dwarf alkali grass (*Puccinellia pumila*)	NL/NL/2B.2	Marshes and swamps (coastal salt). Elevation: 0–30 feet. Bloom: Jul.	**None**. No suitable habitat occurs in the project area.
Trailing black currant (*Ribes laxiflorum*)	NL/NL/4.3	North Coast coniferous forest/sometimes roadside. Elevation: 20–4,580 feet. Bloom: Mar–Jul (Aug).	**High**. Suitable habitat exists in the project area; however, the species was not observed during the 2016 botanical survey.

Species	Status[1] (Federal/ State/CRPR)	General Habitat Description and Blooming Period	Potential to Occur within Project Area
Maple-leaved checkerbloom (*Sidalcea malachroides*)	NL/NL/4.2	Broadleaf upland forest, coastal prairie, coastal scrub, North Coast coniferous forest, riparian woodland/often in disturbed areas. Elevation: 0–2,390 feet. Bloom: (Mar), Apr–Aug.	**Moderate**. Suitable habitat exists in the project area; however, the species was not observed during the 2016 botanical survey.
Siskiyou checkerbloom (*Sidalcea malviflora* ssp. *patula*)	NL/NL/1B.2	Coastal bluff scrub, coastal prairie, North Coast coniferous forest/often roadcuts. Elevation: 50–2,890 feet. Bloom: May–Aug.	**Low**. Suitable habitat exists in the project area; however, the species was not observed during the 2016 botanical survey.
Coast checkerbloom (*Sidalcea oregana* ssp. *eximia*)	NL/NL/1B.2	Lower montane coniferous forest, meadows and seeps, North Coast coniferous forest. Elevation: 20–4,400 feet. Bloom: Jun–Aug.	**Low**. Suitable habitat exists in the project area; however, the species was not observed during the 2016 botanical survey.
Scouler's catchfly (*Silene scouleri* ssp. *scouleri*)	NL/NL/2B.2	Coastal bluff scrub, coastal prairie, valley and foothill grassland. Elevation: 0 feet. Bloom: (Mar–May) Jun–Aug (Sep).	**None**. No suitable habitat occurs in the project area.
Western sand-spurrey (*Spergularia canadensis* var. *occidentalis*)	NL/NL/2B.1	Marshes and swamps (coastal salt). Elevation: 0–10 feet. Bloom: Jun–Aug.	**None**. No suitable habitat occurs in the project area.
Alpine marsh violet (*Viola palustris*)	NL/NL/2B.2	Coastal bogs and fens, coastal scrub (mesic). Elevation: 0-492 feet Bloom: Mar-Aug	**None**. No suitable habitat occurs in the project area.

Species	Status[1] (Federal/ State/CRPR)	General Habitat Description and Blooming Period	Potential to Occur within Project Area

[1]Federal Status Codes:
FE = Federally Endangered Species; NL = Not Listed
State Status Codes:
SE = State Endangered Species; SR = State Rare Species; NL = Not Listed
California Rare Plant Rank Codes and Threat Ranks:
1B Plants rare, threatened, or endangered in California and elsewhere.
2B Plants rare, threatened, or endangered in California, but more common elsewhere.
3 Plants about which more information is needed—a review list.
4 Plants of limited distribution—a watch list.
0.1 Seriously endangered in California
0.2 Fairly endangered in California
0.3 Not very endangered in California

Special-Status Animal Species

Common Name (Scientific Name)	Status[1] (Fed/State)	General Habitat Description	Potential To Occur
Reptiles and Amphibians			
Western pond turtle (*Emys marmorata*)	—/SSC	Found in lakes, rivers, streams, and irrigation ditches. Requires basking habitat such as exposed banks, logs, rocks, or floating vegetation. Eggs are layed and buried in uplands with friable soils and good sun exposure.	**None**. The project does not contain suitable habitat for this species.
Pacific tailed frog (*Ascaphus truei*)	—/SSC	Inhabit cold, clear, perennial streams with rocky substrates. Adults can be found in adjacent uplands during wet weather.	**None**. The project does not contain suitable habitat for this species.

Common Name (Scientific Name)	Status[1] (Fed/State)	General Habitat Description	Potential To Occur
Northern red-legged frog (*Rana aurora*)	—/SSC	Found in humid forests, woodlands, grasslands, and stream sides in northwestern California, usually near dense riparian cover. Breeds in perennial aquatic habitats including lakes, ponds, reservoirs and streams.	**High**. Two drainages within the project area provide suitable habitat for this species.
Foothill yellow-legged frog (*Rana boylii*)	—/FT, SSC	Inhabits streams with rocky substrates in coniferous forests, woodlands, and chaparral. Seldomly found far from water.	**None**. The project does not contain suitable habitat for this species.
Southern torrent salamander (*Rhyacotriton variegatus*)	—/SSC	Inhabits shallow, cold, clear, well-shaded streams and seeps often associated with rock or talus and mature to old growth forests. Occasionally found in riparian vegetation.	**Moderate**. Marginal habitat occurs nearby, outside of the project area.
Fish			
Green sturgeon, northern DPS (*Acipenser medirostris*)	FSC/—	This DPS includes coastal spawning populations from the Eel River north to Klamath River. Prefer deep, low gradient reaches or off-channel coves.	**None**. There is no suitable habitat within the study area.
Pacific lamprey (*Entosphenus tridentatus*)	—/SSC	Usually anadromous, begin life cycle as ammocoete in freshwater streams. Larval lamprey often stay in freshwater for 5-7 years then move downstream to saltwater environments where they usually stay for 2-3 years before returning to freshwater to spawn.	**None**. There is no suitable habitat within the study area.
Tidewater goby (*Eucyclogobius newberryi*)	FE/SSC	Shallow lagoons and lower stream reaches where the water is brackish to fresh and slow-moving or fairly still but not stagnant.	**None**. There is no suitable habitat within the study area.
Western brook lamprey (Lampreta richardsoni)	—/SSC	Found in cold, clear water with little disturbance and clean, clear gravel near bank cover. Also needs areas with low flow velocities and fine sediments.	**None**. There is no suitable habitat within the study area.

Common Name (Scientific Name)	Status[1] (Fed/State)	General Habitat Description	Potential To Occur
Coast cutthroat trout (*Oncorhynchus clarkii clarkii*)	—/SSC	Require cool, clean water with cover such as rocks or fallen logs, and deep pools for holding. Spawn in small streams with gravel substrates.	**None**. There is no suitable habitat within the study area.
Southern Oregon/northern California coho salmon ESU (*Oncorhynchus kisutch*)	FT/ST	Spawns in streams and rivers with cool water temperatures. Redds are constructed in riffle habitats with gravel and cobble substrates.	**None**. There is no suitable habitat within the study area.
Birds			
Sharp-shinned hawk (*Accipter striatus*)	NL/NL	Cismontane woodland, lower montane coniferous forest, riparian forest, riparian woodland.	**High.** Suitable habitat occurs within the project area.
Great egret (*Ardea alba*)	NL/NL	Brackish marsh, estuary, freshwater marsh, marsh and swamp, riparian forest, wetlands.	**Moderate.** No suitable nesting or foraging habitat in the study area but fly over is possible.
Great blue heron (*Ardea Herodias*)	NL/NL	Brackish marsh, estuary, freshwater marsh, marsh and swamp, riparian forest, wetland.	**Moderate.** No suitable nesting or foraging habitat in the study area, however, fly over is possible.
Marbled murrelet (*Brachyramphus marmoratus*)	FT/SE	Nests in coastal old growth coniferous forests or coastal forests with old growth characteristics. Requires trees with nest platforms.	**Moderate.** – There is no nesting habitat within the project area and any occurrence of this species onsite would be during flight to and from its nest located within appropriate old-growth forest inland.

Common Name (Scientific Name)	Status[1] (Fed/State)	General Habitat Description	Potential To Occur
Western snowy plover (*Charadrius alexandrinus nivosus*)	FT/SSC	Nests above the high tide line on coastal beaches and sandspits. Also nests on sparsely-vegetated dunes, beaches at creek and river mouths, dredge material sites, and river bars.	**None**. There is no suitable habitat within the project area for this species.
Snowy egret (*Egretta thula*)	NL/NL	Marsh and swamp, meadows and seeps, riparian forest, riparian woodland and wetlands.	**Moderate.** No suitable nesting or foraging habitat, fly over is possible.
Mountain plover (*Charadrius montanus*)	—/SSC	Rare to uncommon winter visitor along the northern coastal area of California. Uses open grasslands, plowed fields with little vegetation, and open sagebrush habitats.	**None**. There is no suitable habitat within the project area for this species.
Northern harrier (*Circus cyaneus*)	—/SSC	Nests on ground in shrubby or herbaceous vegetation often associated with emergent wetland, grasslands, or along rivers or lakes. Forage over open habitats including marshes, meadows, and grasslands.	**None**. There is no suitable habitat within the project area for this species.
Western yellow-billed cuckoo (*Coccyzus americanus occidentalis*)	FT/SE	Nests in extensive riparian forest. Nearest known population occurs in riparian forest at the mouth of the Eel River, Humboldt County.	**None**. There is no suitable habitat within the project area for this species.
Yellow rail (*Coturnicops noveboracensis*)	—/SSC	Found in wet meadows and coastal tide marshes. Nests in sedge marshes/meadows with moist soil.	**None**. There is no suitable habitat within the study area.
White-tailed kit (Elanus leucurus)	/FP	Found near undisturbed open grasslands, meadows, farmlands, and emergent wetlands.	**None**. There is no suitable habitat within the project area for this species.

Common Name (Scientific Name)	Status[1] (Fed/State)	General Habitat Description	Potential To Occur
Bald eagle (*Haliaeetus leucocephalus*)	FD/SE, FP	Requires large bodies of water, or free flowing rivers with abundant fish and adjacent snags and large trees for perching and nesting.	**Moderate**. The project area does not provide suitable habitat and this species would only be seen in the project area during flyover to and from different feeding locations.
Black-crowned night heron (*Nycticorax nycticorax*)	NL/NL	Marshes and swamps, riparian forest, riparian woodland, wetlands.	**Low.** No suitable nesting or foraging habitat, fly over is possible.
Osprey (Pandion haliaetus)	—/WL	Associated with large fish-bearing waters mainly in ponderosa-pine and mixed conifer habitats.	**Moderate**. The project area does not provide suitable nesting habitat and this species would only be seen in the project area during flyover to and from different feeding locations.
Double-crested cormorant (*Phalacrocorax aurtis*)	NL/NL	Riparian forest, riparian scrub, riparian woodland.	**Low.** No suitable nesting or foraging habitat, fly over is possible.
Purple martin (*Progne subis*)	—/SSC	Nests in cavities in snags or live trees in open forest and woodland areas. Also known to nest on man-made structures such as bridges and radio communications towers. Forages in riparian areas, forests, and woodlands.	**None**. There is no suitable nesting habitat within the study area.

Common Name (Scientific Name)	Status[1] (Fed/State)	General Habitat Description	Potential To Occur
California's ridgeway rail (*rallus obsoletus obsoletus*)	FE/SE,FP	Found in saltmarsh swamps often dominated by cordgrass and pickleweed.	**None**. There is no suitable habitat within the study area.
Bank swallow (*Riparia riparia*)	—/ST	Found in riparian habitats with vertical banks, bluff, and cliffs with fine-textured or sandy soils. Nests in holes in banks or cliffs adjacent to streams or rivers.	**None**. There is no suitable nesting habitat within the study area.
Yellow warbler (*Setophaga petechia*)	—/SSC	Primarily nests in riparian vegetation in close proximity to water along streams and in wet meadows. Also, nests in xeric montane shrub fields and occasionally in shrubby understory of mixed conifer forest.	**Low**. There is suitable nesting habitat within the study area.
Northern spotted owl (*Strix occidentalis caurina*)	FT/ST, SSC	In northern California, resides in stands of old growth or mature coniferous forest with multi-layered canopy and complex forest understory.	**High.** Habitat for this species is not present within the project area, and no spotted owls have been observed within a half-mile of the project area (CNDDB 2020a). The dense third-growth redwood forest does not have the conditions necessary to support its species, with a dense single canopy preventing hunting by this species.
Mammals			

Common Name (Scientific Name)	Status[1] (Fed/State)	General Habitat Description	Potential To Occur
White-footed vole (*Arborimus albipes*)	—/SSC	Found in areas with deciduous vegetation, generally near water. In redwood forests, this vole has been found along small streams with alders.	**Low**. There is marginal suitable habitat within the project area.
Sonoma tree vole (*Arborimus pomo*)	—/SSC	Nests consisting of Douglas-fir needles are constructed in trees, preferably tall trees. Nests may be situated on whorl of limbs against tree trunk, on outer limits of branches, or in broken tops of trees. Prefers forest stands with a high Douglas-fir component.	**None**. There is no suitable habitat within the study area.
Townsend's big-eared bat (*Corynorhinus townsendii*)	—/SSC	Maternity roost sites include caves, tunnels, mines, and buildings. Hibernate in groups from October to April. Individuals may use bridges, flumes, and trees with big hollows for day or night roosting during their active period.	**Low**. There is no suitable roosting habitat within the project area. Flyover is possible.
Humboldt marten (*Martes caurina humboldtensis*)	—/SE, SSC	Historically occurred throughout Humboldt County. Current geographic range includes Del Norte County and northern Humboldt County. Associated with closed-canopy, late-successional, mesic coniferous forest (redwood, Douglas-fir, and/or tanoak) with complex physical structure near the ground.	**None**. There is no suitable habitat within the study area.
Fisher – West Coast DPS (*Pekania pennanti*)	—/ST, SSC	Dens and forages in intermediate to large stands of old-growth conifer/mixed hardwood conifer forests or mixed stands of old-growth and mature trees with greater than 50% canopy closure. May use riparian corridors for movement.	**None**. There is no suitable habitat within the study area.

Common Name (Scientific Name)	Status[1] (Fed/State)	General Habitat Description	Potential To Occur

[1] Federal Status Codes: Federal Endangered (FE); Federal Threatened (FT); Federal Proposed Threatened (FPT); Federal Candidate (FC); Federal Delisted (FD); National Marine Fisheries Service Special Concern (FSC)

State Status Codes: State Endangered (SE); State Threatened (ST); State Candidate Endangered (SCE); State Candidate Threatened (SCT); State Fully Protected (FP); State Species of Special Concern (SSC)

APPENDIX D1

Cultural Resources Investigation
(CONFIDENTIAL)

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APPENDIX D2

Cultural Resources Investigation Addendum – Water Storage Tank (CONFIDENTIAL)

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APPENDIX E

Geologic and Geotechnical Investigation

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R-1 Geologic and Geotechnical Investigation

Proposed Subdivision, McKay Tract, Cutten, California

Prepared for:

Kramer Investment Corporation

SHN Engineers & Geologists

812 W. Wabash Ave.
Eureka, CA 95501-2138
707-441-8855

October 2017
016148

CONSULTING ENGINEERS & GEOLOGISTS, INC.
812 W. Wabash • Eureka, CA 95501-2138 • 707-441-8855 • FAX: 707-441-8877 •shninfo@shn-engr.com

Reference: 016148

October 17, 2017

Mr. Chris Mikkelsen
Kramer Investment Corporation
1589 Myrtle Ave, Suite B
Eureka, CA 95501

Subject: R-1 Geologic and Geotechnical Investigation, Proposed Subdivision, McKay Tract, Cutten, California

Dear Mr. Mikkelsen:

The enclosed report presents the results of our investigations for your proposed project. In the report, we discuss geologic and geotechnical site characteristics and risks, and provide specific recommendations for site preparation, and design and construction of "code" foundation and floor slab systems within designated areas. For other areas, conclusions regarding development feasibility are provided, with associated recommendations for additional investigations to formulate appropriate site and structure specific recommendations.

This report concludes our work on the project in accordance with our current agreement. If you have any questions, please call us at 707-441-8855.

Respectfully,

SHN Engineers & Geologists

Gary D. Simpson, CEG 2107
Senior Engineering Geologist

Lianna M. Winkler-Prins, PE 87650
Staff Engineer

AWC:LMW:dla

Enclosure: Geotechnical Report

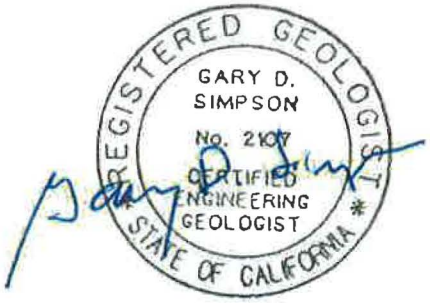
Reference: 016148

R-1 Geologic and Geotechnical Investigation

Proposed Subdivision, McKay Tract
Cutten, California

Prepared for:

Kramer
Investment Corporation
1589 Myrtle Avenue, Suite B
Eureka, CA 95501



Gary D. Simpson, PG, CEG



Lianna Winkler Prins, PE

Prepared by:

Engineers & Geologists
812 W. Wabash Ave.
Eureka, CA 95501-2138
707-441-8855

October 2017

QA/QC: GDS

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Abbreviations and Acronyms

cy	cubic yard
km	kilometer
mm/yr	millimeter per year
pcf	pounds per cubic foot
psf	pounds per square foot
ASTM	ASTM-International
Caltrans	California Department of Transportation
CBC	California Building Code
CDMG	California Division of Mines and Geology
CSZ	Cascadia Subduction Zone
GIS	Geographic Information System
H	height
H:V	horizontal to vertical
LID	low impact development
MSE	mechanically stabilized earth
NR	no reference
PVC	polyvinyl-chloride
SDR	standard dimension ratio
SHN	SHN Engineers & Geologists
TP-	Test pit-number
USGS	United States Geological Survey

1.0 Introduction

1.1 Project Location and Description of Development Plans

This report presents the results of our geologic and geotechnical evaluation of the site for a proposed 154 lot major subdivision in the Cutten area of Eureka (146 single family lots, 6 multi-family lots, and 2 commercial lots), to be developed in nine phases. The site occupies about 80 acres along the eastern margin of Cutten, bordering the Redwood Fields baseball complex (Figure 1). The project area was previously timberland, and has been logged extensively in the past. The property is currently undeveloped. It was formerly part of the McKay tract owned by Louisiana-Pacific (later Simpson Timber, then Green Diamond Resource Company). The majority of the proposed development area occupies forested upland surfaces above Ryan Creek and several un-named tributaries. The plans include variously-sized parcels for both single-family and multi-unit development, with associated roads and utilities (Figure 2).

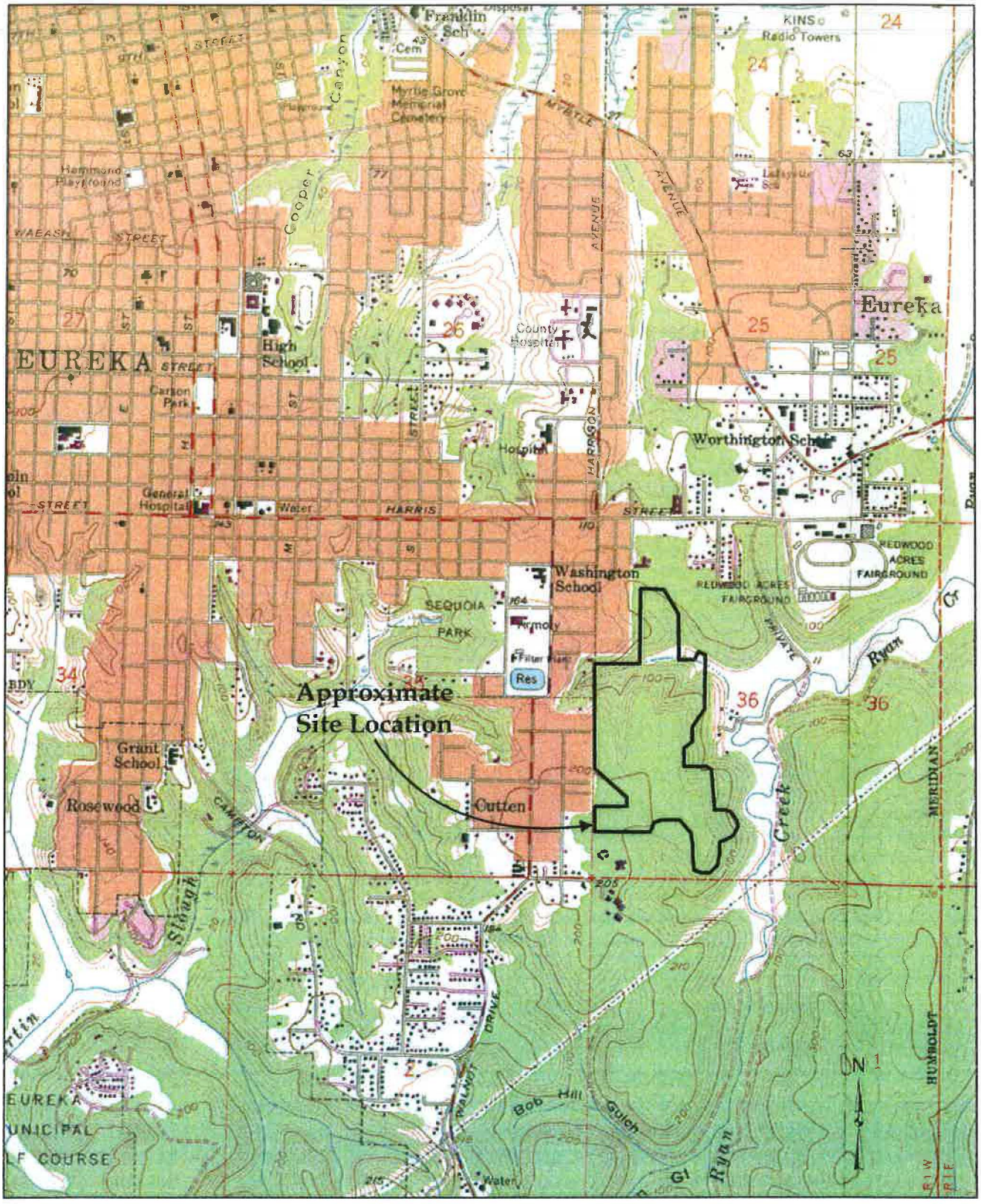
We have been provided with a set of five drawings by Ontiveros and Associates, titled "McKay Ranch Subdivision, Tentative Map for a Planned Development." The drawings consist of Sheet C1.0 – Phasing Plan and Road Sections, Sheet C1.1 – Proposed Land Use Designations, Sheet C2.0 - Site Plan, Sheet C3.0 - Preliminary Grading and Drainage Plan, and Sheet C4.0 – Preliminary Utility Plan. The drawings are plot-dated October 10, 2017. The project layout shown on these drawings is the basis of our Site Plan (Figure 2). The subject site is located in the northwest corner of Section 36, Township 5 North, Range 1 West, of the Eureka 7.5′ quadrangle.

1.2 Purpose and Scope of Work

SHN Engineers & Geologists (SHN) was retained to conduct a geologic and geotechnical evaluation of the proposed subdivision site. The site is shown on the Humboldt County Geographic Information System (GIS; Humboldt County, 2017) as containing areas of both low and moderate instability (stability zones E1 and E2). The Humboldt County Code requires an R-2 level report for areas of low instability and an R-1 level report for areas of moderate instability. Because the planning maps are regional in scale and the proposed development area contains some areas of moderate instability, and because it is a major subdivision, we have conducted an R-1 level evaluation for the portion of the site to be developed.

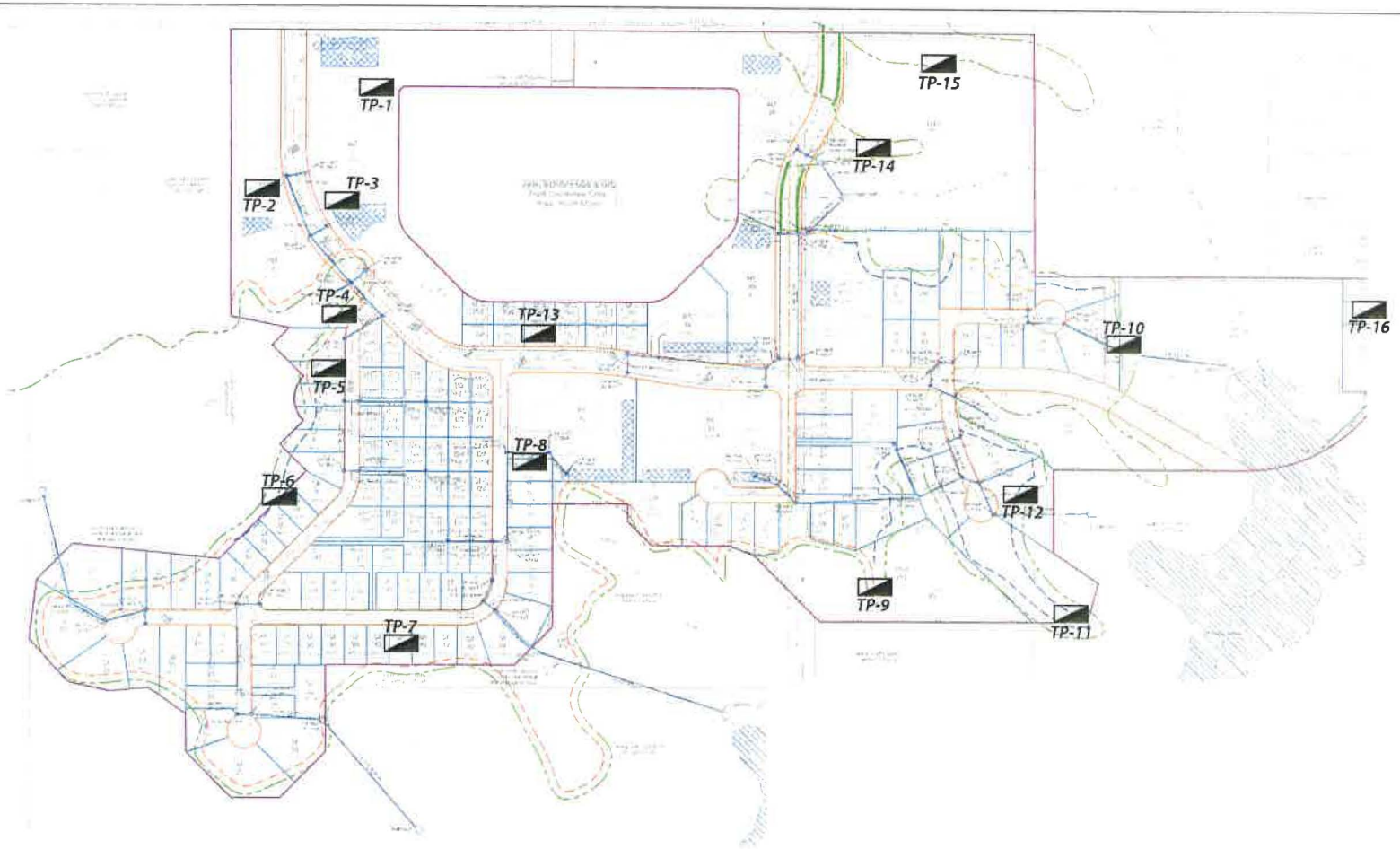
The principal geologic and geotechnical hazards at the site are associated with slope failures along the margins of upland areas and the potential for uncontrolled fill (for example, stumps and slash) from previous logging; as such, our investigation has focused on these issues. We have evaluated the seismic considerations of the site, including the potential for surface fault rupture and secondary seismic effects. In addition, we evaluated the suitability of site soils to support conventional one- and two-story multi-family and residential foundations, and related improvements. We understand that water and sewer drawings will be provided by the Humboldt County Services District.

SHN previously investigated the site for a proposed residential development, and the results of those investigations have been incorporated into this report for the currently proposed project.



Eureka, Arcata South USGS 7.5 minute quadrangles

Consulting Engineers & Geologists, Inc.	Kramer Properties, Inc. McKay Ranch Subdivision Cutten, California		Vicinity Map SHN 016148
	October 2017	vicinitymap_2017.mxd	Figure 1



EXPLANATION

TP-1 *TEST PIT LOCATION*

BASEMAP FROM ONTIVEROS & ASSOCIATES, "MCKAY RANCH SUBDIVISION, TENTATIVE MAP FOR A PLANNED DEVELOPMENT, PRELIMINARY GRADING & DRAINAGE PLAN", SHEET C3.0, DATED 10/10/17.

Consulting Engineers & Geologists, Inc.

Kramer Properties, Inc. McKay Ranch Subdivision Cutten, California		Site Plan Showing Test Pit Locations SHN 016148
October 2017	Figure2_SitePlanMap	Figure 2

The scope of our investigations at the site include review of pertinent geologic maps and literature, stereoscopic review of aerial photographs, field reconnaissance and geologic/geomorphic mapping of the subject property and vicinity, and excavation of exploratory test pits and borings. Fourteen test pits have been excavated throughout the site to evaluate subsurface soil conditions (see Figure 2). We also excavated two additional hand-auger test borings to evaluate site conditions (designated as TP-15 and TP-16). At the time of our investigations, limited survey monuments were in place along property corners and three proposed cul-de-sac locations were staked, while individual lots were not staked. Our ability to identify proposed lot locations, therefore, was limited to tape and compass accuracy, and should be considered approximate.

2.0 Geologic Setting

2.1 Regional Geology

Basement rock beneath Humboldt Bay is the Paleocene-Eocene Yager terrane, a part of the Coastal belt of the Franciscan Complex (Blake et al., 1985; Clarke, 1992). The Franciscan Complex is a regional bedrock unit that consists of a series of "terranes," which are discrete blocks of highly deformed oceanic crust that have been welded to the western margin of the North American plate over the past 140 million years. Yager terrane bedrock is in excess of 1,000 feet below the ground surface in the vicinity of Humboldt Bay, and is not exposed in the vicinity of the project site.

Basement rock in the Humboldt Bay region is unconformably overlain by a late Miocene to middle Pleistocene age sequence of marine and terrestrial deposits referred to as the Wildcat Group (Ogle, 1953). The marine portion of the Wildcat Group includes some 6,000 to 8,000 feet of mudstone and lesser amounts of sandstone that were deposited in a deep coastal basin (for example, the Eel River basin). Gradationally overlying the marine portion of the Wildcat Group are 2,500 to 3,250 feet of nonmarine sandstone and conglomerate, which represent the uppermost part of the Wildcat depositional sequence. The Wildcat Group is truncated at its top by an unconformity of middle Pleistocene age, and is overlain by coastal plain and fluvial deposits of middle to late Pleistocene age. In the Eureka area, these middle and late Pleistocene age deposits are referred to as the Hookton Formation (Ogle, 1953). Hookton Formation sediments are described as gravel, sand, silt, and clay which have a characteristically yellow-orange color (Ogle, 1953).

Along the coast of northern California between Cape Mendocino on the south and Big Lagoon, about 60 miles (100 kilometers [km]) to the north, a sequence of uplifted late Pleistocene age marine terraces is preserved. The terraces are preserved as erosional remnants of raised shore platforms and associated cover sediments. Sea level has fluctuated throughout the late Pleistocene in response to the advance and retreat of large continental ice sheets. Marine terraces preserved along the coast represent surfaces eroded during the highest levels of these sea level fluctuations, superimposed on a coastline being uplifted by regional tectonics. Marine terraces in the region range in age from about 64,000 years old, to as much as 240,000 years old.

Eureka occupies a series of northward-dipping terrace surfaces eroded onto the Hookton Formation. These terrace surfaces are differentiated based on subtle elevation changes, as well as increases in soil profile development within the terrace sediments of older terraces. Mapping presented in Carver and Burke (1992) suggests that the project area is located on the 120,000 year

old "Savage Creek" terrace. Marine terraces in the region are typically associated with 10 to 20 feet of predominantly silty sand and gravelly sand covering the abrasion platform (for example, "marine terrace deposits" in this report).

2.2 Site Setting

The project site occupies the gently northwest-sloping, dissected surface of a late Pleistocene age marine terrace. The project area encompasses large portions of the terrace surface, as well as the heads of several tributary stream valleys that encroach from the north, east, and south. The margins of the project area, therefore, typically consist of sloping ground that descends gradually into the adjacent stream valleys, but include locally steeper areas. Elevation of the terrace surface ranges across the site from about 170 to 200 feet. The lowest elevation at the site is in the stream valley at the northern end of the property, an elevation of about 30 feet. Slopes in the project area are typically negligible on the terrace surface, with gradients of less than 5%, to moderately steep on the stream valley walls, with gradients of 30 to 40%. Steeper valley and ravine wall slopes are locally present within the study area.

2.3 Seismic Setting

The project site is located in a region of high seismicity. More than sixty earthquakes have produced discernible damage in the region since the mid-1800's (Dengler et al., 1992). Historical seismicity and paleoseismic studies in the area suggest there are six distinct sources of damaging earthquakes in the Eureka region: (1) the Gorda Plate; (2) the Mendocino fault; (3) the Mendocino Triple Junction; (4) the northern end of the San Andreas fault; (5) faults within the North American Plate (including the Mad River and Little Salmon fault zones); and (6) the Cascadia Subduction Zone (CSZ; Dengler et al., 1992).

The most significant seismic sources relative to this site are the Little Salmon fault and the CSZ. The Little Salmon fault is the closest known active fault to the site. Its surface trace is mapped approximately 9 km (5.5 miles) to the southwest, although the fault dips beneath the site and may be within 4 km (2.5 miles) in the subsurface. The fault appears to be the most active fault in the Humboldt Bay region, and is capable of generating very large earthquakes. The Little Salmon fault is a northwest-trending, northeast-dipping reverse fault (that is, the northeast side of the fault slides up and over the southwest side of the fault along a northeast-dipping fault plane). Offset relations within sedimentary rocks of the upper Wildcat Group to the south suggest vertical separation exceeds 5,900 feet (1,800 meters), representing about 4.4 miles (7 km) of dip-slip motion on the Little Salmon fault since the Quaternary (that is, in the past 700,000 to 1 million years). Paleoseismic studies of the Little Salmon fault indicate that the fault deforms late Holocene sediments at the southern end of Humboldt Bay (Clarke and Carver, 1992). Estimates of the amount of fault slip for individual earthquakes along the fault range from 15 to 23 feet (4.5 to 7 meters). Radiocarbon dating suggests that earthquakes have occurred on the Little Salmon fault about 300, 800, and 1,600 years ago. Average slip rate for the Little Salmon fault for the past 6,000 years is between 6 and 10 millimeters/year (mm/yr). Based on currently available fault parameters, the maximum magnitude earthquake for the Little Salmon fault is thought to be between 7.0 (CDMG/USGS, 1996) and 7.3 (Geomatrix Consultants, 1994).

The CSZ represents the most significant potential earthquake source in the north coast region. A great subduction event may rupture along 200 km or more of the coast from Cape Mendocino to British Columbia, and may generate an earthquake up to magnitude 9.0. The April 25, 1992, Petrolia earthquake (magnitude 7.1) appears to be the only historical earthquake involving slip along the subduction zone, but this event was confined to the southernmost portion of the fault. Paleoseismic studies along the subduction zone suggest that great earthquakes are generated along the zone every 300 to 500 years. A great subduction earthquake would generate long duration, very strong ground shaking throughout the north coast region.

3.0 Results of Site Investigation

Test pits and borings excavated at the site indicate that the area is predominantly underlain by generally competent, moderately consolidated fine sandy marine deposits (see Test Pit and Boring Logs in Appendix A). These sediments are relatively uniform in texture and consistency, varying only in the amount of fines. The marine deposits are overlain by a variable thickness of organic fill (for example, slash) and low density, dark-colored native topsoil materials. Surficial fills and soil materials range in thickness from less than 1 foot to more than 3 feet, except where obvious slash piles are present. Dark-colored native topsoils, exclusive of fill, were observed in the subsurface exploration locations to vary from about ½ to 1-½ feet in thickness.

Slope processes within the project area are typically characterized by shallow debris sliding along the stream valley walls bordering much of the site. Slope gradients on the valley walls are typically less than about 40%; steep slopes, approaching nearly vertical, are locally present at various locations. Flat or gently sloping portions of the site are generally separated from the sloping stream valley walls by broad, rolling slope breaks, with a few exceptions. The geomorphic features that we observed that may be associated with dormant slide movement were commonly associated with springs and seeps that commonly daylight on the valley walls. Numerous springs were observed emanating from bowl-shaped depressions on slopes. These bowl-shaped features may be associated with many years of piping and erosion around the springs, or they may be the result of shallow slumping in wet, weakened native materials. Sharp slope breaks, at transitions between mildly and steeply sloping site areas with significant topographic relief, were observed in one area. We consider these locations potentially indicative of past, deep-seated landsliding. We observed evidence for small, shallow failures at a few locations within the project area, moderate depth landsliding or pronounced soil creep potential in one area (Lots 6 through 13), and landforms suggestive of historical deep seated landsliding in another site area (Lots 79 through 84 and 87 through 88). Based on our field reconnaissance and our understanding of the geologic materials at the site, we infer that the potential for large, deep-seated rotational landslides at the site is predominately low, with the exception of one area (Lots 79 through 84 and 87 through 88).

Evidence of at least two generations of logging was observed at the site. Early pioneer logging is evidenced by large, partially decomposed old growth stumps that are common throughout the area. We also observed an area of collapsing ground that was forming on older buried slash material in a ravine that lies in the vicinity of proposed Lot 2, and the proposed northwestern end of McKay Lane. The project site has been extensively logged in the not-too-distant past, and logging debris is evident. Locally, the topography and drainage patterns on the site have been modified by heavy equipment. Forest roads and skid trails, and associated near-vertical cut banks, are present throughout the area.

There are no known active faults mapped crossing the project site. We observed no geomorphic or subsurface evidence during our investigation that would suggest a previously unrecognized active fault may be present at the site. As such, the principal seismic hazard at the site appears to be associated with strong ground shaking from nearby sources (for example, Little Salmon fault or CSZ). Subsurface materials beneath the site are not typically associated with the amplification of seismic ground motion. Strong seismic shaking may induce slope failures along the steeper and/or wetter portions of the stream valley walls, particularly if the earthquake occurs during the wet season. Seismic design parameters are subsequently presented.

4.0 Results of Laboratory Testing

Laboratory tests indicate generally competent, moderately consolidated, fine sandy, silty, or clayey soils. The soils are indicated to be moderately plastic and significantly cohesive where clayey. High plasticity soils were not encountered in the test pits or observed on site.

Selected undisturbed samples were collected, and laboratory tests were conducted. Laboratory testing for index properties included in-place moisture content, dry density, unconfined compressive strength, gradation, and Atterberg Limits (plasticity). See the attached Field Boring Logs (Appendix A) for detailed soil descriptions and the laboratory index test results.

5.0 Conclusions and Recommendations

Based upon the findings of our investigation, SHN's conclusions and recommendations are listed below:

1. Based on the results of our investigation, the geologic and geotechnical conditions at the site appear substantially suitable for the subdivision as proposed. It is our opinion that the project can be developed so that it will not be subject to, nor contributes to, substantial geologic hazards, assuming the recommendations provided herein are incorporated into the development plan and are followed during construction.

2. Individual lots were not staked at the time of our investigation. Available topography is approximate and proposed grading appears schematic and not detailed. From the reconnaissance level of investigation conducted, it appears that suitable building sites are available on most of the 154 proposed lots. 138 of the proposed lots are considered suitable for typical structure foundation systems conforming to current Building Code criteria, with most of the remaining 16 lots concluded to be suitable for the development as proposed, but requiring investigations specific to the proposed structures, site conditions, and proposed grading, in order to provide appropriate recommendations. Additional site-specific recommendations should include criteria for placing proposed fills, as well as structures. Due to limited space, or cost-prohibitive foundation or slope retention systems that may be required, a few lots may not be cost-effective for development as currently proposed. Discussions are provided on a lot-by-lot basis below, in relation to site conditions. A number of lots may require atypical, site and structure specific, deep foundation, subdrainage, and/or retaining wall systems.

3. Where fills more than a few feet in depth are to be placed, post-construction settlement may occur, especially in wet ground areas. Site-specific investigations, with analysis and/or settlement monitoring, is recommended in areas where fills over 3.5 feet in depth are to support structures, or where fills to support structures are located in spring areas. Construction may need to be delayed until negligible remaining settlement potential is indicated by settlement monitoring.

4. Sloping portions of the site are subject to shallow to deep-seated landsliding, depending upon location. A large seismic event, especially during the rainy season, may initiate larger, deeper landslides. As such, structural setbacks from sloping portions of the site are appropriate for the level of investigation conducted. Because our evaluation of the project area is reconnaissance in nature, we have established generalized setback guidelines for each lot based on the topographic and geomorphic conditions. Setbacks are summarized in Table 1, on the following page. Further site-specific investigations may result in conclusions allowing expanded buildable areas on the lots.

   For the purposes of this report, we typically define slope hazard setbacks from slopes with gradients averaging 25%, as indicated by the "25% break-in-slope line" shown on the Site Plan. In a few locations, we recommend setbacks in relation to proposed lot lines for simplicity (due to an irregular break-in-slope line). The width of the setbacks are based on the steepness of the adjacent slope, the relative sharpness of the slope break, and the geomorphic character of the site, as described in Table 1. These setbacks are intended to apply to the anticipated economic lifespan of a typical residential structure, herein assumed to be 40 years.

   Setbacks define those areas on each lot that we interpret to be associated with **Low to Moderate** slope stability hazard. These areas are generally suitable for residential development. Low to Moderate slope stability hazard zones may be developed without further geologic investigation based on the conclusions and recommendations presented in this report. In some cases, planned fills or structures may extend into the Moderate to High slope stability hazard area due to spatial constraints on some lots. Depending upon the nature of the portions of the slopes greater than 25% in gradient, some of these areas are considered feasible for development, but require specific engineering criteria based on site specific investigations, in order to mitigate risk to Low to Moderate slope stability hazard levels.

   Areas within the setback zones are associated with **Moderate to High** slope stability hazards. At the level of investigation conducted, these areas either appear unsuitable for residential development under existing conditions, or require site-specific additional geologic/geotechnical evaluations. We recommend these Moderate to High slope stability hazard zones not be developed at this time, unless additional site-specific investigations are conducted. Once individual lots are located and marked in the field, additional study may allow refinement of setback configurations based on site-specific conditions.

Table 1 Slope Hazard Setback Zones		
Lot Numbers	**Setback from 25% Break in Slope Line, or as noted (in feet)**	**Characteristics**
All Lots not listed below	20	Non-abrupt transitions in slope gradient, competent ground conditions, established forest.
6-13	30	Slopes below are uneven/hummocky, one low height slide scarp observed, springs, no consistent established forest.
60, 63	30	Springs in slope, no consistent established forest.
68-72	30	Steeper slopes below.
77, 78	40 from rear Lot line	Springs, no consistent established forest.
79	30	Small ravine with spring immediately below; steep slope with significant topographic relief about 75 feet further downslope, possibly from historical large-scale sliding. The steeper slope exhibits consistent established second or third growth forest.
80, 81	50	Variable slope topography, logging cut slopes, steep slope with sharp slope break and significant topographic relief below, possibly from historical large-scale sliding. Site-specific inspection required upon layout.
82, 83	50	Steep slope with sharp slope break and significant topographic relief below, possibly from historical large-scale sliding. Site-specific inspection required upon layout.
84, 87	30	Ravine head with springs, bordered by headscarps, apparently a result of piping, erosion, and localized sliding. Possibly from historical large-scale sliding, gradients and relief moderate in ravine head.
88	30	Bordered by a lateral headscarp associated with a ravine head with springs. Also west facing slope with no consistent established forest. Ravine apparently a result of piping, erosion, and localized sliding. Possibly from historical large-scale sliding, gradients and relief moderate in ravine head.

5. **Comments on Specific Lots**

Lots 1, 2, 4-5, 7-16, 20-27, 29-62, 64-67, 70-76, 84-151
Relatively level or moderately sloping lots, competent ground conditions. No significant development constraints anticipated provided setbacks are acknowledged.

Lots 3, 6, 17-19, 28, 63, 68-69, 78-83
These lots are shown on the subdivision map with structures within, or very close to, setback areas. Additional, site-specific investigations will be required on these lots to demonstrate suitability for development as shown.

Lots 77, 78
These lots are in an area with springs and that is not consistently forested. Test pit TP-10 in the vicinity indicated high groundwater conditions, which is consistent with an observed spring on Lot 78, and other springs in the vicinity. Slopes are typically moderate. Subdrainage will likely be required, and we recommend investigations that are specific to the sites and the proposed structures.

Lot 152-154
The building site on this lot will overlie sloping ground. We recommend additional investigations specific to the site and the proposed structures, if the structures are to be located in lot areas sloping at 30% in gradient or steeper.

6. **Comments on Proposed Roads**

Easterly Extension of Redwood Street. The easterly extension of Redwood Street will cross two ravines. Existing uncontrolled fill, and a high-pressure water main (Humboldt Community Services District) are located in the vicinity of the current eastern end of Redwood Street. The two ravine crossings are planned to be made using nearly vertical Mechanically Stabilized Earth (MSE) walls on both sides of the street with culvert openings at the flow lines. Each of the ravine crossings will be on the order of 175 to 185 feet long, and about 35 feet in maximum height. This design concept appears feasible; however, MSE wall design is beyond our current scope of services.

Arbutus Street Opposite Lot 1, Southwest of Proposed Intersection with McKay Lane. The proposed roadway alignment crosses the head of a ravine that contains a flowing spring. Significant topographic relief from slash fill, ravines, and past grading exist in this area. Embankment support of the roadway would require slash, vegetation, and uncontrolled fill removal, installation of subdrainage, placement of compacted fill and/or a retaining structure, and a possible moderate delay between embankment completion and construction of the finished road surface to allow primary settlement to occur.

7. Deep-seated slope failure that would affect the Low to Moderate slope stability hazard areas is considered to be a low-level geologic hazard under existing site conditions. Deep-seated slope failure is not likely to occur except during very strong seismic shaking and/or abnormally high soil moisture conditions. Increased setbacks have been recommended in the vicinity of Lot 80, 81, 82, and 83 where abrupt slope breaks bordering steep slopes with significant topographic relief suggest that large scale or deep seated landsliding may have occurred in the past.

8. Subsurface materials at the site are subject to erosion if subject to direct rainfall impact or concentrated runoff. Soil erosion hazards on the site are likely to increase during and after development of the site, if not mitigated. Changes in land use, including construction of a variety of impervious surfaces (for example, access roads, driveways, rooftops, etc.) will change natural runoff conditions. Increased, concentrated runoff could result in accelerated erosion. Site development should be designed with Low Impact Development (LID) water catchment features that appropriately collect and infiltrate stormwater from impervious surfaces, rather than let stormwater flow offsite by way of drain inlets and storm drains, if possible. Storm drain outlets and discharge points, where necessary, should be designed to uniformly dissipate runoff. Actively eroding areas and areas disturbed during construction or minor site grading should be revegetated prior to the beginning of the rainy season.

9. Soil liquefaction and/or seismically induced settlement is considered to be a low level hazard at the currently proposed building sites. The geologic age (late Pleistocene) of the upland site soils, and their generally cohesive nature, render them unlikely to liquefy or seismically consolidate under seismic conditions. Soil deposits that typically liquefy are geologically recent, submerged, low density, cohesionless or low cohesion sediments, or man-made fill deposits, located adjacent to streams, rivers, bays, or ocean shore lines. Building sites, as currently proposed, are not considered subject to the effects of liquefaction, or other secondary seismically-induced ground failures (exclusive of seismically-induced landsliding; see above). Based on our understanding of the geologic environment and criteria of susceptibility, it appears that liquefiable deposits at the site are confined to alluvial deposits in active stream valleys in the northern part of the project area. No improvements are currently proposed for these valleys.

10. Grading activities that result in nonengineered fill being placed on sloping portions of the project area may initiate slope instability, and are not recommended. Site-specific, geotechnical evaluations are recommended above where the current grading plan indicates fills are to be placed in the setback areas.

11. Cuts and structural fills may be necessary for access roads and within the proposed building areas. Grading recommendations presented below apply to cuts and fills proposed outside the setback areas.

12. Alteration of existing conditions, such as redirection of runoff, removal of slope support during site grading, or increased slope loading by fill placement, may initiate slope failures. In many cases, these risks can be significantly reduced by implementing adequate mitigation measures based on appropriate, site-specific geotechnical evaluations.

13. The project site is likely to be subject to the effects of moderate or large earthquakes during its life span, and conceivably, may be subject to the effects of a very large earthquake. Strong ground shaking and seismically-induced slope failures are the primary seismic hazards that may impact the site. Because numerous sources are present that may generate damaging earthquakes, we recommend that structures for residential use typically be of wood-frame construction, built to withstand strong seismic shaking. Steel frame or concrete structures can be utilized, provided they are seismically designed. The potential for surface fault rupture is considered to be negligible. The minimum standard for construction of the residences should be in accordance with the current edition of the California Building Code (CBC). Seismic design parameters are presented in Section 5.2.

14. The proposed building sites are considered suitable for typical "building code" foundation and floor slab support systems provided the setback recommendations are followed, and all fill (including logging slash), dark-colored native topsoils, vegetation, stumps, and major root systems are first stripped from the site. Following stripping, generally competent, light colored, undisturbed native soils should be exposed. Caution should be taken to review building sites for hidden fills. No evidence of high-plasticity, potentially-expansive soils was observed during our investigation, although occasional moderately plastic clayey soils are indicated. As a precaution, at the time the foundation excavations are made, the building sites should be reviewed to confirm the absence of plastic, potentially expansive clay deposits. Post-construction total and differential settlements are anticipated to be less than ½ inch for typical one or two story, wood frame, single or multi-family residential structures, provided they are founded on typical "building code" foundations and/or floor slab support systems embedded into, or placed on, cut- or stripped-to-grade, competent, undisturbed native soils, or structural fills placed as recommended below.

15. We recommend conducting additional site and structure specific investigations for structures that are to be three or more stories in height.

16. The following recommendations are for typical one or two story single- or multi-family structures constructed on native ground or on structural fills, outside the setback areas.

5.1 Site Preparation and Grading

We recommend the following:

1. As appropriate, notify Underground Service Alert (1-800-642-2444) prior to commencing site work, and use this location service and other methods to avoid injury or risk to life from underground and overhead utilities, and to avoid damaging them.

2. To prepare subgrade surfaces to support improvements or structural fill, strip and remove all existing improvements, surface debris, vegetation, and major root systems. Also, strip existing uncontrolled fill, dark-colored organic-rich topsoil, and any disturbed/soft/loose soils. Stripping should extend out five feet beyond the perimeter of the improvement or structural fill area.

3. With the exception of vertical sides or steps, subgrade surfaces to receive structural fill should be cut-graded to slope no steeper than 15 percent.

4. Conduct a geotechnical engineering review of exposed subgrade surfaces that will support structures, or that will receive structural fill to support structures. The Geotechnical Engineer will recommend that remaining unsuitable soils, such as overly weak, compressible, or disturbed soils, be additionally stripped. This evaluation may include in-place soil density testing, as well as proof-rolling as described in the following paragraph.

5. Scarify and compact (90 percent minimum ASTM D1557) the upper 6 inches of exposed subgrade soils that are to receive structural fills, or improvements such as floor slabs on grade. Alternatively, the subgrade surface may be proofrolled using a loaded 10-wheel, 10-cubic yard (cy) dump truck, or equivalent. The proofrolling should be accomplished under the observation of the Geotechnical Engineer or

qualified representative with the soil damp or moist (not wet or dry), and a firm, non-yielding surface should be evident during the proofrolling. If a yielding surface is observed (pumping, weaving under wheel loads), additionally excavate the yielding area, and replace the overexcavated material with Caltrans specification Class 2 crushed aggregate baserock, in a manner that will result in a stable subgrade surface under the proofrolling, following the overexcavation and replacement.

6. Structure backfill material should consist of relatively non-plastic (Liquid Limit less than 40, Plasticity Index less than 14) material containing no organic material or debris, and no individual particles over 4 inches across. If gravel is used, it should be well-graded, to include a variety of particle sizes to minimize relatively large void spaces, into which fine grained soils can migrate. We suggest the use of well-graded granular soils (sand, gravel) for fill, because these soils are relatively easy to moisture condition and compact.

7. Structure backfill should be placed to design grades and compacted to a minimum of 90% of the maximum dry density as determined by the current ASTM D1557 test method. The final grading plan should be reviewed by the Geotechnical Engineer in advance for conditions that could result in excess differential settlement.

8. Cut and fill slopes up to 5 feet in height should be placed no steeper than 1-½ to 1 and 2 to 1 (horizontal to vertical [H:V]), respectively. Higher or steeper slopes, or cut or fill grading within setback areas, should be specifically reviewed by the geotechnical engineer in advance.

5.2 Seismic Design

We recommend that proposed structures should be designed and built to withstand strong seismic shaking. The minimum standard for construction of the structures should be in accordance with the latest edition of the current building code for the most seismically active areas.

The 2016 CBC requires the following information for seismic design. Based on our knowledge of subsurface and geologic conditions, we estimate a Site Class D for the project. Based on the Site Class and the latitude and longitude, we calculated the design spectral response acceleration parameters S_S, S_1, F_a, F_v, S_{MS}, S_{M1}, S_{DS} and S_{D1} using the United States Geological Survey (USGS) seismic design map (USGS, 2017). Calculated values are presented in Table 2.

Table 2 Seismic Design Criteria McKay Tract, Cutten, California	
Latitude	40.770
Longitude	-124.135
Site Class	D
S_S	3.237
S_1	1.236
F_a	1.00
F_v	1.50
S_{MS}	3.237
S_{M1}	1.854
S_{DS}	2.158
S_{D1}	1.236
Risk Category	I/II/III
Seismic Design Category	E

5.3 Foundations

Following site preparation as recommended, foundations may be constructed. Foundations should be sized, embedded, and reinforced to at least the minimums presented in the current edition of the CBC. Embedment depth should be determined starting at the surface of competent, undisturbed, native soils, or the surface of properly compacted structural fill placed as recommended above. Ignore surficial landscaping fill in determining minimum embedment depth.

Design parameters for foundation soils are listed in Table 3.

Table 3 Foundation Soil Design Parameters McKay Tract, Cutten, California	
Design Parameter	**Value**
Bearing Capacity (dead load plus long-term live load)	2,000[1,2] psf[3]
Friction Factor (between concrete and foundation soil)	0.35
Equivalent Fluid Weight for Lateral Passive Pressure[4]	200 pcf[5]

1. Value may be increased by one-third to account for short-term loads (for example, wind, seismic).
2. Value is based on a 1-foot-wide footing, embedded 1 foot in firm soil. This value may be increased by 300 psf for each additional foot of width or depth, up to a maximum allowable bearing pressure of 4,500 psf.
3. psf: pounds per square foot
4. Lateral passive pressure is effective only where footings bear laterally against competent undisturbed native subsoils, or structural fill. Where the adjacent ground surface is not paved, neglect the upper one foot of soil when determining passive resistance.
5. pcf: pounds per cubic foot

Footing lines located adjacent and generally parallel to utility trenches should extend below a 1.5H:1V plane projected upward from the bottom of the trench. Two sack per cubic yard concrete slurry can be used beneath the regular reinforced concrete foundations to effectively extend the foundations deeper in this regard.

The ground surface around the structure perimeter should be sloped away, or other design measures implemented to provide positive surface water drainage away from perimeter foundation areas. If the project includes depressed crawl spaces, resulting in crawl space grade below exterior grade elevation, we recommend that positive surface drainage be provided so any surface water entering the crawl space can drain away instead of ponding.

5.4 Slabs-on-Grade

Following site preparation and grading as recommended, which should result in a compacted structural fill surface, or a cut-to-grade exposure of competent, undisturbed native subsoils, slabs-on-grade may be constructed.

Concrete slabs can become damp from capillary water migration. As a precaution to minimize transmission of soil moisture up through floor slabs in habitable areas, or other areas where damp slabs should be avoided, we recommend that the slabs be underlain by a moisture/vapor barrier manufactured for the purpose, not less than 15 mils thick (such as, Stego Wrap Vapor Barrier by Stego Industries, LLC, or equivalent). The membrane should be overlapped at least two feet and taped at joints. This membrane should overlie a capillary break consisting of a 4 inch thick layer of No. 4 U.S. Sieve (0.187 inch) minimum, up to 1 inch maximum, gravel. The capillary break provides a layer with relatively large, intergranular, void spaces, which inhibits the capillary rise of ground moisture.

It has been common practice to cover the membrane with a few inches of sand, to protect the membrane during construction, and to aid in concrete curing. However, some designers consider the sand layer to be a potential source of moisture that can adversely affect the slab, either from the water present in the sand during construction, or from surface water or groundwater gaining access to the sand layer above the membrane, while some designers consider the sand layer important in concrete curing. We understand the American Concrete Institute has produced recommendations or guidelines with respect to this issue. Whether or not a sand layer is placed above the membrane, the membrane should be protected against tearing or puncture during construction.

The base elevation of the capillary break should be designed to be at or above the average ground surface elevation exterior to the building, so that if the groundwater table rises to the ground surface, it should not inundate or flood the capillary break.

If the capillary gravel layer lies below average exterior grade, the capillary break material beneath the slab should be thickened to 8 inches in minimum thickness, and this layer should be compacted with a walk-behind vibratory plate compactor. In addition, 3-inch diameter perforated drainpipes should be installed, not exceeding 6 feet on centers, in the bottom 3 inches of this thickened capillary break layer, and the drainpipes should be placed with perforations downward, and they should gravity drain to daylight. The perforated drainpipes beneath the slab may be installed level. This recommendation is intended to provide an underdrainage blanket as well as a capillary break beneath the slab.

Soil subgrade should not be allowed to dry excessively before placing the vapor barrier and the slab. These soils should also not be fully saturated at the time the vapor barrier and slab are placed. They should be maintained in a damp to moist condition, which will minimize risk of subsequent swelling or shrinking once the overlying materials are placed.

5.5 Retaining Walls

Retaining wall backfill materials and drainage should follow the specifications and geometries shown in Figure 3. The drainage system for backfilled walls should consist of a 4-inch diameter perforated pipe surrounded by a clean, coarse gravel or drain rock (such as Caltrans Class 2 Permeable Material). The permeable material should be completely separated from the surrounding soil by an engineering filter fabric (such as Mirafi 140N or similar fabric). The section of permeable material should be at least 12 inches wide and should extend up the back of the wall to within about 18 inches of finished grade. The drainage material should be capped with compacted fine-grained soil, soil-cement, or other relatively impermeable material or barrier. The pipe should be polyvinyl chloride (PVC) Schedule 40 or acrylonitrile butadiene styrene (ABS) with a standard dimension ratio (SDR) of 35 or better. Perforations in the drainpipe should be ¼ inch in diameter. The perforated pipe should be placed holes-down near the bottom of the section of permeable material and should discharge by gravity to a suitable outlet. Accessible subdrain cleanouts should be provided and maintained on a regular basis. All materials used in retaining wall construction should be approved by the Geotechnical Engineer.

Retaining wall foundations should be designed according to the recommendations in the "Foundations" section of this report (regarding bearing capacity, friction, and passive resistance) (see Table 3).

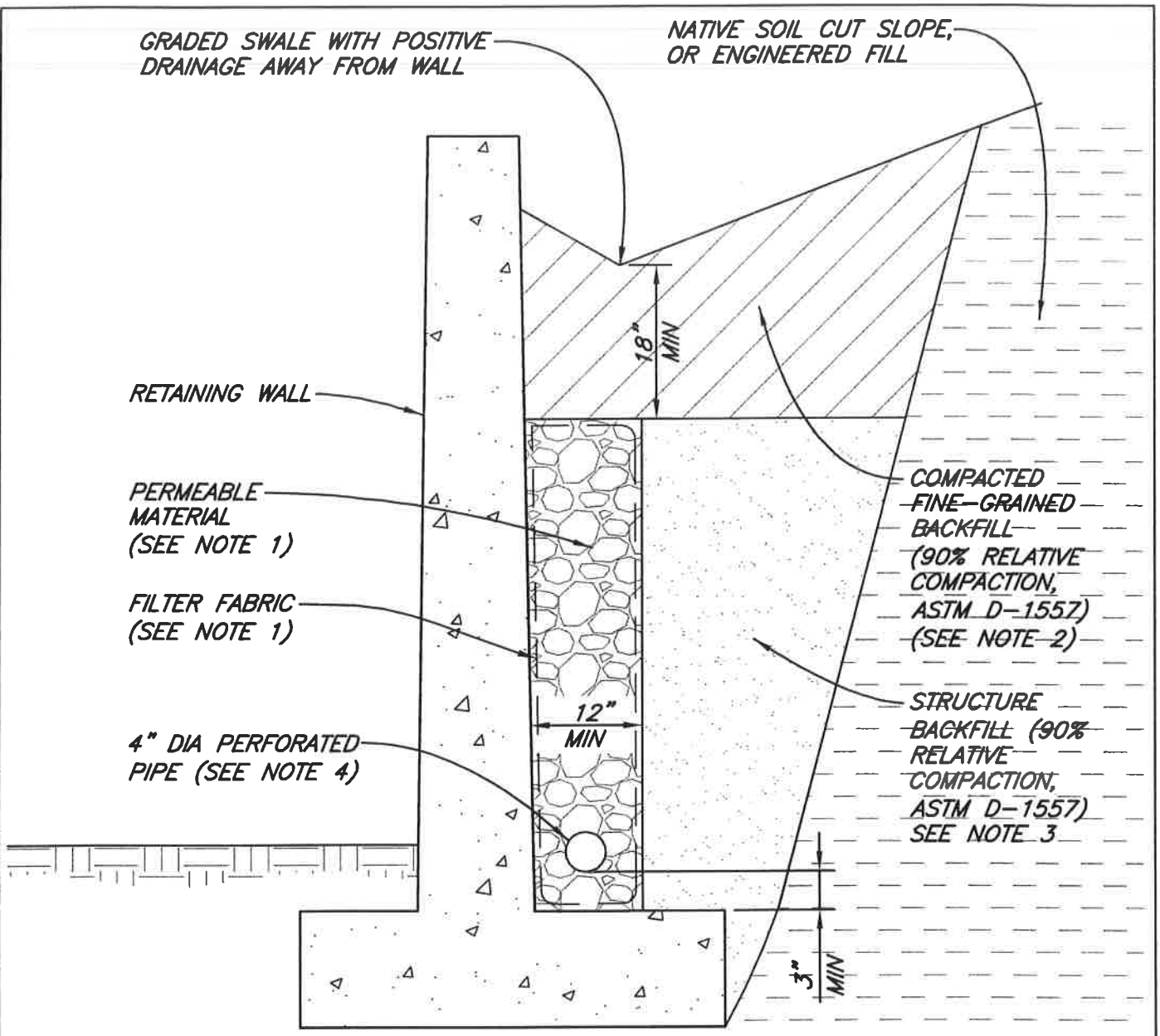
Retaining walls should be designed to resist static earth pressures, seismic earth pressures, and surcharge pressures.

Active earth pressures may be used for design of unrestrained retaining walls where the top of the wall is free to translate or rotate. To develop active earth pressures, the walls should be capable of deflecting by at least 0.004H (where H is the height of the wall). At-rest earth pressures should be used for design of retaining walls where the wall top is restrained such that the deflections required to develop active soil pressures cannot occur or are undesirable. Cantilever walls retaining soils such as those shown in Figure 3 may be designed for active or at-rest lateral earth pressures for various backfill slopes using the equivalent fluid unit weights presented in Table 4.

Table 4
Equivalent Fluid Unit Weights
McKay Tract, Cutten, California

Backfill Slope	At-Rest Conditions (pcf)[1]	Active Conditions (pcf)
Level	62	36
3H:1V[2]	73	43
2H:1V	78	47

1. pcf: pounds per cubic foot
2. H:V: horizontal to vertical (ratio)



NOTES:

1. PERMEABLE MATERIAL SHOULD BE A CLEAN COARSE GRAVEL OR DRAIN ROCK (SUCH AS CALTRANS CLASS II PERMEABLE MATERIAL). PERMEABLE MATERIAL SHOULD BE FULLY ENCAPSULATED BY FILTER FABRIC (MIRAFI 140 OR EQUIVALENT).
2. ALTERNATIVELY, SOIL CEMENT OR OTHER RELATIVELY IMPERMEABLE MATERIAL OR BARRIER MAY BE USED.
3. STRUCTURE BACKFILL SHOULD BE A WELL-GRADED, RELATIVELY NON-PLASTIC, GRANULAR MATERIAL (PRIMARILY SAND AND GRAVEL), FREE FROM ORGANICS, DEBRIS, AND INDIVIDUAL PARTICLES OVER 4 INCHES ACROSS.
4. PIPE SHOULD CONFORM TO THE REQUIREMENTS OF SECTION 68 OF THE 2015 CALTRANS STANDARD SPECIFICATIONS. PERFORATIONS SHOULD BE 1/4 INCH IN DIAMETER AND PLACED DOWN, AND PIPE SHOULD BE SLOPED AT 1% MINIMUM TO DRAIN TO GRAVITY OUTLET. PIPE SHOULD BE PVC SCHED 40 OR ABS WITH AN SDS OF 35 OR BETTER.
5. ACCESSIBLE SUBDRAIN CLEANOUTS SHOULD BE PROVIDED AND MAINTAINED ON A REGULAR BASIS.
6. ALL MATERIALS SHOULD BE APPROVED BY THE GEOTECHNICAL ENGINEER.

SHN Consulting Engineers & Geologists, Inc.	McKay Ranch Subdivision Kramer Properties, Inc. Cutten, California	Retaining Wall Backfill and Drainage Detail SHN 016148
	October 2017 | 016148-RETWALL	Figure 3

\\ARCATASVR1\Projects\2016\016148A-McKay-Ranch\Dwgs , SAVED: 10/17/2017 5:28 PM NDOWNEY, PLOTTED: 10/17/2017 5:29 PM , NATHAN DOWNEY

Lateral earth pressures for backfill slopes other than those given above can be estimated by interpolation. The lateral earth pressures should be applied to a plane extending vertically upward from the base of the heel of the retaining wall to the ground surface.

The lateral earth pressures given above apply where the wall backfill is fully drained, is not subject to traffic or other surcharge loads, and the backfill is not subject to heavy compaction equipment within a distance of one-third the height of the backfill. Lateral surcharge pressures are discussed later in this section.

If retaining wall backfill will be subject to passenger vehicle or light truck traffic loading within a distance of H/2 from the top of the wall (where H is the wall height), the wall should be designed to resist an additional uniform lateral pressure of 72 pounds per square foot (psf) applied to the back of yielding walls (active conditions), or 124 psf applied to the back of non-yielding walls (at-rest conditions). Surcharge loads imposed by greater loads or unusual loads within a distance of H of the back of the wall should be considered on a case-by-case basis.

In addition to the active or at-rest lateral soil pressures, retaining walls should be designed to resist additional dynamic earth pressures during earthquake loading. The additional dynamic pressure increment may be calculated using an additional equivalent fluid pressure of 23 pounds per cubic foot (pcf) for back slopes up to 3H:1V. The dynamic pressure increment should be applied to the wall as a triangular distribution so the resultant force acts at a distance of 0.33H above the base of the wall (where H is the height of the wall). Under the combined effects of static and dynamic loading, a safety factor of 1.1 against sliding or overturning is acceptable. The dynamic component of the lateral earth pressure was calculated using the Mononobe-Okabe equation and, therefore, assumes that sufficient deformation of the wall will occur during seismic loading to develop active soil conditions.

5.6 LID Features

Drainage around the proposed improvements should be constructed in such a way that soils near the improvements do not become saturated from stormwater runoff. Positive drainage should be provided to prevent ponding and enable water to drain away from foundations, and edges of pavements, and toward suitable collection and/or discharge facilities. A positive surface drainage of at least 5 percent is recommended within 10 feet of all building foundations in unpaved areas. In paved areas, a positive surface drainage of at least 2 percent is recommended to allow for rapid removal of surface water. In addition, surface drainage design should adhere to the setbacks for LID features as shown in Table 5.

Table 5 Recommended Setbacks from LID[1] Features McKay Tract, Cutten, California		
Type of LID Feature	**Setback From Building Foundations**	**Setback From Pavement Sections and Exterior Slabs-On-Grade**
Designed to Infiltrate Collected and Concentrated Stormwater (for example, dry wells, vegetated swales, bioretention facilities)	10 feet	3 feet[2]
Alternative engineered hardscaping (for example, porous asphalt, permeable pavers) subject only to incidental rainfall (that is, *not* subject to re-routed, concentrated stormwater)	5 feet	3 feet[2]

1. LID: low-impact development
2. No setback is required *only if* an effective barrier is installed (such as, a concrete-filled cutoff trench that prevents moisture from traveling from the LID feature to below the pavement section/slab-on-grade).

6.0 Closure and Limitations

The data and conclusions presented herein are based on a study of inherently limited scope. Our interpretations are based on conditions that were evident at the time of our study. Existing site conditions have evolved according to the geologic processes of the past. It is conceivable that these processes may change or accelerate in an unpredictable manner in the future. Because the north coastal region of California is one of dynamic geologic processes, future geologic hazards may not be accurately portrayed by existing conditions. Therefore, risks from geologic hazards cannot be precisely determined when developing the site.

We have assumed that the information obtained from our limited subsurface explorations is representative of the subsurface conditions throughout the site. It would be prudent to have a representative of our firm confirm site conditions during the construction phase. If subsurface conditions differ significantly from those disclosed by our investigation, we should be given the opportunity to re-evaluate the applicability of our conclusions and recommendations. Some alteration of recommendations may be appropriate.

Our recommendations are tended on the assumption that design and construction of the improvements will conform to their intent. We are available to review grading and construction plans, if an evaluation of conformance is desired.

If there is a substantial lapse of time between the submission of this report and the start of work at the site, or if conditions change due to natural causes or construction operations at or adjacent to the site, we urge that our report be reviewed to determine the applicability of the conclusions and recommendations. This report is applicable only for the project site studied.

The conclusions and recommendations presented in this report are professional opinions derived in accordance with current standards of professional practice. No warranty is expressed or implied.

The field and laboratory work was conducted to investigate the site characteristics specifically addressed by this report. Assumptions about other site characteristics, such as hazardous materials contamination, or environmentally sensitive or culturally significant areas, should not be made from this report.

7.0 References

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A

Field Boring and Test Pit Logs

CONSULTING ENGINEERS
& GEOLOGISTS

BORING LOG KEY

SAMPLE TYPES



DISTURBED SAMPLE (BULK)



HAND DRIVEN TUBE SAMPLE



1.4" I.D. STANDARD PENETRATION TEXT SAMPLE (SPT)



2.5" I.D. MODIFIED CALIFORNIA SAMPLE (NOT RETAINED)



MODIFIED CALIFORNIA SAMPLE (RETAINED)



CORE BARREL SAMPLE (NOT RETAINED)



CORE BARREL SAMPLE (RETAINED)

SYMBOLS



INITIAL WATER LEVEL



STABILIZED WATER LEVEL

GRADATIONAL CONTACT

WELL DEFINED CONTACT

SS SPLIT SPOON

SHN CONSULTING ENGINEERS & GEOLOGISTS

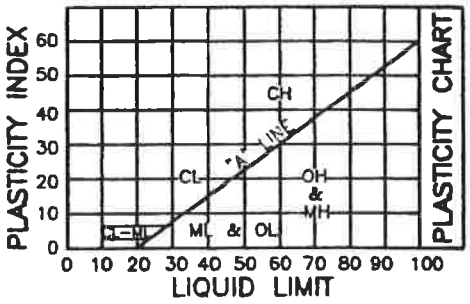
METHOD OF SOIL CLASSIFICATION

MAJOR DIVISIONS		SYMBOLS	TYPICAL NAMES
COARSE GRAINED SOILS (MORE THAN 1/2 OF SOIL > NO. 200 SIEVE SIZE)	GRAVELS (MORE THAN 1/2 OF COARSE FRACTION > NO.4 SIEVE SIZE)	GW	WELL GRADED GRAVELS OR GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GP	POORLY GRADED GRAVELS OR GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
		GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SANDS (MORE THAN 1/2 OF COARSE FRACTION < NO.4 SIEVE SIZE)	SW	WELL GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES
		SP	POORLY GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES
		SM	SILTY SANDS, SAND-SILT MIXTURES
		SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS (MORE THAN 1/2 OF SOIL <NO. 200 SIEVE SIZE)	SILTS & CLAYS LIQUID LIMIT LESS THAN 50	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR 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 ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS & CLAYS LIQUID LIMIT GREATER THAN 50	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
		CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
		OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTY CLAYS, ORGANIC SILTS
HIGHLY ORGANIC SOILS		PT	PEAT AND OTHER HIGHLY ORGANIC SOILS

CLASSIFICATION CHART

CLASSIFICATION	U.S. STANDARD SIEVE SIZE
BOULDERS	ABOVE 12"
COBBLES	12" TO 3"
GRAVEL	3" TO NO. 4
COARSE	3" TO 3/4"
FINE	3/4" TO NO. 4
SAND	NO. 4 TO NO. 200
COARSE	NO. 4 TO NO. 10
MEDIUM	NO. 10 TO NO. 40
FINE	NO. 40 TO NO. 200
SILT & CLAY	BELOW NO. 200

GRAIN SIZE CHART



CONSISTANCY OF FINE GRAINED SOILS		DENSITY OF COARSE GRAINED SOILS	
CLASSIFICATION	COHESION (PSF)	CLASSIFICATION	STANDARD PENETRATION (BLOW COUNT)
VERY SOFT	0-250	VERY LOOSE	0-4
SOFT	250-500	LOOSE	4-10
MEDIUM STIFF	500-1000	MEDIUM	10-30
STIFF	1000-2000	DENSE	30-50
VERY STIFF	2000-4000	VERY DENSE	50+
HARD	4000+		

MOISTURE CLASIFICATIONS
DRY
DAMP
MOIST
WET

BASED ON UNIFIED SOILS CLASSIFICATION SYSTEM

HOLE NUMBER TP-1

PROJECT Cutten Subdivision
JOB NUMBER 099112
LOCATION Cutten, CA
DATE DRILLED 7/6/99
GROUND SURFACE ELEVATION
SAMPLER TYPE 2.5" Brass Shelby Tubes, Hand Driven
EXCAVATION METHOD Backhoe
LOGGED BY CC
TOTAL DEPTH OF HOLE 10.5 ft.

MOISTURE (%)	DRY DEN (PCF)	UNC CMP (PSF)	% PASS #200	DEPTH (ft.)	SAMPLES	BLOWS/6 IN	GRAPHIC LOG	USCS CLASS	MATERIALS DESCRIPTION	REMARKS
				0				SM PT	FILL, wood debris, organics, and sand, silty, loose, damp, brown.	
				1						
				2						
				3					With stumps and logs (logging slash).	
				4						
				5						
				6						
				7						
				8				CL	CLAY, fine sandy, slightly silty, medium stiff, moist, gray and light brown.	
				9						
				10				SC	SAND, fine, clayey, slightly silty, medium dense, moist, gray and light brown.	
				11					Bottom of excavation at 10.5 feet. No free groundwater observed.	

HOLE NUMBER TP-2

PROJECT Cutten Subdivision
JOB NUMBER 099112
LOCATION Cutten, CA
DATE DRILLED 7/6/99
GROUND SURFACE ELEVATION
SAMPLER TYPE 2.5" Brass Shelby Tubes, Hand Driven
EXCAVATION METHOD Backhoe
LOGGED BY CC
TOTAL DEPTH OF HOLE 5.0 ft.

MOISTURE (%) / DRY DEN (PCF) / UNC CMP (PSF) / % PASS #200	DEPTH (ft.)	SAMPLES	BLOWS/6 IN	GRAPHIC LOG	USCS CLASS	MATERIALS DESCRIPTION	REMARKS
	0				SM	SAND, fine, silty, clayey, loose, damp, dark gray, with wood debris, organic topsoil.	
	1				SM	SAND, fine, silty, medium dense, damp, mottled brown and gray.	
	2						
	3					Thin clayey zone.	
	4					Becomes slightly silty.	
	5					Bottom of excavation at 5.0 feet. No free groundwater observed.	
	6						
	7						
	8						
	9						
	10						
	11						

HOLE NUMBER TP-3

PROJECT Cutten Subdivision
JOB NUMBER 099112
LOCATION Cutten, CA
DATE DRILLED 7/6/99
GROUND SURFACE ELEVATION
SAMPLER TYPE 2.5" Brass Shelby Tubes, Hand Driven
EXCAVATION METHOD Backhoe
LOGGED BY CC
TOTAL DEPTH OF HOLE 5.5 ft.

MOISTURE (%)	DRY DEN (PCF)	UNC CMP (PSF)	% PASS #200	DEPTH (ft.)	SAMPLES	BLOWS/6 IN	GRAPHIC LOG	USCS CLASS	MATERIALS DESCRIPTION	REMARKS
				0				SM	SAND, fine, silty, organic, loose, moist, gray, topsoil.	
				1				SM	SAND, fine, silty, medium dense, moist, mottled orange and gray.	
				2					With some cementation.	
				3						
				4					Reduction in fines.	
				5						
				6					Bottom of excavation at 5.5 feet. No free groundwater observed.	
				7						
				8						
				9						
				10						
				11						

HOLE NUMBER TP-4

PROJECT Cutten Subdivision
LOCATION Cutten, CA
GROUND SURFACE ELEVATION
EXCAVATION METHOD Backhoe
LOGGED BY CC

JOB NUMBER 099112
DATE DRILLED 7/6/99
SAMPLER TYPE 2.5" Brass Shelby Tubes, Hand Driven
TOTAL DEPTH OF HOLE 6.0 ft.

MOISTURE (%)	DRY DEN (PCF)	UNC CMP (PSF)	% PASS #200	DEPTH (ft.)	SAMPLES	BLOWS/6 IN	GRAPHIC LOG	USCS CLASS	MATERIALS DESCRIPTION	REMARKS
				1				SM	SAND, silty, organic, loose, damp, gray, with roots, topsoil.	
				2				SM	SAND, silty, medium dense, moist, gray and reddish brown.	
				3					With some cementation.	
				4						
				5					Reduction in fines, gray.	
				6					Bottom of excavation at 6.0 feet. No free groundwater observed.	
				7						
				8						
				9						
				10						
				11						

HOLE NUMBER TP-5

PROJECT Cutten Subdivision
JOB NUMBER 099112
LOCATION Cutten, CA
DATE DRILLED 7/6/99
GROUND SURFACE ELEVATION
SAMPLER TYPE 2.5" Brass Shelby Tubes, Hand Driven
EXCAVATION METHOD Backhoe
LOGGED BY CC
TOTAL DEPTH OF HOLE 7.0 ft.

MOISTURE (%)	DRY DEN (PCF)	UNC CMP (PSF)	% PASS #200	DEPTH (ft.)	SAMPLES	BLOWS/6 IN	GRAPHIC LOG	USCS CLASS	MATERIALS DESCRIPTION	REMARKS
				0				SM	SAND, fine, silty, organic, loose, moist, gray, with roots and forest debris, topsoil.	
				1				SM	SAND, fine, silty, medium dense, moist, light brown.	
21.1	101	4860	—	2		15				Liquid Limit = 31.2% Plasticity Index = 15%
				3						
				4						
				5					Reduction in fines, coarse sand.	
				6						
				7					Bottom of excavation at 7.0 feet. No free groundwater observed.	
				8						
				9						
				10						
				11						

HOLE NUMBER TP-6

PROJECT Cutten Subdivision
LOCATION Cutten, CA
GROUND SURFACE ELEVATION
EXCAVATION METHOD Backhoe
LOGGED BY CC

JOB NUMBER 099112
DATE DRILLED 7/6/99
SAMPLER TYPE 2.5" Brass Shelby Tubes, Hand Driven
TOTAL DEPTH OF HOLE 8.0 ft.

MOISTURE (%)	DRY DEN (PCF)	UNC CMP (PSF)	% PASS #200	DEPTH (ft.)	SAMPLES	BLOWS/6 IN	GRAPHIC LOG	USCS CLASS	MATERIALS DESCRIPTION	REMARKS
				0				SM PT	FILL, wood debris, organics, and fine sand, silty, loose, damp, brown, with roots, topsoil.	
				3				SM	SAND, fine, silty, medium dense, moist, light brown.	
				8					Bottom of excavation at 8.0 feet. No free groundwater observed.	

HOLE NUMBER TP-7

PROJECT Cutten Subdivision
JOB NUMBER 099112
LOCATION Cutten, CA
DATE DRILLED 7/7/99
GROUND SURFACE ELEVATION
SAMPLER TYPE 2.5" Brass Shelby Tubes, Hand Driven
EXCAVATION METHOD Backhoe
LOGGED BY CC
TOTAL DEPTH OF HOLE 5.0 ft.

MOISTURE (%)	DRY DEN (PCF)	UNC CMP (PSF)	% PASS #200	DEPTH (ft.)	SAMPLES	BLOWS/6 IN	GRAPHIC LOG	USCS CLASS	MATERIALS DESCRIPTION	REMARKS
				0				SM	SAND, fine, silty, organic, loose, moist, gray, with wood debris, topsoil.	
								SC	SAND, fine, clayey, silty, medium dense, moist, reddish brown and brown, partially cemented.	
27.0	88	—	45.7	3		10				Percent Passing U.S. Sieve #16 = 99.9% #30 = 99.7% #50 = 93.6% #100 = 53.3% #200 = 45.7%
				5					Bottom of excavation at 5.0 feet. No free groundwater observed.	

HOLE NUMBER TP-8

PROJECT Cutten Subdivision
LOCATION Cutten, CA
GROUND SURFACE ELEVATION
EXCAVATION METHOD Backhoe
LOGGED BY CC

JOB NUMBER 099112
DATE DRILLED 7/7/99
SAMPLER TYPE 2.5" Brass Shelby Tubes, Hand Driven
TOTAL DEPTH OF HOLE 6.5 ft.

MOISTURE (%)	DRY DEN (PCF)	UNC CMP (PSF)	% PASS #200	DEPTH (ft.)	SAMPLES	BLOWS/6 IN	GRAPHIC LOG	USCS CLASS	MATERIALS DESCRIPTION	REMARKS
				0				SM	SAND, fine, silty, organic, loose, moist, gray, with roots and forest debris, topsoil.	
				1				CL	CLAY, silty, fine sandy, stiff, moist, moist, reddish brown, brown, and yellowish brown.	
				2						
				3						
				4						
				5						
				6						
				7					Bottom of excavation at 6.5 feet. No free groundwater observed.	
				8						
				9						
				10						
				11						

HOLE NUMBER TP-9

PROJECT Cutten Subdivision
JOB NUMBER 099112
LOCATION Cutten, CA
DATE DRILLED 7/7/99
GROUND SURFACE ELEVATION
SAMPLER TYPE 2.5" Brass Shelby Tubes, Hand Driven
EXCAVATION METHOD Backhoe
LOGGED BY CC
TOTAL DEPTH OF HOLE 6.0 ft.

MOISTURE (%)	DRY DEN (PCF)	UNC CMP (PSF)	% PASS #200	DEPTH (ft.)	SAMPLES	BLOWS/6 IN	GRAPHIC LOG	USCS CLASS	MATERIALS DESCRIPTION	REMARKS
				0				SM	SAND, fine, silty, organic, loose, moist, gray, with roots and forest debris, topsoil.	
								SM	SAND, fine, silty, clayey, medium dense, moist, reddish brown and yellowish brown.	
26.6	82	2770	—	2		9				
				6					Bottom of excavation at 6.0 feet. No free groundwater observed.	

HOLE NUMBER TP-10

PROJECT Cutten Subdivision
JOB NUMBER 099112
LOCATION Cutten, CA
DATE DRILLED 7/7/99
GROUND SURFACE ELEVATION
SAMPLER TYPE 2.5" Brass Shelby Tubes, Hand Driven
EXCAVATION METHOD Backhoe
LOGGED BY CC
TOTAL DEPTH OF HOLE 6.0 ft.

MOISTURE (%)	DRY DEN (PCF)	UNC CMP (PSF)	% PASS #200	DEPTH (ft.)	SAMPLES	BLOWS/6 IN	GRAPHIC LOG	USCS CLASS	MATERIALS DESCRIPTION	REMARKS
				0				SM	SAND, fine, silty, organic, loose, moist, gray, with roots and forest debris, and vegetation, topsoil.	
								SC	SAND, fine, slightly clayey, loose to medium dense, moist to wet, gray and reddish brown.	
17.8	107	—	16.2	2		4				Percent Passing U.S. Sieve #30 = 98.7% #50 = 75.5% #100 = 21.3% #200 = 16.2%
				5					Water pouring into test pit, flowing sands, sidewalls collasping.	
				6					Bottom of excavation at 6.0 feet.	

HOLE NUMBER TP-11

PROJECT Cutten Subdivision
JOB NUMBER 099112
LOCATION Cutten, CA
DATE DRILLED 7/7/99
GROUND SURFACE ELEVATION
SAMPLER TYPE 2.5" Brass Shelby Tubes, Hand Driven
EXCAVATION METHOD Backhoe
LOGGED BY CC
TOTAL DEPTH OF HOLE 5.5 ft.

MOISTURE (%)	DRY DEN (PCF)	UNC CMP (PSF)	% PASS #200	DEPTH (ft.)	SAMPLES	BLOWS/6 IN	GRAPHIC LOG	USCS CLASS	MATERIALS DESCRIPTION	REMARKS
				0				SM	SAND, fine, silty, organic, loose, moist, gray, with roots and wood debris, topsoil.	
				1				SM	SAND, fine, silty, clayey, medium dense, damp, gray and reddish brown.	
				2						
				3						
				4						
				5						
				6					Bottom of excavation at 5.5 feet. No free groundwater observed.	
				7						
				8						
				9						
				10						
				11						

HOLE NUMBER TP-12

PROJECT Cutten Subdivision
JOB NUMBER 099112
LOCATION Cutten, CA
DATE DRILLED 7/7/99
GROUND SURFACE ELEVATION
SAMPLER TYPE 2.5" Brass Shelby Tubes, Hand Driven
EXCAVATION METHOD Backhoe
LOGGED BY CC
TOTAL DEPTH OF HOLE 7.0 ft.

MOISTURE (%)	DRY DEN (PCF)	UNC CMP (PSF)	% PASS #200	DEPTH (ft.)	SAMPLES	BLOWS/6 IN	GRAPHIC LOG	USCS CLASS	MATERIALS DESCRIPTION	REMARKS
				0				SM	SAND, fine, silty, organic, loose, moist, gray, with roots and wood debris, topsoil.	
				1				SC	SAND, fine, clayey, silty, medium dense, yellowish brown, with cementation.	
18.2	89	—	—	3		5				
				4						
				5						
				6						
				7					Bottom of excavation at 7.0 feet. No free groundwater observed.	
				8						
				9						
				10						
				11						

HOLE NUMBER TP-13

PROJECT Cutten Subdivision
JOB NUMBER 099112
LOCATION Cutten, CA
DATE DRILLED 7/7/99
GROUND SURFACE ELEVATION
SAMPLER TYPE 2.5" Brass Shelby Tubes, Hand Driven
EXCAVATION METHOD Backhoe
LOGGED BY CC
TOTAL DEPTH OF HOLE 4.0 ft.

MOISTURE (%)	DRY DEN (PCF)	UNC CMP (PSF)	% PASS #200	DEPTH (ft.)	SAMPLES	BLOWS/6 IN	GRAPHIC LOG	USCS CLASS	MATERIALS DESCRIPTION	REMARKS
				0				SM	SAND, fine, silty, organic, loose, moist, gray, with roots and wood debris, topsoil.	
				1						
				2				SC	SAND, fine, clayey, medium dense to dense, damp reddish brown.	
21.0	99	—	63.9	3		11				Percent Passing U.S. Sieve #8 = 100% #16 = 99.9% #30 = 99.8% #50 = 96.5% #100 = 72.0% #200 = 63.9%
				4					Bottom of excavation at 4.0 feet. No free groundwater observed.	
				5						
				6						
				7						
				8						
				9						
				10						
				11						

HOLE NUMBER TP-14

PROJECT Cutten Subdivision
JOB NUMBER 099112
LOCATION Cutten, CA
DATE DRILLED 7/7/99
GROUND SURFACE ELEVATION
SAMPLER TYPE 2.5" Brass Shelby Tubes, Hand Driven
EXCAVATION METHOD Backhoe
LOGGED BY CC
TOTAL DEPTH OF HOLE 6.3 ft.

MOISTURE (%)	DRY DEN (PCF)	UNC CMP (PSF)	% PASS #200	DEPTH (ft.)	SAMPLES	BLOWS/6 IN	GRAPHIC LOG	USCS CLASS	MATERIALS DESCRIPTION	REMARKS
				0				SM	SAND, fine, silty, organic, loose, moist, gray, with roots and wood debris, topsoil.	
								SC	SAND, fine, clayey, medium dense, damp reddish brown and gray, with roots to ≈3'.	
				1						
				2						
				3						
				4					Some sandy clay regions.	
				5						
				6						
				7					Bottom of excavation at 6.3 feet. No free groundwater observed.	
				8						
				9						
				10						
				11						

HOLE NUMBER TP-15

PROJECT Cutten Subdivision
JOB NUMBER 099112
LOCATION Cutten, CA
DATE DRILLED 7/7/99
GROUND SURFACE ELEVATION
SAMPLER TYPE 2.5" Brass Shelby Tubes, Hand Driven
EXCAVATION METHOD Hand Auger
LOGGED BY CC
TOTAL DEPTH OF HOLE 4.0 ft.

MOISTURE (%)	DRY DEN (PCF)	UNC CMP (PSF)	% PASS #200	DEPTH (ft.)	SAMPLES	BLOWS/6 IN	GRAPHIC LOG	USCS CLASS	MATERIALS DESCRIPTION	REMARKS
				0				SM	SAND, fine, silty, organic, loose, moist, gray, with roots and wood debris, topsoil.	
				1				SC CL	SAND, fine, clayey, or CLAY, sandy, medium dense/stiff, damp to dry, reddish brown.	
				2				SC	SAND, clayey, medium dense, damp, brown.	
				3				SM	SAND, slightly silty, medium dense, damp, brown, with some cementation.	
				4					Bottom of excavation at 4.0 feet. No free groundwater observed.	
				5						
				6						
				7						
				8						
				9						
				10						
				11						

HOLE NUMBER TP-16

PROJECT Cutten Subdivision
JOB NUMBER 099112
LOCATION Cutten, CA
DATE DRILLED 7/7/99
GROUND SURFACE ELEVATION
SAMPLER TYPE 2.5" Brass Shelby Tubes, Hand Driven
EXCAVATION METHOD Hand Auger
LOGGED BY CC
TOTAL DEPTH OF HOLE 4.3 ft.

MOISTURE (%)	DRY DEN (PCF)	UNC CMP (PSF)	% PASS #200	DEPTH (ft.)	SAMPLES	BLOWS/6 IN	GRAPHIC LOG	USCS CLASS	MATERIALS DESCRIPTION	REMARKS
				0				SM ML	SAND, fine, silty, or SILT, fine sandy, medium dense/stiff, dry, light brown, with roots to ~2.5'.	
				1						
				2					With some cementation.	
				3				SC	SAND, clayey, slightly silty, medium dense, damp, reddish brown.	
				4					Reduction in clay, increase in silt, loose.	
									Bottom of excavation at 4.3 feet. No free groundwater observed.	
				5						
				6						
				7						
				8						
				9						
				10						
				11						

APPENDIX F

Preliminary Hydrologic / Drainage Study

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ONTIVEROS & ASSOCIATES
INC
CONSULTING ENGINEERS AND SURVEYORS

PRELIMINARY
HYDROLOGIC / DRAINAGE STUDY

McKAY RANCH SUBDIVISION
PLANNED DEVELOPMENT

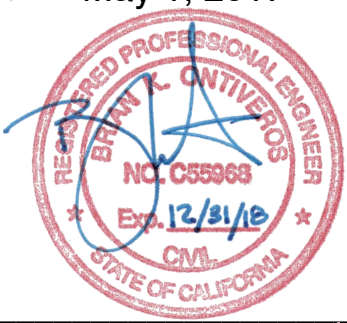
Cutten – Eureka Area

APN's
017-032-003
017-071-004 & 017-071-009
017-072-002 & 017-072-003
017-073-007 & 017-073-009

Prepared for

Kramer Investment Corp.
1589 Myrtle Ave.
Eureka, CA

May 1, 2017



BRIAN K. ONTIVEROS
Civil Engineer – C55968

404 N. Fortuna Blvd. • Fortuna, CA 95540 • (707) 725-7410 • FAX (707) 725-7411

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INTRODUCTION & PROJECT DESCRIPTION

The McKay Ranch Planned Development (hereinafter "project" or "property), is a 320-unit development comprised of a mixture of multiple-family and single-family lots surrounding the Redwood Fields baseball complex in the Cutten area of Eureka. The site is approximately 81 acres in size and is identified as Assessor's Parcel Numbers 017-032-003, 017-071-004, 017-071-009, 017-072-002, 017-072-003, 017-073-007 & 017-073-009. A Location Map illustrating the location of the property is enclosed as Appendix 1 of this Report. The purpose of this Preliminary Drainage Analysis is to provide County staff and the site owner/developer with the information needed to make informed decisions regarding the development of the subject property.

The property is currently undeveloped. Most the proposed development area occupies forested upland surfaces above Ryan Creek and several un-named tributaries. The upper portion of the property is generally flat on the Westerly side with a gentle grade that increasingly slopes to the east eventually falling off with steep grades into the various natural gulches surrounding the property. Currently no drainage infrastructure exists on the site. Storm water runoff sheet flows across the property in the easterly direction gathering in the various channels on the easterly side eventually flowing onto the neighboring parcels currently owned by Humboldt County and known as the McKay Community Forest.

The plans include varying sized lots for the residential structures with a road network throughout the development. The following is a summary of the proposed developed condition of the site:

- 146 Single-Family House Lots (30 acres)
- 6 Multi-Family Lots comprised of 174 units (19 acres)
- 2 Commercial Lots (2 acres)
- Roads (10 acres)
- Undeveloped (20 acres)

MS4 DRAINAGE DESIGN STANDARDS

Humboldt County Public Works staff have indicated that, for post-construction stormwater control and drainage design, the project will need to meet the requirements of the State Water Resources Control Board (SWRCB) Water Quality Order No. 2013-0001-DWQ Waste Discharge Requirements for Storm Water Discharges from Small Municipal Separate Storm Sewer Systems (MS4) General Permit (hereinafter referred to as “MS4 Permit”). Section E.12 of the MS4 permit is the Post Construction Storm Water Management Program, established for MS4 municipalities such as Humboldt County, and includes standards and regulations pertaining to the numeric sizing criteria for stormwater detention and treatment.

PART 1 - As stated in Section E.12.e.ii.c of the MS4 Permit, facilities shall be designed to evapotranspire, infiltrate, harvest/use, or bio-treat storm water to meet at least one of the following hydraulic sizing design criteria:

Volumetric Criteria:

1. The maximized capture storm water volume for the tributary area, on the basis of historical rainfall records, determined using the formula and volume capture coefficients in Urban Runoff Quality Management, WEF Manual of Practice No. 23/ASCE Manual of Practice No. 87 (i.e., the 85th percentile 24-hour storm event runoff); or
2. The volume of annual runoff required to achieve 80 percent or more capture, determined in accordance with the methodology in Section 5 of the CASQA Stormwater Best Management Practice Handbook, New Development and Redevelopment (2003), using local rainfall data

Flow-based Criteria:

1. The flow of runoff produced from a rain event equal to at least 0.2 inches per hour intensity; or
2. The flow of runoff produced from a rain event equal to at least 2 times the 85th percentile hourly rainfall intensity as determined from local rainfall records

PART 2 - Additionally as stated in Section E.12.f.ii.a of the MS4 Permit, for projects over one acres in size: "Post-project runoff shall not exceed estimated pre-project flow rate for the 2-year, 24-hour storm."

MS4 DRAINAGE IMPLEMENTATION

According to Humboldt County's GIS Maps only a portion of the site is within the County's MS4 permit jurisdiction (Appendix 2). This area has been overlaid onto the site development map as shown in Appendix 3.

Each individual parcel within the development will be required to comply with the requirements noted in part 1 above. This can easily be accomplished with a combination of Low Impact Development (LID) features including infiltration galleries, bioswales, rain gardens, rain barrels, trees, etc. At the time improvement plans are prepared for each phase of the development a typical LID plan shall be prepared for the single-family residential lots. This typical design may be modified as required for each individual house permit/construction as long as the minimum requirements are adhered to.

LID designs for the multi-family and commercial properties will require individual attention as the layout and design for these properties can vary greatly. These lots are currently shown with plenty of open space and should be able to accommodate the MS4 permit design criteria.

All roadways within the subdivision are shown with a depressed parkway adjacent to the road surface. This is intended to be used as a bioswale for the roadway drainage. Storm drain inlets will be located within the bioswales to receive drainage into the storm drain system for flows in excess of the 85th percentile storm. Once drainage is within the storm drain system it will be conveyed to the outlet for the drainage area. See Appendix 3 for the locations of the eight Drainage Management Areas (DMA) proposed for the site.

For each DMA within the MS4 permit area additional storm water detention is required as noted in Part 2 above. This applies to DMA 1 – 3. To determine the amount of detention required we looked at the hydrographs of the Pre-Development condition to that of the Post Development condition for each of the three DMAs within the MS4 permit area.

Peak runoff estimates used in this report were computed using the SCS TR-20 runoff method. The rainfall distribution used is a Type 1A 24-hr curve. Rainfall data was obtained from the NOAA Precipitation Frequency Data Server (PFDS) for the project location (see Appendix 4). The Curve Number (CN) used for the existing Pre-Development condition was 43 (Soil Type A with a woods/grass surface). The Time of Concentration (TOC) was computed from a combination of 'sheet flow' and 'Shallow Concentrated Flow'. The resulting TOCs and peak flows for each DMA are shown in Table 1.

The CN used for the Post-Development condition was 77 (Soil Type A with a Residential 1/8 acre lot size). The Time of Concentration (TOC) was computed from a combination of 'sheet flow' and 'Shallow Concentrated Flow'. The resulting TOCs and peak flows for each DMA are shown in Table 1 below.

Drainage Management Area	Pre-Dev. TOC (min)	Pre-Dev. Peak Runoff (cfs)	Post-Dev. TOC (min)	Post-Dev. Peak Runoff (cfs)	Required Storage Volume (ft^3)	Potential Detention Area (ft^2)
DMA-1	74	0.05	35	2.2	46,277	23,400
DMA-2	78	0.03	30	1.6	33,413	20,100
DMA-3	73	0.01	6	0.6	10,455	10,400

Table 1 - Drainage Area Detention Storage Volume for the 2-yr, 24-hr Storm

As seen in the above table, the time of concentration for the existing condition is rather large due to the existing wooded condition of the site. This results in a very small runoff for the 2-yr, 24-hr storm event. Limiting the post-development runoff to that of the pre-development runoff requires an amount of storage as shown in Table 1. The Drainage Area Map in Appendix 3 show the potential locations for the detention areas. Using the detention areas shown results in a 1' – 2' water depth in each of the detention basins. Appendix 5 contains the summary drainage hydrographs for DMAs 1 – 3.

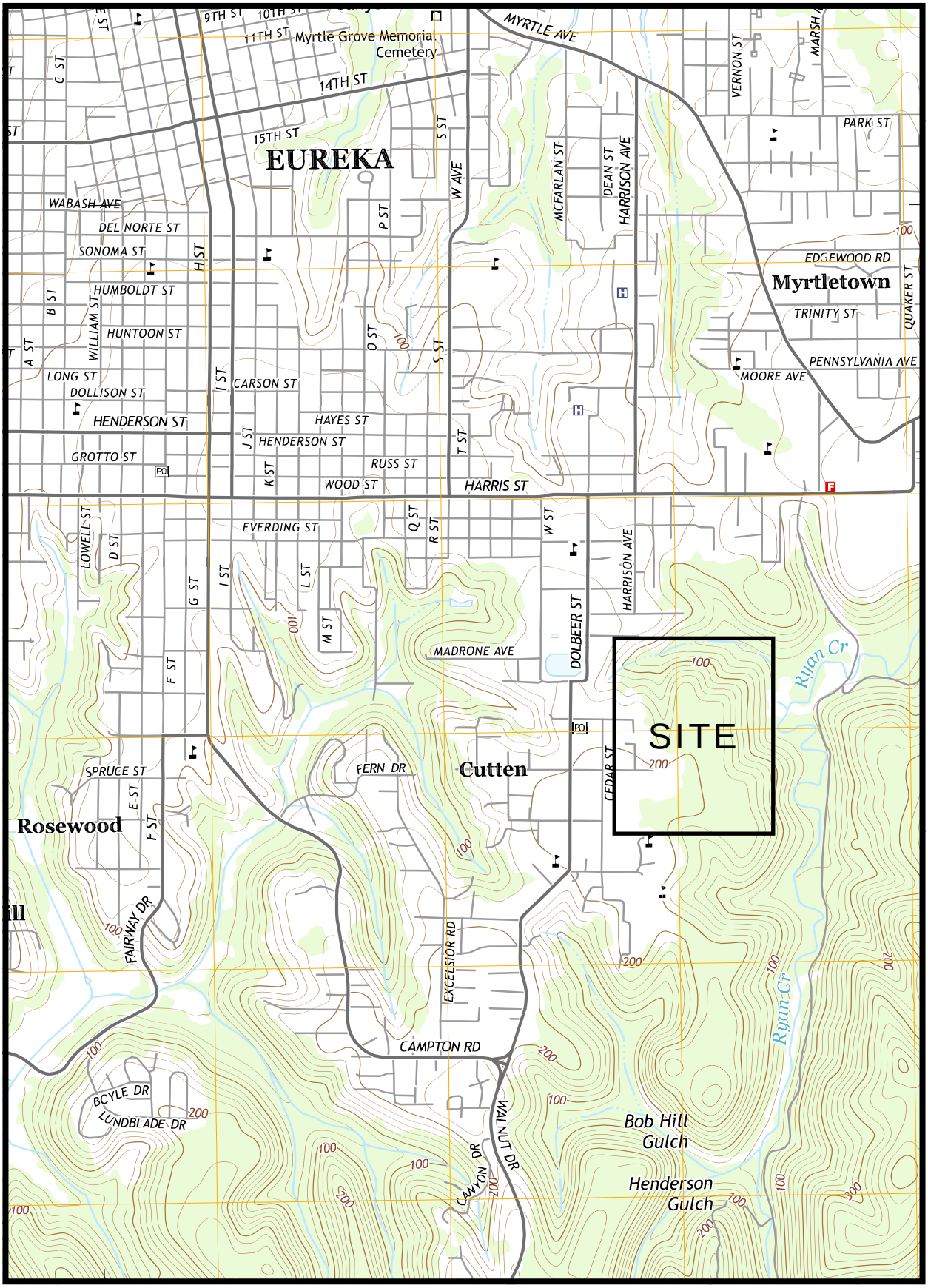
As noted earlier, this information is preliminary and shall be reviewed / revised during the design of each phase of the subdivision. This information has been developed to show that the proposed development can comply with the County's MS4 permit and that drainage infrastructure can be provided to properly drain the development.

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APPENDIX 1

Location Map

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LOCATION MAP - MCKAY RANCH PLANNED DEVELOPMENT

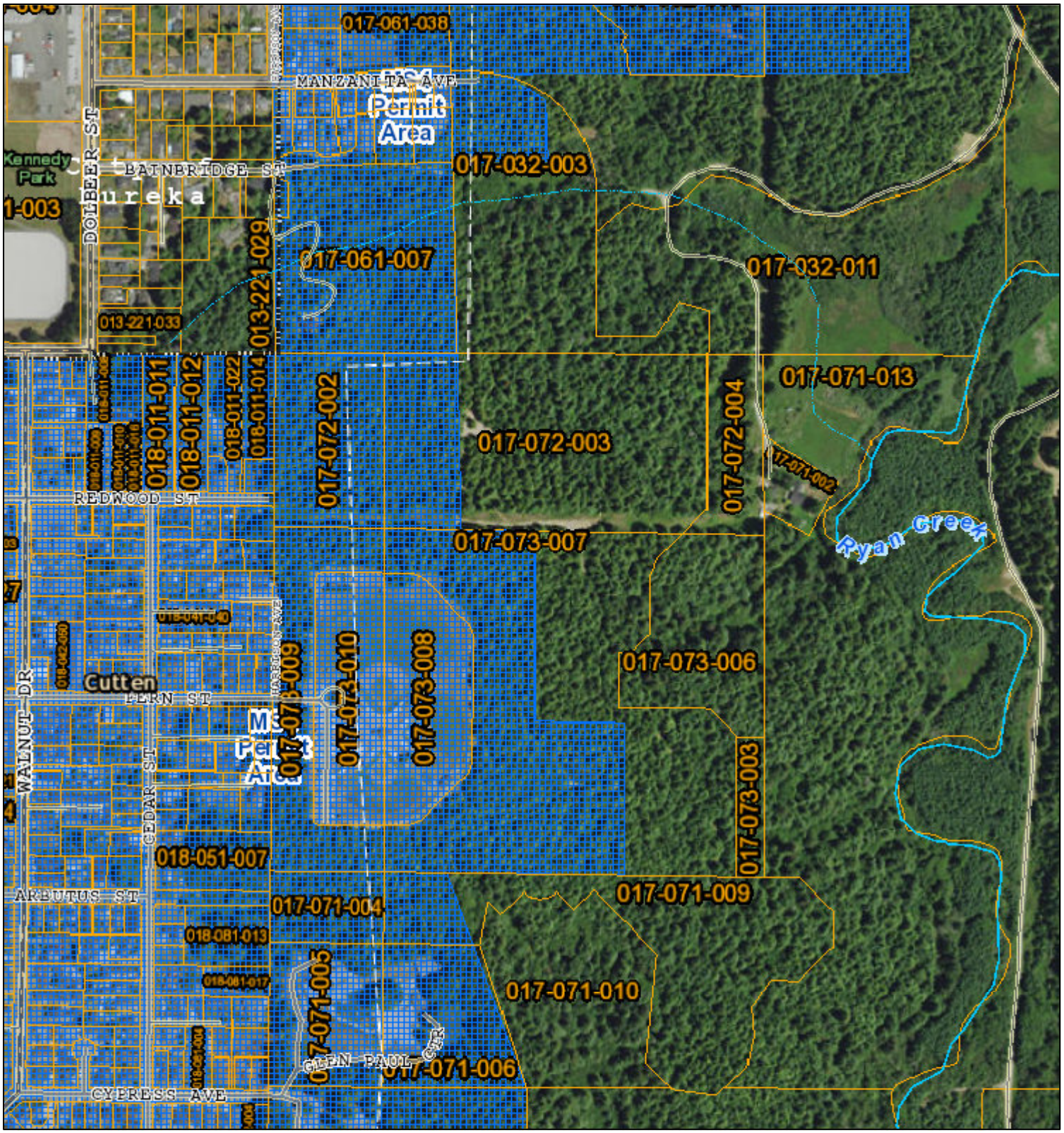
NTS

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APPENDIX 2

Humboldt County GIS MS4 Area Map

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McKay Ranch MS4 Permit Area

Humboldt County Planning and Building Department

0 300 600 1,200 Feet

0 0.05 0.1 0.2 Miles

RF= 1:7,716 1 in = 643 ft

N W E S

Highways and Roads

- Principal Arterials
- Minor Arterials
- Major Collectors
- Minor Collectors
- Local Roads
- Private or Unclassified
- Major River or Stream

Blue Line Streams

- Perennial 1-3
- Perennial >4
- Intermittent
- Subsurface
- City Boundary
- Counties
- Parcels
- MS4 Permit Area

Printed: May 1, 2017 Web AppBuilder 2.0 for ArcGIS

Map Disclaimer:
While every effort has been made to assure the accuracy of this information, it should be understood that it does not have the force & effect of law, rule, or regulation. Should any difference or error occur, the law will take precedence.

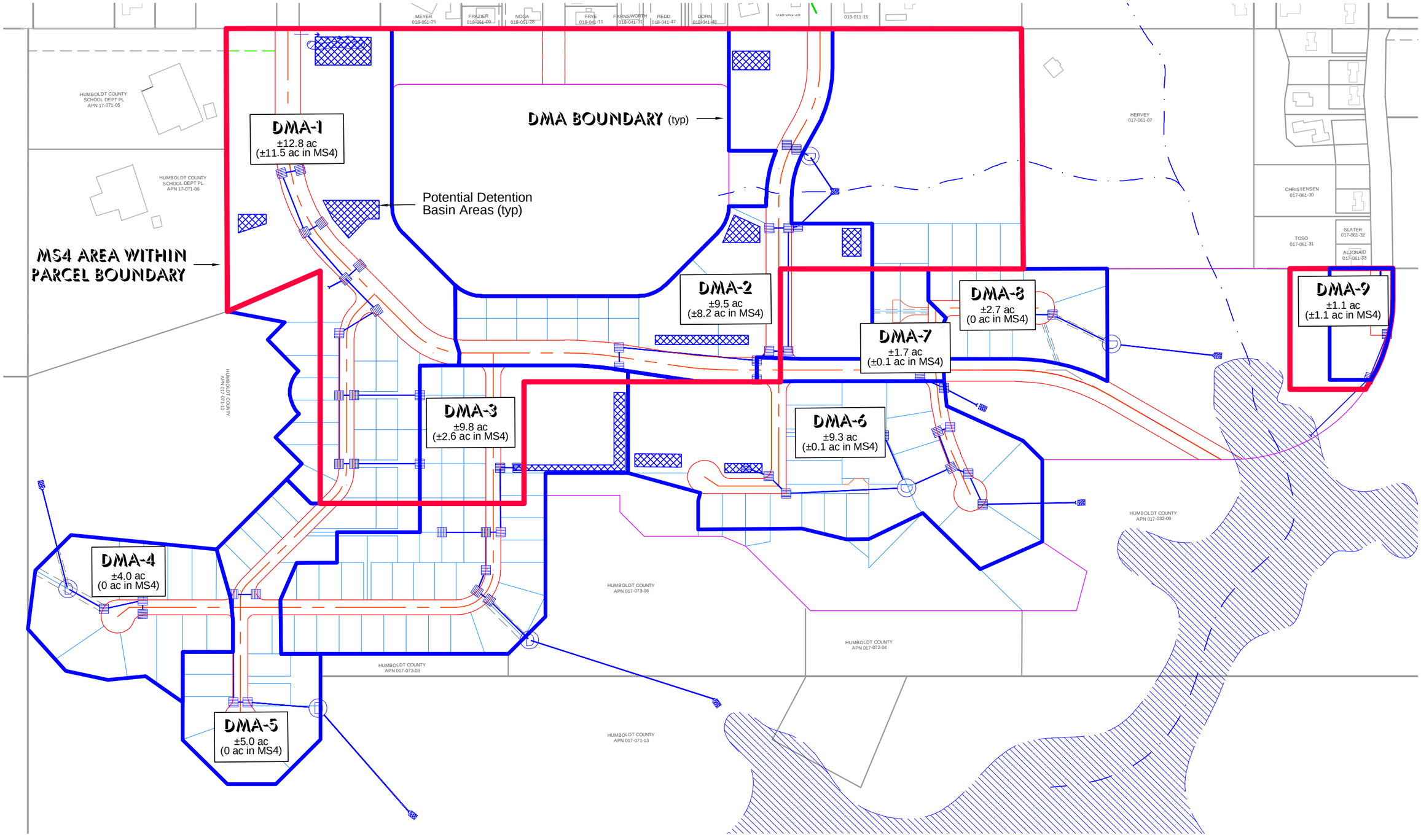
Source: NRCS, Humboldt County GIS, Healthy Rural Roads, Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community, Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community, FRAP, FEMA, USGS

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APPENDIX 3

Drainage Area Map

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DRAINAGE AREAS PLAN

SCALE: NTS

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APPENDIX 4

Rainfall Data

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NOAA Atlas 14, Volume 6, Version 2
Location name: Eureka, California, USA*
Latitude: 40.7696°, Longitude: -124.1363°
Elevation: 199.31 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.129 (0.113-0.149)	0.165 (0.144-0.190)	0.214 (0.187-0.248)	0.257 (0.222-0.300)	0.320 (0.266-0.388)	0.371 (0.302-0.462)	0.427 (0.337-0.546)	0.487 (0.372-0.644)	0.575 (0.419-0.796)	0.648 (0.454-0.933)
10-min	0.185 (0.162-0.213)	0.236 (0.207-0.272)	0.307 (0.268-0.355)	0.369 (0.319-0.431)	0.458 (0.381-0.556)	0.532 (0.432-0.662)	0.612 (0.483-0.782)	0.698 (0.534-0.922)	0.824 (0.601-1.14)	0.928 (0.651-1.34)
15-min	0.224 (0.196-0.258)	0.285 (0.250-0.329)	0.371 (0.324-0.429)	0.446 (0.386-0.521)	0.554 (0.461-0.673)	0.644 (0.523-0.800)	0.740 (0.584-0.946)	0.844 (0.646-1.12)	0.996 (0.727-1.38)	1.12 (0.787-1.62)
30-min	0.305 (0.267-0.351)	0.388 (0.340-0.448)	0.506 (0.442-0.585)	0.607 (0.525-0.709)	0.755 (0.628-0.916)	0.877 (0.712-1.09)	1.01 (0.795-1.29)	1.15 (0.879-1.52)	1.36 (0.990-1.88)	1.53 (1.07-2.20)
60-min	0.429 (0.376-0.494)	0.547 (0.479-0.630)	0.712 (0.621-0.823)	0.855 (0.739-0.998)	1.06 (0.884-1.29)	1.23 (1.00-1.53)	1.42 (1.12-1.81)	1.62 (1.24-2.14)	1.91 (1.39-2.65)	2.15 (1.51-3.10)
2-hr	0.669 (0.587-0.770)	0.828 (0.726-0.955)	1.05 (0.919-1.22)	1.25 (1.08-1.46)	1.53 (1.27-1.86)	1.77 (1.44-2.20)	2.02 (1.59-2.58)	2.30 (1.76-3.03)	2.70 (1.97-3.74)	3.03 (2.13-4.37)
3-hr	0.862 (0.756-0.992)	1.05 (0.925-1.22)	1.33 (1.16-1.53)	1.56 (1.35-1.82)	1.91 (1.59-2.31)	2.19 (1.78-2.72)	2.49 (1.97-3.19)	2.83 (2.16-3.73)	3.31 (2.41-4.58)	3.71 (2.60-5.34)
6-hr	1.28 (1.12-1.47)	1.55 (1.36-1.78)	1.92 (1.68-2.22)	2.24 (1.94-2.62)	2.70 (2.25-3.28)	3.08 (2.50-3.83)	3.48 (2.75-4.45)	3.92 (3.00-5.18)	4.55 (3.32-6.30)	5.07 (3.55-7.30)
12-hr	1.86 (1.63-2.14)	2.23 (1.95-2.57)	2.74 (2.40-3.17)	3.18 (2.75-3.71)	3.79 (3.16-4.61)	4.29 (3.48-5.34)	4.81 (3.80-6.16)	5.37 (4.11-7.10)	6.17 (4.50-8.54)	6.81 (4.78-9.81)
24-hr	2.61 (2.33-2.97)	3.14 (2.80-3.58)	3.85 (3.43-4.40)	4.44 (3.93-5.11)	5.26 (4.52-6.25)	5.91 (4.98-7.16)	6.59 (5.43-8.16)	7.30 (5.87-9.27)	8.29 (6.42-10.9)	9.09 (6.81-12.4)
2-day	3.41 (3.05-3.88)	4.13 (3.69-4.71)	5.08 (4.53-5.81)	5.86 (5.19-6.75)	6.93 (5.96-8.23)	7.77 (6.54-9.40)	8.62 (7.11-10.7)	9.51 (7.64-12.1)	10.7 (8.29-14.1)	11.7 (8.75-15.9)
3-day	3.88 (3.48-4.42)	4.73 (4.23-5.40)	5.84 (5.21-6.68)	6.75 (5.98-7.78)	7.98 (6.86-9.48)	8.93 (7.53-10.8)	9.90 (8.16-12.3)	10.9 (8.75-13.8)	12.2 (9.47-16.2)	13.3 (9.97-18.1)
4-day	4.30 (3.85-4.90)	5.27 (4.71-6.01)	6.52 (5.82-7.46)	7.54 (6.67-8.68)	8.91 (7.65-10.6)	9.96 (8.39-12.1)	11.0 (9.08-13.6)	12.1 (9.73-15.4)	13.6 (10.5-17.9)	14.7 (11.0-20.0)
7-day	5.44 (4.87-6.20)	6.72 (6.01-7.67)	8.37 (7.47-9.57)	9.69 (8.58-11.2)	11.4 (9.83-13.6)	12.8 (10.8-15.5)	14.1 (11.6-17.5)	15.5 (12.4-19.6)	17.3 (13.3-22.8)	18.6 (14.0-25.4)
10-day	6.35 (5.68-7.24)	7.88 (7.05-8.99)	9.83 (8.77-11.2)	11.4 (10.1-13.1)	13.4 (11.5-15.9)	15.0 (12.6-18.1)	16.5 (13.6-20.4)	18.0 (14.5-22.9)	20.1 (15.5-26.5)	21.6 (16.2-29.4)
20-day	8.81 (7.89-10.0)	11.0 (9.79-12.5)	13.6 (12.2-15.6)	15.7 (13.9-18.1)	18.4 (15.8-21.9)	20.4 (17.2-24.7)	22.4 (18.4-27.7)	24.3 (19.5-30.9)	26.8 (20.7-35.4)	28.7 (21.5-39.1)
30-day	11.0 (9.83-12.5)	13.6 (12.2-15.5)	16.9 (15.0-19.3)	19.4 (17.1-22.3)	22.6 (19.4-26.8)	24.9 (21.0-30.2)	27.2 (22.4-33.7)	29.4 (23.6-37.4)	32.3 (25.0-42.6)	34.4 (25.8-46.9)
45-day	14.2 (12.7-16.2)	17.5 (15.7-20.0)	21.6 (19.3-24.7)	24.7 (21.9-28.4)	28.6 (24.6-34.0)	31.4 (26.5-38.0)	34.1 (28.1-42.2)	36.7 (29.5-46.7)	40.1 (31.0-52.9)	42.6 (31.9-57.9)
60-day	16.9 (15.1-19.3)	20.7 (18.5-23.6)	25.3 (22.6-28.9)	28.8 (25.5-33.2)	33.2 (28.5-39.4)	36.3 (30.6-44.0)	39.3 (32.4-48.7)	42.2 (33.9-53.6)	45.9 (35.5-60.5)	48.5 (36.4-66.0)

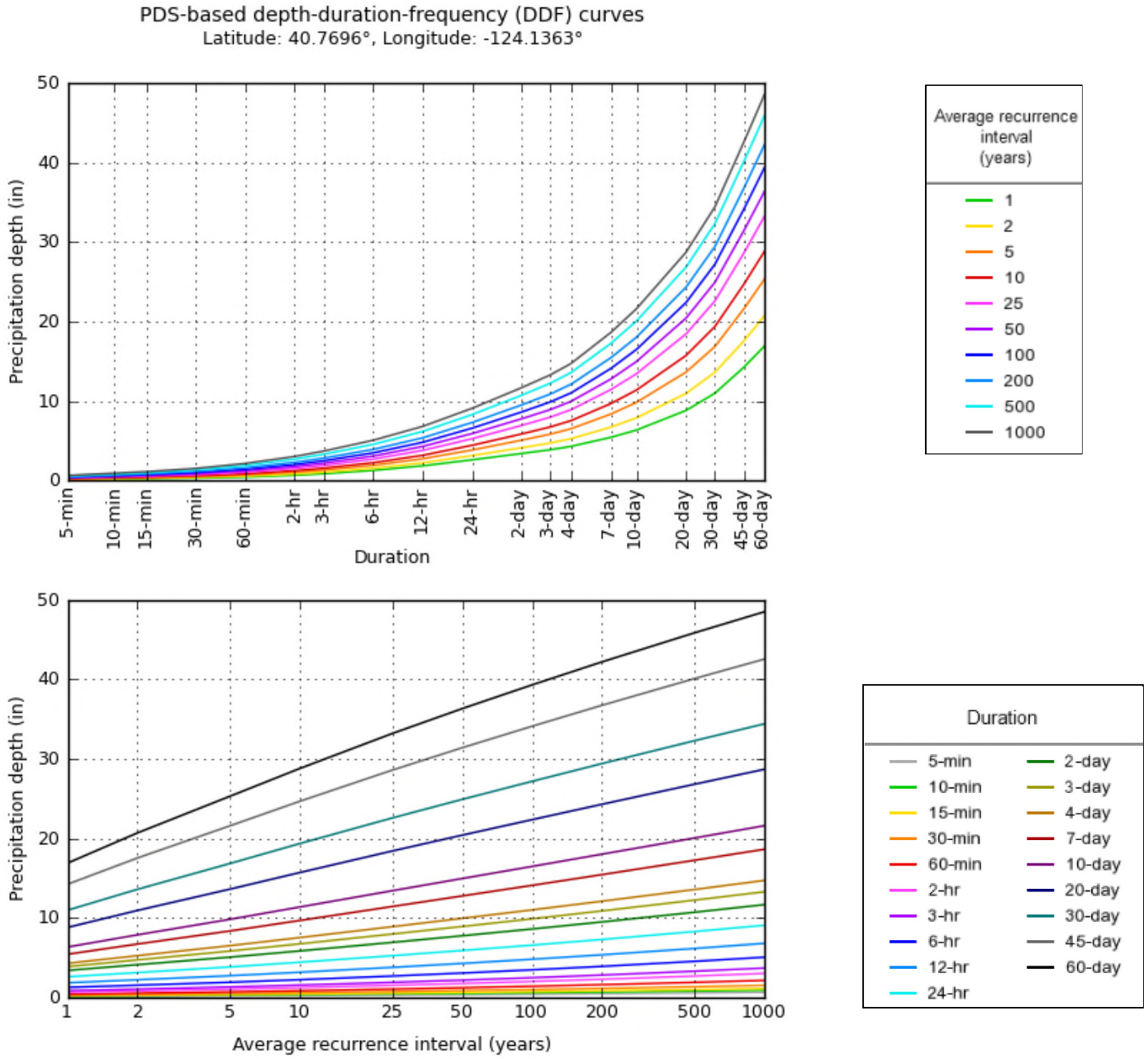
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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PF graphical



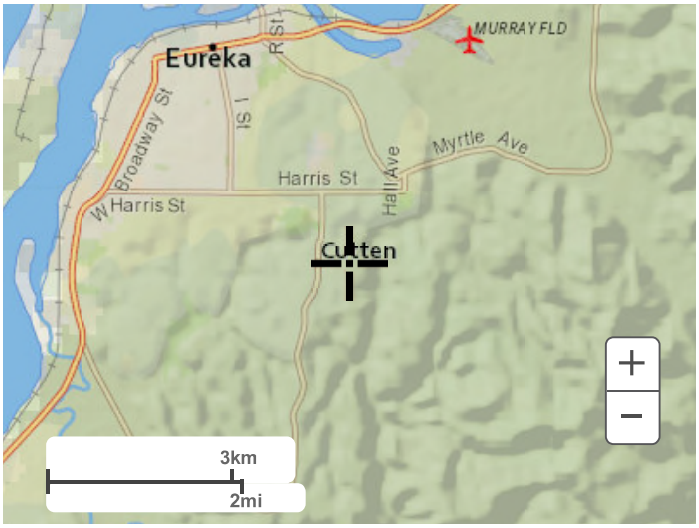
NOAA Atlas 14, Volume 6, Version 2

Created (GMT): Wed Mar 29 04:15:37 2017

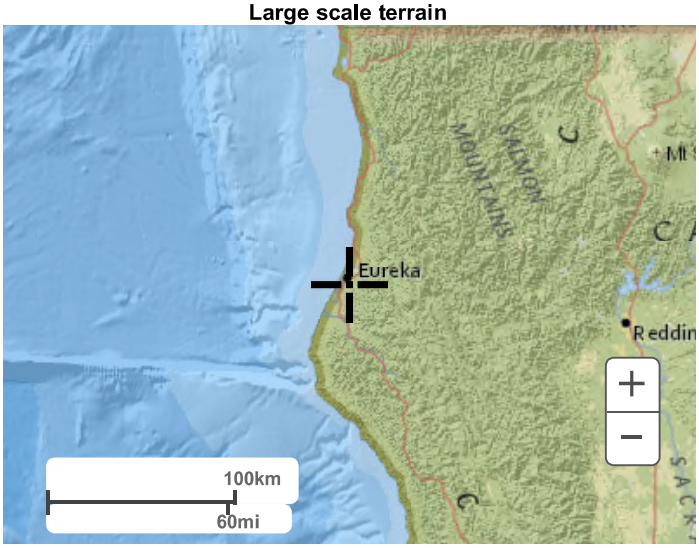
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Maps & aerials

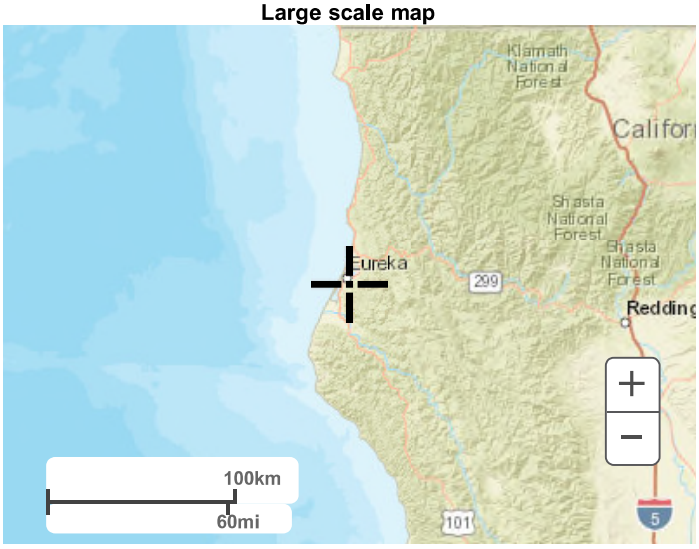
Small scale terrain



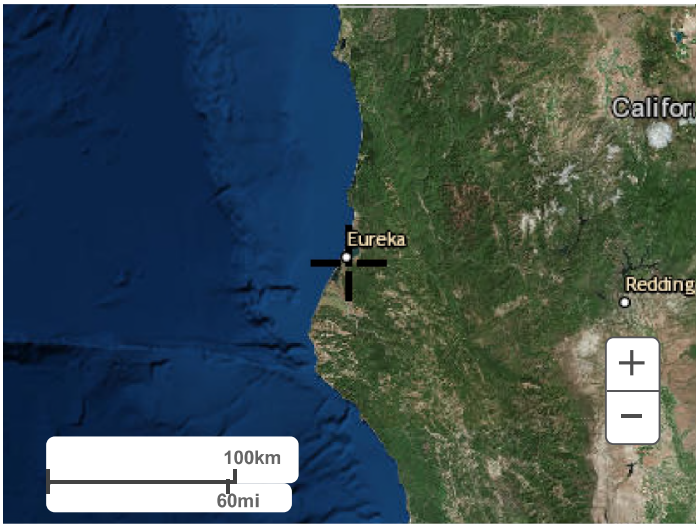
Large scale terrain



Large scale map



Large scale aerial



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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

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APPENDIX 5

Summary Drainage Hydrographs

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Summary for Subcatchment 1S: DMA-1 (Pre-Development)

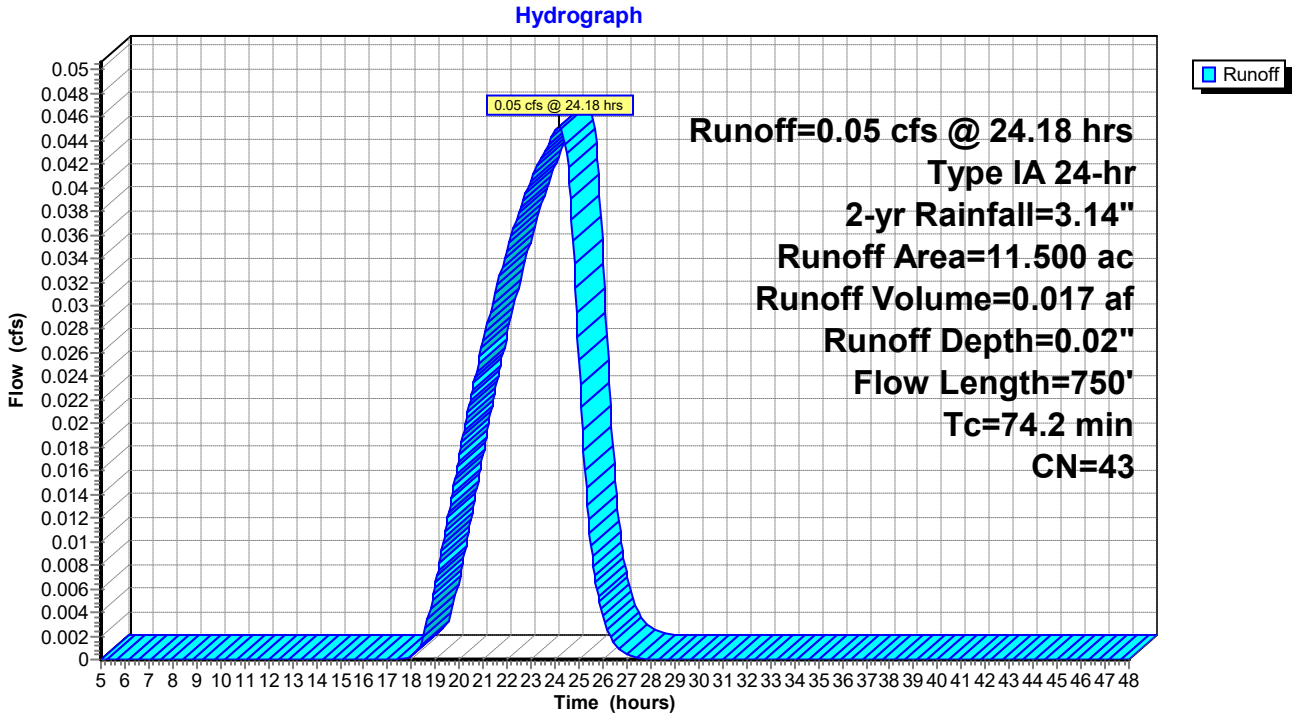
Runoff = 0.05 cfs @ 24.18 hrs, Volume= 0.017 af, Depth= 0.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2-yr Rainfall=3.14"

Area (ac)	CN	Description
11.500	43	Woods/grass comb., Fair, HSG A
11.500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
68.9	300	0.0100	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.14"
5.3	450	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
74.2	750	Total			

Subcatchment 1S: DMA-1 (Pre-Development)



Summary for Subcatchment 2S: DMA-1 (Post-Development)

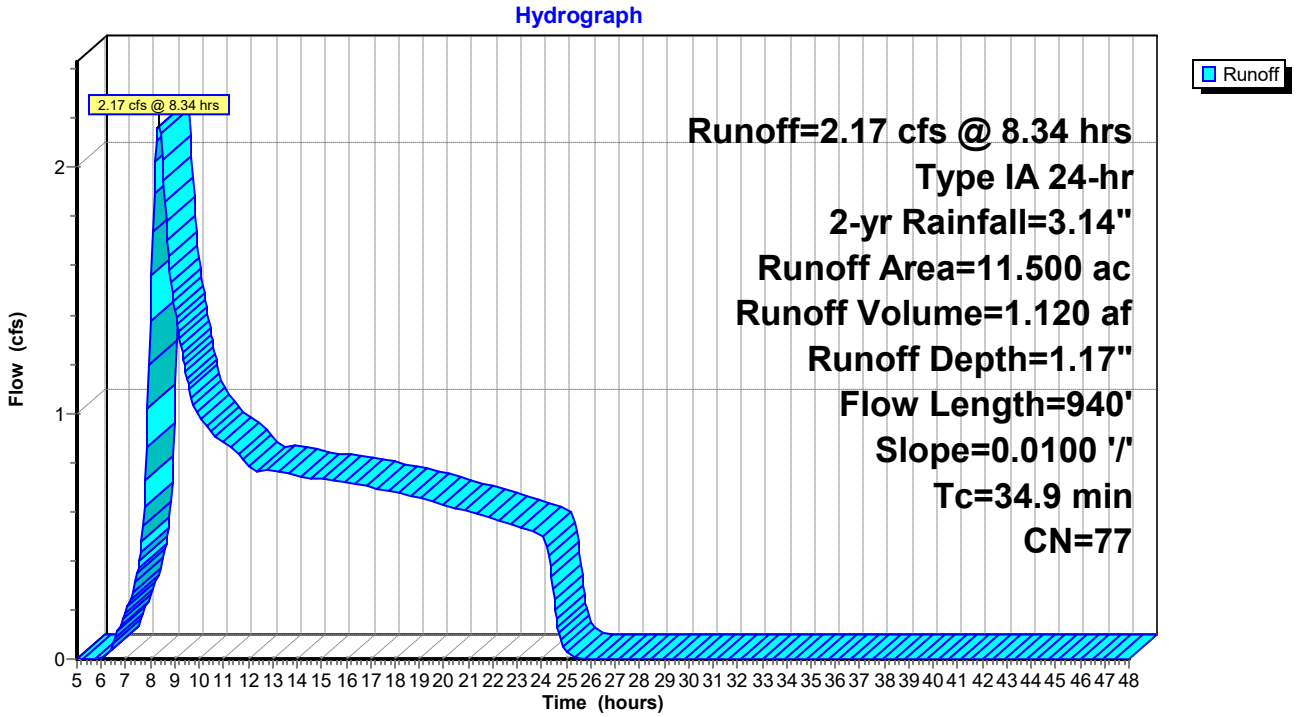
Runoff = 2.17 cfs @ 8.34 hrs, Volume= 1.120 af, Depth= 1.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2-yr Rainfall=3.14"

Area (ac)	CN	Description
11.500	77	1/8 acre lots, 65% imp, HSG A
4.025		35.00% Pervious Area
7.475		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.2	250	0.0100	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.14"
7.7	690	0.0100	1.50		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
34.9	940	Total			

Subcatchment 2S: DMA-1 (Post-Development)



Summary for Pond 3P: DMA-1 Pond

Inflow Area = 11.500 ac, 65.00% Impervious, Inflow Depth = 1.17" for 2-yr event
Inflow = 2.17 cfs @ 8.34 hrs, Volume= 1.120 af
Outflow = 0.05 cfs @ 24.87 hrs, Volume= 0.155 af, Atten= 98%, Lag= 991.6 min
Primary = 0.05 cfs @ 24.87 hrs, Volume= 0.155 af

Routing by Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 103.97' @ 24.87 hrs Surf.Area= 13,424 sf Storage= 46,277 cf

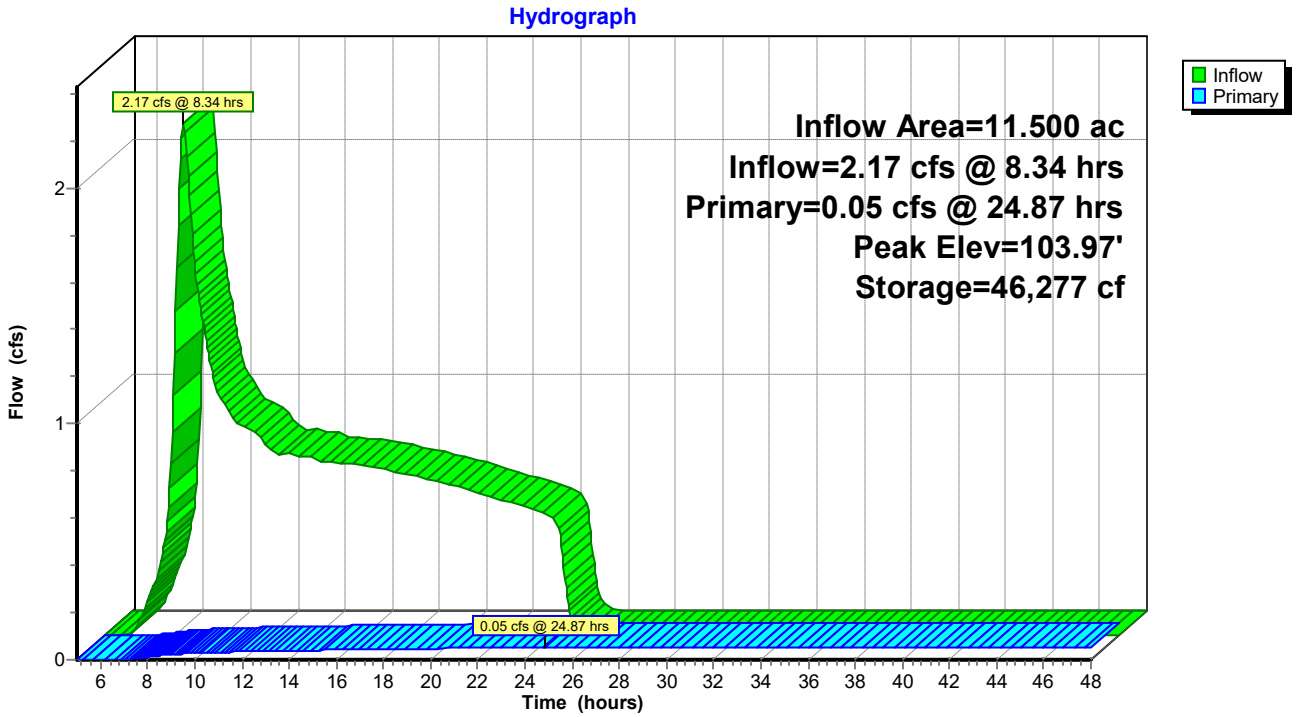
Plug-Flow detention time= 1,276.9 min calculated for 0.155 af (14% of inflow)
Center-of-Mass det. time= 891.3 min (1,762.5 - 871.2)

Volume	Invert	Avail.Storage	Storage Description
#1	100.00'	60,667 cf	**100.00'W x 100.00'L x 5.00'H Prismatoid Z=2.0**

Device	Routing	Invert	Outlet Devices
#1	Primary	100.00'	**18.0" Round Culvert** L= 100.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 100.00' / 95.00' S= 0.0500 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf
#2	Device 1	100.00'	**1.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.05 cfs @ 24.87 hrs HW=103.97' (Free Discharge)
↑**1=Culvert** (Passes 0.05 cfs of 15.26 cfs potential flow)
↑**2=Orifice/Grate** (Orifice Controls 0.05 cfs @ 9.54 fps)

Pond 3P: DMA-1 Pond



Summary for Subcatchment 4S: DMA-2 (Pre-Development)

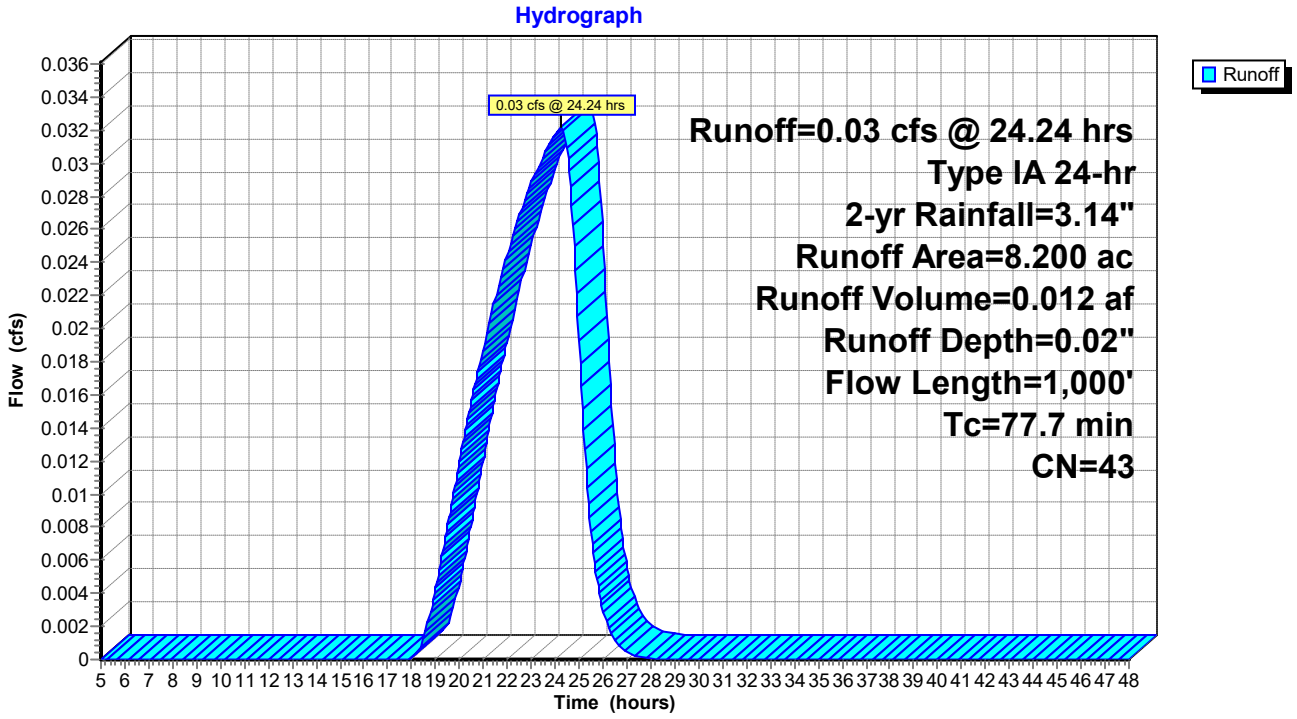
Runoff = 0.03 cfs @ 24.24 hrs, Volume= 0.012 af, Depth= 0.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2-yr Rainfall=3.14"

Area (ac)	CN	Description
8.200	43	Woods/grass comb., Fair, HSG A
8.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
68.9	300	0.0100	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.14"
8.8	700	0.0700	1.32		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
77.7	1,000	Total			

Subcatchment 4S: DMA-2 (Pre-Development)



Summary for Subcatchment 5S: DMA-2 (Post-Development)

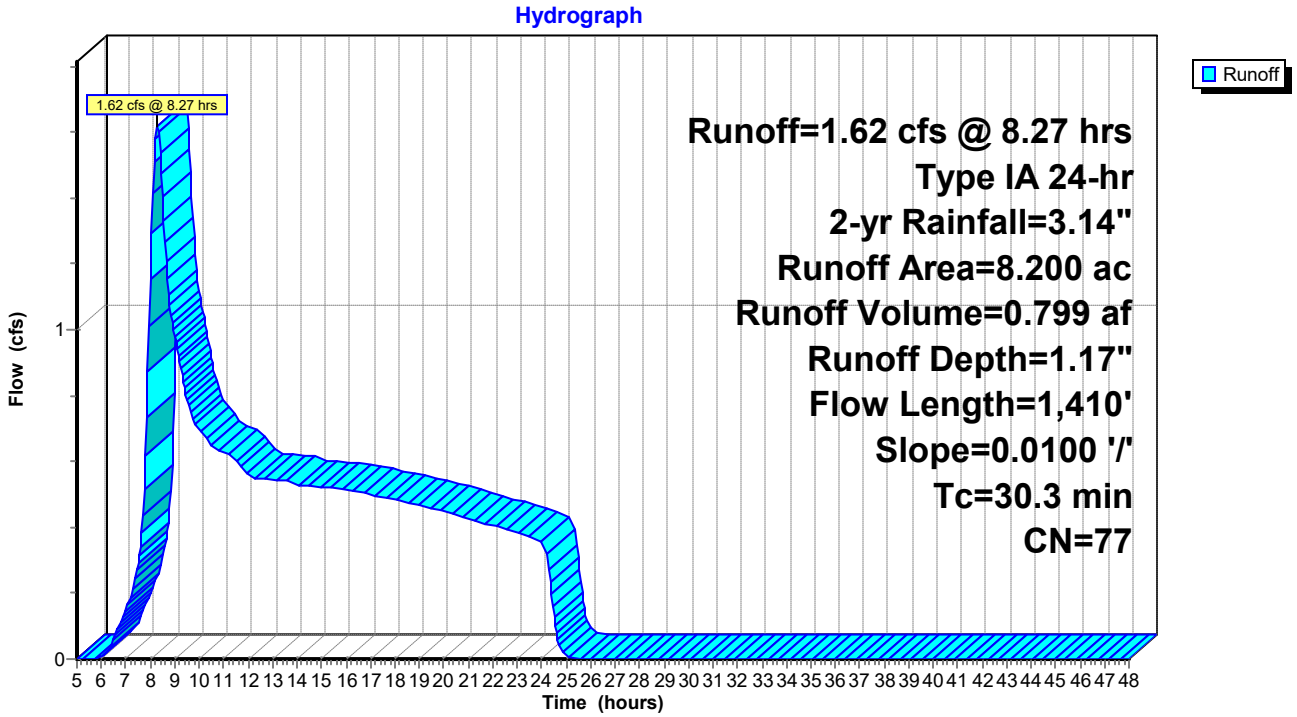
Runoff = 1.62 cfs @ 8.27 hrs, Volume= 0.799 af, Depth= 1.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2-yr Rainfall=3.14"

Area (ac)	CN	Description
8.200	77	1/8 acre lots, 65% imp, HSG A
2.870		35.00% Pervious Area
5.330		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	130	0.0100	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.14"
14.2	1,280	0.0100	1.50		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
30.3	1,410	Total			

Subcatchment 5S: DMA-2 (Post-Development)



Summary for Pond 6P: DMA-2 Pond

Inflow Area = 8.200 ac, 65.00% Impervious, Inflow Depth = 1.17" for 2-yr event
Inflow = 1.62 cfs @ 8.27 hrs, Volume= 0.799 af
Outflow = 0.03 cfs @ 24.81 hrs, Volume= 0.086 af, Atten= 98%, Lag= 991.8 min
Primary = 0.03 cfs @ 24.81 hrs, Volume= 0.086 af

Routing by Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 102.97' @ 24.81 hrs Surf.Area= 12,520 sf Storage= 33,413 cf

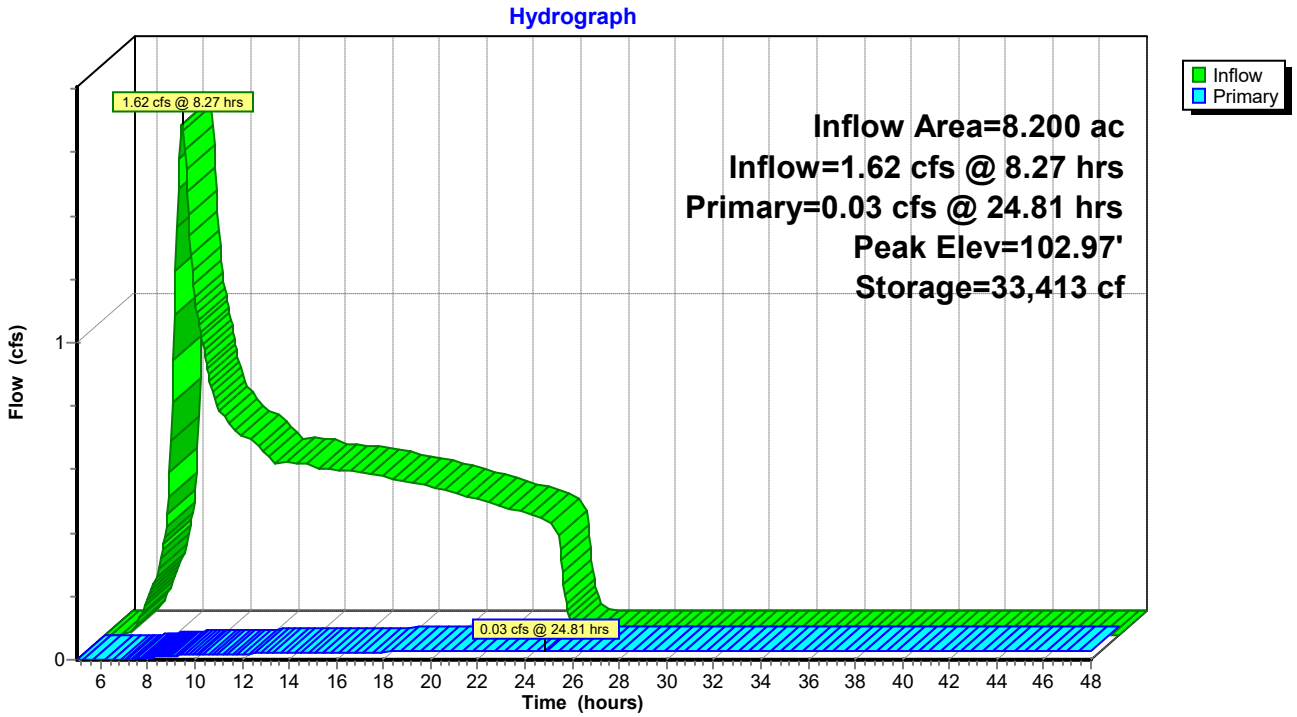
Plug-Flow detention time= 1,290.9 min calculated for 0.086 af (11% of inflow)
Center-of-Mass det. time= 898.1 min (1,765.1 - 866.9)

Volume	Invert	Avail.Storage	Storage Description
#1	100.00'	60,667 cf	**100.00'W x 100.00'L x 5.00'H Prismatoid Z=2.0**

Device	Routing	Invert	Outlet Devices
#1	Primary	100.00'	**18.0" Round Culvert** L= 100.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 100.00' / 95.00' S= 0.0500 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf
#2	Device 1	100.00'	**0.8" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.03 cfs @ 24.81 hrs HW=102.97' (Free Discharge)
└**1=Culvert** (Passes 0.03 cfs of 12.69 cfs potential flow)
└**2=Orifice/Grate** (Orifice Controls 0.03 cfs @ 8.26 fps)

Pond 6P: DMA-2 Pond



Summary for Subcatchment 7S: DMA-3 (Pre-Development)

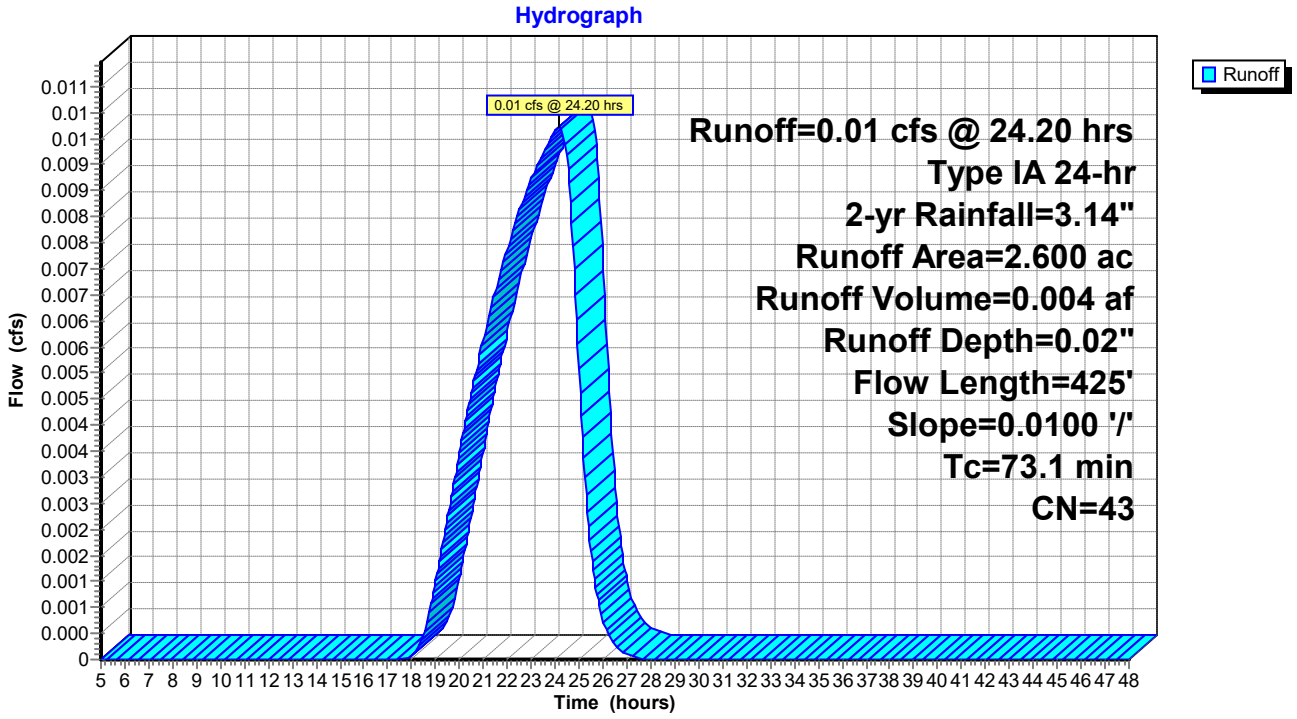
Runoff = 0.01 cfs @ 24.20 hrs, Volume= 0.004 af, Depth= 0.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2-yr Rainfall=3.14"

Area (ac)	CN	Description
2.600	43	Woods/grass comb., Fair, HSG A
2.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
68.9	300	0.0100	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.14"
4.2	125	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
73.1	425	Total			

Subcatchment 7S: DMA-3 (Pre-Development)



Summary for Subcatchment 8S: DMA-3 (Post-Development)

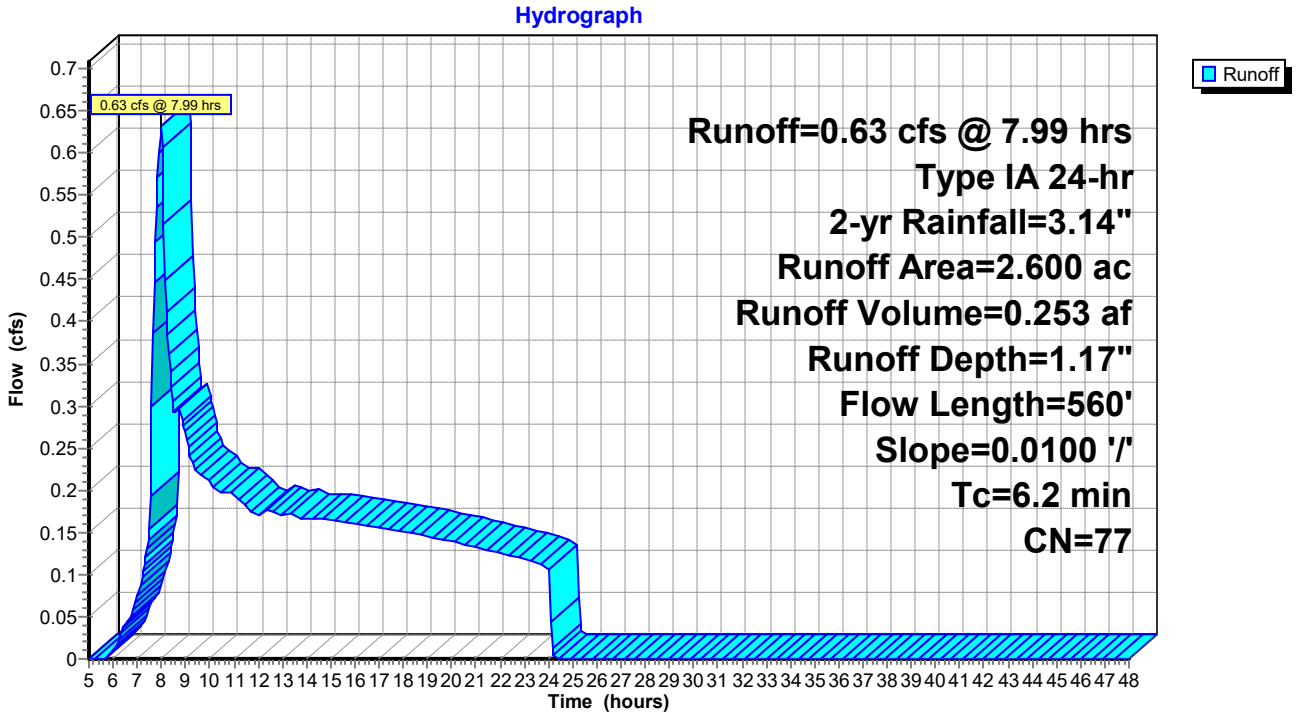
Runoff = 0.63 cfs @ 7.99 hrs, Volume= 0.253 af, Depth= 1.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2-yr Rainfall=3.14"

Area (ac)	CN	Description
2.600	77	1/8 acre lots, 65% imp, HSG A
0.910		35.00% Pervious Area
1.690		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	80	0.0100	0.99		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.14"
1.6	190	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.2	290	0.0100	1.50		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
6.2	560	Total			

Subcatchment 8S: DMA-3 (Post-Development)



Summary for Pond 9P: DMA-3 Pond

Inflow Area = 2.600 ac, 65.00% Impervious, Inflow Depth = 1.17" for 2-yr event
Inflow = 0.63 cfs @ 7.99 hrs, Volume= 0.253 af
Outflow = 0.01 cfs @ 24.16 hrs, Volume= 0.038 af, Atten= 98%, Lag= 970.5 min
Primary = 0.01 cfs @ 24.16 hrs, Volume= 0.038 af

Routing by Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 101.00' @ 24.16 hrs Surf.Area= 10,820 sf Storage= 10,455 cf

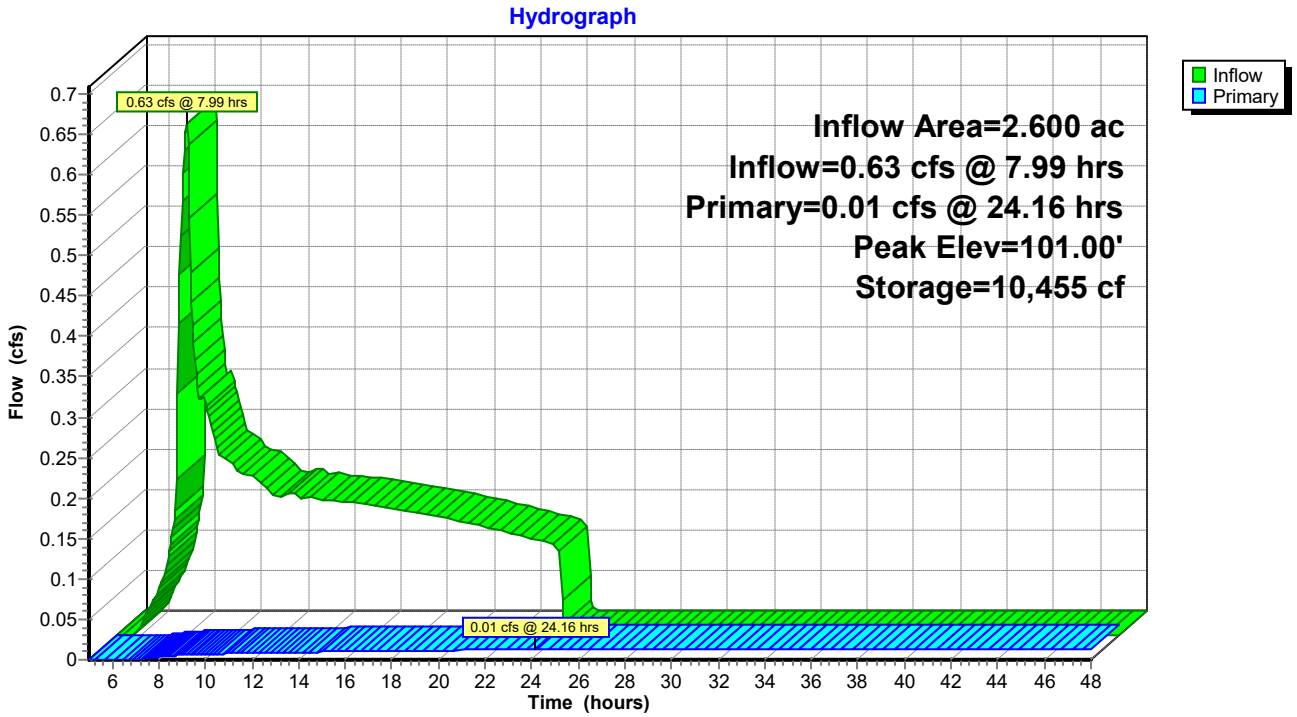
Plug-Flow detention time= 1,293.1 min calculated for 0.038 af (15% of inflow)
Center-of-Mass det. time= 913.3 min (1,757.9 - 844.6)

Volume	Invert	Avail.Storage	Storage Description
#1	100.00'	60,667 cf	**100.00'W x 100.00'L x 5.00'H Prismatoid Z=2.0**

Device	Routing	Invert	Outlet Devices
#1	Primary	100.00'	**18.0" Round Culvert** L= 100.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 100.00' / 95.00' S= 0.0500 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf
#2	Device 1	100.00'	**0.7" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.01 cfs @ 24.16 hrs HW=101.00' (Free Discharge)
└**1=Culvert** (Passes 0.01 cfs of 4.29 cfs potential flow)
└**2=Orifice/Grate** (Orifice Controls 0.01 cfs @ 4.76 fps)

Pond 9P: DMA-3 Pond



APPENDIX G

Noise Calculations

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Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/19/2020
Case Description: Phase 1 - Road Extension / Grading

		Baselines (dBA)			---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night	
Single-Family Residence along Manzanita Ave	Residential	60	50	50	

			Equipment			
	Impact		Spec Lmax	Actual Lmax	Receptor Distance	Estimated Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Concrete Saw	No	20		89.6	20	0
Excavator	No	40		80.7	20	0
Excavator	No	40		80.7	20	0
Grader	No	40	85		20	0
Dozer	No	40		81.7	20	0
Scraper	No	40		83.6	20	0
Scraper	No	40		83.6	20	0
Tractor	No	40	84		20	0
Tractor	No	40	84		20	0

			Results											
	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Saw	97.5	90.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	88.7	84.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	88.7	84.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	93	89	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	89.6	85.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	91.5	87.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	91.5	87.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	92	88	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	92	88	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	102.1	97.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/19/2020
Case Description: Phase 1 - Road Extension / Paving

		Baselines (dBA)		---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night
Single-Family Residence along Manzanita Ave	Residential	60	50	50

			Equipment Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Paver	No	50		77.2	20	0
Paver	No	50		77.2	20	0
Paver	No	50		77.2	20	0
Paver	No	50		77.2	20	0
Roller	No	20		80	20	0
Roller	No	20		80	20	0
Grader	No	40	85		20	0
Tractor	No	40	84		20	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment		Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Paver	85.2	82.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver	85.2	82.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver	85.2	82.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver	85.2	82.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	88	81	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	88	81	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	93	89	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	92	88	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	97.9	93.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/19/2020
Case Description: Phase 1 - Homes / Site Preparation

		Baselines (dBA)		---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night
Single-Family Residence along Manzanita Ave	Residential	60	50	50

			Equipment			
	Impact		Spec Lmax	Actual Lmax	Receptor Distance	Estimated Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Concrete Saw	No	20		89.6	20	0
Dozer	No	40		81.7	20	0
Tractor	No	40	84		20	0
Tractor	No	40	84		20	0

			Results													
	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)							
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Saw	97.5	90.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	89.6	85.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	92	88	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	92	88	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	99.9	94.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/19/2020
Case Description: Phase 1 - Homes / Grading

		Baselines (dBA)		---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night
Single-Family Residence along Manzanita Ave	Residential	60	50	50

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	20	0
Excavator	No	40		80.7	20	0
Excavator	No	40		80.7	20	0
Front End Loader	No	40		79.1	20	0
Front End Loader	No	40		79.1	20	0
Grader	No	40	85		20	0
Dozer	No	40		81.7	20	0
Scraper	No	40		83.6	20	0
Scraper	No	40		83.6	20	0
Tractor	No	40	84		20	0
Tractor	No	40	84		20	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane	88.5	80.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	88.7	84.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	88.7	84.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	87.1	83.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	87.1	83.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	93	89	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	89.6	85.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	91.5	87.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	91.5	87.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	92	88	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	92	88	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	100.8	96.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/19/2020
Case Description: Phase 1 - Homes / Construction

		Baselines (dBA)			---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night	
Single-Family Residence along Manzanita Ave	Residential	60	50	50	

			Equipment			
	Impact		Spec Lmax	Actual Lmax	Receptor Distance	Estimated Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Concrete Mixer Truck	No	40		78.8	20	0
Concrete Mixer Truck	No	40		78.8	20	0
Concrete Mixer Truck	No	40		78.8	20	0
Concrete Mixer Truck	No	40		78.8	20	0
Crane	No	16		80.6	20	0
Front End Loader	No	40		79.1	20	0
Front End Loader	No	40		79.1	20	0
Front End Loader	No	40		79.1	20	0
Generator	No	50		80.6	20	0
Paver	No	50		77.2	20	0
Roller	No	20		80	20	0
Tractor	No	40	84		20	0
Welder / Torch	No	40		74	20	0

			Results											
	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Mixer Truck	86.8	82.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Mixer Truck	86.8	82.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Mixer Truck	86.8	82.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Mixer Truck	86.8	82.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	88.5	80.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	87.1	83.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	87.1	83.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	87.1	83.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator	88.6	85.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver	85.2	82.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	88	81	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	92	88	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Welder / Torch	82	78	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	98.8	94.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/19/2020
Case Description: Phase 1 - Homes / Architectural Coating

				---- Receptor #1 ----
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Single-Family Residence along Manzanita Ave	Residential	60	50	50

			Equipment			
	Impact		Spec Lmax	Actual Lmax	Receptor Distance	Estimated Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Compressor (air)	No	40		77.7	20	0

				Results												
		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)						
				Day		Evening		Night		Day		Evening		Night		
Equipment		Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	
Compressor (air)		85.6	81.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Total	85.6	81.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/19/2020
Case Description: Phase 2 - Road Extension / Grading

		Baselines (dBA)			---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night	
Glen Paul School	Commercial	60	50	50	

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Compressor (air)	No	40		77.7	62	0
Excavator	No	40		80.7	62	0
Excavator	No	40		80.7	62	0
Grader	No	40	85		62	0
Dozer	No	40		81.7	62	0
Scraper	No	40		83.6	62	0
Scraper	No	40		83.6	62	0
Tractor	No	40	84		62	0
Tractor	No	40	84		62	0

			Results											
	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)	75.8	71.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	78.8	74.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	78.8	74.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	83.1	79.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	79.8	75.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	81.7	77.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	81.7	77.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	82.1	78.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	82.1	78.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	90.5	86.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/19/2020
Case Description: Phase 2 - Road Extension / Paving

		---- Receptor #1 ----		
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Glen Paul School	Commercial	60	50	50

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Paver	No	50		77.2	62	0
Paver	No	50		77.2	62	0
Paver	No	50		77.2	62	0
Paver	No	50		77.2	62	0
Roller	No	20		80	62	0
Roller	No	20		80	62	0

				Results												
	Calculated (dBA)			Noise Limits (dBA)						Noise Limit Exceedance (dBA)						
				Day		Evening		Night		Day		Evening		Night		
Equipment	Lmax		Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	
Paver		75.4	72.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Paver		75.4	72.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Paver		75.4	72.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Paver		75.4	72.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Roller		78.1	71.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Roller		78.1	71.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Total	84.3	79.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/19/2020
Case Description: Phase 2 - Homes / Site Preparation

		Baselines (dBA)			---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night	
Glen Paul School	Commercial	60	50	50	

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	62	0
Dozer	No	40		81.7	62	0
Dozer	No	40		81.7	62	0
Tractor	No	40	84		62	0
Tractor	No	40	84		62	0
Tractor	No	40	84		62	0
Tractor	No	40	84		62	0

		Results													
		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer		79.8	75.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		79.8	75.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		79.8	75.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		82.1	78.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		82.1	78.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		82.1	78.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		82.1	78.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	89.7	85.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/19/2020
Case Description: Phase 2 - Homes / Grading

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Glen Paul School	Commercial	60	50	50

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	62	0
Excavator	No	40		80.7	62	0
Grader	No	40	85		62	0
Dozer	No	40		81.7	62	0
Scraper	No	40		83.6	62	0
Scraper	No	40		83.6	62	0
Tractor	No	40	84		62	0
Tractor	No	40	84		62	0

Results

Equipment	Calculated (dBA) Lmax	Leq	Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq	Noise Limit Exceedance (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq
Excavator	78.8	74.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	78.8	74.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	83.1	79.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	79.8	75.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	81.7	77.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	81.7	77.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	82.1	78.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	82.1	78.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	90.3	86.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/19/2020
Case Description: Phase 2 - Homes / Construction

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Glen Paul School	Commercial	60	50	50

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	62	0
Front End Loader	No	40		79.1	62	0
Front End Loader	No	40		79.1	62	0
Front End Loader	No	40		79.1	62	0
Generator	No	50		80.6	62	0
Tractor	No	40	84		62	0
Tractor	No	40	84		62	0
Tractor	No	40	84		62	0
Welder / Torch	No	40		74	62	0

Results

Equipment	Calculated (dBA) Lmax	Leq	Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq	Noise Limit Exceedance (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq
Crane	78.7	70.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	77.2	73.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	77.2	73.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	77.2	73.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator	78.8	75.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	82.1	78.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	82.1	78.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	82.1	78.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Welder / Torch	72.1	68.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	89.1	85	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/19/2020
Case Description: Phase 2 - Homes / Architectural Coating

		Baselines (dBA)			---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night	
Glen Paul School	Commercial	60	50	50	

			Equipment			
	Impact		Spec Lmax	Actual Lmax	Receptor Distance	Estimated Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Compressor (air)	No	40		77.7	62	0

		Results													
		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)		75.8	71.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	75.8	71.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/19/2020
Case Description: Phase 3 - Road Extension / Grading

		Baselines (dBA)			---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night	
Single-Family Home along Redwood Street	Residential	60	50	50	

			Equipment Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Excavator	No	40		80.7	40	0
Excavator	No	40		80.7	40	0
Grader	No	40	85		40	0
Dozer	No	40		81.7	40	0
Scraper	No	40		83.6	40	0
Scraper	No	40		83.6	40	0
Tractor	No	40	84		40	0
Tractor	No	40	84		40	0

		Results													
		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator		82.6	78.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator		82.6	78.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader		86.9	83	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		83.6	79.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper		85.5	81.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper		85.5	81.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		85.9	82	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		85.9	82	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	94.1	90.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/19/2020
Case Description: Phase 3 - Road Extension / Paving

		Baselines (dBA)			---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night	
Single-Family Residential along Redwood St	Residential	60	50	50	

			Equipment			
	Impact		Spec Lmax	Actual Lmax	Receptor Distance	Estimated Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Paver	No	50		77.2	40	0
Paver	No	50		77.2	40	0
Paver	No	50		77.2	40	0
Paver	No	50		77.2	40	0
Roller	No	20		80	40	0
Roller	No	20		80	40	0

			Results											
	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Paver	79.2	76.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver	79.2	76.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver	79.2	76.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver	79.2	76.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	81.9	74.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	81.9	74.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	88.1	83.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/19/2020
Case Description: Phase 3 - Homes / Site Preparation

				---- Receptor #1 ----
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Single-Family Residence along Redwood St	Residential	60	50	50

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Dozer	No	40		81.7	40	0
Dozer	No	40		81.7	40	0
Dozer	No	40		81.7	40	0
Tractor	No	40	84		40	0
Tractor	No	40	84		40	0
Tractor	No	40	84		40	0
Tractor	No	40	84		40	0

				Results											
		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer		83.6	79.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		83.6	79.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		83.6	79.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		85.9	82	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		85.9	82	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		85.9	82	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		85.9	82	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	93.5	89.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/19/2020
Case Description: Phase 3 - Homes / Grading

		Baselines (dBA)		---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night
Single-Family Residential along Redwood St	Residential	60	50	50

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Excavator	No	40		80.7	40	0
Excavator	No	40		80.7	40	0
Grader	No	40	85		40	0
Dozer	No	40		81.7	40	0
Scraper	No	40		83.6	40	0
Scraper	No	40		83.6	40	0
Tractor	No	40	84		40	0
Tractor	No	40	84		40	0

				Results											
		Calculated (dBA)			Noise Limits (dBA)						Noise Limit Exceedance (dBA)				
				Day		Evening		Night		Day		Evening		Night	
Equipment		Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator		82.6	78.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator		82.6	78.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader		86.9	83	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		83.6	79.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper		85.5	81.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper		85.5	81.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		85.9	82	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		85.9	82	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	93.8	90.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/19/2020
Case Description: Phase 3 - Homes / Construction

				---- Receptor #1 ----
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Single-Family Residential along Redwood St	Residential	60	50	50

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Crane	No	16		80.6	40	0
Front End Loader	No	40		79.1	40	0
Front End Loader	No	40		79.1	40	0
Front End Loader	No	40		79.1	40	0
Generator	No	50		80.6	40	0
Tractor	No	40	84		40	0
Tractor	No	40	84		40	0
Tractor	No	40	84		40	0
Welder / Torch	No	40		74	40	0

			Results											
	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane	82.5	74.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	81	77.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	81	77.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	81	77.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator	82.6	79.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	85.9	82	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	85.9	82	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	85.9	82	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Welder / Torch	75.9	72	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	92.9	88.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/19/2020
Case Description: Phase 3 - Homes / Architectural Coating

				---- Receptor #1 ----
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Single-Family Residential along Redwood St	Residential	60	50	50

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Compressor (air)	No	40		77.7	40	0

				Results												
		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)						
				Day		Evening		Night		Day		Evening		Night		
Equipment		Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	
Compressor (air)		79.6	75.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Total	79.6	75.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/20/2020
Case Description: Phase 4 - Road Extension / Grading

		Baselines (dBA)			---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night	
Single-Family Home along Fern Street	Residential	60	50	50	

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	915	0
Excavator	No	40		80.7	915	0
Grader	No	40	85		915	0
Dozer	No	40		81.7	915	0
Scraper	No	40		83.6	915	0
Scraper	No	40		83.6	915	0
Tractor	No	40	84		915	0
Tractor	No	40	84		915	0

	Results															
	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)							
			Day		Evening		Night		Day		Evening		Night			
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator	55.5	51.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	55.5	51.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	59.8	55.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	56.4	52.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	58.3	54.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	58.3	54.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	58.8	54.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	58.8	54.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	67	63	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/20/2020
Case Description: Phase 4 - Road Extension / Paving

		Baselines (dBA)			---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night	
Single-Family Residential along Fern St	Residential	60	50	50	

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Paver	No	50		77.2	915	0
Paver	No	50		77.2	915	0
Paver	No	50		77.2	915	0
Paver	No	50		77.2	915	0
Roller	No	20		80	915	0
Roller	No	20		80	915	0

			Results													
		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)						
				Day		Evening		Night		Day		Evening		Night		
Equipment		Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	
Paver		52	49	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Paver		52	49	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Paver		52	49	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Paver		52	49	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Roller		54.8	47.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Roller		54.8	47.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Total	60.9	56.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/20/2020
Case Description: Phase 4 - Homes / Site Preparation

		Baselines (dBA)			---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night	
Single-Family Residence along Fern St	Residential	60	50	50	

			Equipment			
	Impact		Spec Lmax	Actual Lmax	Receptor Distance	Estimated Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Dozer	No	40		81.7	915	0
Dozer	No	40		81.7	915	0
Dozer	No	40		81.7	915	0
Tractor	No	40	84		915	0
Tractor	No	40	84		915	0
Tractor	No	40	84		915	0
Tractor	No	40	84		915	0

				Results												
		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)						
				Day		Evening		Night		Day		Evening		Night	
Equipment		Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer		56.4	52.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		56.4	52.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		56.4	52.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		58.8	54.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		58.8	54.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		58.8	54.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		58.8	54.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	66.4	62.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/20/2020
Case Description: Phase 4 - Homes / Grading

		---- Receptor #1 ----		
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Single-Family Residential along Fern St	Residential	60	50	50

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Excavator	No	40		80.7	915	0
Excavator	No	40		80.7	915	0
Grader	No	40	85		915	0
Dozer	No	40		81.7	915	0
Scraper	No	40		83.6	915	0
Scraper	No	40		83.6	915	0
Tractor	No	40	84		915	0
Tractor	No	40	84		915	0

			Results											
	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator	55.5	51.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	55.5	51.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	59.8	55.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	56.4	52.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	58.3	54.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	58.3	54.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	58.8	54.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	58.8	54.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	67	63	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/20/2020
Case Description: Phase 4 - Homes / Construction

				---- Receptor #1 ----
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Single-Family Residential along Fern St	Residential	60	50	50

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	915	0
Front End Loader	No	40		79.1	915	0
Front End Loader	No	40		79.1	915	0
Front End Loader	No	40		79.1	915	0
Generator	No	50		80.6	915	0
Tractor	No	40	84		915	0
Tractor	No	40	84		915	0
Tractor	No	40	84		915	0
Welder / Torch	No	40		74	915	0

			Results													
		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)						
				Day		Evening		Night		Day		Evening		Night		
Equipment		Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	
Crane		55.3	47.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Front End Loader		53.9	49.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Front End Loader		53.9	49.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Front End Loader		53.9	49.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Generator		55.4	52.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Tractor		58.8	54.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Tractor		58.8	54.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Tractor		58.8	54.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Welder / Torch		48.8	44.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Total	65.8	61.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/20/2020
Case Description: Phase 4 - Homes / Architectural Coating

				---- Receptor #1 ----
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Single-Family Residential along Fern St	Residential	60	50	50

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Compressor (air)	No	40		77.7	915	0

				Results												
		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)						
				Day		Evening		Night		Day		Evening		Night		
Equipment		Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	
Compressor (air)		52.4	48.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Total	52.4	48.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

Case Description: Phase 5 - Road Extension / Grading

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Single-Family Home along Redwood Street	Residential	60	50	50

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	540	0
Excavator	No	40		80.7	540	0
Grader	No	40	85		540	0
Dozer	No	40		81.7	540	0
Scraper	No	40		83.6	540	0
Scraper	No	40		83.6	540	0
Tractor	No	40	84		540	0
Tractor	No	40	84		540	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator	60	56.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	60	56.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	64.3	60.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	61	57	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	62.9	58.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	62.9	58.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	63.3	59.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	63.3	59.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	71.5	67.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/20/2020
Case Description: Phase 5 - Road Extension / Paving

		Baselines (dBA)			---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night	
Single-Family Residential along Redwood St	Residential	60	50	50	

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Paver	No	50		77.2	540	0
Paver	No	50		77.2	540	0
Paver	No	50		77.2	540	0
Paver	No	50		77.2	540	0
Roller	No	20		80	540	0
Roller	No	20		80	540	0

		Results													
		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Paver		56.6	53.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver		56.6	53.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver		56.6	53.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver		56.6	53.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller		59.3	52.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller		59.3	52.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	65.5	61	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/20/2020
Case Description: Phase 5 - Homes / Site Preparation

				---- Receptor #1 ----
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Single-Family Residence along Redwood St	Residential	60	50	50

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Dozer	No	40		81.7	540	0
Dozer	No	40		81.7	540	0
Dozer	No	40		81.7	540	0
Tractor	No	40	84		540	0
Tractor	No	40	84		540	0
Tractor	No	40	84		540	0
Tractor	No	40	84		540	0

				Results												
		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)						
				Day		Evening		Night		Day		Evening		Night	
Equipment		Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer		61	57	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		61	57	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		61	57	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		63.3	59.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		63.3	59.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		63.3	59.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		63.3	59.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	70.9	67	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/20/2020
Case Description: Phase 5 - Homes / Grading

				---- Receptor #1 ----
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Single-Family Residential along Redwood St	Residential	60	50	50

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	540	0
Excavator	No	40		80.7	540	0
Grader	No	40	85		540	0
Dozer	No	40		81.7	540	0
Scraper	No	40		83.6	540	0
Scraper	No	40		83.6	540	0
Tractor	No	40	84		540	0
Tractor	No	40	84		540	0

				Results												
		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)						
				Day		Evening		Night		Day		Evening		Night		
Equipment		Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	
Excavator		60	56.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Excavator		60	56.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Grader		64.3	60.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Dozer		61	57	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Scraper		62.9	58.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Scraper		62.9	58.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Tractor		63.3	59.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Tractor		63.3	59.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Total	71.5	67.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/20/2020
Case Description: Phase 5 - Homes / Construction

		Baselines (dBA)		---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night
Single-Family Residential along Redwood St	Residential	60	50	50

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	540	0
Front End Loader	No	40		79.1	540	0
Front End Loader	No	40		79.1	540	0
Front End Loader	No	40		79.1	540	0
Generator	No	50		80.6	540	0
Tractor	No	40	84		540	0
Tractor	No	40	84		540	0
Tractor	No	40	84		540	0
Welder / Torch	No	40		74	540	0

		Results													
		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane		59.9	51.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader		58.4	54.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader		58.4	54.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader		58.4	54.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator		60	57	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		63.3	59.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		63.3	59.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		63.3	59.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Welder / Torch		53.3	49.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	70.3	66.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/20/2020
Case Description: Phase 5 - Homes / Architectural Coating

		Baselines (dBA)		---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night
Single-Family Residential along Redwood St	Residential	60	50	50

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Compressor (air)	No	40		77.7	540	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)	57	53	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	57	53	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/20/2020
Case Description: Phase 6 - Road Extension / Grading

				---- Receptor #1 ----
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Single-Family Home along Redwood Street	Residential	60	50	50

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	945	0
Excavator	No	40		80.7	945	0
Grader	No	40	85		945	0
Dozer	No	40		81.7	945	0
Scraper	No	40		83.6	945	0
Scraper	No	40		83.6	945	0
Tractor	No	40	84		945	0
Tractor	No	40	84		945	0

			Results											
	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator	55.2	51.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	55.2	51.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	59.5	55.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	56.1	52.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	58.1	54.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	58.1	54.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	58.5	54.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	58.5	54.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	66.7	62.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/20/2020
Case Description: Phase 6 - Road Extension / Paving

				---- Receptor #1 ----
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Single-Family Residential along Redwood St	Residential	60	50	50

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Paver	No	50		77.2	945	0
Paver	No	50		77.2	945	0
Paver	No	50		77.2	945	0
Paver	No	50		77.2	945	0
Roller	No	20		80	945	0
Roller	No	20		80	945	0

			Results											
	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Paver	51.7	48.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver	51.7	48.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver	51.7	48.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver	51.7	48.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	54.5	47.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	54.5	47.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	60.6	56.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/20/2020
Case Description: Phase 6 - Homes / Site Preparation

				---- Receptor #1 ----
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Single-Family Residence along Redwood St	Residential	60	50	50

			Equipment			
	Impact		Spec Lmax	Actual Lmax	Receptor Distance	Estimated Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Dozer	No	40		81.7	945	0
Dozer	No	40		81.7	945	0
Dozer	No	40		81.7	945	0
Tractor	No	40	84		945	0
Tractor	No	40	84		945	0
Tractor	No	40	84		945	0
Tractor	No	40	84		945	0

			Results											
	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer	56.1	52.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	56.1	52.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	56.1	52.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	58.5	54.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	58.5	54.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	58.5	54.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	58.5	54.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	66.1	62.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/20/2020
Case Description: Phase 6 - Homes / Grading

				---- Receptor #1 ----
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Single-Family Residential along Redwood St	Residential	60	50	50

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Excavator	No	40		80.7	945	0
Excavator	No	40		80.7	945	0
Grader	No	40	85		945	0
Dozer	No	40		81.7	945	0
Scraper	No	40		83.6	945	0
Scraper	No	40		83.6	945	0
Tractor	No	40	84		945	0
Tractor	No	40	84		945	0

			Results											
	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator	55.2	51.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	55.2	51.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	59.5	55.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	56.1	52.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	58.1	54.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	58.1	54.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	58.5	54.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	58.5	54.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	66.7	62.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/20/2020
Case Description: Phase 6 - Homes / Construction

		Baselines (dBA)			---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night	
Single-Family Residential along Redwood St	Residential	60	50	50	

			Equipment Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Crane	No	16		80.6	945	0
Front End Loader	No	40		79.1	945	0
Front End Loader	No	40		79.1	945	0
Front End Loader	No	40		79.1	945	0
Generator	No	50		80.6	945	0
Tractor	No	40	84		945	0
Tractor	No	40	84		945	0
Tractor	No	40	84		945	0
Welder / Torch	No	40		74	945	0

			Results													
	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane	55	47.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	53.6	49.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	53.6	49.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	53.6	49.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator	55.1	52.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	58.5	54.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	58.5	54.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	58.5	54.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Welder / Torch	48.5	44.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	65.5	61.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/20/2020
Case Description: Phase 6 - Homes / Architectural Coating

		Baselines (dBA)		---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night
Single-Family Residential along Redwood St	Residential	60	50	50

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Compressor (air)	No	40		77.7	945	0

			Results											
	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)	52.1	48.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	52.1	48.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/20/2020
Case Description: Phase 7 - Road Extension / Grading

		---- Receptor #1 ----		
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Glen Paul School	Commercial	60	50	50

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	470	0
Excavator	No	40		80.7	470	0
Grader	No	40	85		470	0
Dozer	No	40		81.7	470	0
Scraper	No	40		83.6	470	0
Scraper	No	40		83.6	470	0
Tractor	No	40	84		470	0
Tractor	No	40	84		470	0

		Results													
		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator		61.2	57.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator		61.2	57.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader		65.5	61.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		62.2	58.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper		64.1	60.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper		64.1	60.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		64.5	60.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		64.5	60.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	72.7	68.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/20/2020
Case Description: Phase 7 - Road Extension / Paving

				---- Receptor #1 ----
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Glen Paul School	Commercial	60	50	50

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Paver	No	50		77.2	470	0
Paver	No	50		77.2	470	0
Paver	No	50		77.2	470	0
Paver	No	50		77.2	470	0
Roller	No	20		80	470	0
Roller	No	20		80	470	0

				Results											
		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Paver		57.8	54.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver		57.8	54.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver		57.8	54.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver		57.8	54.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller		60.5	53.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller		60.5	53.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	66.7	62.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/20/2020
Case Description: Phase 7 - Homes / Site Preparation

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Glen Paul School	Commercial	60	50	50

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	470	0
Dozer	No	40		81.7	470	0
Dozer	No	40		81.7	470	0
Tractor	No	40	84		470	0
Tractor	No	40	84		470	0
Tractor	No	40	84		470	0
Tractor	No	40	84		470	0

Results

Equipment	Calculated (dBA) Lmax	Leq	Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq	Noise Limit Exceedance (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq
Dozer	62.2	58.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	62.2	58.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	62.2	58.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	64.5	60.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	64.5	60.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	64.5	60.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	64.5	60.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	72.1	68.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/20/2020
Case Description: Phase 7 - Homes / Grading

		Baselines (dBA)			---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night	
Glen Paul School	Commercial	60	50	50	

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	470	0
Excavator	No	40		80.7	470	0
Grader	No	40	85		470	0
Dozer	No	40		81.7	470	0
Scraper	No	40		83.6	470	0
Scraper	No	40		83.6	470	0
Tractor	No	40	84		470	0
Tractor	No	40	84		470	0

		Results													
		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator		61.2	57.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator		61.2	57.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader		65.5	61.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		62.2	58.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper		64.1	60.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper		64.1	60.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		64.5	60.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		64.5	60.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	72.7	68.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/20/2020
Case Description: Phase 7 - Homes / Construction

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Glen Paul School	Commercial	60	50	50

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	470	0
Front End Loader	No	40		79.1	470	0
Front End Loader	No	40		79.1	470	0
Front End Loader	No	40		79.1	470	0
Generator	No	50		80.6	470	0
Tractor	No	40	84		470	0
Tractor	No	40	84		470	0
Tractor	No	40	84		470	0
Welder / Torch	No	40		74	470	0

Results

Equipment	Calculated (dBA) Lmax	Leq	Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq	Noise Limit Exceedance (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq
Crane	61.1	53.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	59.6	55.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	59.6	55.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	59.6	55.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator	61.2	58.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	64.5	60.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	64.5	60.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	64.5	60.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Welder / Torch	54.5	50.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	71.5	67.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/20/2020
Case Description: Phase 7 - Homes / Architectural Coating

		Baselines (dBA)		---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night
Glen Paul School	Commercial	60	50	50

			Equipment			
	Impact		Spec Lmax	Actual Lmax	Receptor Distance	Estimated Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Compressor (air)	No	40		77.7	470	0

		Calculated (dBA)		Results						Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night							
Equipment		Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)		58.2	54.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	58.2	54.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/20/2020
Case Description: Phase 8 - Road Extension / Grading

				---- Receptor #1 ----
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Glen Paul School	Commercial	60	50	50

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	890	0
Excavator	No	40		80.7	890	0
Grader	No	40	85		890	0
Dozer	No	40		81.7	890	0
Scraper	No	40		83.6	890	0
Scraper	No	40		83.6	890	0
Tractor	No	40	84		890	0
Tractor	No	40	84		890	0

				Results												
		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)						
				Day		Evening		Night		Day		Evening		Night		
Equipment		Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	
Excavator		55.7	51.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Excavator		55.7	51.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Grader		60	56	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Dozer		56.7	52.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Scraper		58.6	54.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Scraper		58.6	54.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Tractor		59	55	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Tractor		59	55	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Total	67.2	63.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/20/2020
Case Description: Phase 8 - Road Extension / Paving

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Glen Paul School	Commercial	60	50	50

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Paver	No	50		77.2	890	0
Paver	No	50		77.2	890	0
Paver	No	50		77.2	890	0
Paver	No	50		77.2	890	0
Roller	No	20		80	890	0
Roller	No	20		80	890	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Paver	52.2	49.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver	52.2	49.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver	52.2	49.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver	52.2	49.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	55	48	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	55	48	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	61.1	56.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/20/2020
Case Description: Phase 8 - Homes / Site Preparation

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Glen Paul School	Commercial	60	50	50

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	890	0
Dozer	No	40		81.7	890	0
Dozer	No	40		81.7	890	0
Tractor	No	40	84		890	0
Tractor	No	40	84		890	0
Tractor	No	40	84		890	0
Tractor	No	40	84		890	0

Results

		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer		56.7	52.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		56.7	52.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		56.7	52.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		59	55	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		59	55	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		59	55	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		59	55	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	66.6	62.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/20/2020
Case Description: Phase 8 - Homes / Grading

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Glen Paul School	Commercial	60	50	50

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	890	0
Excavator	No	40		80.7	890	0
Grader	No	40	85		890	0
Dozer	No	40		81.7	890	0
Scraper	No	40		83.6	890	0
Scraper	No	40		83.6	890	0
Tractor	No	40	84		890	0
Tractor	No	40	84		890	0

Results

Equipment	Calculated (dBA) Lmax	Leq	Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq	Noise Limit Exceedance (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq
Excavator	55.7	51.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	55.7	51.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	60	56	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	56.7	52.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	58.6	54.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	58.6	54.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	59	55	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	59	55	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	67.2	63.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/20/2020
Case Description: Phase 8 - Homes / Construction

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Glen Paul School	Commercial	60	50	50

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	890	0
Front End Loader	No	40		79.1	890	0
Front End Loader	No	40		79.1	890	0
Front End Loader	No	40		79.1	890	0
Generator	No	50		80.6	890	0
Tractor	No	40	84		890	0
Tractor	No	40	84		890	0
Tractor	No	40	84		890	0
Welder / Torch	No	40		74	890	0

Results

Equipment	Calculated (dBA) Lmax	Leq	Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq	Noise Limit Exceedance (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq
Crane	55.5	47.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	54.1	50.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	54.1	50.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	54.1	50.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator	55.6	52.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	59	55	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	59	55	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	59	55	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Welder / Torch	49	45	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	66	61.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/20/2020
Case Description: Phase 8 - Homes / Architectural Coating

		---- Receptor #1 ----		
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Glen Paul School	Commercial	60	50	50

			Equipment			
			Spec	Actual	Receptor	Estimated
		Impact	Lmax	Lmax	Distance	Shielding
Description		Device	(dBA)	(dBA)	(feet)	(dBA)
Compressor (air)		No	40	77.7	890	0

				Results													
		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)							
				Day		Evening		Night		Day		Evening		Night			
Equipment		Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq		
Compressor (air)		52.7	48.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
	Total	52.7	48.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/20/2020
Case Description: Phase 9 - Road Extension / Grading

		Baselines (dBA)		---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night
Glen Paul School	Commercial	60	50	50

			Equipment			
	Impact		Spec Lmax	Actual Lmax	Receptor Distance	Estimated Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Excavator	No	40		80.7	855	0
Excavator	No	40		80.7	855	0
Grader	No	40	85		855	0
Dozer	No	40		81.7	855	0
Scraper	No	40		83.6	855	0
Scraper	No	40		83.6	855	0
Tractor	No	40	84		855	0
Tractor	No	40	84		855	0

			Results											
	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator	56.1	52.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	56.1	52.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	60.3	56.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	57	53	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	58.9	54.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	58.9	54.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	59.3	55.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	59.3	55.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	67.5	63.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/20/2020
Case Description: Phase 9 - Road Extension / Paving

		---- Receptor #1 ----		
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Glen Paul School	Commercial	60	50	50

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Paver	No	50		77.2	855	0
Paver	No	50		77.2	855	0
Paver	No	50		77.2	855	0
Paver	No	50		77.2	855	0
Roller	No	20		80	855	0
Roller	No	20		80	855	0

				Results											
		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Paver		52.6	49.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver		52.6	49.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver		52.6	49.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver		52.6	49.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller		55.3	48.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller		55.3	48.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	61.5	57	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/20/2020
Case Description: Phase 9 - Homes / Site Preparation

		Baselines (dBA)		---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night
Glen Paul School	Commercial	60	50	50

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	855	0
Dozer	No	40		81.7	855	0
Dozer	No	40		81.7	855	0
Tractor	No	40	84		855	0
Tractor	No	40	84		855	0
Tractor	No	40	84		855	0
Tractor	No	40	84		855	0

		Results													
		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer		57	53	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		57	53	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		57	53	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		59.3	55.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		59.3	55.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		59.3	55.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		59.3	55.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	66.9	63	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/20/2020
Case Description: Phase 9 - Homes / Grading

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Glen Paul School	Commercial	60	50	50

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	855	0
Excavator	No	40		80.7	855	0
Grader	No	40	85		855	0
Dozer	No	40		81.7	855	0
Scraper	No	40		83.6	855	0
Scraper	No	40		83.6	855	0
Tractor	No	40	84		855	0
Tractor	No	40	84		855	0

Results

		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator		56.1	52.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator		56.1	52.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader		60.3	56.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		57	53	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper		58.9	54.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper		58.9	54.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		59.3	55.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		59.3	55.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	67.5	63.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/20/2020
Case Description: Phase 9 - Homes / Construction

		Baselines (dBA)		---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night
Glen Paul School	Commercial	60	50	50

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	855	0
Front End Loader	No	40		79.1	855	0
Front End Loader	No	40		79.1	855	0
Front End Loader	No	40		79.1	855	0
Generator	No	50		80.6	855	0
Tractor	No	40	84		855	0
Tractor	No	40	84		855	0
Tractor	No	40	84		855	0
Welder / Torch	No	40		74	855	0

	Results													
	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane	55.9	47.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	54.5	50.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	54.5	50.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	54.5	50.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator	56	53	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	59.3	55.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	59.3	55.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	59.3	55.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Welder / Torch	49.3	45.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	66.3	62.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/20/2020
Case Description: Phase 9 - Homes / Architectural Coating

				---- Receptor #1 ----
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Glen Paul School	Commercial	60	50	50

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Compressor (air)	No	40		77.7	855	0

				Results												
		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)						
				Day		Evening		Night		Day		Evening		Night		
Equipment		Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	
Compressor (air)		53	49	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Total	53	49	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/23/2020
Case Description: Water Tank Construction

		Baselines (dBA)			---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night	
Single-Family Homes	Residential	60	50	50	

			Equipment			
	Impact		Spec Lmax	Actual Lmax	Receptor Distance	Estimated Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Excavator	No	40		80.7	1531	0
Tractor	No	40	84		1531	0
Concrete Saw	No	20		89.6	1531	0

				Results												
		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)						
				Day		Evening		Night		Day		Evening		Night		
Equipment		Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	
Excavator		51	47	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Tractor		54.3	50.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Concrete Saw		59.9	52.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Total	61.4	55.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/23/2020
Case Description: Sewer Line Work

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Single-Family Homes along Redwood and Walnut	Residential	60	50	50

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40		77.6	30	0
Tractor	No	40	84		30	0
Front End Loader	No	40		79.1	30	0

Results

Equipment	Calculated (dBA) Lmax	Leq	Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq	Noise Limit Exceedance (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq
Backhoe	82	78	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	88.4	84.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	83.5	79.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	90.3	86.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

APPENDIX H

Focused Traffic Study

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TECHNICAL MEMORANDUM

Date: May 9, 2018

To: Robert Bronkall, County of Humboldt

From: Chris Kinzel

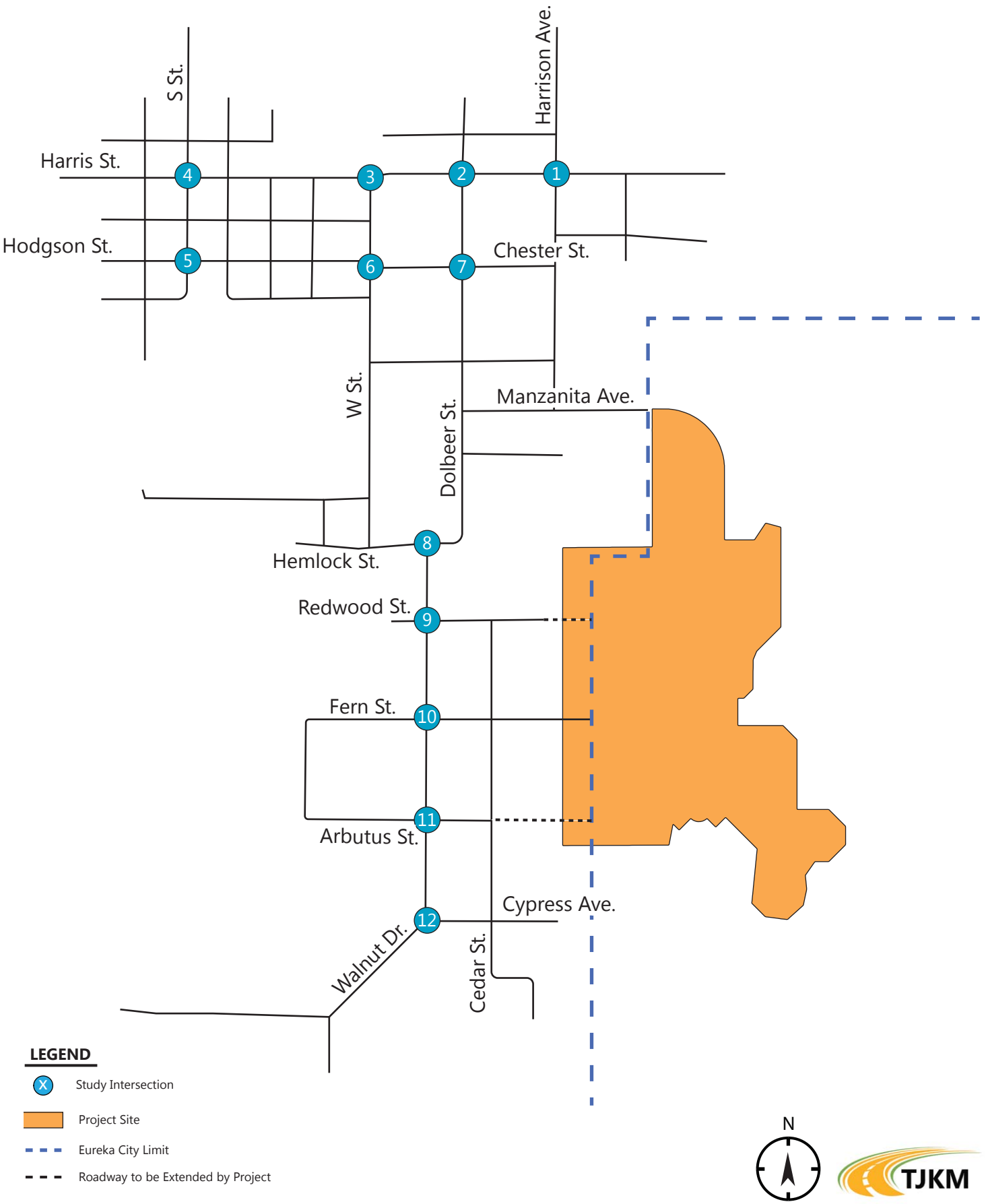
Subject: **Focused Traffic Study for the McKay Ranch Subdivision**

TJKM Transportation Consultants was retained to conduct a focused traffic study for the proposed subdivision McKay Ranch Subdivision in the Greater Eureka Area of Humboldt County. The development consists of parcels both within and immediately outside the Eureka city limits, with all access to the site via City of Eureka streets. A prior study was conducted in 2008 for a similar mixed-use development at the same site, which was reviewed by TJKM in 2017 and compared to the new proposed development. This memorandum examines the traffic impact of the current proposed development on the surrounding roadway system. The project vicinity is shown in **Figure 1**.

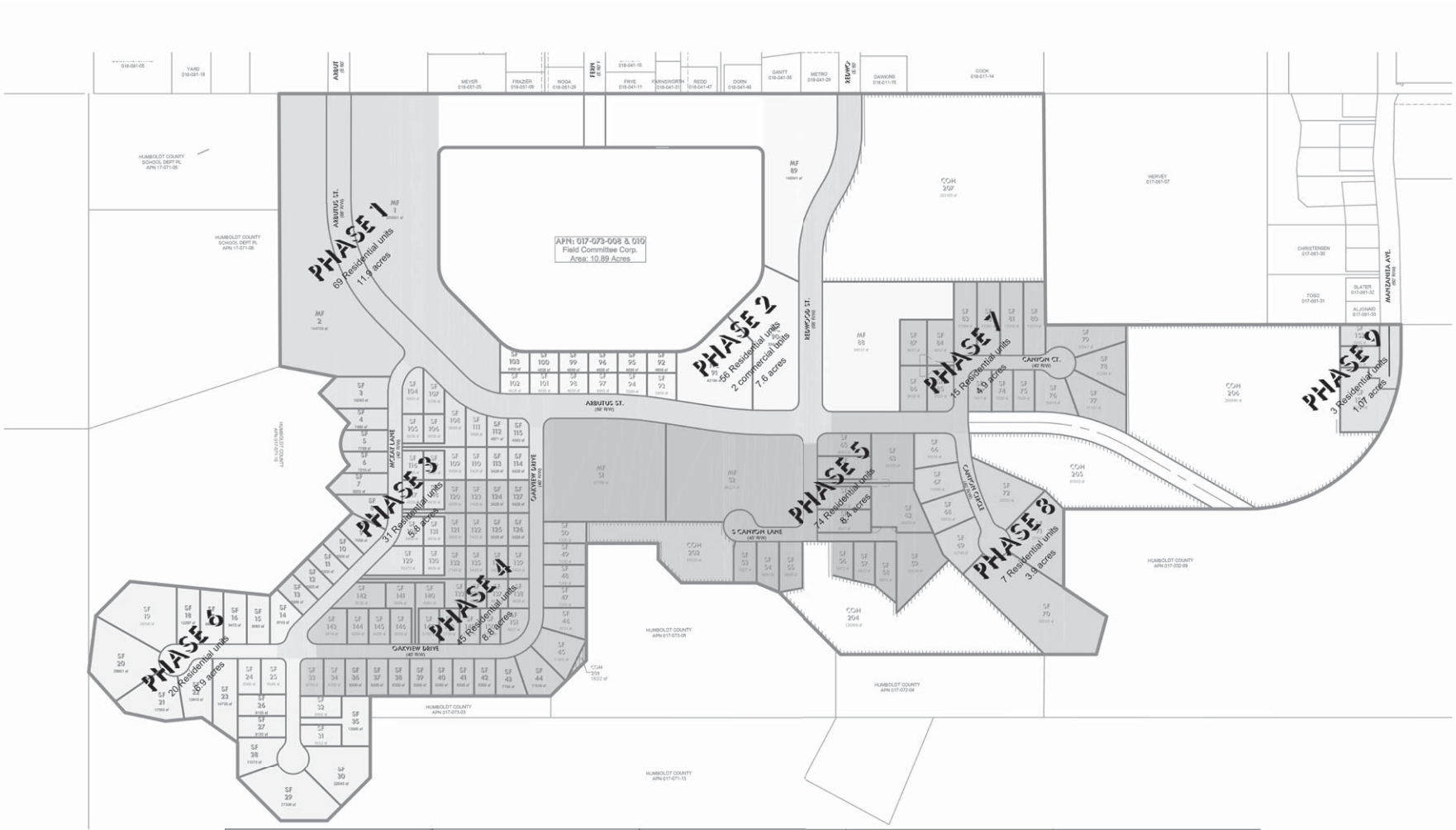
The proposed McKay Ranch subdivision would construct a total of 146 single-family homes, 174 multi-family homes, and 24,000 square feet (sq. ft.) of multi-tenant office space. The project would be constructed over a total of nine phases. **Figure 2** shows the project site plan and proposed phasing. This analysis considers the impact of the full development on twelve nearby intersections selected in consultation with Humboldt County and City of Eureka staff, identified in **Figure 1**. Mitigation measures have been recommended at any intersection that will operate at LOS E or F under Project Conditions. The following intersections were studied:

1. Harrison Avenue & Harris Street
2. Dolbeer Street & Harris Street
3. W Street & Harris Street
4. S Street & Harris Stree4t
5. S Street & Hodgson Street
6. W Street & Hodgson Street/Chester Street
7. Dolbeer Street & Chester Street
8. Walnut Drive & Hemlock Street
9. Walnut drive & Redwood Street
10. Walnut Drive & Fern Street
11. Walnut Drive & Arbutus Street
12. Walnut Drive & Cypress Street

Vicinity Map



Site Plan



PHASE 1	PHASE 2	PHASE 3	PHASE 4	PHASE 5
69 Mulyi-Family (MF) 69 TOTAL RESIDENTIAL UNITS	12 Small Lot Single-Family Houses (SF) 44 Multi-Family (MF) 56 TOTAL RESIDENTIAL UNITS 2 NEIGHBORHOOD COMMERCIAL UNIT	11 Single-Family House Lots (SF) 20 Small Lot Single-Family Houses (SF) 31 TOTAL RESIDENTIAL UNITS	27 Single-Family House Lots (SF) 18 Affordable Single-Family Houses (AH) 45 TOTAL RESIDENTIAL UNITS	13 Single-Family House Lots (SF) 61 Multi-Family (MFF) 74 TOTAL RESIDENTIAL UNITS
PHASE 6	**PHASE 7**	**PHASE 8**	**PHASE 9**	**PROJECT TOTAL**
20 Single-Family House Lots (SF) 20 TOTAL RESIDENTIAL UNITS	15 Single-Family House Lots (SF) 15 TOTAL RESIDENTIAL UNITS	7 Single-Family House Lots (SF) 7 TOTAL RESIDENTIAL UNITS	3 Single-Family House Lots (SF) 3 TOTAL RESIDENTIAL UNITS	96 Single-Family House Lots (SF) 174 Multi-Family (MF) 50 Small Lot Single Family (SF) 320 TOTAL RESIDENTIAL UNITS 2 TOTAL COMMERCIAL UNITS

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TJKM

Figure 2

EXISTING CONDITIONS

Existing traffic conditions in 2018 were developed from a combination of new intersection turning movement counts conducted in 2017-2018 and earlier counts increased by a 10-year growth factor, based on volume changes at adjacent intersections. Intersection Level of Service (LOS) was calculated at each intersection both with and without added project traffic, using existing intersection controls and lane geometry.

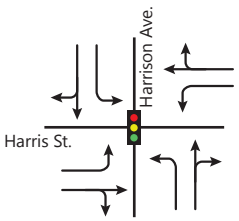
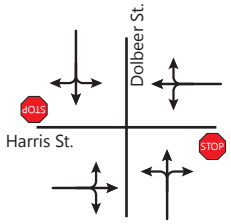
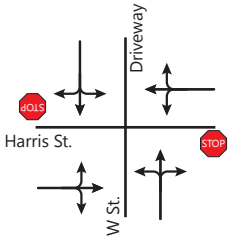
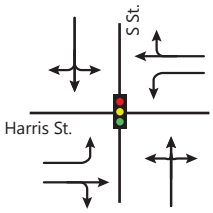
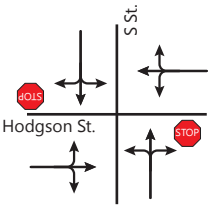
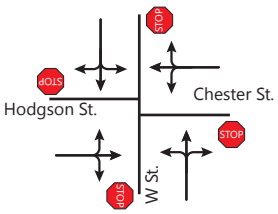
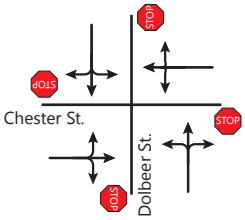
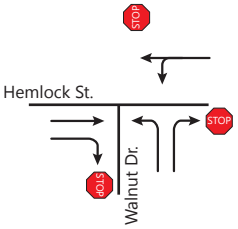
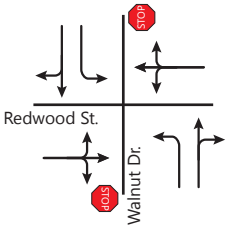
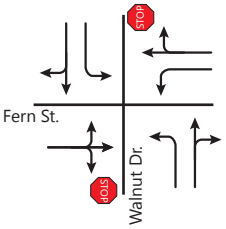
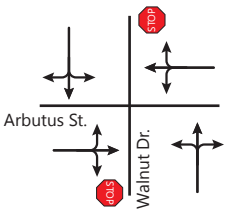
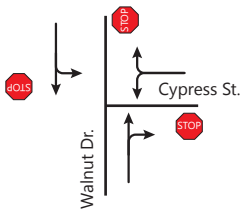
The roadways in the project vicinity are generally two-lane streets, with limited all-way stop controlled and signalized intersections. Walnut Street/Dolbeer Street is the primary arterial connecting the project to the rest of the City. Most roadways are wide enough to provide ample space for two travel lanes and on-street parking on both sides. North of Fern Street, Walnut Avenue features a two-way left turn lane, bike lanes on both sides, and on-street parking on one side.

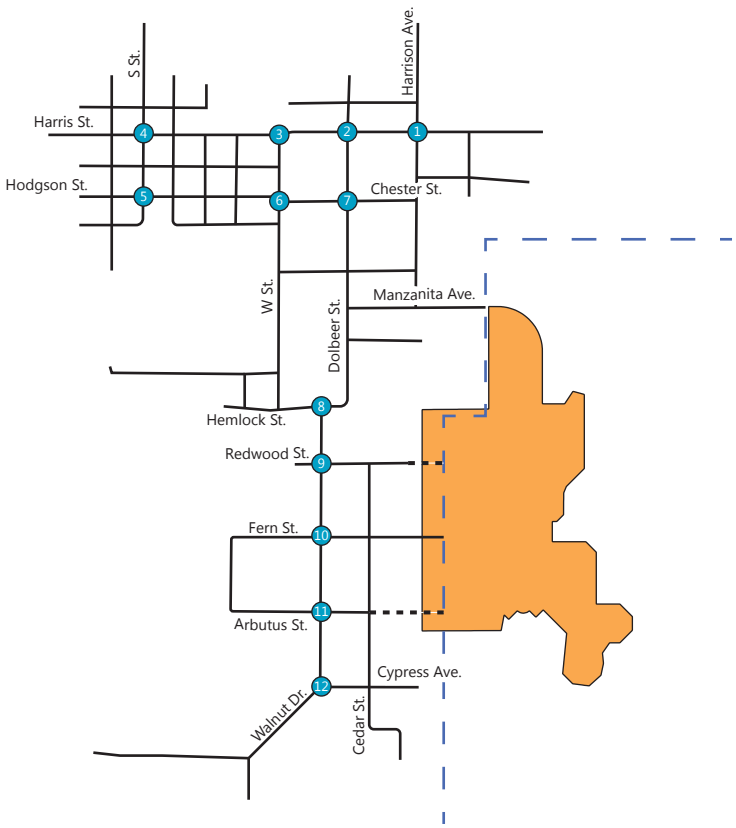
Existing Traffic Conditions

New intersection turning movement data was collected by TJKM and the City of Eureka at intersections 1, 4, 5, 6, 7, 8, and 11. Data at the remaining intersections was obtained from the 2008 McKay Tract study (intersections 2 and 3 in the a.m. peak hour, and intersections 9 and 10) and from the 2017 Sequoia Park Zoo Expansion and Renovation study (intersections 2 and 3 in the p.m. peak hour). At intersections without new counts available, annual growth factors were calculated relative to the year each older count was obtained (2003-2007 for the 2008 study). Intersections without new turning movement data were increased to 2018 levels based on growth factors from adjoining intersections. Existing intersection lane geometry and traffic controls are shown in **Figure 3**, and 2018 traffic volumes are shown in **Figure 4**.

Intersection level of service was calculated using Highway Capacity Manual (HCM) 2000 methodology with Synchro 10 software. Under Existing Conditions, the study intersections generally operate at LOS D or better in both peak hours. The intersection of Dolbeer Street & Harris Street operates at LOS D in the a.m. peak hour but LOS F in the p.m. peak hour. As a two-way stop controlled intersection, LOS is based on the average delay for the minor street only. Level of Service results for Existing Conditions are summarized in **Table 4** at the end of this memorandum. Traffic count data is attached in the **Appendix**.

Existing Lane Geometry and Controls

Intersection #1 Harrison Ave. & Harris St.	Intersection #2 Dolbeer St. & Harris St.	Intersection #3 W St. & Harris St.	Intersection #4 S St. & Harris St.	Intersection #5 S St. & Hodgson St.
				
Intersection #6 Hodgson St. / Chester St. & W St.	**Intersection #7** Dolbeer St. & Chester St.	**Intersection #8** Walnut Dr. & Hemlock St.	**Intersection #9** Walnut Dr. & Redwood St.	**Intersection #10** Walnut Dr & Fern St.
				
Intersection #11 Walnut Dr. & Arbutus St.	**Intersection #12** Walnut Dr. & Cypress St.			
				



LEGEND

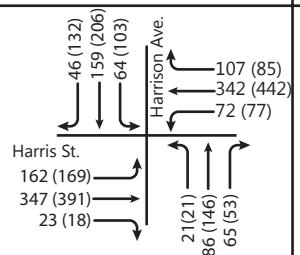
- Study Intersection
- Project Site
- Eureka City Limit
- Roadway to be Extended by Project
- Traffic Light
- Stop Sign

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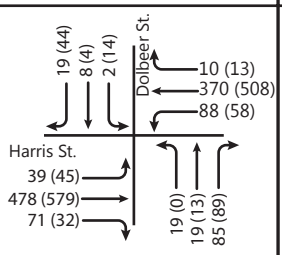
TJKM

Existing Conditions Peak Hour Traffic Volumes

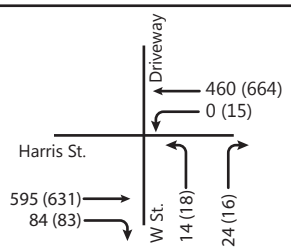
Intersection #1
Harrison Ave. & Harris St.



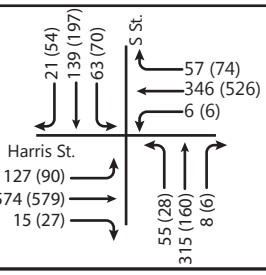
Intersection #2
Dolbeer St. & Harris St.



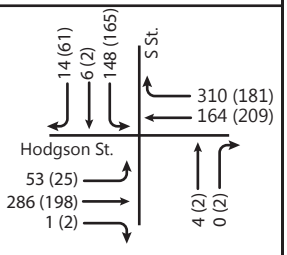
Intersection #3
W St. & Harris St.



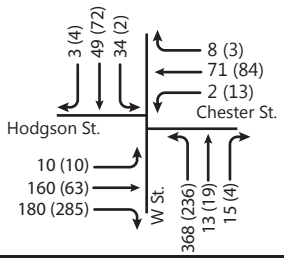
Intersection #4
S St. & Harris St.



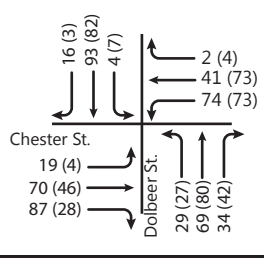
Intersection #5
S St. & Hodgson St.



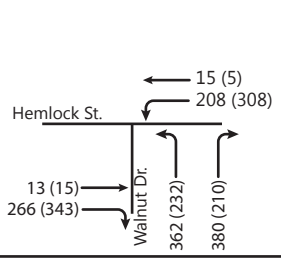
Intersection #6
Hodgson St. / Chester St. & W St.



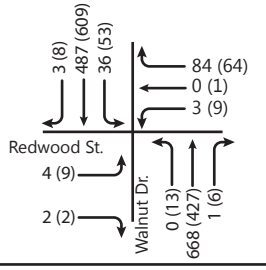
Intersection #7
Dolbeer St. & Chester St.



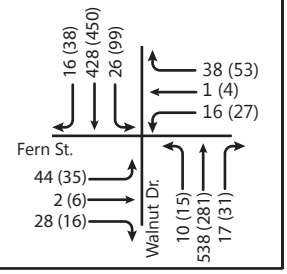
Intersection #8
Walnut Dr. & Hemlock St.



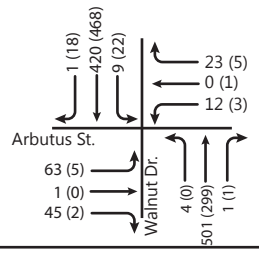
Intersection #9
Walnut Dr. & Redwood St.



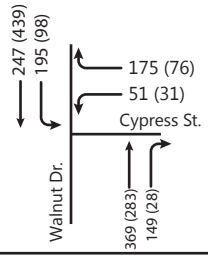
Intersection #10
Walnut Dr & Fern St.

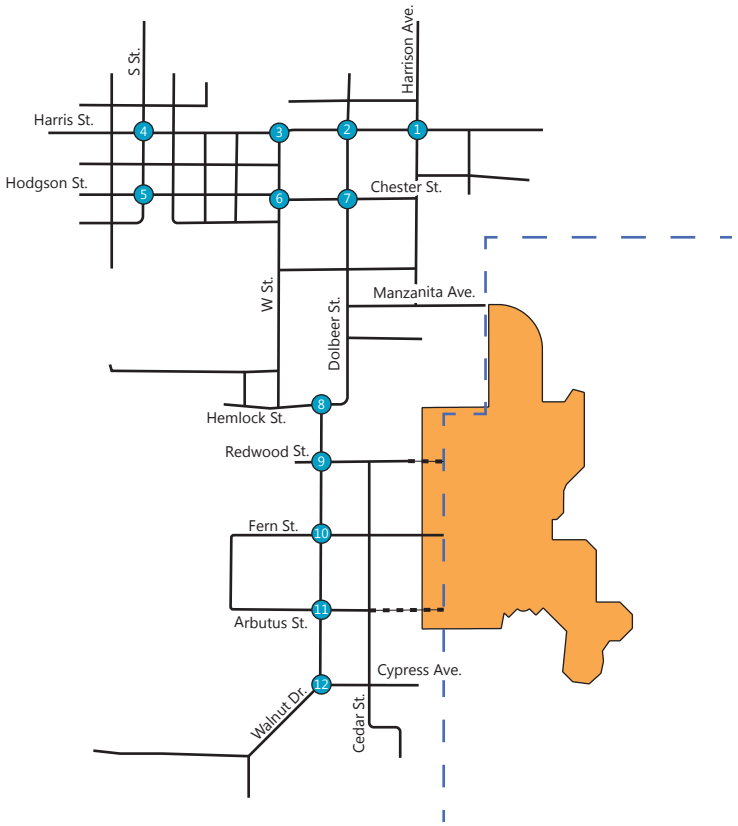


Intersection #11
Walnut Dr. & Arbutus St.



Intersection #12
Walnut Dr. & Cypress St.





LEGEND

- Study Intersection
- Project Site
- Eureka City Limit
- Roadway to be Extended by Project
- XX AM Peak Hour Volumes
- (XX) PM Peak Hour Volumes

N

TJKM

Planned Intersection Improvements

TJKM is currently working with Humboldt County and the City of Eureka to develop the Greater Eureka Area Traffic Impact Fee (GEATIF) program. Fees associated with this program would go toward funding capital improvements at thirteen intersections in the Greater City of Eureka Area. Three intersections with suggested capital improvements are also in the study area for the McKay Ranch project: Dolbeer Street & Harris Street, W Street & Hodgson Street/Chester Street, and Walnut Drive & Hemlock Street. Signals are recommended at Dolbeer Street & Harris Street and at Walnut Drive & Hemlock Street. Improvements at W Street & Hodgson Street/Chester Street would include realigning the eastern leg of the intersection (Chester Street) to eliminate the current offset. Signalization may also be considered at this intersection. The project study intersections considered in the GEATIF study are identified in **Table 4**.

Existing Pedestrian, Bicycle, and Transit Facilities

Pedestrian Facilities and Safety

The neighborhood streets surrounding the project site generally have sidewalks provided on one or both sides, particularly along collectors such as Walnut Drive and arterials such as Harris Street and S Street. The City of Eureka is actively improving pedestrian connectivity, having improved or constructed new sidewalks to fill in gaps, enhanced or adding new crosswalks, and improving curb ramps at corners and other pedestrian crossings. The City's Capital Improvement Plan 2017/2018 sets aside funds for sidewalks to improve Americans with Disabilities Act (ADA) compliance, providing citizen safety and access. These improvements include enhancing pedestrian safety on designated routes to local schools.

Notable gaps remain on certain side streets, including streets immediately surrounding the project site. Redwood Street and Fern Street have continuous sidewalks on one side each and some intermittent sections of sidewalks elsewhere, however, following continuous sidewalks on Fern Street requires crossing at Cedar Street. Arbutus Street and Cedar Street lack continuous sidewalks, with breaks of various sizes on both sides where sidewalks exist on each block. It should be noted that Eureka has historically experienced a high rate of pedestrian accidents, rating the third most dangerous incorporated California city of its size for pedestrians (California Office of Traffic Safety, 2015 rankings). The City has made efforts to reduce pedestrian collisions, through both improvements to pedestrian facilities and public safety and awareness campaigns. Existing pedestrian facilities are summarized in **Figure 5a**.

Transit Facilities

Transit services within the project area consist of Eureka Transit System buses, operated by the Humboldt Transit Authority. On weekdays, the Red Route operates along W Street and Walnut Drive, and the Purple Route and Green Routes operate on Harris Street, providing connectivity throughout the City. Weekday buses operate in a loop with one-hour headways, 6:30 a.m. – 7

p.m. On weekends, the Rainbow Route operates on W Street, Dolbeer Street, and Harris Street, and the Purple Route operates on Harris Street. Weekend buses operate with one-hour headways, 10 a.m. – 5 p.m. The nearest Red and Rainbow Route bus stops are located within half a mile of the project site, and the nearest Green and Purple Route bus stops are located approximately 1-1.2 miles from the project site. Existing transit facilities are summarized in **Figure 5a**.

Bicycle Facilities

Designated bicycle facilities in the project vicinity are limited, but the Humboldt Bay Area Bike Map (Humboldt County) identifies both existing facilities and streets that are suitable for families or bicyclists with a range of skill levels. Class II bike lanes provided on disconnected sections of Walnut Drive and Harris Street. A portion of Harris Street is designated a Class III bike route, and there is a section of Class I multiuse trail through Sequoia Park. The Bike Map identifies "Intermediate" bike-friendly streets with moderate shoulder widths, traffic volumes, topography, and pavement conditions. Certain streets and intersections are also identified as requiring higher skill and caution, including S Street and Harrison Avenue north of Harris Street, and intersections 1 and 2. Existing bicycle facilities are summarized in **Figure 5b**.

Existing Conditions Pedestrian and Transit Facilities

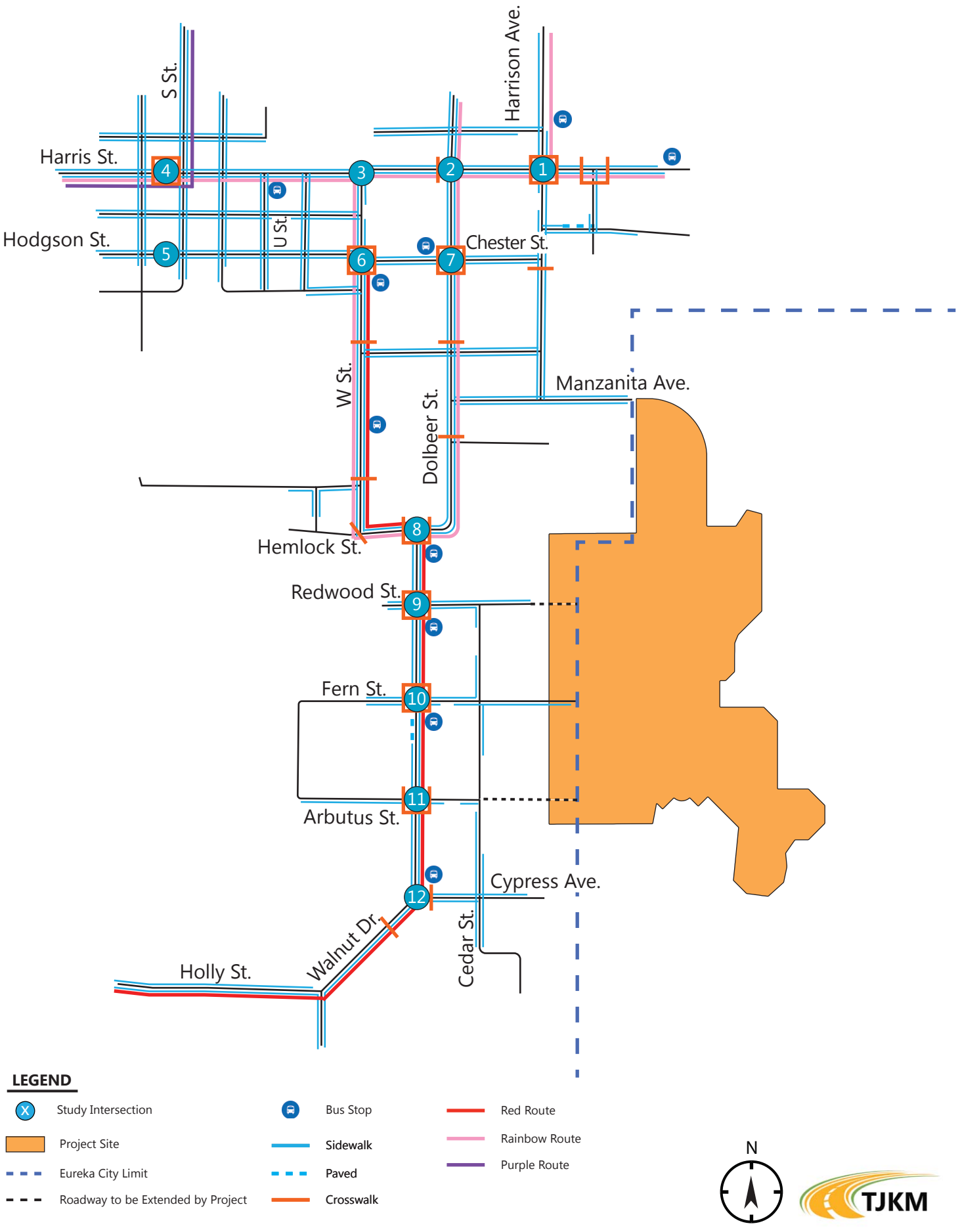
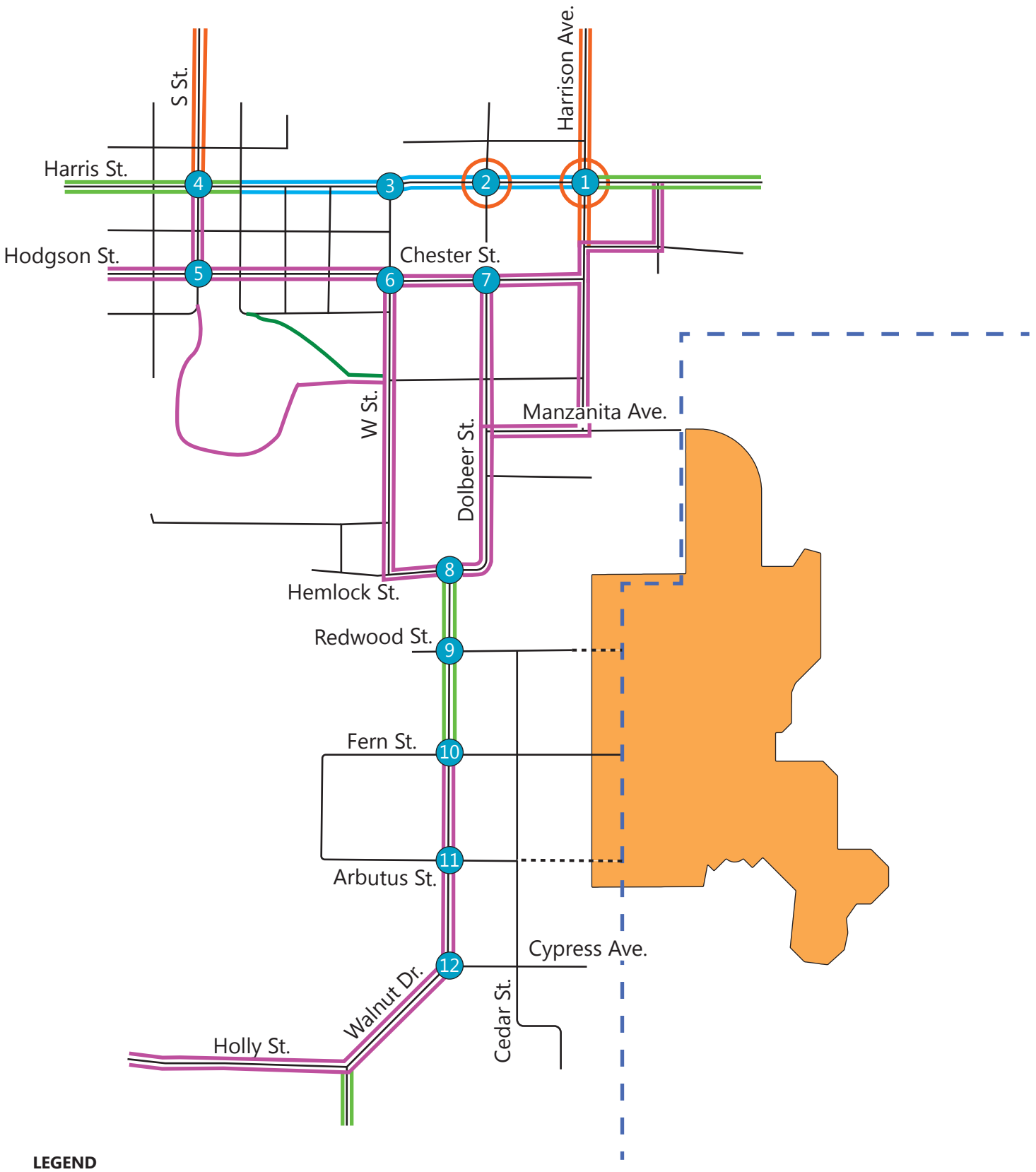


Figure 5a

Existing Conditions Bicycle Facilities



TRIP GENERATION, DISTRIBUTION, AND ASSIGNMENT

As shown in **Figure 2**, the proposed McKay Ranch Subdivision would consist of a total of 146 single-family homes, 174 multi-family homes, and 24,000 square feet (sq. ft.) of multi-tenant office space. The project would be constructed over a total of nine phases. The project trip generation and impact analysis are based on the full buildout of all phases. Trip generation for the proposed project was developed using rates from the Institute of Transportation Engineers publication *Trip Generation, 10th Edition* (2017). A conservative trip reduction of three percent was applied to the office portion to represent internal trip capture between the residential and office uses. As shown in **Table 1**, the full project buildout would generate a total of 2,879 daily trips, including 215 (68 in, 147 out) a.m. peak hour trips and 269 (156 in, 113 out) p.m. peak hour trips.

Project trips were distributed as follows, taking into account prevailing traffic patterns and surrounding land uses and incorporating feedback from City and County staff:

- 25 percent to/from northwest and downtown Eureka via S Street
- 25 percent to/from the west side of Eureka via Harris Street and Hodgson Street
- 15 percent to/from destinations to the northeast via Harrison Avenue
- 15 percent to/from commercial uses northeast of Harrison Avenue & Harris Street
- 20 percent to/from the south and southwest via Walnut Street

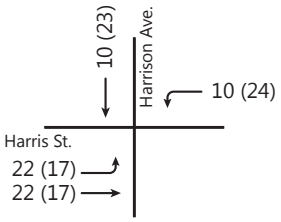
Project trip distribution and assignment are summarized in **Figure 6**

Table 1. Project Trip Generation

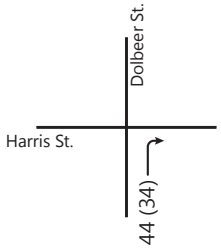
Land Use (ITE Code)	*Size*	*Daily*		*A.M. Peak*						*P.M. Peak*					
		Rate	*Trips*	*Rate*	*In %*	*Out %*	*In*	*Out*	*Total*	*Rate*	*In %*	*Out %*	*In*	*Out*	*Total*
Single Family Detached Housing (210)	146 d.u.	9.44	1,378	0.74	25	75	27	81	108	0.99	63	37	91	54	145
Multifamily Housing (Low-Rise) (220)	174 d.u.	7.32	1,274	0.46	23	77	18	62	80	0.56	63	37	61	36	97
General Office Building (710)	24.0 ksf	9.74	234	1.16	86	14	24	4	28	1.15	16	84	4	24	28
3 percent internal discount: office			*-7*				*-1*	*0*	*-1*				*0*	*-1*	*-1*
Total Trips			**2,879**				**68**	**147**	**215**				**156**	**113**	**269**

Trip Distribution & Assignment

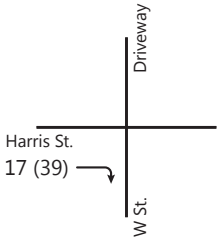
Intersection #1
Harrison Ave. & Harris St.



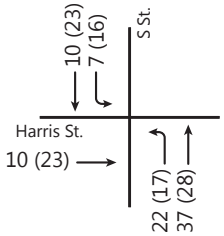
Intersection #2
Dolbeer St. & Harris St.



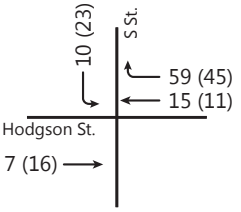
Intersection #3
W St. & Harris St.



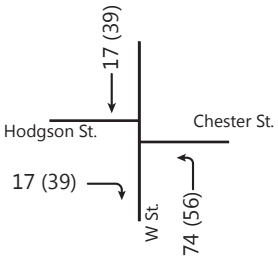
Intersection #4
S St. & Harris St.



Intersection #5
S St. & Hodgson St.



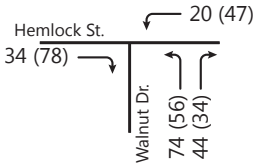
Intersection #6
Hodgson St. / Chester St. & W St.



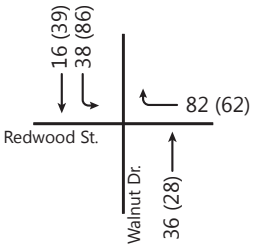
Intersection #7
Dolbeer St. & Chester St.



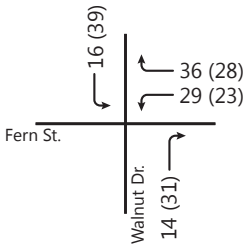
Intersection #8
Walnut Dr. & Hemlock St.



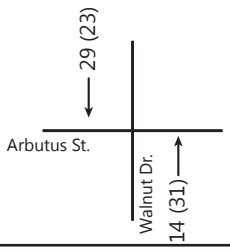
Intersection #9
Walnut Dr. & Redwood St.



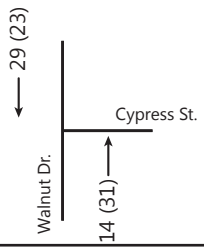
Intersection #10
Walnut Dr & Fern St.

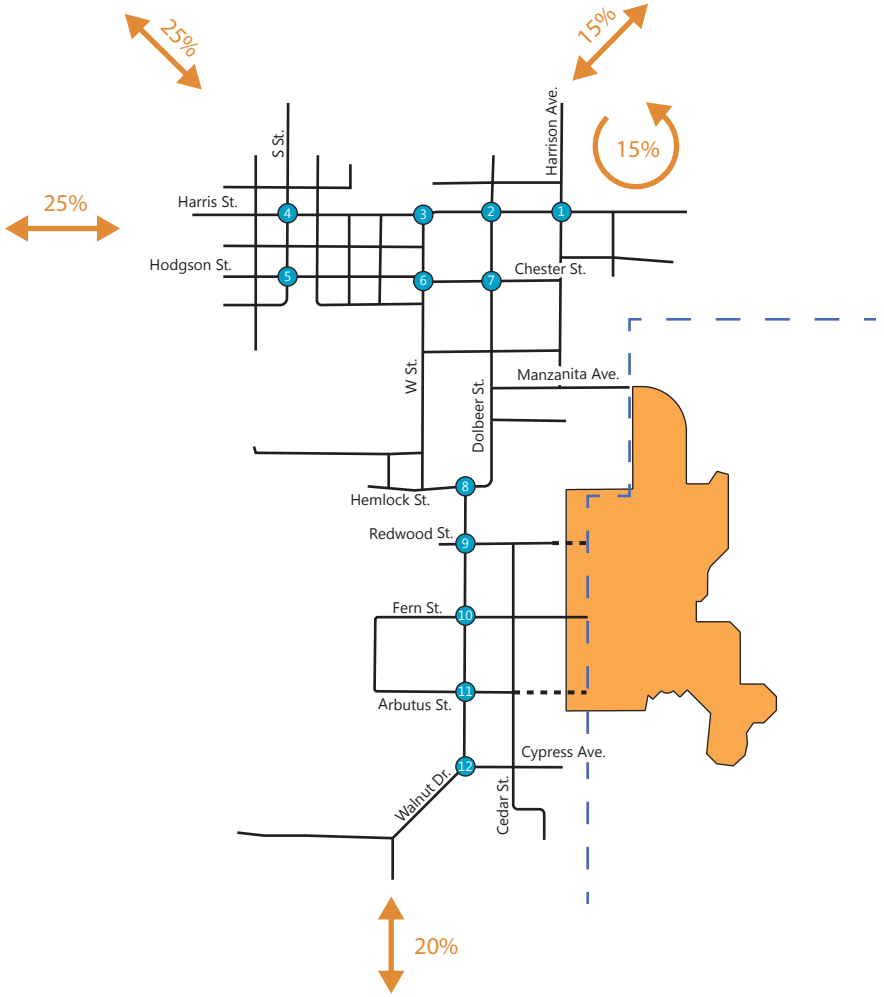


Intersection #11
Walnut Dr. & Arbutus St.



Intersection #12
Walnut Dr. & Cypress St.





LEGEND

- Study Intersection
- Project Site
- Eureka City Limit
- Roadway to be Extended by Project
- XX AM Peak Hour Volumes
- (XX) PM Peak Hour Volumes

N

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EXISTING PLUS PROJECT CONDITIONS

Traffic Impacts

With the addition of project trips, the intersection of Dolbeer Street & Harris Street (intersection 2) would degrade to LOS E in the a.m. peak hour and continue to operate at LOS F in the p.m. peak hour. The intersections of S Street & Hodgson Street (intersection 5) and Walnut Drive & Redwood Street (intersection 9) would degrade to LOS E in the a.m. peak hour. The intersection of Walnut Drive & Hemlock Street (intersection 8) would degrade to LOS E during both peak hours. The remaining eight intersections would continue to operate at LOS D or better in both peak hours. Mitigation measures for intersections operating at LOS E or F are discussed below.

Level of Service results for Existing plus Project Conditions are summarized in **Table 4** at the end of this memorandum. Existing plus Project peak hour traffic volumes are shown in **Figure 7**.

Site Access and Internal Circulation

As shown in **Figure 1**, the project would involve extending Redwood Street and Arbutus Street into the proposed subdivision. Additional internal streets would provide for vehicle circulation and direct access to each single-family lot, as shown in **Figure 2**. The internal streets shown provide efficient access to each section of the development, and the street layout provides efficient vehicle and pedestrian access to the adjacent neighborhood.

FUTURE YEAR (2040) CONDITIONS

Future conditions in 2040 were projected by applying a one percent annual growth rate to 2018 traffic volumes. Intersection Level of Service was calculated using future volumes with existing intersection geometry and controls, with and without added project traffic. Level of Service results for Future Conditions with and without added project traffic are summarized in **Table 4**.

Future no Project Conditions

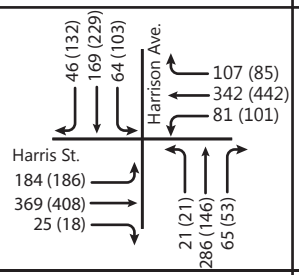
Under Future (2040) Conditions, five of the twelve study intersections would operate at LOS E or F during one or both peak hours. The two-way stop controlled intersection of Dolbeer Street & Harris Street (intersection 2) would experience extremely high delay of 228.2 seconds in the a.m. peak hour and 821.7 seconds in the p.m. peak hour, representing the delay experienced by vehicles on the minor street approach. All other intersections would continue to operate at LOS D or better during both peak hours. Future Year (2040) peak hour traffic volumes are shown in **Figure 8**.

Future plus Project Conditions

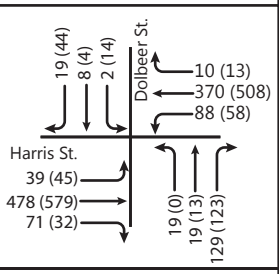
With the addition of traffic generated by the proposed project, the five intersections already operating at LOS E or F under Future Conditions would experience increased delay. In addition, the intersections of W Street & Hodgson Street/Chester Street (intersection 6) and Walnut Drive & Redwood Street (intersection 9) would degrade to LOS F during one or both peak hours. The already extremely delayed intersection of Dolbeer Street & Harris Street (intersection 2) would experience an increase in delay of 308.6 seconds. The remaining four intersections (1, 4, 7, and 10) would continue to operate at LOS D or better. Mitigation measures for intersections operating at LOS E or F are discussed below. Future Year (2040) plus Project peak hour traffic volumes are shown in **Figure 9**.

Existing Plus Project Conditions Peak Hour Traffic Volume

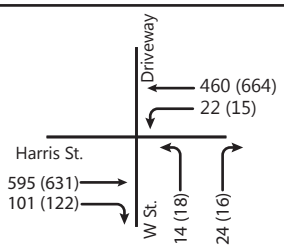
Intersection #1
Harrison Ave. & Harris St.



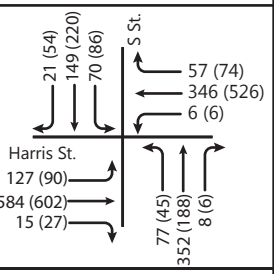
Intersection #2
Dolbeer St. & Harris St.



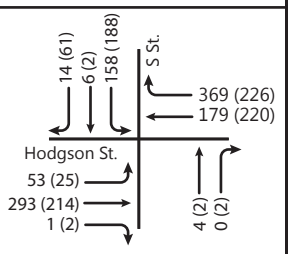
Intersection #3
W St. & Harris St.



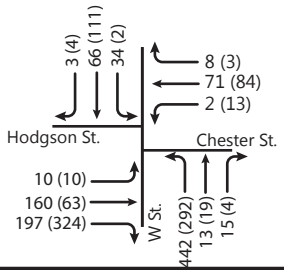
Intersection #4
S St. & Harris St.



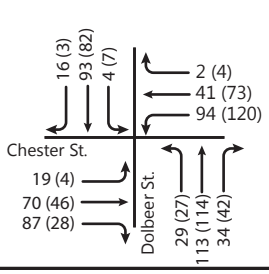
Intersection #5
S St. & Hodgson St.



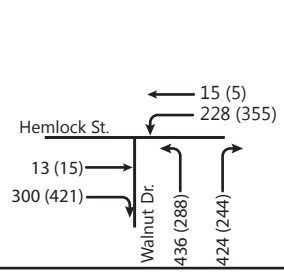
Intersection #6
Hodgson St. / Chester St. & W St.



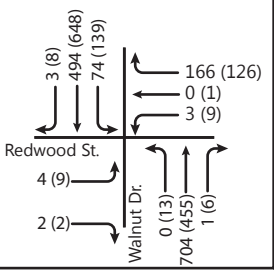
Intersection #7
Dolbeer St. & Chester St.



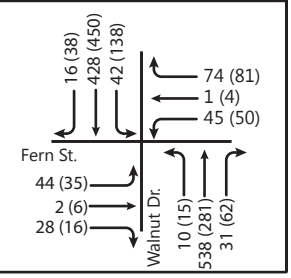
Intersection #8
Walnut Dr. & Hemlock St.



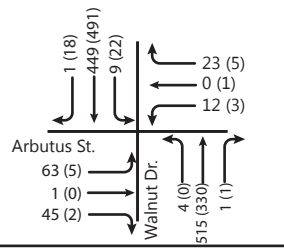
Intersection #9
Walnut Dr. & Redwood St.



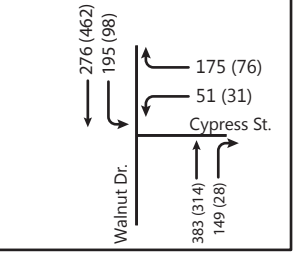
Intersection #10
Walnut Dr & Fern St.

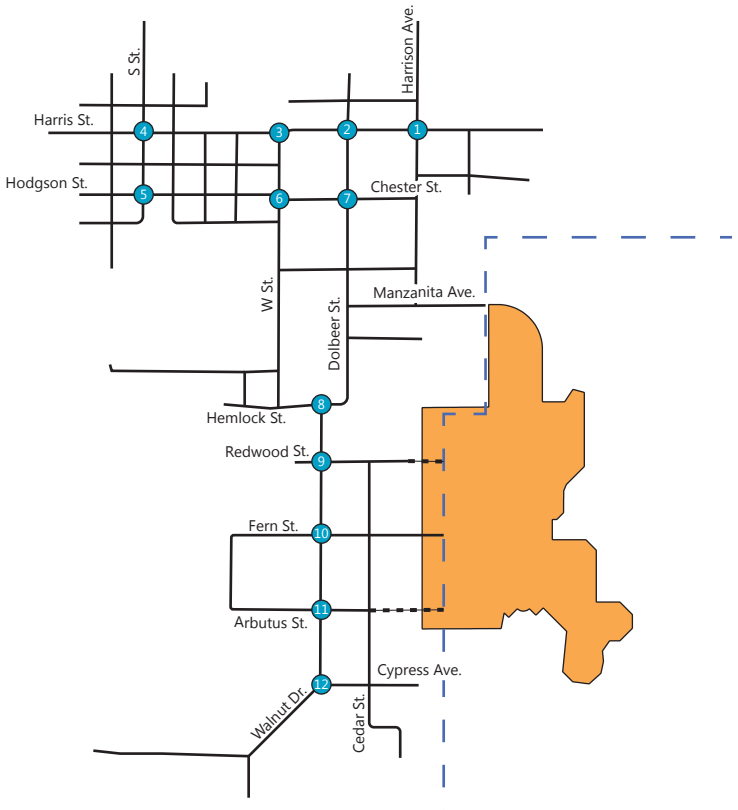


Intersection #11
Walnut Dr. & Arbutus St.



Intersection #12
Walnut Dr. & Cypress St.





LEGEND

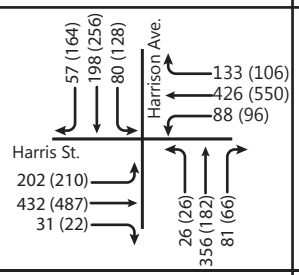
- X — Study Intersection
- Project Site
- Eureka City Limit
- Roadway to be Extended by Project
- XX — AM Peak Hour Volumes
- (XX) — PM Peak Hour Volumes

N

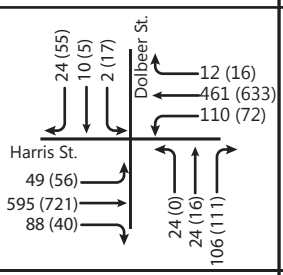
TJKM

Future Year (2040) Peak Hour Traffic Volumes

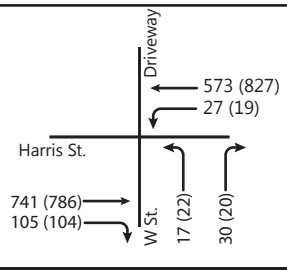
Intersection #1
Harrison Ave. & Harris St.



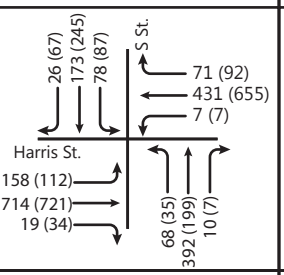
Intersection #2
Dolbeer St. & Harris St.



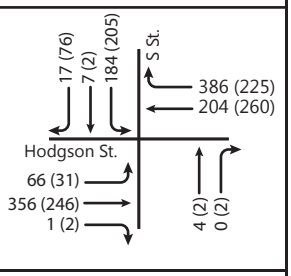
Intersection #3
W St. & Harris St.



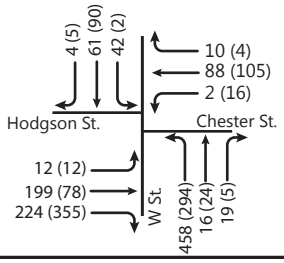
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S St. & Harris St.



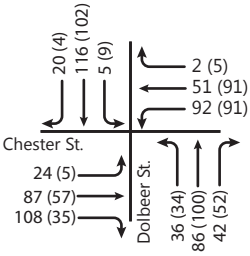
Intersection #5
S St. & Hodgson St.



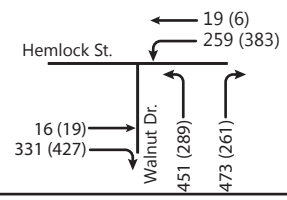
Intersection #6
Hodgson St. / Chester St. & W St.



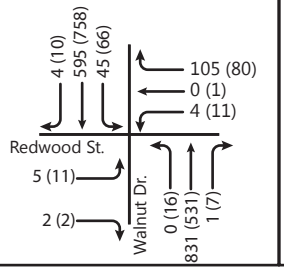
Intersection #7
Dolbeer St. & Chester St.



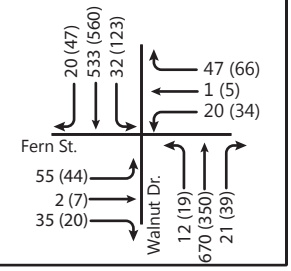
Intersection #8
Walnut Dr. & Hemlock St.



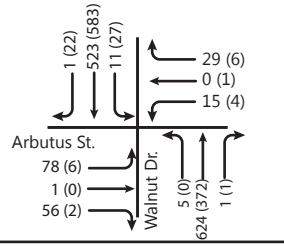
Intersection #9
Walnut Dr. & Redwood St.



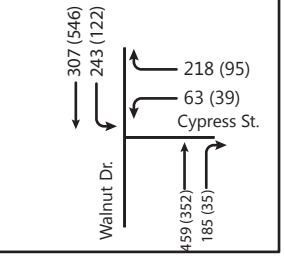
Intersection #10
Walnut Dr & Fern St.

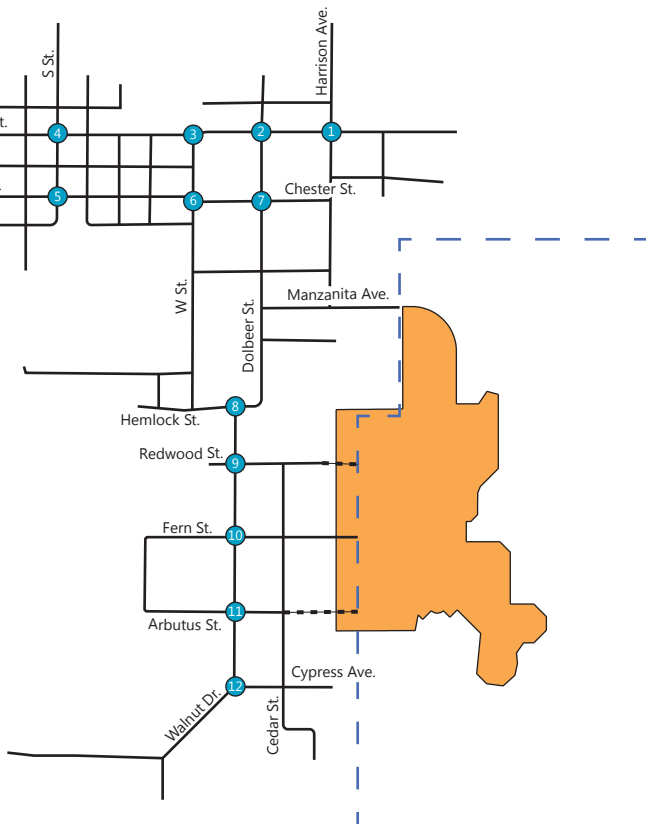


Intersection #11
Walnut Dr. & Arbutus St.



Intersection #12
Walnut Dr. & Cypress St.





LEGEND

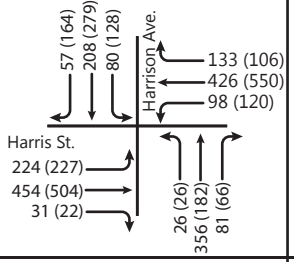
- Study Intersection
- Project Site
- Eureka City Limit
- Roadway to be Extended by Project
- XX AM Peak Hour Volumes
- (XX) PM Peak Hour Volumes

N

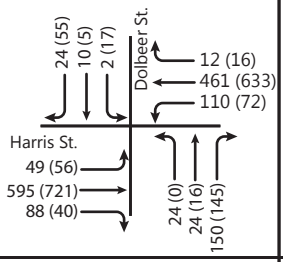
TJKM

Future Year (2040) Plus Project Peak Hour Traffic Volumes

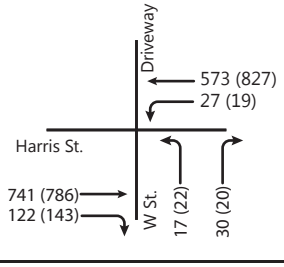
Intersection #1
Harrison Ave. & Harris St.



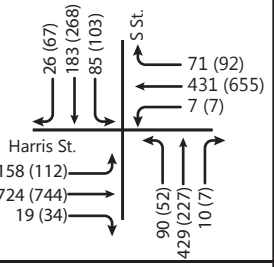
Intersection #2
Dolbeer St. & Harris St.



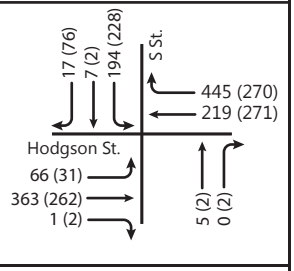
Intersection #3
W St. & Harris St.



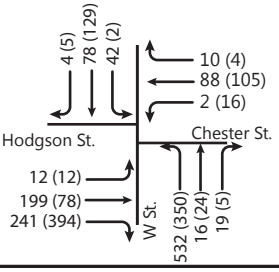
Intersection #4
S St. & Harris St.



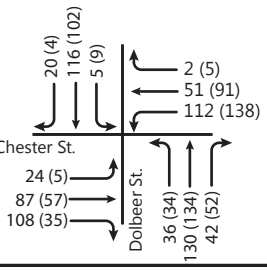
Intersection #5
S St. & Hodgson St.



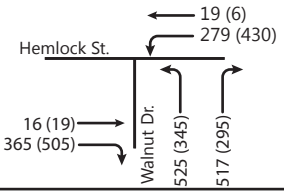
Intersection #6
Hodgson St. / Chester St. & W St.



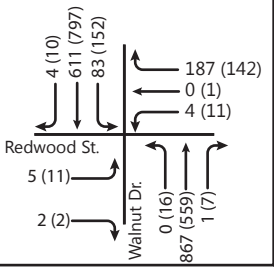
Intersection #7
Dolbeer St. & Chester St.



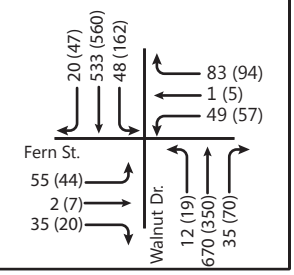
Intersection #8
Walnut Dr. & Hemlock St.



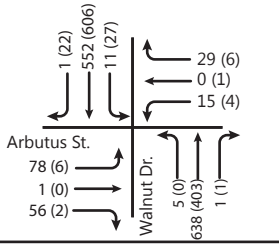
Intersection #9
Walnut Dr. & Redwood St.



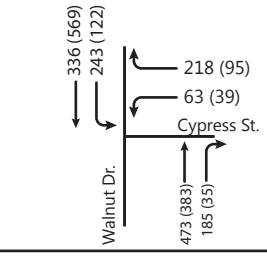
Intersection #10
Walnut Dr & Fern St.

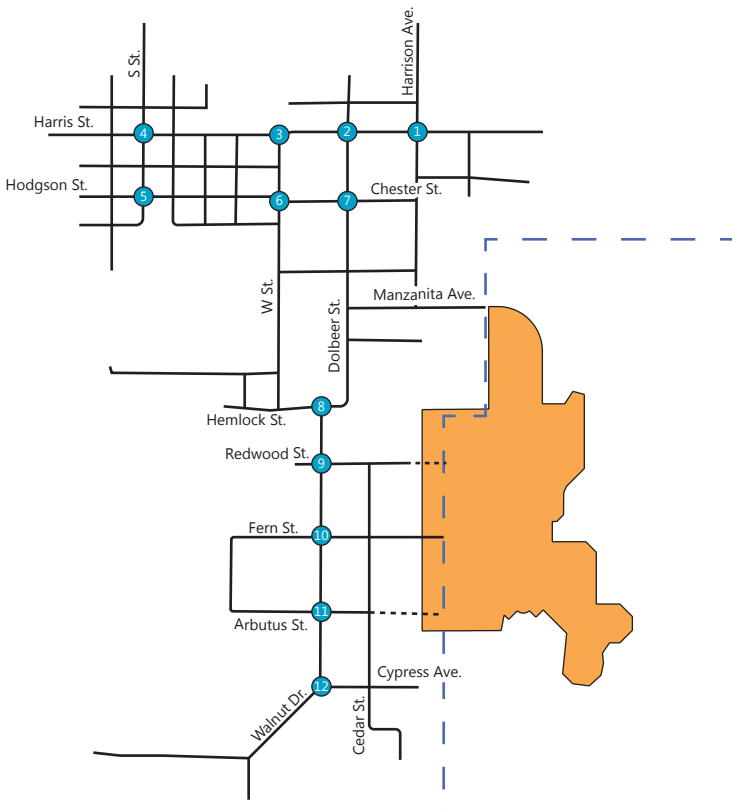


Intersection #11
Walnut Dr. & Arbutus St.



Intersection #12
Walnut Dr. & Cypress St.





LEGEND

- X — Study Intersection
- Project Site
- Eureka City Limit
- Roadway to be Extended by Project
- XX — AM Peak Hour Volumes
- (XX) — PM Peak Hour Volumes

N

TJKM

Mitigation Measures and Fair Share Contributions

Peak Hour Signal Warrants

TJKM conducted peak hour signal warrants at each unsignalized intersection operating at LOS E or F under any scenario. Under Existing Conditions, only the intersection of Walnut Drive & Cypress Street (intersection 12) met the peak hour signal warrant in the a.m. peak hour. With the addition of project traffic, the intersection of Walnut Drive & Hemlock Street (intersection 8) also met the peak hour signal warrant in the p.m. peak hour.

Under Future Conditions, five of the ten unsignalized intersections met the peak hour signal warrants in one or both peak hours: Dolbeer Street & Harris Street (intersection 2), S Street & Hodgson Street (intersection 5), W Street & Hodgson Street/Chester Street (intersection 6), Walnut Drive & Hemlock Street (intersection 8), and Walnut Drive & Cypress Street (intersection 12). With the addition of project traffic, no additional intersections met the peak hour signal warrant.

Mitigation Measures

Although the City of Eureka General Plan (1997) specifies a goal of maintaining LOS C or better on all roadways within the city, it does not specify a particular threshold for identifying significant impacts from proposed projects. For the purpose of identifying mitigation measures, TJKM evaluated intersection control modifications at any intersection where the addition of project traffic caused operations to degrade from LOS D or better to LOS E or F. Modifications considered included converting an existing two-way stop controlled (TWSC) intersection to all-way stop control (AWSC), or intersection signalization. The addition of more approach lanes was not considered, due to a general lack of sufficient right of way at intersections with potential impacts.

Under Existing plus Project Conditions, there are potentially significant impacts at Dolbeer Street & Harris Street (intersection 2), S Street & Hodgson (intersection 5), Walnut Drive & Hemlock Street (intersection 8), and Walnut Drive & Redwood Street (intersection 9). Intersections 2 and 8 are among the intersections that may be signalized under the GEATIF plan. These intersections were reevaluated under both Existing and Existing plus Project Conditions, with signalization improving operations to LOS B or better at intersections 2, 8, and 9, and all-way stop control improving operations to LOS B/C at intersection 5 under both scenarios.

Under Future plus Project Conditions, in addition to the intersections listed above, there are potentially significant impacts at W Street & Harris Street (intersection 3), W Street & Hodgson Street/Chester Street (intersection 6), Walnut Drive & Arbutus Street (intersection 11), and Walnut Drive & Cypress Street (intersection 12). These intersections were reevaluated under both Future and Future plus Project Conditions. All-way stop control at intersection 5 failed to

improve operations to LOS C or better, so signalization was also evaluated. Signalization improved operations to LOS C or better at all impacted intersections during both peak hours under both scenarios.

Table 4 summarizes the mitigation measures considered for each intersection and the resulting Level of Service. Intersections meeting signal warrants and intersections included in the GEATIF plan are also identified.

Fair Share Contributions

As the proposed project will add a large number of new trips to the study intersections and is expected to degrade operations at several of them, a fair share contribution was calculated for each intersection where mitigation measures were evaluated. This fair share represents the proportion of capital improvement costs the project would need to contribute to mitigate potentially significant impacts.

Fair share contributions were based on Future plus Project Conditions. **Table 2** presents fair share calculations based on the combined total volumes of both a.m. and p.m. peak hours at each intersection. The project fair share was defined as the proportion of peak hour traffic growth above Existing Conditions that is due to the proposed project.

As shown in **Table 2**, project trips added to each intersection would account for between eight and 40 percent of traffic growth beyond Existing traffic volumes, with the highest proportion at Walnut Drive & Hemlock Street. As discussed previously, signalization at this intersection is currently being studied in conjunction with the GEATIF study.

Table 2. Project Fair Share Contributions

ID	Study Intersection	Peak hour	Existing Volume (1)	Project Trips (2)	Future plus Project Volumes (3)	Cumulative Growth (4)	Project %	Fair Share
						(3 - 1)	(2 ÷ 4)	
2	Dolbeer Street & Harris Street	AM	1,208	44	1,548	340	13%	**11%**
		PM	1,400	34	1,776	377	9%	
		Total	2,608	78	3,324	716	**11%**	
3	W Street & Harris Street	AM	1,199	17	1,509	310	5%	**8%**
		PM	1,428	39	1,817	388	10%	
		Total	2,627	56	3,326	699	8%	
5	S Street & Hodgson Street	AM	986	91	1,318	332	27%	**29%**
		PM	847	95	1,149	302	31%	
		Total	1,833	186	2,468	635	**29%**	
6	W Street & Hodgson Street/Chester Street	AM	913	108	1,244	331	33%	**37%**
		PM	795	134	1,124	329	41%	
		Total	1,708	242	2,368	660	**37%**	
8	Walnut Drive & Hemlock Street	AM	1,244	172	1,720	476	36%	**40%**
		PM	1,113	215	1,600	487	44%	
		Total	2,357	387	3,321	964	**40%**	
9	Walnut Drive & Redwood Street	AM	1,279	172	1,764	485	35%	**39%**
		PM	1,201	215	1,710	509	42%	
		Total	2,480	387	3,474	994	**39%**	
11	Walnut Drive & Arbutus Street	AM	1,080	43	1,387	307	14%	**17%**
		PM	824	54	1,080	256	21%	
		Total	1,904	97	2,467	563	**17%**	
12	Walnut Drive & Cypress Street	AM	1,186	43	1,519	333	13%	**16%**
		PM	955	54	1,243	288	19%	
		Total	2,141	97	2,762	621	**16%**	

Table 3. Project Traffic Impact Fee

Land Use (ITE Code)	Size	P.M. Peak Trips		TIF per Trip	Traffic Impact Fee per Use
		Rate	Total		
Single Family Detached Housing (210)	146 d.u.	0.99	145	$2,065	$299,425
Multifamily Housing (Low-Rise) (220)	174 d.u.	0.56	97	$2,065	$200,305
General Office Building (710)	24.0 ksf	1.15	27	$2,065	$55,755
Total			**269**		**$555,485**

CONCLUSIONS AND RECOMMENDATIONS

The proposed McKay Ranch Subdivision would construct 146 single-family homes, 174 multifamily units, and 24,000 square feet of general office space, over nine phases. At buildout, the project is expected to produce 2,879 daily trips, including 215 a.m. peak hour and 269 p.m. peak hour trips. Under Existing Conditions, all but one of the twelve study intersections operates at LOS D or better during both peak hours, with most operating at LOS A or B. The addition of project traffic would cause three additional intersections to degrade to LOS E or F during one or both peak hours. These potentially significant impacts could be fully mitigated with conversion of two-way stop control to all-way stop control or signalization of impacted intersections. Under Future (2040) Conditions, six of the twelve study intersections would operate at LOS E or F during one or both peak hours. The addition of project traffic would cause two additional intersections to degrade to LOS E or F and substantially increase delay at two of the intersections already operating at LOS E or F. These potentially significant impacts could be fully mitigated with signalization of impacted intersections.

Based on projected Future plus Project traffic volumes, the proposed project would produce between eight and forty percent of the growth above Existing traffic volumes at impacted intersections. This proportion represents the fair share contribution the project could be expected to contribute to capital improvements at these intersections.

Pedestrian access and safety within the vicinity of the project is generally adequate, but with notable gaps in sidewalks on the side streets near the project. Bus stops are located within easy walking distance. Most streets within the project vicinity either provide existing bike facilities or have been identified as bike friendly, allowing for good bike access for the project site. Vehicle access to the site is also adequate, with two neighborhood streets to be extended into the subdivision site and adequate internal streets provided for convenient internal circulation.

TJKM makes the following recommendation:

- All newly constructed streets should provide adequate sidewalks and ADA-compliant curb ramps, with marked crosswalks as needed.

Table 4. Intersection Level of Service and Mitigation Measures

ID	Study Intersections	Control	Planned Project	Peak Hour	Existing			Existing plus Project				Future (2040)			Future plus Project			
					Delay	LOS	Meets signal warrant?	Delay	LOS	Change in Delay	Meets signal warrant?	Delay	LOS	Meets signal warrant?	Delay	LOS	Change in Delay	Meets signal warrant?
1	Harrison Avenue & Harris Street	Signal		AM	25.4	C		25.4	C	0.0		35.0	D		36.4	D	1.4	
				PM	27.0	C		28.1	C	1.1		38.8	D		42.3	D	3.5	
2	Dolbeer Street & Harris Street	TWSC	**Signal**	AM	34.1	D		**35.4**	**E**	**1.3**		**228.2**	**F**	**Yes**	**248.5**	**F**	**20.3**	**Yes**
				PM	**50.3**	**F**		**63.0**	**F**	**12.7**		**821.7**	**F**	**Yes**	**1130.3**	**F**	**308.6**	**Yes**
	Mitigation: Signal	*Signal*		*AM*	*8.2*	*A*		*8.4*	*A*	*0.2*		*9.7*	*A*		*10.2*	*B*	*0.5*	
				PM	*8.4*	*A*		*8.6*	*A*	*0.2*		*9.8*	*A*		*10.2*	*B*	*0.4*	
3	W Street & Harris Street	TWSC		AM	23.4	C		23.9	C	0.5		**49.2**	**E**		**60.5**	**F**	**11.3**	
				PM	25.7	D		27.3	D	1.6		**35.9**	**E**		**36.9**	**E**	**1.0**	
	Mitigation: Signal	*Signal*		*AM*	-	-		-	-	-		*7.3*	*A*		*7.3*	*A*	*0.0*	
				PM	-	-		-	-	-		*6.9*	*A*		*7.4*	*A*	*0.5*	
4	S Street & Harris Street	Signal		AM	12.8	B		14.7	B	1.9		20.2	C		25.4	C	5.2	
				PM	13.2	B		14.8	B	1.6		22.0	C		27.6	C	5.6	
5	S Street & Hodgson Street	TWSC	**AWSC**	AM	31.5	D		**40.8**	**E**	**9.3**		**102.4**	**F**	**Yes**	**154.6**	**F**	**52.2**	**Yes**
				PM	21.8	C		28.5	D	6.7		**48.2**	**E**		**81.6**	**F**	**33.4**	
	Mitigation 1: AWSC	*AWSC*		*AM*	*14.9*	*B*		*18.7*	*C*	*3.8*		*29.2*	*D*		***45.9***	***E***	***16.7***	
				PM	*12.5*	*B*		*14.6*	*B*	*2.1*		*18.5*	*C*		*25.3*	*D*	*6.8*	
	Mitigation 2: Signal	*Signal*		*AM*	-	-		-	-	-					*12.8*	*A*	*-16.4*	
				PM	-	-		-	-	-					*11.6*	*B*	*11.6*	
6	W Street & Hodgson Street/Chester Street	AWSC	**Alignment**	AM	16.0	C		22.6	C	6.6		33.7	D	**Yes**	**57.5**	**F**	**23.8**	**Yes**
				PM	11.9	B		14.5	B	2.6		16.7	C		24.6	C	7.9	
	Mitigation: Signal	*Signal*		*AM*	-	-		-	-	-		*19.6*	*B*		*27.8*	*C*	*8.2*	
				PM	-	-		-	-	-		*9.7*	*A*		*11.1*	*B*	*1.4*	
7	Dolbeer Street & Chester Street	AWSC		AM	8.9	A		9.3	A	0.4		9.8	A		10.4	B	0.6	
				PM	8.7	A		9.3	A	0.6		9.4	A		11.0	B	1.6	
8	Walnut Drive & Hemlock Street	AWSC	**Signal**	AM	22.9	C		**38.8**	**E**	**15.9**		**53.6**	**F**		**92.3**	**F**	**38.7**	**Yes**
				PM	21.0	C		**43.4**	**E**	**22.4**	**Yes**	**50.3**	**F**	**Yes**	**142.6**	**F**	**92.3**	**Yes**
	Mitigation: Signal	*Signal*		*AM*	*8.9*	*A*		*10.2*	*B*	*1.3*		*11.1*	*B*		*13.0*	*B*	*1.9*	
				PM	*9.1*	*A*		*10.6*	*B*	*1.5*		*11.4*	*B*		*13.5*	*B*	*2.1*	

ID	Study Intersections	Control	Planned Project	Peak Hour	Existing			Existing plus Project				Future (2040)			Future plus Project			
					Delay	LOS	Meets signal warrant?	Delay	LOS	Change in Delay	Meets signal warrant?	Delay	LOS	Meets signal warrant?	Delay	LOS	Change in Delay	Meets signal warrant?
9	Walnut Drive & Redwood Street	TWSC		AM	18.0	C		**35.1**	**E**	**17.1**	**Yes**	27.8	D	**Yes**	**252.8**	**F**	**225.0**	**Yes**
				PM	17.5	C		27.6	D	10.1		22.9	C		**51.2**	**F**	**28.3**	**Yes**
	Mitigation: Signal	*Signal*		*AM*	*4.3*	*A*		*6.0*	*A*	*1.7*		*5.6*	*A*		*8.5*	*A*	*2.9*	
				PM	*4.1*	*A*		*5.4*	*A*	*1.3*		*5.2*	*A*		*6.1*	*A*	*0.9*	
10	Walnut Drive & Fern Street	TWSC		AM	16.3	C		18.3	C	2.0		22.1	C		27.1	D	5.0	
				PM	16.9	C		19.3	C	2.4		22.9	C		28.1	D	5.2	
11	Walnut Drive & Arbutus Street	TWSC		AM	28.6	D		31.5	D	2.9		**76.9**	**F**		**92.5**	**F**	**15.6**	
				PM	17.3	C		18.4	C	1.1		23.2	C		24.9	C	1.7	
	Mitigation: Signal	*Signal*		*AM*	-	-		-	-			*6.8*	*A*		*6.9*	*A*	*0.1*	
				PM	-	-		-	-			*2.3*	*A*		*2.4*	*A*	*0.1*	
12	Walnut Drive & Cypress Street	AWSC		AM	24.3	C	**Yes**	28.0	D	3.7	**Yes**	**72.4**	**F**	**Yes**	**82.3**	**F**	**9.9**	**Yes**
				PM	17.3	C		19.5	C	2.2		**40.4**	**E**		**72.9**	**F**	**32.5**	
	Mitigation: Signal	*Signal*		*AM*	-	-		-	-	-		*18.1*	*B*		*21.3*	*C*	*3.2*	
				PM	-	-		-	-	-		*6.4*	*A*		*6.4*	*A*	*0.0*	

City of Eureka
Traffic Engineering
Turning Movement Traffic Count

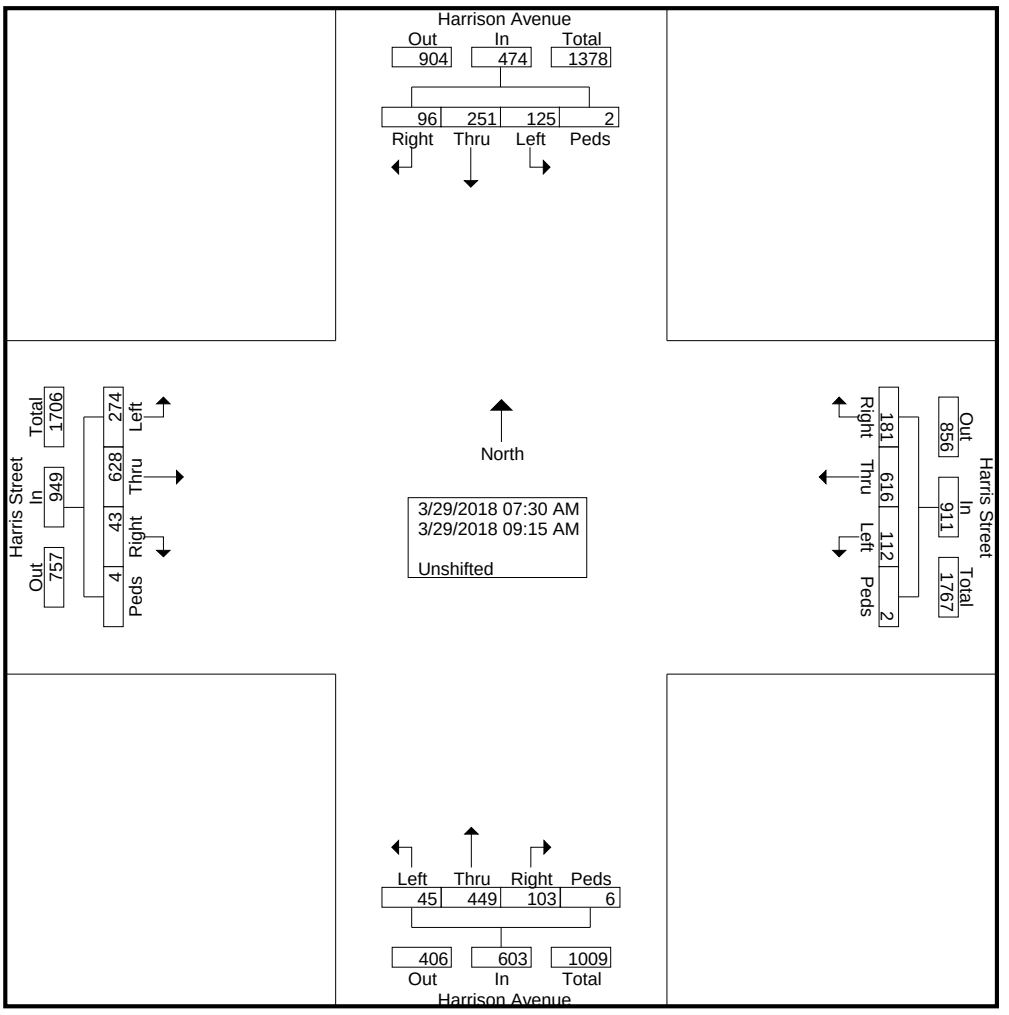
531 K Street
Eureka, CA 95501

Weather:
Collected By:
Other Notes:

File Name : Harris & Harrison - A.M. 3-29-18
Site Code : 03292018
Start Date : 3/29/2018
Page No : 1

Groups Printed- Unshifted

	Harrison Avenue From North					Harris Street From East					Harrison Avenue From South					Harris Street From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:30 AM	12	25	13	0	50	19	85	18	0	122	9	49	5	0	63	1	82	19	0	102	337
07:45 AM	17	49	14	2	82	36	86	16	1	139	18	79	4	0	101	6	89	39	1	135	457
Total	29	74	27	2	132	55	171	34	1	261	27	128	9	0	164	7	171	58	1	237	794
08:00 AM	8	46	6	0	60	26	89	24	0	139	18	87	12	3	120	6	103	40	1	150	469
08:15 AM	13	35	21	0	69	22	78	14	1	115	19	77	5	2	103	10	92	42	2	146	433
08:30 AM	8	29	23	0	60	23	89	17	0	129	10	43	0	1	54	3	63	41	0	107	350
08:45 AM	10	21	14	0	45	20	63	10	0	93	6	43	8	0	57	6	72	31	0	109	304
Total	39	131	64	0	234	91	319	65	1	476	53	250	25	6	334	25	330	154	3	512	1556
09:00 AM	16	23	24	0	63	22	72	7	0	101	9	25	2	0	36	5	57	35	0	97	297
09:15 AM	12	23	10	0	45	13	54	6	0	73	14	46	9	0	69	6	70	27	0	103	290
Grand Total	96	251	125	2	474	181	616	112	2	911	103	449	45	6	603	43	628	274	4	949	2937
Apprch %	20.3	53	26.4	0.4		19.9	67.6	12.3	0.2		17.1	74.5	7.5	1		4.5	66.2	28.9	0.4		
Total %	3.3	8.5	4.3	0.1	16.1	6.2	21	3.8	0.1	31	3.5	15.3	1.5	0.2	20.5	1.5	21.4	9.3	0.1	32.3	



City of Eureka
Traffic Engineering
Turning Movement Traffic Count

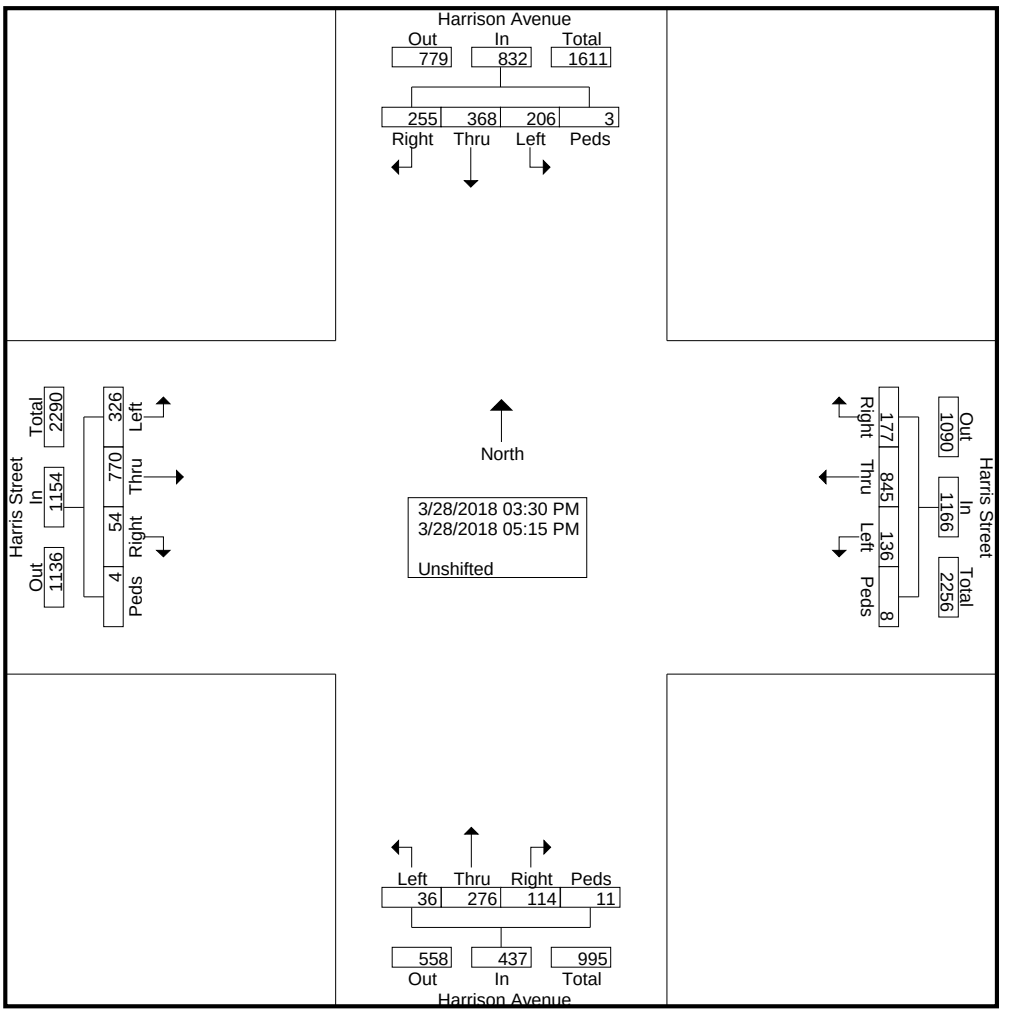
531 K Street
Eureka, CA 95501

Weather:
Collected By:
Other Notes:

File Name : Harris & Harrison - P.M. 3-28-18
Site Code : 03282018
Start Date : 3/28/2018
Page No : 1

Groups Printed- Unshifted

	Harrison Avenue From North					Harris Street From East					Harrison Avenue From South					Harris Street From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
03:30 PM	35	38	25	1	99	32	105	16	1	154	21	39	3	0	63	9	111	47	0	167	483
03:45 PM	29	41	35	0	105	23	100	16	0	139	14	36	4	1	55	16	98	34	1	149	448
Total	64	79	60	1	204	55	205	32	1	293	35	75	7	1	118	25	209	81	1	316	931
04:00 PM	27	49	24	0	100	23	88	11	0	122	16	29	5	0	50	9	91	39	1	140	412
04:15 PM	32	34	19	2	87	14	110	16	1	141	10	26	3	2	41	2	79	37	1	119	388
04:30 PM	32	51	23	0	106	24	106	21	2	153	12	28	5	0	45	3	104	42	1	150	454
04:45 PM	32	42	26	0	100	20	104	18	1	143	13	23	5	1	42	9	90	40	0	139	424
Total	123	176	92	2	393	81	408	66	4	559	51	106	18	3	178	23	364	158	3	548	1678
05:00 PM	33	53	33	0	119	24	122	17	3	166	16	41	5	3	65	3	94	46	0	143	493
05:15 PM	35	60	21	0	116	17	110	21	0	148	12	54	6	4	76	3	103	41	0	147	487
Grand Total	255	368	206	3	832	177	845	136	8	1166	114	276	36	11	437	54	770	326	4	1154	3589
Apprch %	30.6	44.2	24.8	0.4		15.2	72.5	11.7	0.7		26.1	63.2	8.2	2.5		4.7	66.7	28.2	0.3		
Total %	7.1	10.3	5.7	0.1	23.2	4.9	23.5	3.8	0.2	32.5	3.2	7.7	1	0.3	12.2	1.5	21.5	9.1	0.1	32.2	



City of Eureka
Traffic Engineering
Turning Movement Traffic Count

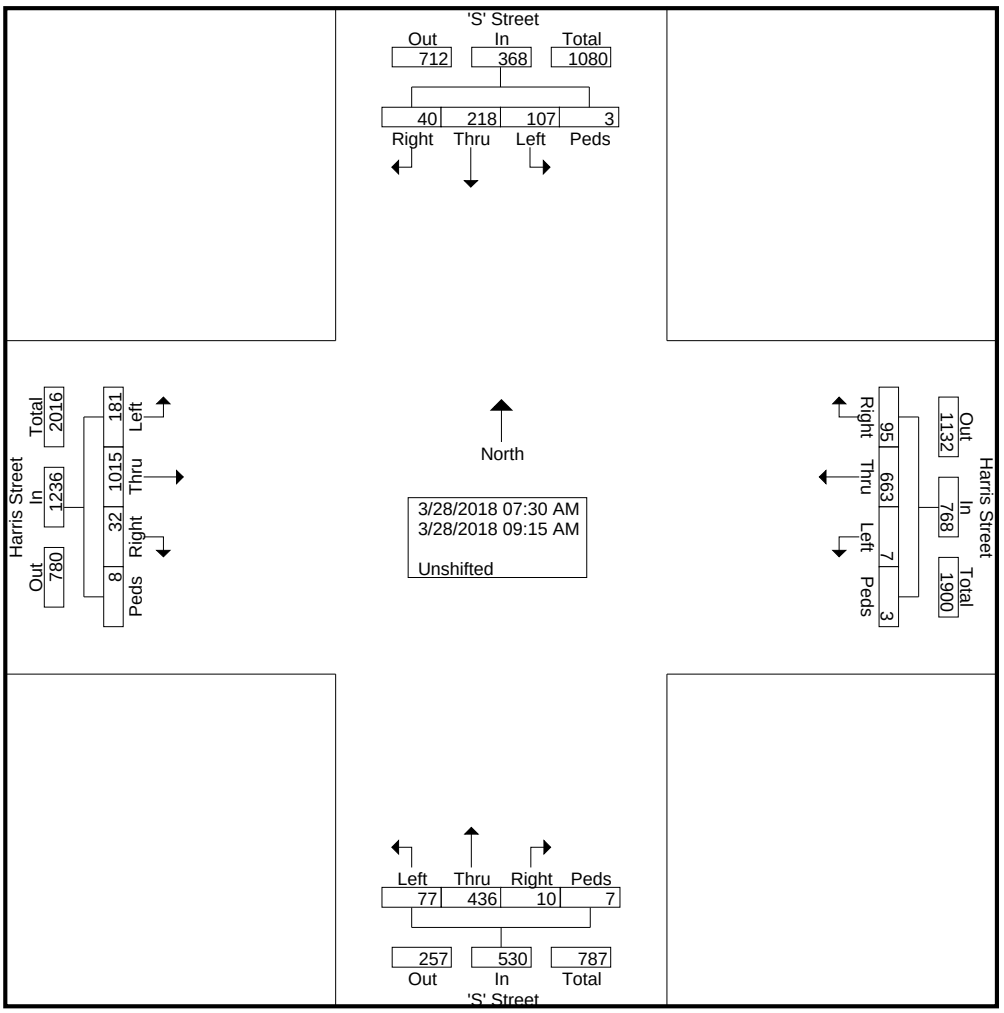
531 K Street
Eureka, CA 95501

Weather: Partly Cloudy
Collected By: Patrick Bellefeuille
Other Notes:

File Name : Harris & S - A.M. 3-28-18
Site Code : 03282018
Start Date : 3/28/2018

Groups Printed- Unshifted

	'S' Street From North					Harris Street From East					'S' Street From South					Harris Street From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:30 AM	2	37	13	0	52	9	76	1	0	86	2	66	16	0	84	2	117	26	1	146	368
07:45 AM	10	32	19	0	61	13	100	1	0	114	3	98	8	0	109	4	146	40	1	191	475
Total	12	69	32	0	113	22	176	2	0	200	5	164	24	0	193	6	263	66	2	337	843
08:00 AM	4	32	18	0	54	21	81	2	0	104	2	78	18	2	100	5	153	34	1	193	451
08:15 AM	5	38	13	1	57	14	89	2	1	106	1	73	13	1	88	4	158	27	1	190	441
08:30 AM	7	26	7	1	41	10	86	1	0	97	1	32	8	0	41	6	119	16	0	141	320
08:45 AM	1	29	15	0	45	9	72	0	1	82	0	42	6	0	48	2	122	13	0	137	312
Total	17	125	53	2	197	54	328	5	2	389	4	225	45	3	277	17	552	90	2	661	1524
09:00 AM	5	16	10	1	32	10	72	0	1	83	0	21	4	2	27	5	94	17	3	119	261
09:15 AM	6	8	12	0	26	9	87	0	0	96	1	26	4	2	33	4	106	8	1	119	274
Grand Total	40	218	107	3	368	95	663	7	3	768	10	436	77	7	530	32	1015	181	8	1236	2902
Apprch %	10.9	59.2	29.1	0.8		12.4	86.3	0.9	0.4		1.9	82.3	14.5	1.3		2.6	82.1	14.6	0.6		
Total %	1.4	7.5	3.7	0.1	12.7	3.3	22.8	0.2	0.1	26.5	0.3	15	2.7	0.2	18.3	1.1	35	6.2	0.3	42.6	



City of Eureka
Traffic Engineering
Turning Movement Traffic Count

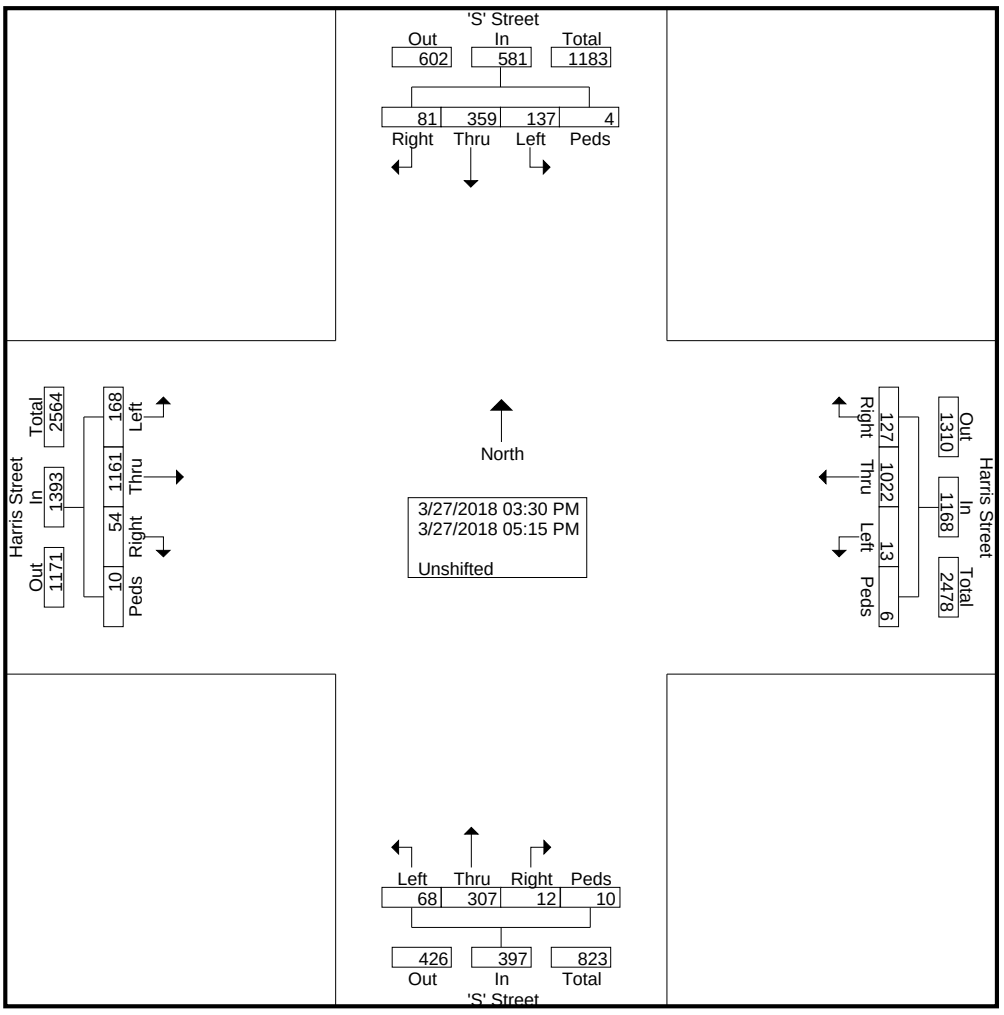
531 K Street
Eureka, CA 95501

Weather: Sunny
Collected By: Brian Weekly
Other Notes:

File Name : Harris & S - P.M. 3-27-18
Site Code : 03272018
Start Date : 3/27/2018

Groups Printed- Unshifted

	'S' Street From North					Harris Street From East					'S' Street From South					Harris Street From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
03:30 PM	4	45	22	2	73	16	141	0	1	158	1	38	12	2	53	1	143	12	0	156	440
03:45 PM	9	44	13	0	66	12	119	2	3	136	1	31	10	1	43	14	142	23	3	182	427
Total	13	89	35	2	139	28	260	2	4	294	2	69	22	3	96	15	285	35	3	338	867
04:00 PM	7	37	22	0	66	10	123	3	0	136	1	41	7	0	49	10	137	26	2	175	426
04:15 PM	7	36	10	0	53	15	113	2	0	130	3	37	11	1	52	2	160	17	0	179	414
04:30 PM	9	42	16	0	67	15	129	3	0	147	2	30	7	0	39	4	121	23	1	149	402
04:45 PM	14	45	16	0	75	18	144	0	1	163	2	35	7	2	46	7	134	15	2	158	442
Total	37	160	64	0	261	58	509	8	1	576	8	143	32	3	186	23	552	81	5	661	1684
05:00 PM	19	51	20	1	91	18	126	1	1	146	1	35	8	3	47	9	166	30	1	206	490
05:15 PM	12	59	18	1	90	23	127	2	0	152	1	60	6	1	68	7	158	22	1	188	498
Grand Total	81	359	137	4	581	127	1022	13	6	1168	12	307	68	10	397	54	1161	168	10	1393	3539
Apprch %	13.9	61.8	23.6	0.7		10.9	87.5	1.1	0.5		3	77.3	17.1	2.5		3.9	83.3	12.1	0.7		
Total %	2.3	10.1	3.9	0.1	16.4	3.6	28.9	0.4	0.2	33	0.3	8.7	1.9	0.3	11.2	1.5	32.8	4.7	0.3	39.4	



City of Eureka
Traffic Engineering
Turning Movement Traffic Count

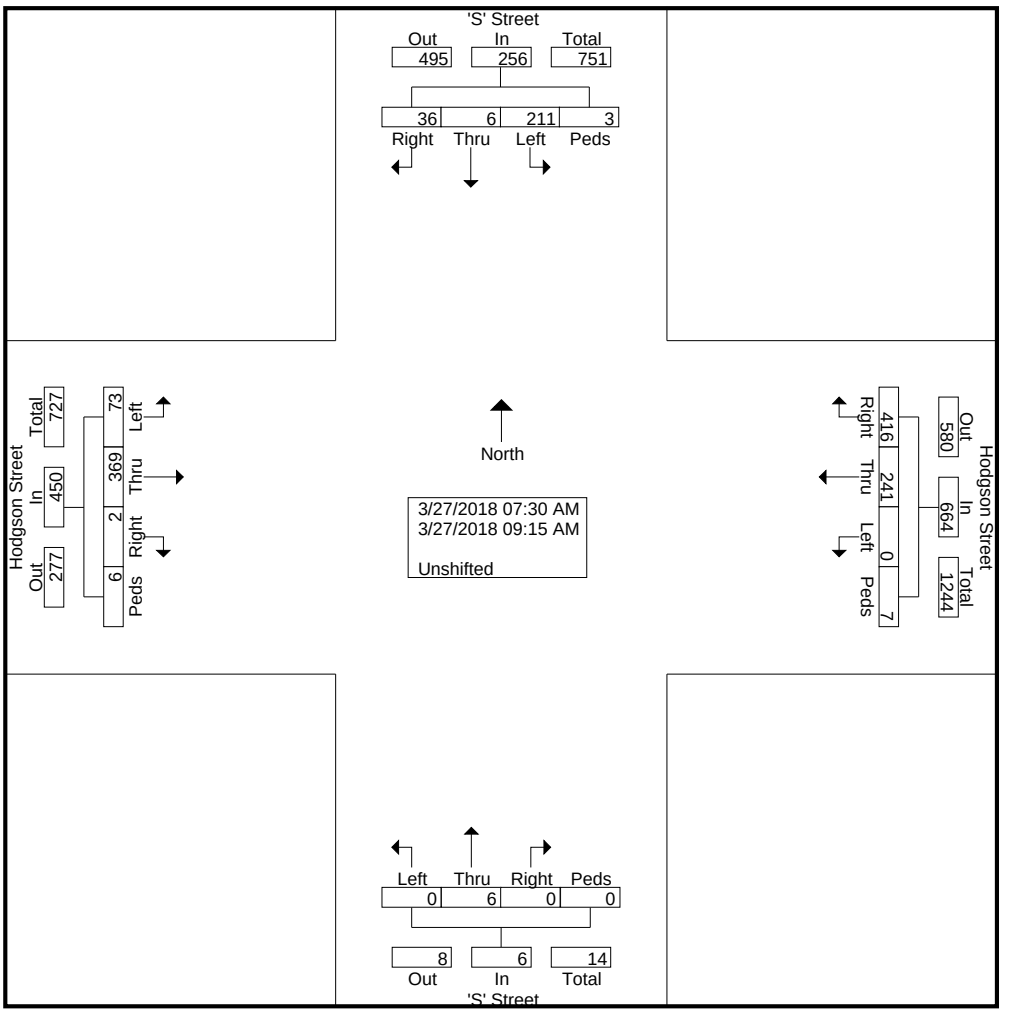
531 K Street
Eureka, CA 95501

Weather: Sunny
Collected By: Patrick Bellefeuille
Other Notes:

File Name : Hodgson & S - A.M. 3-27-18
Site Code : 03272018
Start Date : 3/27/2018
Page No : 1

Groups Printed- Unshifted

	'S' Street From North					Hodgson Street From East					'S' Street From South					Hodgson Street From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:30 AM	6	0	30	0	36	73	32	0	2	107	0	2	0	0	2	0	58	16	0	74	219
07:45 AM	1	2	35	0	38	77	42	0	0	119	0	2	0	0	2	0	78	11	1	90	249
Total	7	2	65	0	74	150	74	0	2	226	0	4	0	0	4	0	136	27	1	164	468
08:00 AM	2	2	45	0	49	79	39	0	1	119	0	0	0	0	0	0	90	11	1	102	270
08:15 AM	5	2	38	0	45	81	51	0	0	132	0	0	0	0	0	1	60	15	1	77	254
08:30 AM	9	0	18	0	27	43	24	0	0	67	0	0	0	0	0	1	28	6	0	35	129
08:45 AM	2	0	22	0	24	20	27	0	2	49	0	0	0	0	0	0	25	4	0	29	102
Total	18	4	123	0	145	223	141	0	3	367	0	0	0	0	0	2	203	36	2	243	755
09:00 AM	6	0	14	0	20	22	17	0	0	39	0	0	0	0	0	0	13	4	0	17	76
09:15 AM	5	0	9	3	17	21	9	0	2	32	0	2	0	0	2	0	17	6	3	26	77
Grand Total	36	6	211	3	256	416	241	0	7	664	0	6	0	0	6	2	369	73	6	450	1376
Apprch %	14.1	2.3	82.4	1.2		62.7	36.3	0	1.1		0	100	0	0		0.4	82	16.2	1.3		
Total %	2.6	0.4	15.3	0.2	18.6	30.2	17.5	0	0.5	48.3	0	0.4	0	0	0.4	0.1	26.8	5.3	0.4	32.7	



City of Eureka
Traffic Engineering
Turning Movement Traffic Count

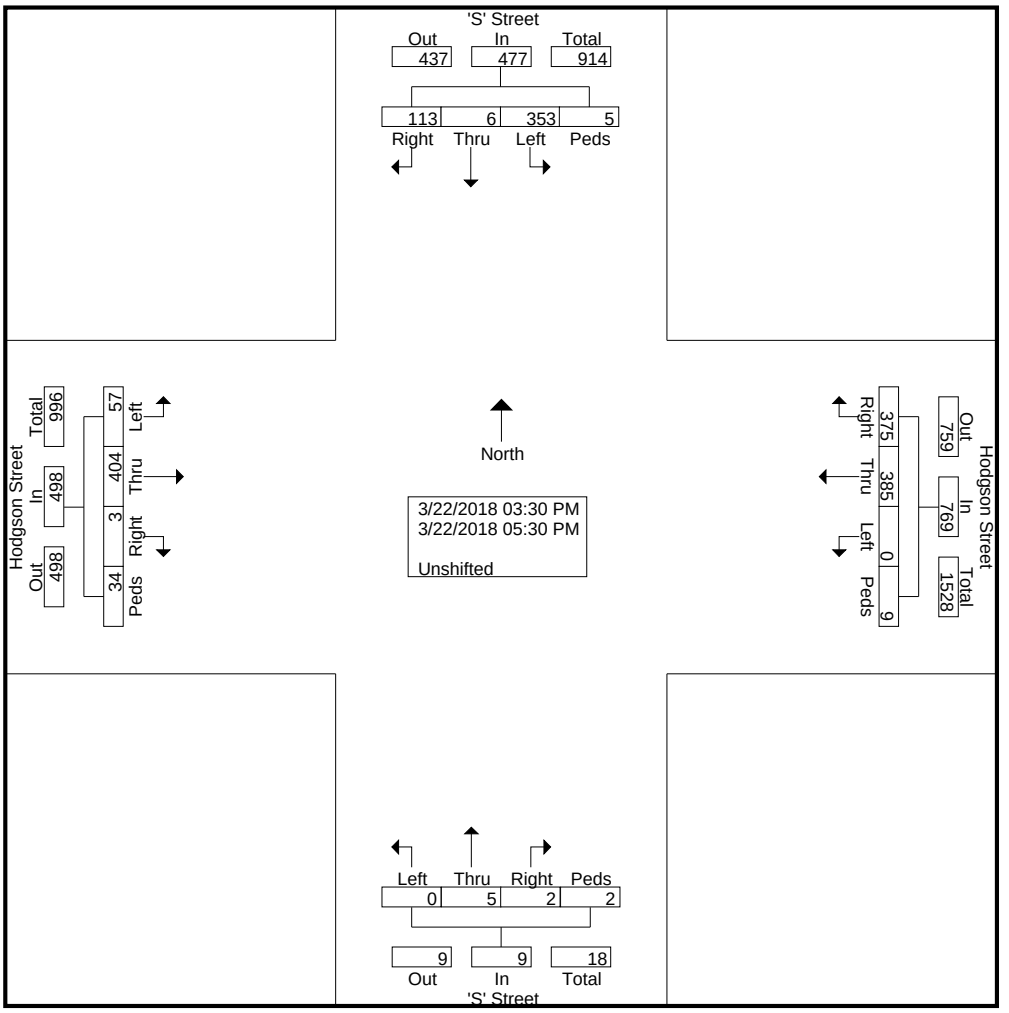
531 K Street
Eureka, CA 95501

Weather: Sunny
Collected By: Brian Weekly
Other Notes:

File Name : Hodgson & S - P.M. 3-22-18
Site Code : 03222018
Start Date : 3/22/2018
Page No : 1

Groups Printed- Unshifted

	'S' Street From North					Hodgson Street From East					'S' Street From South					Hodgson Street From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
03:30 PM	11	1	51	1	64	37	34	0	0	71	0	0	0	2	2	0	48	5	3	56	193
03:45 PM	9	1	40	0	50	37	27	0	1	65	0	0	0	0	0	0	46	11	2	59	174
Total	20	2	91	1	114	74	61	0	1	136	0	0	0	2	2	0	94	16	5	115	367
04:00 PM	12	0	36	0	48	35	29	0	2	66	0	0	0	0	0	0	31	5	5	41	155
04:15 PM	9	1	29	1	40	46	39	0	2	87	0	1	0	0	1	0	44	8	1	53	181
04:30 PM	12	1	38	0	51	45	43	0	2	90	1	0	0	0	1	0	51	3	6	60	202
04:45 PM	16	0	40	1	57	44	52	0	0	96	0	2	0	0	2	0	52	4	3	59	214
Total	49	2	143	2	196	170	163	0	6	339	1	3	0	0	4	0	178	20	15	213	752
05:00 PM	18	0	36	0	54	44	60	0	2	106	1	0	0	0	1	0	55	13	7	75	236
05:15 PM	15	1	51	1	68	48	54	0	0	102	0	0	0	0	0	2	40	5	4	51	221
05:30 PM	11	1	32	1	45	39	47	0	0	86	0	2	0	0	2	1	37	3	3	44	177
Grand Total	113	6	353	5	477	375	385	0	9	769	2	5	0	2	9	3	404	57	34	498	1753
Apprch %	23.7	1.3	74	1		48.8	50.1	0	1.2		22.2	55.6	0	22.2		0.6	81.1	11.4	6.8		
Total %	6.4	0.3	20.1	0.3	27.2	21.4	22	0	0.5	43.9	0.1	0.3	0	0.1	0.5	0.2	23	3.3	1.9	28.4	



City of Eureka
Traffic Engineering
Turning Movement Traffic Count

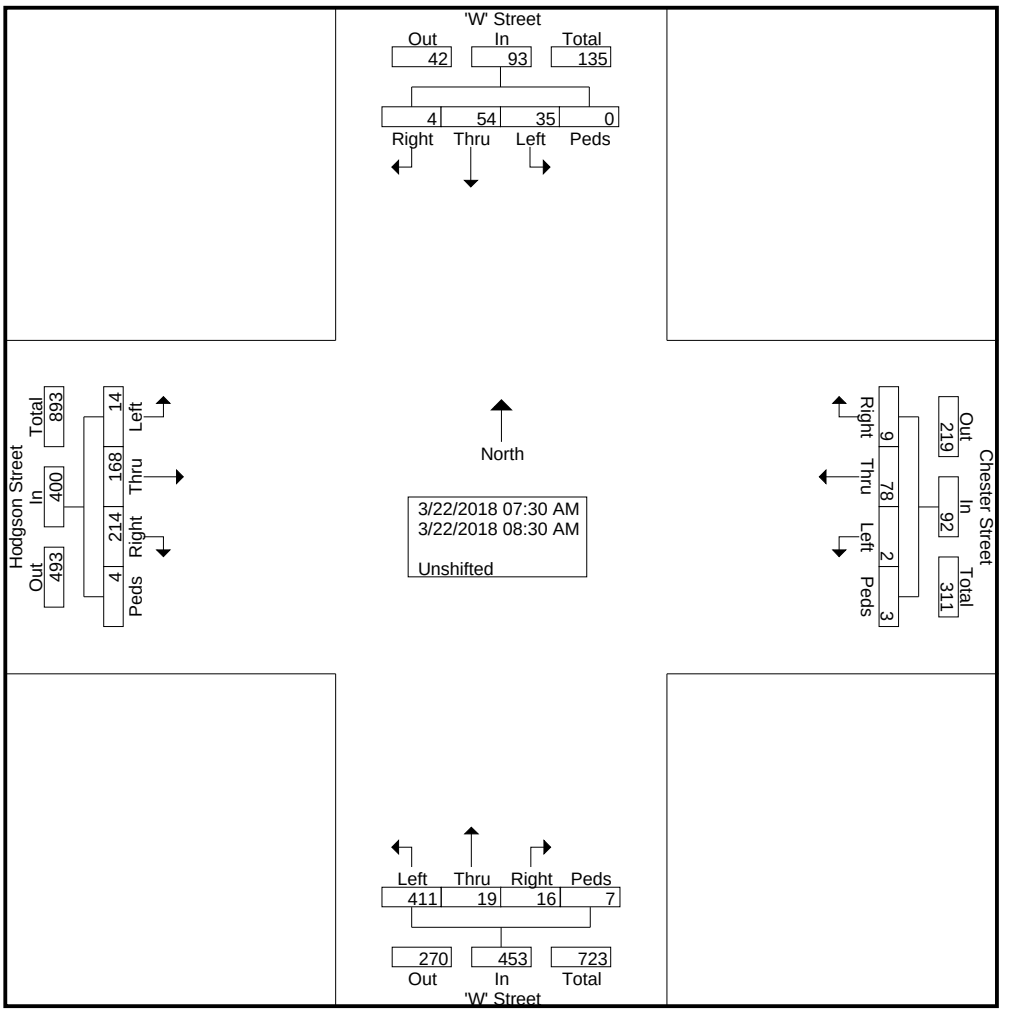
531 K Street
Eureka, CA 95501

Weather: Rainy
Collected By: Scott Ellsmore
Other Notes:

File Name : Hodgson & W - A.M. 3-22-18
Site Code : 03222018
Start Date : 3/22/2018

Groups Printed- Unshifted

	'W' Street From North					Chester Street From East					'W' Street From South					Hodgson Street From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:30 AM	0	9	4	0	13	3	10	0	0	13	4	4	79	0	87	37	32	2	1	72	185
07:45 AM	0	7	20	0	27	1	18	0	0	19	3	1	98	1	103	39	47	3	0	89	238
Total	0	16	24	0	40	4	28	0	0	32	7	5	177	1	190	76	79	5	1	161	423
08:00 AM	2	15	8	0	25	4	30	2	3	39	5	6	91	6	108	52	55	2	3	112	284
08:15 AM	1	18	2	0	21	0	13	0	0	13	3	2	100	0	105	52	26	3	0	81	220
08:30 AM	1	5	1	0	7	1	7	0	0	8	1	6	43	0	50	34	8	4	0	46	111
Grand Total	4	54	35	0	93	9	78	2	3	92	16	19	411	7	453	214	168	14	4	400	1038
Apprch %	4.3	58.1	37.6	0		9.8	84.8	2.2	3.3		3.5	4.2	90.7	1.5		53.5	42	3.5	1		
Total %	0.4	5.2	3.4	0	9	0.9	7.5	0.2	0.3	8.9	1.5	1.8	39.6	0.7	43.6	20.6	16.2	1.3	0.4	38.5	



City of Eureka
Traffic Engineering
Turning Movement Traffic Count

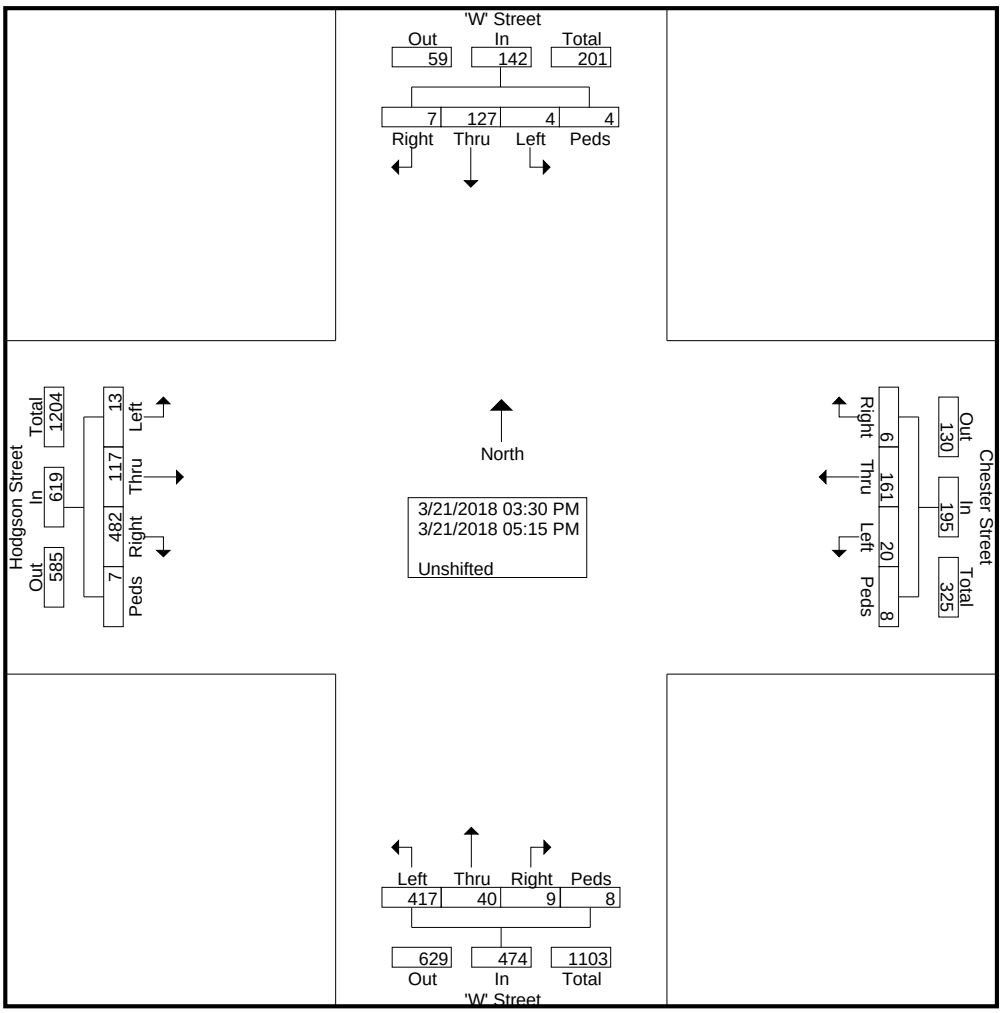
531 K Street
Eureka, CA 95501

Weather: Rainy
Collected By: Brian Weekly
Other Notes:

File Name : Hodgson & W - P.M. 3-21-18
Site Code : 03212018
Start Date : 3/21/2018
Page No : 1

Groups Printed- Unshifted

	'W' Street From North					Chester Street From East					'W' Street From South					Hodgson Street From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
03:30 PM	0	9	0	0	9	0	21	0	0	21	1	7	47	0	55	48	15	1	1	65	150
03:45 PM	2	14	0	0	16	0	18	5	0	23	0	3	42	0	45	54	14	1	0	69	153
Total	2	23	0	0	25	0	39	5	0	44	1	10	89	0	100	102	29	2	1	134	303
04:00 PM	0	15	0	0	15	0	14	2	0	16	1	7	43	0	51	43	15	0	0	58	140
04:15 PM	1	17	2	3	23	3	24	0	7	34	3	4	49	7	63	52	10	1	2	65	185
04:30 PM	1	17	1	0	19	0	16	3	0	19	2	5	47	1	55	59	18	4	1	82	175
04:45 PM	0	15	0	1	16	1	14	3	1	19	1	2	60	0	63	60	14	1	3	78	176
Total	2	64	3	4	73	4	68	8	8	88	7	18	199	8	232	214	57	6	6	283	676
05:00 PM	2	18	0	0	20	1	30	6	0	37	1	4	66	0	71	85	13	2	0	100	228
05:15 PM	1	22	1	0	24	1	24	1	0	26	0	8	63	0	71	81	18	3	0	102	223
Grand Total	7	127	4	4	142	6	161	20	8	195	9	40	417	8	474	482	117	13	7	619	1430
Apprch %	4.9	89.4	2.8	2.8		3.1	82.6	10.3	4.1		1.9	8.4	88	1.7		77.9	18.9	2.1	1.1		
Total %	0.5	8.9	0.3	0.3	9.9	0.4	11.3	1.4	0.6	13.6	0.6	2.8	29.2	0.6	33.1	33.7	8.2	0.9	0.5	43.3	



City of Eureka
Traffic Engineering
Turning Movement Traffic Count

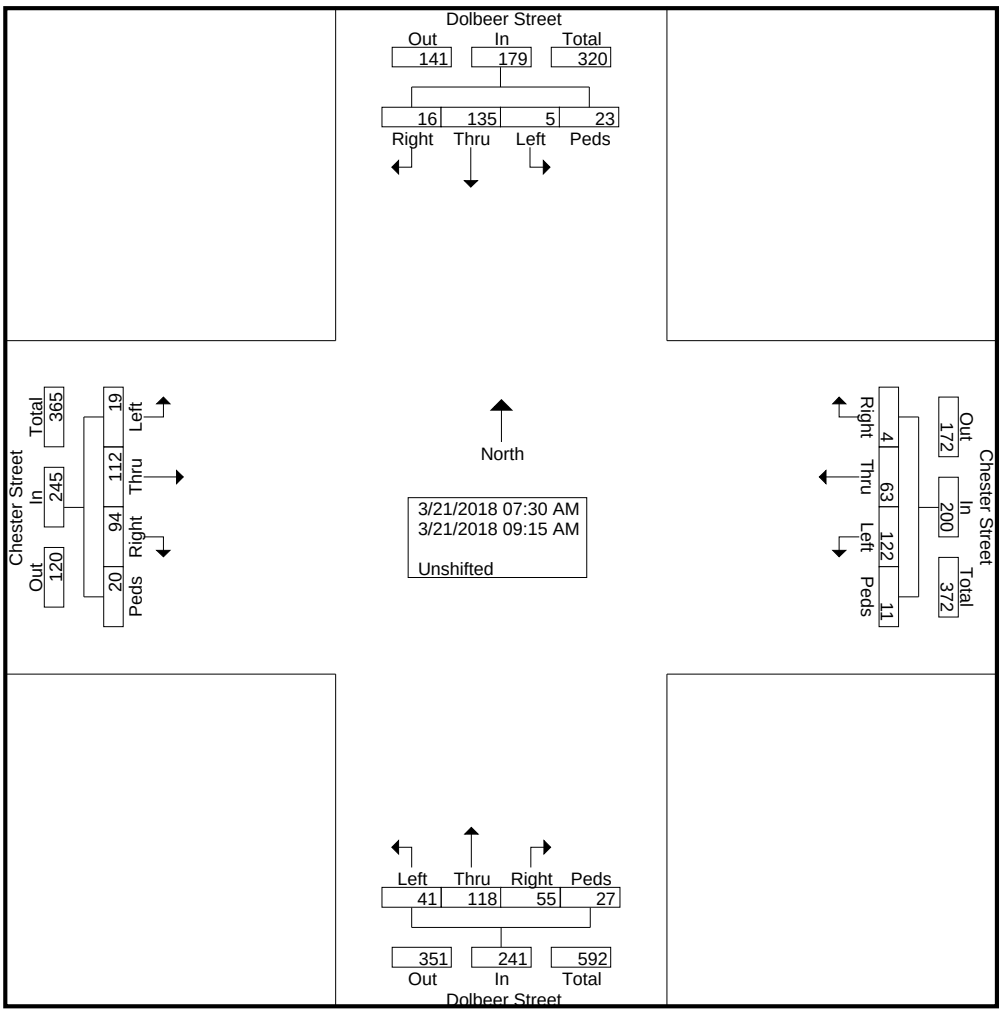
531 K Street
Eureka, CA 95501

Weather:
Collected By:
Other Notes:

File Name : Dolbeer & Chester - A.M. 3-21-18
Site Code : 03212018
Start Date : 3/21/2018
Page No : 1

Groups Printed- Unshifted

	Dolbeer Street From North					Chester Street From East					Dolbeer Street From South					Chester Street From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:30 AM	1	27	0	3	31	0	7	12	1	20	4	10	7	1	22	16	9	4	0	29	102
07:45 AM	5	30	1	4	40	2	12	26	5	45	10	19	7	10	46	35	18	4	2	59	190
Total	6	57	1	7	71	2	19	38	6	65	14	29	14	11	68	51	27	8	2	88	292
08:00 AM	10	24	3	9	46	0	16	27	3	46	7	17	8	10	42	28	29	8	9	74	208
08:15 AM	0	12	0	3	15	0	6	9	0	15	13	23	7	1	44	8	14	3	3	28	102
08:30 AM	0	6	0	2	8	0	4	4	0	8	6	16	5	0	27	1	17	0	3	21	64
08:45 AM	0	14	0	1	15	1	4	13	2	20	5	15	2	2	24	4	11	0	2	17	76
Total	10	56	3	15	84	1	30	53	5	89	31	71	22	13	137	41	71	11	17	140	450
09:00 AM	0	8	1	1	10	1	4	12	0	17	5	8	4	3	20	1	9	0	0	10	57
09:15 AM	0	14	0	0	14	0	10	19	0	29	5	10	1	0	16	1	5	0	1	7	66
Grand Total	16	135	5	23	179	4	63	122	11	200	55	118	41	27	241	94	112	19	20	245	865
Apprch %	8.9	75.4	2.8	12.8		2	31.5	61	5.5		22.8	49	17	11.2		38.4	45.7	7.8	8.2		
Total %	1.8	15.6	0.6	2.7	20.7	0.5	7.3	14.1	1.3	23.1	6.4	13.6	4.7	3.1	27.9	10.9	12.9	2.2	2.3	28.3	



City of Eureka
Traffic Engineering
Turning Movement Traffic Count

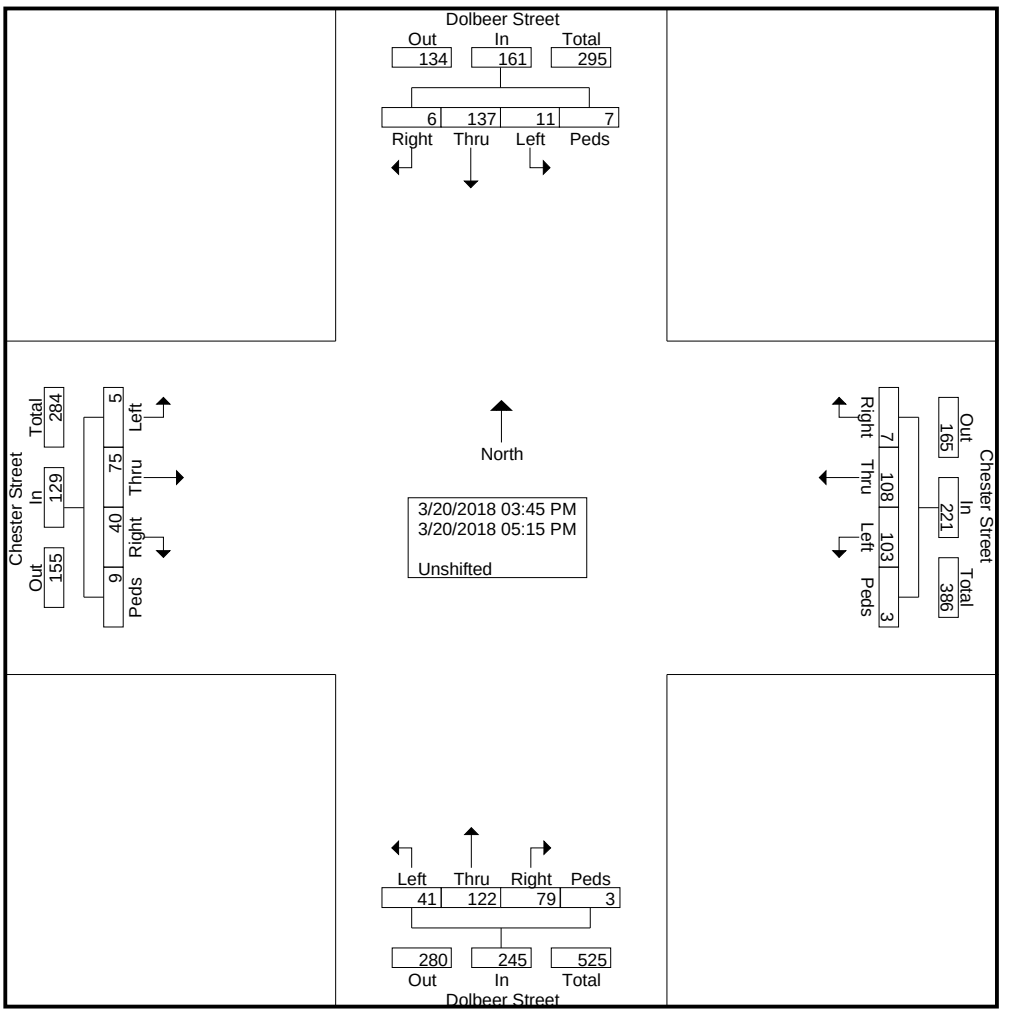
531 K Street
Eureka, CA 95501

Weather:
Collected By:
Other Notes:

File Name : Dolbeer & Chester - P.M. 3-20-18
Site Code : 03202018
Start Date : 3/20/2018
Page No : 1

Groups Printed- Unshifted

	Dolbeer Street From North					Chester Street From East					Dolbeer Street From South					Chester Street From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
03:45 PM	2	18	3	2	25	1	11	9	2	23	17	17	7	2	43	4	11	1	2	18	109
Total	2	18	3	2	25	1	11	9	2	23	17	17	7	2	43	4	11	1	2	18	109
04:00 PM	0	20	1	1	22	0	17	7	0	24	11	12	4	0	27	4	9	0	1	14	87
04:15 PM	1	17	0	0	18	2	7	14	0	23	9	13	3	0	25	4	9	0	2	15	81
04:30 PM	1	26	0	0	27	1	18	12	0	31	16	19	4	0	39	4	12	2	2	20	117
04:45 PM	1	23	2	1	27	1	12	18	0	31	7	19	7	0	33	10	10	1	0	21	112
Total	3	86	3	2	94	4	54	51	0	109	43	63	18	0	124	22	40	3	5	70	397
05:00 PM	1	14	5	1	21	2	19	25	1	47	11	25	7	1	44	5	13	0	2	20	132
05:15 PM	0	19	0	2	21	0	24	18	0	42	8	17	9	0	34	9	11	1	0	21	118
Grand Total	6	137	11	7	161	7	108	103	3	221	79	122	41	3	245	40	75	5	9	129	756
Apprch %	3.7	85.1	6.8	4.3		3.2	48.9	46.6	1.4		32.2	49.8	16.7	1.2		31	58.1	3.9	7		
Total %	0.8	18.1	1.5	0.9	21.3	0.9	14.3	13.6	0.4	29.2	10.4	16.1	5.4	0.4	32.4	5.3	9.9	0.7	1.2	17.1	

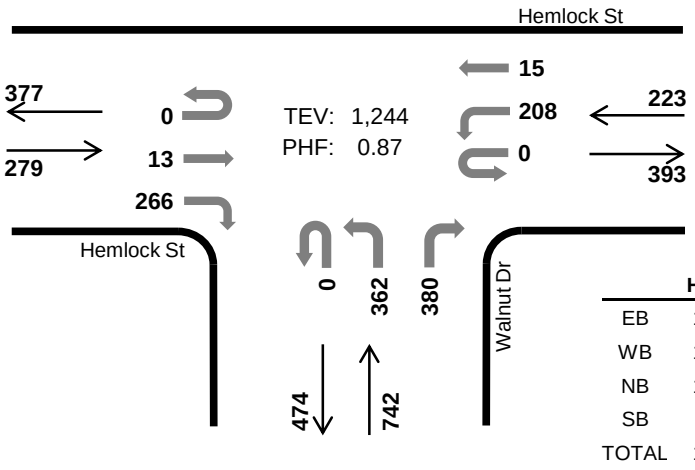


Walnut Dr
Hemlock St

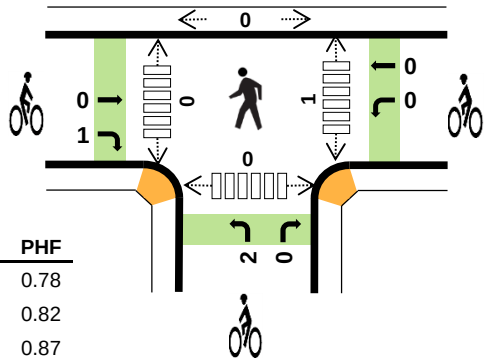
N

Peak Hour

Date: 03/02/2017
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:30 AM to 8:30 AM



	HV %:	PHF
EB	1.8%	0.78
WB	1.8%	0.82
NB	1.2%	0.87
SB	-	-
TOTAL	1.4%	0.87



Two-Hour Count Summaries

Interval Start	Hemlock St Eastbound				Hemlock St Westbound				Walnut Dr Northbound				0 Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	0	19	0	15	0	0	0	32	0	23	0	0	0	0	89	0
7:15 AM	0	0	2	31	0	22	1	0	0	54	0	34	0	0	0	0	144	0
7:30 AM	**0**	**0**	**2**	**35**	**0**	**30**	**3**	**0**	**0**	**76**	**0**	**75**	**0**	**0**	**0**	**0**	**221**	0
7:45 AM	**0**	**0**	**5**	**60**	**0**	**64**	**4**	**0**	**0**	**96**	**0**	**90**	**0**	**0**	**0**	**0**	**319**	773
8:00 AM	**0**	**0**	**4**	**83**	**0**	**61**	**7**	**0**	**0**	**97**	**0**	**94**	**0**	**0**	**0**	**0**	**346**	1,030
8:15 AM	**0**	**0**	**2**	**88**	**0**	**53**	**1**	**0**	**0**	**93**	**0**	**121**	**0**	**0**	**0**	**0**	**358**	**1,244**
8:30 AM	0	0	2	37	0	43	1	0	0	50	0	56	0	0	0	0	189	1,212
8:45 AM	0	0	2	40	0	31	3	0	0	47	0	55	0	0	0	0	178	1,071
Count Total	0	0	19	393	0	319	20	0	0	545	0	548	0	0	0	0	1,844	0
Peak Hour All	**0**	**0**	**13**	**266**	**0**	**208**	**15**	**0**	**0**	**362**	**0**	**380**	**0**	**0**	**0**	**0**	**1,244**	**0**
Peak Hour HV	**0**	**0**	**0**	**5**	**0**	**4**	**0**	**0**	**0**	**7**	**0**	**2**	**0**	**0**	**0**	**0**	**18**	**0**
Peak Hour HV%	**-**	**-**	**0%**	**2%**	**-**	**2%**	**0%**	**-**	**-**	**2%**	**-**	**1%**	**-**	**-**	**-**	**-**	**1%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	1	1	0	0	*2*	0	0	0	0	*0*	1	0	0	2	*3*
7:15 AM	1	0	3	0	*4*	0	0	0	0	*0*	1	1	0	1	*3*
7:30 AM	**1**	**0**	**2**	**0**	***3***	**0**	**0**	**1**	**0**	***1***	**0**	**0**	**0**	**0**	*0*
7:45 AM	**1**	**2**	**3**	**0**	***6***	**1**	**0**	**1**	**0**	***2***	**0**	**0**	**0**	**0**	*0*
8:00 AM	**2**	**0**	**2**	**0**	***4***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
8:15 AM	**1**	**2**	**2**	**0**	***5***	**0**	**0**	**0**	**0**	***0***	**1**	**0**	**0**	**0**	***1***
8:30 AM	5	1	3	0	*9*	0	0	0	0	*0*	0	0	0	0	*0*
8:45 AM	5	3	2	0	*10*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	17	9	17	0	*43*	1	0	2	0	*3*	3	1	0	3	*7*
Peak Hr	**5**	**4**	**9**	**0**	***18***	**1**	**0**	**2**	**0**	***3***	**1**	**0**	**0**	**0**	***1***

Deon Fouche: 415 - 757 - 7714

deon.fouche@idaxdata.com

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Hemlock St				Hemlock St				Walnut Dr				0				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	2	0
7:15 AM	0	0	0	1	0	0	0	0	0	1	0	2	0	0	0	0	4	0
7:30 AM	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	0
7:45 AM	**0**	**0**	**0**	**1**	**0**	**2**	**0**	**0**	**0**	**2**	**0**	**1**	**0**	**0**	**0**	**0**	**6**	15
8:00 AM	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**4**	17
8:15 AM	**0**	**0**	**0**	**1**	**0**	**2**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**18**
8:30 AM	0	0	1	4	0	1	0	0	0	2	0	1	0	0	0	0	9	24
8:45 AM	0	0	0	5	0	3	0	0	0	1	0	1	0	0	0	0	10	28
Count Total	0	0	1	16	0	9	0	0	0	11	0	6	0	0	0	0	43	0
Peak Hour	**0**	**0**	**0**	**5**	**0**	**4**	**0**	**0**	**0**	**7**	**0**	**2**	**0**	**0**	**0**	**0**	**18**	**0**

Two-Hour Count Summaries - Bikes

Interval Start	Hemlock St			Hemlock St			Walnut Dr			0			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	0
7:45 AM	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**2**	3
8:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	3
8:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	1	0	0	0	2	0	0	0	0	0	3	0
Peak Hour	**0**	**0**	**1**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**3**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

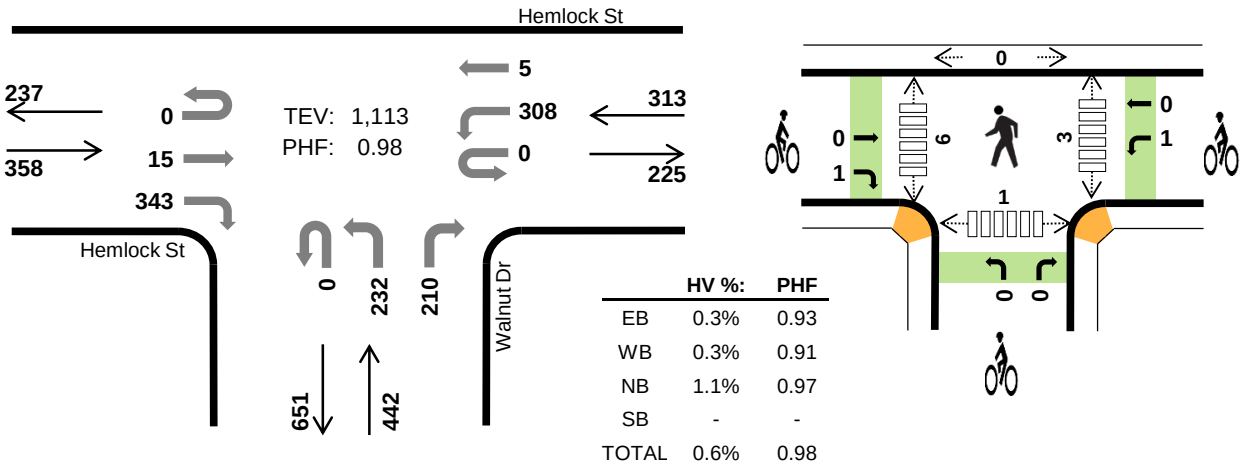
Deon Fouche: 415 - 757 - 7714 deon.fouche@idaxdata.com

Walnut Dr
Hemlock St

N

Peak Hour

Date: 03/02/2017
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:45 PM to 5:45 PM



	HV %:	PHF
EB	0.3%	0.93
WB	0.3%	0.91
NB	1.1%	0.97
SB	-	-
TOTAL	0.6%	0.98

Two-Hour Count Summaries

Interval Start	Hemlock St Eastbound				Hemlock St Westbound				Walnut Dr Northbound				0 Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	5	66	0	70	2	0	0	55	0	40	0	0	0	0	238	0
4:15 PM	0	0	3	70	0	81	3	0	0	51	0	58	0	0	0	0	266	0
4:30 PM	0	0	5	72	0	59	1	0	0	53	0	57	0	0	0	0	247	0
4:45 PM	**0**	**0**	**4**	**74**	**0**	**86**	**0**	**0**	**0**	**64**	**0**	**50**	**0**	**0**	**0**	**0**	**278**	1,029
5:00 PM	**0**	**0**	**4**	**87**	**0**	**72**	**2**	**0**	**0**	**53**	**0**	**61**	**0**	**0**	**0**	**0**	**279**	1,070
5:15 PM	**0**	**0**	**5**	**91**	**0**	**76**	**2**	**0**	**0**	**60**	**0**	**50**	**0**	**0**	**0**	**0**	**284**	1,088
5:30 PM	**0**	**0**	**2**	**91**	**0**	**74**	**1**	**0**	**0**	**55**	**0**	**49**	**0**	**0**	**0**	**0**	**272**	**1,113**
5:45 PM	0	0	2	57	0	71	5	0	0	32	0	67	0	0	0	0	234	1,069
Count Total	0	0	30	608	0	589	16	0	0	423	0	432	0	0	0	0	2,098	0
Peak Hour All	**0**	**0**	**15**	**343**	**0**	**308**	**5**	**0**	**0**	**232**	**0**	**210**	**0**	**0**	**0**	**0**	**1,113**	**0**
Peak Hour HV	**0**	**0**	**0**	**1**	**0**	**1**	**0**	**0**	**0**	**4**	**0**	**1**	**0**	**0**	**0**	**0**	**7**	**0**
Peak Hour HV%	**-**	**-**	**0%**	**0%**	**-**	**0%**	**0%**	**-**	**-**	**2%**	**-**	**0%**	**-**	**-**	**-**	**-**	**1%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	0	2	1	0	*3*	2	0	1	0	*3*	0	1	0	1	*2*
4:15 PM	2	2	0	0	*4*	1	0	1	0	*2*	2	1	0	2	*5*
4:30 PM	1	0	1	0	*2*	0	0	0	0	*0*	4	4	0	0	*8*
4:45 PM	**1**	**0**	**0**	**0**	***1***	**0**	**1**	**0**	**0**	***1***	**1**	**5**	**0**	**0**	*6*
5:00 PM	**0**	**1**	**4**	**0**	***5***	**0**	**0**	**0**	**0**	***0***	**1**	**1**	**0**	**0**	*2*
5:15 PM	**0**	**0**	**0**	**0**	***0***	**1**	**0**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	*0*
5:30 PM	**0**	**0**	**1**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**1**	**0**	**0**	**1**	***2***
5:45 PM	0	2	0	0	*2*	0	0	0	0	*0*	0	2	0	2	*4*
Count Total	4	7	7	0	*18*	4	1	2	0	*7*	9	14	0	6	*29*
Peak Hr	**1**	**1**	**5**	**0**	***7***	**1**	**1**	**0**	**0**	***2***	**3**	**6**	**0**	**1**	***10***

Deon Fouche: 415 - 757 - 7714

deon.fouche@idaxdata.com

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Hemlock St				Hemlock St				Walnut Dr				0				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	3	0
4:15 PM	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	4	0
4:30 PM	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	2	0
4:45 PM	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	10
5:00 PM	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**3**	**0**	**1**	**0**	**0**	**0**	**0**	**5**	12
5:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	8
5:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**7**
5:45 PM	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	2	8
Count Total	0	0	0	4	0	6	1	0	0	5	0	2	0	0	0	0	18	0
Peak Hour	**0**	**0**	**0**	**1**	**0**	**1**	**0**	**0**	**0**	**4**	**0**	**1**	**0**	**0**	**0**	**0**	**7**	**0**

Two-Hour Count Summaries - Bikes

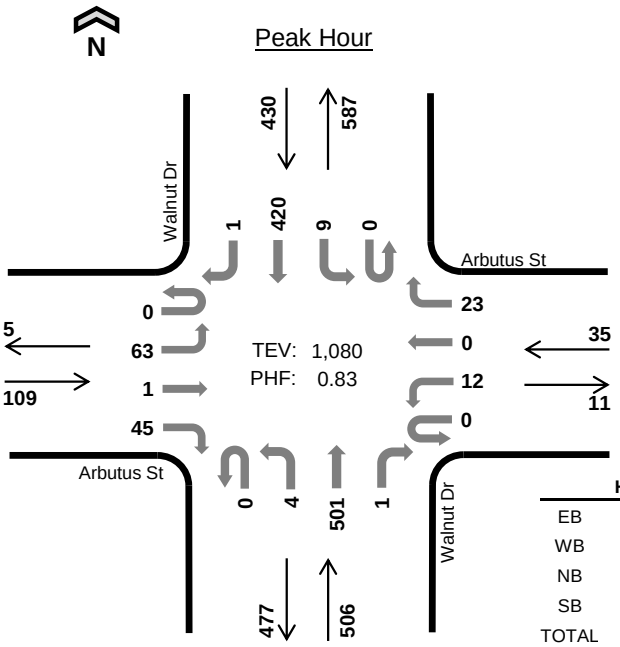
Interval Start	Hemlock St			Hemlock St			Walnut Dr			0			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
4:00 PM	0	0	2	0	0	0	1	0	0	0	0	0	3	0
4:15 PM	0	0	1	0	0	0	1	0	0	0	0	0	2	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	6
5:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	3
5:15 PM	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	2
5:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Count Total	0	0	4	1	0	0	2	0	0	0	0	0	7	0
Peak Hour	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**

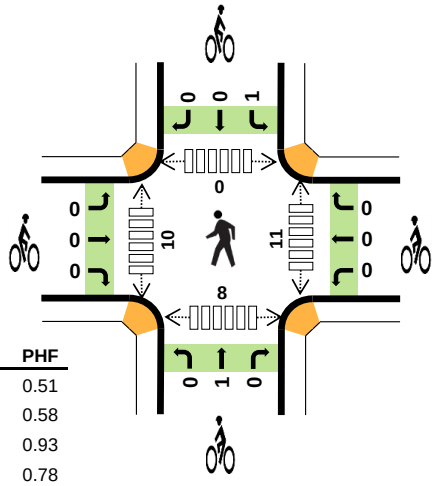
Note: U-Turn volumes for bikes are included in Left-Turn, if any.

Deon Fouche: 415 - 757 - 7714 deon.fouche@idaxdata.com

Walnut Dr
Arbutus St

Date: 03/02/2017
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:30 AM to 8:30 AM





	HV %:	PHF
EB	0.0%	0.51
WB	0.0%	0.58
NB	1.0%	0.93
SB	1.6%	0.78
TOTAL	1.1%	0.83

Two-Hour Count Summaries

Interval Start		Arbutus St Eastbound				Arbutus St Westbound				Walnut Dr Northbound				Walnut Dr Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM		0	2	0	1	0	0	0	1	0	1	37	1	0	2	18	0	63	0
7:15 AM		0	1	0	1	0	0	0	3	0	0	72	0	0	1	42	0	120	0
7:30 AM		**0**	**7**	**0**	**1**	**0**	**2**	**0**	**3**	**0**	**0**	**110**	**0**	**0**	**0**	**62**	**0**	**185**	0
7:45 AM		**0**	**5**	**1**	**8**	**0**	**3**	**0**	**4**	**0**	**2**	**128**	**1**	**0**	**4**	**102**	**1**	**259**	627
8:00 AM		**0**	**19**	**0**	**15**	**0**	**5**	**0**	**10**	**0**	**1**	**135**	**0**	**0**	**3**	**121**	**0**	**309**	873
8:15 AM		**0**	**32**	**0**	**21**	**0**	**2**	**0**	**6**	**0**	**1**	**128**	**0**	**0**	**2**	**135**	**0**	**327**	**1,080**
8:30 AM		0	8	0	3	0	1	0	0	0	0	76	1	0	0	59	1	149	1,044
8:45 AM		0	6	0	0	0	0	0	0	0	0	85	0	0	0	58	5	154	939
Count Total		0	80	1	50	0	13	0	27	0	5	771	3	0	12	597	7	1,566	0
Peak Hour	**All**	**0**	**63**	**1**	**45**	**0**	**12**	**0**	**23**	**0**	**4**	**501**	**1**	**0**	**9**	**420**	**1**	**1,080**	**0**
	HV	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**0**	**0**	**0**	**7**	**0**	**12**	**0**
	HV%	**-**	**0%**	**0%**	**0%**	**-**	**0%**	**-**	**0%**	**-**	**0%**	**1%**	**0%**	**-**	**0%**	**2%**	**0%**	**1%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	0	0	1	1	*2*	0	0	0	0	*0*	0	0	0	0	*0*
7:15 AM	0	0	3	1	*4*	0	0	0	0	*0*	0	2	0	0	*2*
7:30 AM	**0**	**0**	**3**	**1**	***4***	**0**	**0**	**0**	**0**	***0***	**1**	**0**	**0**	**1**	*2*
7:45 AM	**0**	**0**	**1**	**2**	***3***	**0**	**0**	**1**	**0**	***1***	**7**	**8**	**0**	**6**	*21*
8:00 AM	**0**	**0**	**1**	**2**	***3***	**0**	**0**	**0**	**1**	***1***	**1**	**2**	**0**	**1**	*4*
8:15 AM	**0**	**0**	**0**	**2**	***2***	**0**	**0**	**0**	**0**	***0***	**2**	**0**	**0**	**0**	***2***
8:30 AM	0	0	2	4	*6*	0	0	0	0	*0*	0	0	0	0	*0*
8:45 AM	0	0	3	5	*8*	0	0	0	0	*0*	2	2	0	0	*4*
Count Total	0	0	14	18	*32*	0	0	1	1	*2*	13	14	0	8	*35*
Peak Hour	**0**	**0**	**5**	**7**	***12***	**0**	**0**	**1**	**1**	***2***	**11**	**10**	**0**	**8**	***29***

Deon Fouche: 415 - 757 - 7714 deon.fouche@idaxdata.com

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Arbutus St Eastbound				Arbutus St Westbound				Walnut Dr Northbound				Walnut Dr Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	2	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	3	0	0	1	0	0	4	0
7:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**1**	**0**	**4**	0
7:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**2**	**0**	**3**	13
8:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**2**	**0**	**3**	14
8:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**2**	**12**
8:30 AM	0	0	0	0	0	0	0	0	0	0	2	0	0	0	4	0	6	14
8:45 AM	0	0	0	0	0	0	0	0	0	0	3	0	0	0	5	0	8	19
Count Total	0	0	0	0	0	0	0	0	0	0	14	0	0	1	17	0	32	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**0**	**0**	**0**	**7**	**0**	**12**	**0**

Two-Hour Count Summaries - Bikes

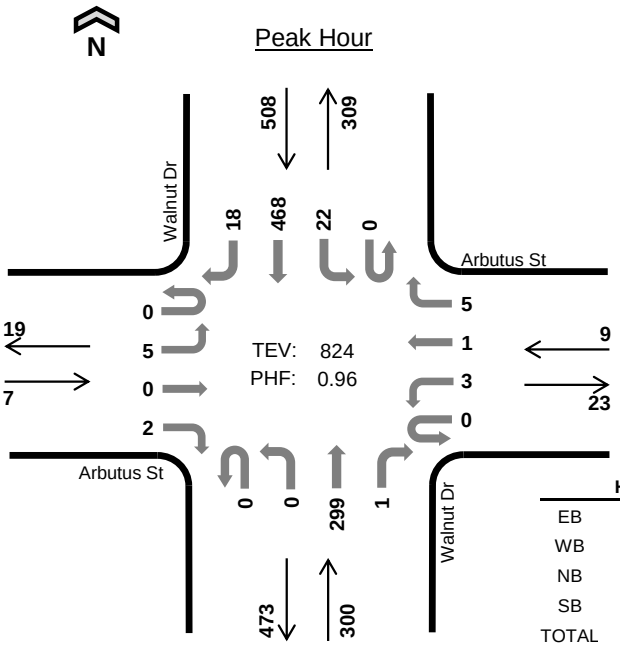
Interval Start	Arbutus St Eastbound			Arbutus St Westbound			Walnut Dr Northbound			Walnut Dr Southbound			15-min Total	Rolling One Hour
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
7:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**1**	1
8:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	2
8:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Count Total	0	0	0	0	0	0	0	1	0	1	0	0	2	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**1**	**0**	**0**	**2**	**0**

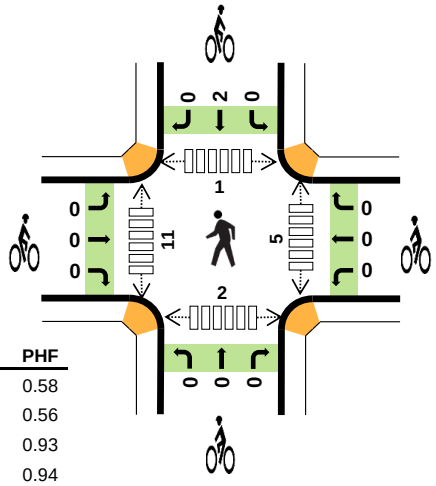
Note: U-Turn volumes for bikes are included in Left-Turn, if any.

Deon Fouche: 415 - 757 - 7714 deon.fouche@idaxdata.com

Walnut Dr
Arbutus St

Date: 03/02/2017
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:45 PM to 5:45 PM





	HV %:	PHF
EB	0.0%	0.58
WB	0.0%	0.56
NB	1.7%	0.93
SB	0.2%	0.94
TOTAL	0.7%	0.96

Two-Hour Count Summaries

Interval Start	Arbutus St Eastbound				Arbutus St Westbound				Walnut Dr Northbound				Walnut Dr Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	5	1	0	0	1	0	2	0	0	85	1	0	0	83	5	183	0
4:15 PM	0	1	0	0	0	1	0	3	1	0	62	1	0	6	103	2	180	0
4:30 PM	0	1	0	1	0	2	0	3	0	1	90	1	0	3	100	7	209	0
4:45 PM	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**81**	**0**	**0**	**4**	**109**	**6**	**204**	776
5:00 PM	**0**	**0**	**0**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**69**	**1**	**0**	**5**	**115**	**2**	**194**	787
5:15 PM	**0**	**2**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**79**	**0**	**0**	**8**	**117**	**7**	**215**	822
5:30 PM	**0**	**2**	**0**	**0**	**0**	**2**	**0**	**2**	**0**	**0**	**70**	**0**	**0**	**5**	**127**	**3**	**211**	**824**
5:45 PM	0	4	0	2	0	1	0	4	0	0	62	1	0	0	94	3	171	791
Count Total	0	16	1	5	0	8	1	17	1	1	598	5	0	31	848	35	1,567	0
Peak Hour All	**0**	**5**	**0**	**2**	**0**	**3**	**1**	**5**	**0**	**0**	**299**	**1**	**0**	**22**	**468**	**18**	**824**	**0**
Peak Hour HV	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**0**	**0**	**0**	**1**	**0**	**6**	**0**
Peak Hour HV%	**-**	**0%**	**-**	**0%**	**-**	**0%**	**0%**	**0%**	**-**	**-**	**2%**	**0%**	**-**	**0%**	**0%**	**0%**	**1%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	0	0	0	2	*2*	0	0	0	1	*1*	1	3	0	0	*4*
4:15 PM	0	0	0	4	*4*	0	0	0	0	*0*	1	2	0	0	*3*
4:30 PM	0	0	1	1	*2*	0	0	0	0	*0*	3	5	0	1	*9*
4:45 PM	**0**	**0**	**4**	**0**	***4***	**0**	**0**	**0**	**2**	***2***	**0**	**4**	**0**	**0**	*4*
5:00 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**3**	**5**	**0**	**0**	*8*
5:15 PM	**0**	**0**	**0**	**1**	***1***	**0**	**0**	**0**	**0**	***0***	**0**	**1**	**0**	**1**	*2*
5:30 PM	**0**	**0**	**1**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**2**	**1**	**1**	**1**	***5***
5:45 PM	0	0	0	1	*1*	0	0	0	1	*1*	1	2	0	2	*5*
Count Total	0	0	6	9	*15*	0	0	0	4	*4*	11	23	1	5	*40*
Peak Hour	**0**	**0**	**5**	**1**	***6***	**0**	**0**	**0**	**2**	***2***	**5**	**11**	**1**	**2**	***19***

Deon Fouche: 415 - 757 - 7714 deon.fouche@idaxdata.com

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Arbutus St Eastbound				Arbutus St Westbound				Walnut Dr Northbound				Walnut Dr Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	2	0
4:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**4**	12
5:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	10
5:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**1**	7
5:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**6**
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	3
Count Total	0	0	0	0	0	0	0	0	0	0	6	0	0	0	9	0	15	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**0**	**0**	**0**	**1**	**0**	**6**	**0**

Two-Hour Count Summaries - Bikes

Interval Start	Arbutus St Eastbound			Arbutus St Westbound			Walnut Dr Northbound			Walnut Dr Southbound			15-min Total	Rolling One Hour
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**2**	3
5:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	2
5:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	2
5:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**
5:45 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	1
Count Total	0	0	0	0	0	0	0	0	0	0	4	0	4	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**2**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

Deon Fouche: 415 - 757 - 7714 deon.fouche@idaxdata.com

C Traffic Counts

Harris Dolbeer Counts
1:40-3:00 PM
9/6/2017

	Dolbeer				Harris				Dolbeer				Harris			
	Southbound				Westbound				Northbound				Eastbound			
	Left	Thru	Right	Que > 3	Left	Thru	Right	Que > 3	Left	Thru	Right	Que > 3	Left	Thru	Right	Que > 3
1:40:00 PM	0	2	2	0	1	28	2	0	1	1	8	1	2	56	1	0
1:45:00 PM	0	1	3	0	3	40	0	0	3	0	6	0	1	44	3	0
1:50:00 PM	1	2	4	0	4	31	3	0	2	1	5	0	6	47	1	0
1:55:00 PM	1	0	5	0	2	37	3	0	0	3	5	0	3	36	3	1
2:00:00 PM	0	3	4	1	3	39	1	0	2	0	5	0	3	42	5	1
2:05:00 PM	0	1	5	0	5	32	0	0	5	1	1	2	3	54	4	0
2:10:00 PM	0	1	8	0	4	37	0	2	1	0	4	0	3	33	7	0
2:15:00 PM	1	1	4	0	1	38	1	0	4	2	7	1	2	32	3	0
2:20:00 PM	0	0	3	0	4	43	1	1	2	1	8	0	1	44	1	0
2:25:00 PM	0	0	7	0	3	48	1	1	1	0	4	0	3	45	0	1
2:30:00 PM	0	0	8	0	2	44	0	2	1	0	5	0	1	52	3	0
2:35:00 PM	0	0	2	0	1	37	0	0	1	2	4	0	6	38	3	2
2:40:00 PM	1	5	3	0	3	31	1	0	4	1	3	1	2	41	4	0
2:45:00 PM	0	0	5	0	6	38	0	0	5	1	3	0	1	48	2	0
2:50:00 PM	0	1	9	0	4	35	2	0	1	0	5	1	4	44	4	1
2:55:00 PM	2	0	4	0	6	34	1	0	0	1	4	1	2	49	2	0
3:00:00 PM	0	0	5	0	6	41	0	0	1	1	6	0	6	52	0	3

Bank 1 Trucks

	Dolbeer				Harris				Dolbeer				Harris			
	Southbound				Westbound				Northbound				Eastbound			
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
1:40:00 PM	0	0	0		0	0	0		0	0	0		0	0	0	
1:45:00 PM	0	0	0		0	0	0		0	0	0		0	0	0	
1:50:00 PM	0	0	0		0	0	0		0	0	0		0	0	0	
1:55:00 PM	0	0	0		0	0	0		0	0	0		0	1	0	
2:00:00 PM	0	0	0		0	1	0		0	0	0		0	1	0	
2:05:00 PM	0	0	0		0	0	0		0	0	0		0	0	0	
2:10:00 PM	0	0	0		0	0	0		0	0	0		0	2	0	
2:15:00 PM	0	0	0		0	0	0		0	0	0		0	0	0	
2:20:00 PM	0	0	0		0	0	0		0	0	0		0	0	0	
2:25:00 PM	0	0	0		0	2	0		0	0	0		0	1	0	
2:30:00 PM	0	0	0		0	0	0		0	0	0		0	0	0	
2:35:00 PM	0	0	0		0	0	0		0	0	0		0	0	0	
2:40:00 PM	0	0	0		0	0	0		0	0	0		0	1	0	
2:45:00 PM	0	0	0		0	0	0		0	0	1		0	0	0	
2:50:00 PM	0	0	0		0	1	0		0	0	1		0	1	0	
2:55:00 PM	0	0	0		0	1	0		0	0	0		0	1	0	
3:00:00 PM	0	0	0		0	0	0		0	0	0		0	0	0	

Bank 2 Peds

	Dolbeer				Harris				Dolbeer				Harris			
	Southbound				Westbound				Northbound				Eastbound			
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
1:40:00 PM	0	0	0		0	0	0		0	0	0		0	0	0	
1:45:00 PM	0	0	0		0	1	0		0	0	0		0	0	0	
1:50:00 PM	0	0	0		0	0	0		0	0	0		0	0	0	
1:55:00 PM	0	1	0		0	2	0		0	0	0		0	0	0	
2:00:00 PM	0	0	0		0	0	0		0	0	0		0	1	0	
2:05:00 PM	0	0	0		0	0	0		1	0	0		0	0	0	
2:10:00 PM	0	2	0		0	0	0		0	0	0		0	1	0	
2:15:00 PM	0	0	0		0	1	0		0	0	0		0	0	0	
2:20:00 PM	0	0	0		0	0	0		0	0	0		0	0	0	
2:25:00 PM	0	0	0		0	0	0		0	0	0		0	0	0	
2:30:00 PM	0	0	0		0	1	0		0	0	0		0	0	0	
2:35:00 PM	0	0	0		2	0	0		0	21	0		0	0	0	
2:40:00 PM	0	0	0		0	0	0		0	0	0		0	3	0	
2:45:00 PM	0	0	0		0	3	0		0	0	0		0	0	0	
2:50:00 PM	0	0	0		0	0	0		0	7	0		0	1	0	
2:55:00 PM	0	0	0		0	1	0		0	0	0		0	0	0	
3:00:00 PM	0	0	0		0	1	0		0	0	0		0	0	0	

Harris Dolbeer Counts
4-6 PM
9/6/2017

	Harris				Harris				Dolbeer				Dolbeer			
	Westbound				Eastbound				Southbound				Northbound			
	Left	Thru	Right	Que > 3	Left	Thru	Right	Que > 3	Left	Thru	Right	Que > 3	Left	Thru	Right	Que > 3
4:00:00 PM	10	119	1	0	13	130	8	0	1	5	18	0	4	6	10	0
4:15:00 PM	12	139	0	0	8	135	7	0	1	4	18	0	5	3	16	1
4:30:00 PM	7	130	1	0	8	118	4	0	1	5	21	0	2	2	16	0
4:45:00 PM	13	145	3	0	12	127	10	0	0	3	27	0	0	0	1	0
5:00:00 PM	13	157	3	0	15	148	7	0	0	7	23	2	5	3	21	1
5:15:00 PM	11	150	4	0	8	159	9	0	0	2	20	0	4	0	14	0
5:30:00 PM	21	128	3	0	10	145	6	0	0	1	19	0	5	1	8	0
5:45:00 PM	13	93	2	0	14	125	8	0	2	5	16	0	1	5	15	0
6:00:00 PM	13	106	1	0	4	97	5	0	0	2	21	0	2	6	11	0

Bank 1 Trucks

	Harris				Harris				Dolbeer				Dolbeer			
	Westbound				Eastbound				Southbound				Northbound			
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
4:00:00 PM	0	0	0		0	1	0		0	0	0		0	0	0	
4:15:00 PM	0	1	0		0	0	0		0	0	0		0	0	0	
4:30:00 PM	0	0	0		0	1	0		0	0	0		0	0	0	
4:45:00 PM	0	1	0		0	1	0		0	0	0		0	0	0	
5:00:00 PM	0	0	0		0	2	0		0	0	0		0	0	0	
5:15:00 PM	0	2	0		0	1	0		0	0	0		0	0	0	
5:30:00 PM	0	0	0		0	0	0		0	0	0		0	0	0	
5:45:00 PM	0	1	0		0	1	0		0	0	0		0	0	0	
6:00:00 PM	0	1	0		0	1	0		0	0	0		0	0	0	

Bank 2 Peds

	Harris				Harris				Dolbeer				Dolbeer			
	Westbound				Eastbound				Southbound				Northbound			
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
4:00:00 PM	0	1	0		0	0	0		0	1	0		0	1	1	
4:15:00 PM	0	0	0		0	0	0		0	0	0		0	0	0	
4:30:00 PM	0	2	0		0	1	0		0	2	0		0	1	0	
4:45:00 PM	1	0	0		0	1	0		0	3	0		0	0	0	
5:00:00 PM	0	4	0		0	0	0		0	0	0		0	0	0	
5:15:00 PM	0	1	0		0	1	0		0	0	0		0	1	0	
5:30:00 PM	0	0	0		0	2	0		0	0	0		0	2	0	
5:45:00 PM	0	0	0		0	1	0		0	0	0		0	0	0	
6:00:00 PM	0	0	0		0	1	0		0	0	0		0	2	0	

Harris W Counts
1:35-3:05 PM
9/6/2017

	W Southbound				Harris Westbound				W Northbound				Harris Eastbound			
	Left	Thru	Right	Que > 3	Left	Thru	Right	Que > 3	Left	Thru	Right	Que > 3	Left	Thru	Right	Que > 3
1:35:00 PM					1	26	0	0	0	0	2	0	0	61	2	0
1:40:00 PM					3	37	0	0	1	0	0	0	0	44	2	0
1:45:00 PM					0	50	0	0	1	0	3	1	0	55	4	0
1:50:00 PM					2	32	0	0	1	0	1	0	0	45	4	0
1:55:00 PM					3	34	0	0	1	0	0	0	0	52	8	0
2:00:00 PM					3	46	0	0	1	0	1	0	0	48	3	0
2:05:00 PM					0	44	0	0	0	0	0	0	0	56	5	0
2:10:00 PM					3	39	0	0	0	0	3	0	0	33	4	0
2:15:00 PM					1	50	0	0	3	0	6	0	0	38	10	0
2:20:00 PM					1	53	0	0	2	0	4	0	0	41	7	0
2:25:00 PM					2	65	0	0	1	0	1	0	0	49	7	0
2:30:00 PM					1	40	0	1	2	0	0	0	0	47	6	0
2:35:00 PM					1	26	0	0	1	0	1	0	0	49	4	0
2:40:00 PM					1	52	0	0	2	0	5	0	0	51	0	0
2:45:00 PM					1	39	0	0	2	0	4	0	0	45	3	0
2:50:00 PM					0	43	0	0	2	0	0	0	0	52	2	0
2:55:00 PM					1	51	0	0	2	0	1	0	0	56	8	0
3:00:00 PM					1	35	0	0	1	0	3	0	0	49	4	0
3:05:00 PM					1	53	0	0	0	0	0	0	0	43	8	0

Bank 1 Trucks

	W Southbound				Harris Westbound				W Northbound				Harris Eastbound			
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
1:35:00 PM					0	0	0		0	0	0		0	0	0	
1:40:00 PM					0	1	0		0	0	0		0	0	0	
1:45:00 PM					0	0	0		0	0	0		0	0	0	
1:50:00 PM					0	0	0		0	0	0		0	2	1	
1:55:00 PM					0	1	0		0	0	0		0	1	0	
2:00:00 PM					0	0	0		0	0	0		0	0	1	
2:05:00 PM					0	0	0		0	0	0		0	2	0	
2:10:00 PM					0	0	0		0	0	0		0	0	1	
2:15:00 PM					0	0	0		0	0	0		0	0	0	
2:20:00 PM					0	1	0		0	0	0		0	1	0	
2:25:00 PM					0	2	0		0	0	0		0	0	0	
2:30:00 PM					0	0	0		0	0	0		0	0	0	
2:35:00 PM					0	0	0		0	0	0		0	2	1	
2:40:00 PM					0	0	0		0	0	0		0	1	0	
2:45:00 PM					0	2	0		0	0	0		0	1	0	
2:50:00 PM					0	0	0		0	0	0		0	2	0	
2:55:00 PM					0	1	0		0	0	0		0	0	0	
3:00:00 PM					0	0	0		0	0	0		0	0	0	
3:05:00 PM					0	0	0		0	0	0		0	1	0	

Bank 2 Pedestrians

	W Southbound				Harris Westbound				W Northbound				Harris Eastbound			
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
1:35:00 PM					0	0	0		0	0	0		0	0	0	
1:40:00 PM					0	0	0		0	0	0		0	0	0	
1:45:00 PM					0	1	0		0	0	0		0	0	0	
1:50:00 PM					0	1	0		0	0	0		0	1	0	
1:55:00 PM					0	1	0		0	0	0		0	0	0	
2:00:00 PM					0	0	0		0	0	0		0	0	0	
2:05:00 PM					0	1	0		0	0	0		0	1	0	
2:10:00 PM					0	0	0		0	0	0		0	0	0	
2:15:00 PM					0	1	0		0	0	0		0	0	0	
2:20:00 PM					0	0	0		0	0	0		0	0	0	
2:25:00 PM					0	0	0		0	0	0		0	0	0	
2:30:00 PM					0	1	0		0	0	0		0	0	0	
2:35:00 PM					0	0	0		0	0	0		0	0	0	
2:40:00 PM					0	0	0		0	0	0		0	3	0	
2:45:00 PM					0	3	0		0	0	0		0	1	0	
2:50:00 PM					0	0	0		0	0	0		0	0	0	
2:55:00 PM					0	1	0		0	0	0		0	0	0	
3:00:00 PM					0	1	0		0	0	0		0	0	0	
3:05:00 PM					0	0	0		0	0	0		0	0	0	

Harris W Counts
4-6 PM
9/6/2017

	Harris				Harris				W				W			
	Westbound				Eastbound				Northbound				Southbound			
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
4:00:00 PM	4	144	0	0	0	149	16	0	1	0	4	0				
4:15:00 PM	6	156	0	0	0	131	14	0	1	0	3	0				
4:30:00 PM	3	150	0	0	0	134	15	0	8	0	6	0				
4:45:00 PM	7	162	0	0	0	136	22	0	3	0	4	0				
5:00:00 PM	3	177	0	0	0	165	19	0	3	0	4	0				
5:15:00 PM	2	177	0	0	0	173	23	0	6	0	3	0				
5:30:00 PM	3	146	0	0	0	155	19	0	6	0	5	0				
5:45:00 PM	3	115	0	0	0	134	24	0	6	0	7	0				
6:00:00 PM																

bank 1 Trucks

	Harris				Harris				W				W			
	Westbound				Eastbound				Northbound				Southbound			
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
4:00:00 PM	0	0	0	0	0	2	0	0	0	0	0	0				
4:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0				
4:30:00 PM	0	1	0	0	0	1	0	0	0	0	0	0				
4:45:00 PM	0	1	0	0	0	0	0	0	0	0	0	0				
5:00:00 PM	0	0	0	0	0	2	0	0	0	0	0	0				
5:15:00 PM	0	1	0	0	0	1	0	0	0	0	0	0				
5:30:00 PM	0	1	0	0	0	0	0	0	0	0	0	0				
5:45:00 PM	0	0	0	0	0	1	0	0	0	0	0	0				
6:00:00 PM																

Bank 2 Peds

	Harris				Harris				W				W			
	Westbound				Eastbound				Northbound				Southbound			
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
4:00:00 PM	0	1	0	0	0	0	0	0	0	0	0	0				
4:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0				
4:30:00 PM	0	2	0	0	0	1	1	0	0	0	0	0				
4:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0				
5:00:00 PM	0	3	0	0	0	0	0	0	0	0	0	0				
5:15:00 PM	0	1	0	0	0	0	0	0	0	0	0	0				
5:30:00 PM	0	0	0	0	0	1	0	0	0	0	0	0				
5:45:00 PM	0	0	0	0	0	0	0	0	0	0	1	0				
6:00:00 PM																

Walnut Hemlock Counts
1:40-3:45 PM
9/7/2017

	Walnut				Hemlock				Walnut				Hemlock			
	Southbound				Westbound				Northbound				Eastbound			
	Left	Thru	Right	Que > 3	Left	Thru	Right	Que > 3	Left	Thru	Right	Que > 3	Left	Thru	Right	Que > 3
1:40:00 PM					11	1	0	0	12	0	12	0	0	1	12	0
1:45:00 PM					14	1	0	0	9	0	21	0	0	1	21	0
1:50:00 PM					13	0	0	0	13	0	18	0	0	1	14	0
1:55:00 PM					11	0	0	0	8	0	13	0	0	1	11	0
2:00:00 PM					14	0	0	0	10	0	20	0	0	2	13	0
2:05:00 PM					15	0	0	0	9	0	9	0	0	1	18	0
2:10:00 PM					11	2	0	0	9	0	18	0	0	1	10	0
2:15:00 PM					17	0	0	0	15	0	27	0	0	2	19	0
2:20:00 PM					18	2	0	0	17	0	25	0	0	1	22	0
2:25:00 PM					16	1	0	0	18	0	25	0	0	0	23	0
2:30:00 PM					18	2	0	0	16	0	18	0	0	1	19	0
2:35:00 PM					20	0	0	0	10	0	15	0	0	3	38	0
2:40:00 PM					22	1	0	0	8	0	17	0	0	0	29	2
2:45:00 PM					22	1	0	0	16	0	19	0	0	1	24	0
2:50:00 PM					22	0	0	0	26	0	33	1	0	2	27	0
2:55:00 PM					23	0	0	0	23	0	27	1	0	0	17	0
3:00:00 PM					33	0	0	1	34	0	40	2	0	2	27	2
3:05:00 PM					31	0	0	0	27	0	17	0	0	1	18	0
3:10:00 PM					33	1	0	1	33	0	22	1	0	2	15	1
3:15:00 PM					24	0	0	0	40	0	29	1	0	0	11	0

Bank 1

	Walnut				Hemlock				Walnut				Hemlock			
	Southbound				Westbound				Northbound				Eastbound			
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
1:40:00 PM					0	0	0		1	0	0		0	0	0	
1:45:00 PM					0	0	0		1	0	0		0	0	0	
1:50:00 PM					0	0	0		0	0	0		0	0	0	
1:55:00 PM					0	0	0		0	0	0		0	0	0	
2:00:00 PM					0	0	0		0	0	0		0	0	1	
2:05:00 PM					1	0	0		0	0	0		0	0	0	
2:10:00 PM					0	0	0		0	0	0		0	0	0	
2:15:00 PM					0	0	0		0	0	0		0	0	0	
2:20:00 PM					0	0	0		0	0	1		0	0	0	
2:25:00 PM					0	0	0		0	0	1		0	0	1	
2:30:00 PM					0	0	0		0	0	1		0	0	2	
2:35:00 PM					0	0	0		1	0	0		0	0	0	
2:40:00 PM					0	0	0		1	0	0		0	0	1	
2:45:00 PM					0	0	0		0	0	0		0	0	0	
2:50:00 PM					0	0	0		0	0	1		0	0	0	
2:55:00 PM					0	0	0		3	0	0		0	0	1	
3:00:00 PM					0	0	0		0	0	0		0	0	0	
3:05:00 PM					1	0	0		0	0	0		0	0	0	
3:10:00 PM					0	0	0		0	0	0		0	0	0	
3:15:00 PM					0	0	0		0	0	0		0	0	0	

Bank 2

	Walnut				Hemlock				Walnut				Hemlock			
	Southbound				Westbound				Northbound				Eastbound			
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
1:40:00 PM					0	0	0		0	0	0		0	3	0	
1:45:00 PM					0	0	0		0	0	0		0	0	0	
1:50:00 PM					0	0	0		0	0	0		0	0	0	
1:55:00 PM					0	0	0		1	0	0		0	5	0	
2:00:00 PM					0	0	0		2	0	1		0	0	0	
2:05:00 PM					0	0	0		0	0	0		0	0	1	
2:10:00 PM					0	0	0		3	0	0		0	0	0	
2:15:00 PM					0	3	0		0	0	0		0	2	0	
2:20:00 PM					0	0	0		0	0	0		0	0	0	
2:25:00 PM					12	0	0		1	0	0		0	0	0	
2:30:00 PM					0	2	0		0	0	0		0	0	0	
2:35:00 PM					0	0	0		2	0	0		0	1	1	
2:40:00 PM					1	0	0		0	0	1		0	1	0	
2:45:00 PM					0	0	0		0	0	0		0	0	2	
2:50:00 PM					0	1	0		0	0	0		0	0	0	
2:55:00 PM					0	0	0		1	0	0		0	0	0	
3:00:00 PM					0	3	0		0	0	0		0	1	0	
3:05:00 PM					1	1	0		0	0	0		0	0	1	
3:10:00 PM					1	0	0		0	0	0		0	0	0	
3:15:00 PM					0	1	0		0	0	0		0	0	0	

Walnut Hemlock Counts
4-6 PM
9/7/2017

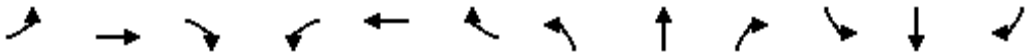
	Walnut				Hemlock				Walnut				Hemlock			
	Southbound				Westbound				Northbound				Eastbound			
	Left	Thru	Right	Que > 3	Left	Thru	Right	Que > 3	Left	Thru	Right	Que > 3	Left	Thru	Right	Que > 3
4:00:00 PM					65	2	0	1	39	0	55	0	0	2	56	0
4:15:00 PM					77	2	0	0	41	0	59	0	0	1	58	1
4:30:00 PM					85	1	0	0	48	0	68	1	0	5	67	1
4:45:00 PM					100	0	0	1	44	0	54	0	0	3	100	3
5:00:00 PM					87	2	0	3	73	0	70	2	0	1	97	4
5:15:00 PM					96	1	0	3	66	0	64	2	0	1	111	4
5:30:00 PM					86	0	0	2	55	0	50	0	0	3	69	2
5:45:00 PM					92	1	0	0	54	0	55	0	0	3	83	1
6:00:00 PM					72	0	0	0	58	0	59	0	0	1	67	1

Bank 1 Trucks

	Walnut				Hemlock				Walnut				Hemlock			
	Southbound				Westbound				Northbound				Eastbound			
	Left	Thru	Right		Left	Thru	Right	Peds	Left	Thru	Right		Left	Thru	Right	
4:00:00 PM					1	0	0		0	0	0		0	0	0	
4:15:00 PM					0	0	0		1	0	0		0	0	0	
4:30:00 PM					0	0	0		1	0	0		0	0	0	
4:45:00 PM					0	0	0		0	0	0		0	0	0	
5:00:00 PM					0	0	0		0	0	0		0	0	0	
5:15:00 PM					0	0	0		0	0	0		0	0	0	
5:30:00 PM					0	0	0		1	0	0		0	0	0	
5:45:00 PM					0	0	0		0	0	0		0	0	0	
6:00:00 PM					0	0	0		0	0	0		0	0	0	

Bank 2 Peds

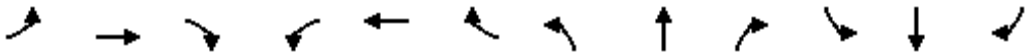
	Walnut				Hemlock				Walnut				Hemlock			
	Southbound				Westbound				Northbound				Eastbound			
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
4:00:00 PM					1	0	0		0	0	1		0	0	0	
4:15:00 PM					0	0	0		0	0	1		0	0	0	
4:30:00 PM					0	0	0		0	0	1		0	0	1	
4:45:00 PM					2	0	0		1	0	0		0	0	0	
5:00:00 PM					0	0	0		1	0	2		0	0	1	
5:15:00 PM					0	0	0		1	0	0		0	0	0	
5:30:00 PM					0	0	0		1	0	1		0	0	2	
5:45:00 PM					0	0	0		0	0	1		0	0	1	
6:00:00 PM					0	0	0		0	0	1		0	0	2	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	162	347	25	71	342	107	21	286	65	64	159	46
Future Volume (vph)	162	347	25	71	342	107	21	286	65	64	159	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.96		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1844		1770	1796		1770	1811		1770	1800	
Flt Permitted	0.95	1.00		0.95	1.00		0.58	1.00		0.35	1.00	
Satd. Flow (perm)	1770	1844		1770	1796		1075	1811		660	1800	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	176	377	27	77	372	116	23	311	71	70	173	50
RTOR Reduction (vph)	0	4	0	0	18	0	0	14	0	0	18	0
Lane Group Flow (vph)	176	400	0	77	470	0	23	368	0	70	205	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	8.2	24.7		3.0	19.5		19.5	19.5		19.5	19.5	
Effective Green, g (s)	8.2	24.7		3.0	19.5		19.5	19.5		19.5	19.5	
Actuated g/C Ratio	0.14	0.41		0.05	0.32		0.32	0.32		0.32	0.32	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	239	750		87	576		345	581		212	578	
v/s Ratio Prot	c0.10	0.22		0.04	c0.26			c0.20			0.11	
v/s Ratio Perm							0.02			0.11		
v/c Ratio	0.74	0.53		0.89	0.82		0.07	0.63		0.33	0.36	
Uniform Delay, d1	25.2	13.6		28.7	18.9		14.3	17.6		15.6	15.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	11.2	0.7		59.7	8.7		0.4	5.2		4.1	1.7	
Delay (s)	36.4	14.4		88.4	27.6		14.7	22.8		19.8	17.5	
Level of Service	D	B		F	C		B	C		B	B	
Approach Delay (s)		21.1			35.9			22.3			18.0	
Approach LOS		C			D			C			B	

Intersection Summary			
HCM 2000 Control Delay	25.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	60.7	Sum of lost time (s)	13.5
Intersection Capacity Utilization	71.7%	ICU Level of Service	C
Analysis Period (min)	15		

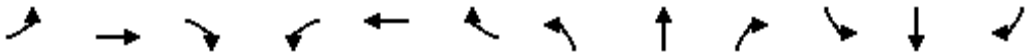
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	39	478	71	88	370	10	19	19	85	2	8	19
Future Volume (Veh/h)	39	478	71	88	370	10	19	19	85	2	8	19
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	42	520	77	96	402	11	21	21	92	2	9	21
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					654							
pX, platoon unblocked	0.82						0.82	0.82		0.82	0.82	0.82
vC, conflicting volume	413			597			1268	1248	558	1344	1280	408
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	170			597			1216	1191	558	1310	1231	163
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			90			80	84	83	97	93	97
cM capacity (veh/h)	1150			980			107	133	529	73	126	720

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	639	509	134	32
Volume Left	42	96	21	2
Volume Right	77	11	92	21
cSH	1150	980	254	250
Volume to Capacity	0.04	0.10	0.53	0.13
Queue Length 95th (ft)	3	8	71	11
Control Delay (s)	1.0	2.7	34.1	21.5
Lane LOS	A	A	D	C
Approach Delay (s)	1.0	2.7	34.1	21.5
Approach LOS			D	C

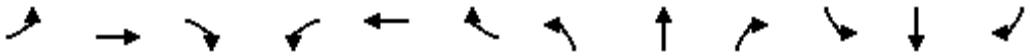
Intersection Summary			
Average Delay	5.5		
Intersection Capacity Utilization	67.9%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	595	84	22	460	0	14	0	24	0	0	0
Future Volume (Veh/h)	0	595	84	22	460	0	14	0	24	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	647	91	24	500	0	15	0	26	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		1317			1315							
pX, platoon unblocked				0.73			0.73	0.73	0.73	0.73	0.73	
vC, conflicting volume	500			738			1240	1240	692	1266	1286	500
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	500			460			1146	1146	398	1181	1208	500
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			97			88	100	95	100	100	100
cM capacity (veh/h)	1064			807			126	142	477	113	130	571

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	738	524	41	0
Volume Left	0	24	15	0
Volume Right	91	0	26	0
cSH	1064	807	237	1700
Volume to Capacity	0.00	0.03	0.17	0.00
Queue Length 95th (ft)	0	2	15	0
Control Delay (s)	0.0	0.8	23.4	0.0
Lane LOS		A	C	A
Approach Delay (s)	0.0	0.8	23.4	0.0
Approach LOS			C	A

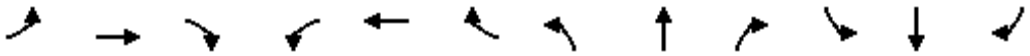
Intersection Summary				
Average Delay	1.1			
Intersection Capacity Utilization	52.1%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	127	574	15	6	346	57	55	315	8	63	139	21
Future Volume (vph)	127	574	15	6	346	57	55	315	8	63	139	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	1.00		1.00	0.98			1.00			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1770	1856		1770	1823			1844			1813	
Flt Permitted	0.42	1.00		0.22	1.00			0.92			0.82	
Satd. Flow (perm)	785	1856		419	1823			1706			1516	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	138	624	16	7	376	62	60	342	9	68	151	23
RTOR Reduction (vph)	0	2	0	0	12	0	0	2	0	0	8	0
Lane Group Flow (vph)	138	638	0	7	426	0	0	409	0	0	234	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	18.6	18.6		18.6	18.6			14.9			14.9	
Effective Green, g (s)	18.6	18.6		18.6	18.6			14.9			14.9	
Actuated g/C Ratio	0.44	0.44		0.44	0.44			0.35			0.35	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	343	812		183	797			598			531	
v/s Ratio Prot		c0.34			0.23							
v/s Ratio Perm	0.18			0.02				c0.24			0.15	
v/c Ratio	0.40	0.79		0.04	0.53			0.68			0.44	
Uniform Delay, d1	8.2	10.2		6.8	8.8			11.8			10.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.8	5.0		0.1	0.7			3.2			0.6	
Delay (s)	8.9	15.3		6.9	9.5			15.0			11.2	
Level of Service	A	B		A	A			B			B	
Approach Delay (s)		14.2			9.4			15.0			11.2	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	12.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	42.5	Sum of lost time (s)	9.0
Intersection Capacity Utilization	69.3%	ICU Level of Service	C
Analysis Period (min)	15		

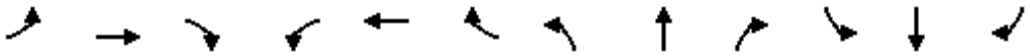
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	53	286	1	0	164	310	0	4	0	148	6	14
Future Volume (Veh/h)	53	286	1	0	164	310	0	4	0	148	6	14
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	58	311	1	0	178	337	0	4	0	161	7	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	515			312			792	942	312	776	774	346
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	515			312			792	942	312	776	774	346
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	94			100			100	98	100	46	98	98
cM capacity (veh/h)	1051			1248			283	248	729	298	311	697

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	370	515	4	183
Volume Left	58	0	0	161
Volume Right	1	337	0	15
cSH	1051	1248	248	313
Volume to Capacity	0.06	0.00	0.02	0.58
Queue Length 95th (ft)	4	0	1	87
Control Delay (s)	1.8	0.0	19.7	31.5
Lane LOS	A		C	D
Approach Delay (s)	1.8	0.0	19.7	31.5
Approach LOS			C	D

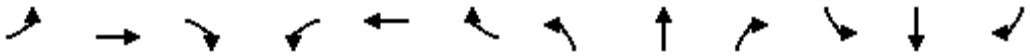
Intersection Summary			
Average Delay	6.1		
Intersection Capacity Utilization	71.7%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	10	160	180	2	71	8	368	13	15	34	49	3
Future Volume (vph)	10	160	180	2	71	8	368	13	15	34	49	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	174	196	2	77	9	400	14	16	37	53	3

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	381	88	430	93
Volume Left (vph)	11	2	400	37
Volume Right (vph)	196	9	16	3
Hadj (s)	-0.27	-0.02	0.20	0.09
Departure Headway (s)	5.3	6.1	5.6	6.1
Degree Utilization, x	0.57	0.15	0.67	0.16
Capacity (veh/h)	635	499	614	504
Control Delay (s)	15.1	10.2	19.2	10.3
Approach Delay (s)	15.1	10.2	19.2	10.3
Approach LOS	C	B	C	B

Intersection Summary				
Delay	16.0			
Level of Service	C			
Intersection Capacity Utilization	59.8%	ICU Level of Service	B	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	19	70	87	74	41	2	29	69	34	4	93	16
Future Volume (vph)	19	70	87	74	41	2	29	69	34	4	93	16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	76	95	80	45	2	32	75	37	4	101	17

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	192	127	144	122
Volume Left (vph)	21	80	32	4
Volume Right (vph)	95	2	37	17
Hadj (s)	-0.24	0.15	-0.08	-0.04
Departure Headway (s)	4.5	5.0	4.8	4.8
Degree Utilization, x	0.24	0.17	0.19	0.16
Capacity (veh/h)	747	677	703	688
Control Delay (s)	8.9	9.0	8.9	8.8
Approach Delay (s)	8.9	9.0	8.9	8.8
Approach LOS	A	A	A	A

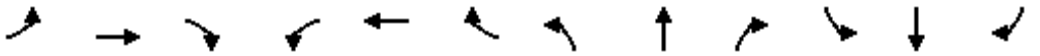
Intersection Summary				
Delay	8.9			
Level of Service	A			
Intersection Capacity Utilization	40.4%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	13	266	208	15	362	380
Future Volume (vph)	13	266	208	15	362	380
Peak Hour Factor	0.78	0.78	0.82	0.82	0.87	0.87
Hourly flow rate (vph)	17	341	254	18	416	437

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2
Volume Total (vph)	17	341	272	416	437
Volume Left (vph)	0	0	254	416	0
Volume Right (vph)	0	341	0	0	437
Hadj (s)	0.03	-0.67	0.22	0.52	-0.68
Departure Headway (s)	7.3	6.6	7.1	7.0	5.8
Degree Utilization, x	0.03	0.62	0.54	0.81	0.71
Capacity (veh/h)	473	524	491	504	603
Control Delay (s)	9.4	18.6	18.2	32.6	20.4
Approach Delay (s)	18.2		18.2	26.3	
Approach LOS	C		C	D	

Intersection Summary			
Delay	22.9		
Level of Service	C		
Intersection Capacity Utilization	45.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	0	2	3	0	84	0	668	1	36	478	3
Future Volume (Veh/h)	4	0	2	3	0	84	0	668	1	36	478	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	0	2	3	0	91	0	726	1	39	520	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1416	1326	522	1326	1328	726	523			727		
vC1, stage 1 conf vol	600	600		726	726							
vC2, stage 2 conf vol	817	727		600	601							
vCu, unblocked vol	1416	1326	522	1326	1328	726	523			727		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	100	99	100	79	100			96		
cM capacity (veh/h)	227	323	555	326	339	424	1043			876		

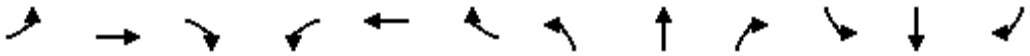
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	6	94	0	727	39	523
Volume Left	4	3	0	0	39	0
Volume Right	2	91	0	1	0	3
cSH	283	420	1700	1700	876	1700
Volume to Capacity	0.02	0.22	0.00	0.43	0.04	0.31
Queue Length 95th (ft)	2	21	0	0	3	0
Control Delay (s)	18.0	16.0	0.0	0.0	9.3	0.0
Lane LOS	C	C			A	
Approach Delay (s)	18.0	16.0	0.0		0.6	
Approach LOS	C	C				

Intersection Summary				
Average Delay	1.4			
Intersection Capacity Utilization	47.2%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	44	2	28	16	1	38	10	538	17	26	428	16
Future Volume (Veh/h)	44	2	28	16	1	38	10	538	17	26	428	16
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	48	2	30	17	1	41	11	585	18	28	465	17
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			TWLTL	
Median storage veh)											2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1178	1154	474	1168	1154	594	482			603		
vC1, stage 1 conf vol	530	530		616	616							
vC2, stage 2 conf vol	648	625		552	538							
vCu, unblocked vol	1178	1154	474	1168	1154	594	482			603		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	86	99	95	95	100	92	99			97		
cM capacity (veh/h)	332	369	591	356	378	505	1081			975		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	80	17	42	11	603	28	482
Volume Left	48	17	0	11	0	28	0
Volume Right	30	0	41	0	18	0	17
cSH	398	356	501	1081	1700	975	1700
Volume to Capacity	0.20	0.05	0.08	0.01	0.35	0.03	0.28
Queue Length 95th (ft)	19	4	7	1	0	2	0
Control Delay (s)	16.3	15.6	12.8	8.4	0.0	8.8	0.0
Lane LOS	C	C	B	A		A	
Approach Delay (s)	16.3	13.6		0.1		0.5	
Approach LOS	C	B					

Intersection Summary				
Average Delay	1.9			
Intersection Capacity Utilization	46.9%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	63	1	45	12	0	23	4	501	1	9	420	1
Future Volume (Veh/h)	63	1	45	12	0	23	4	501	1	9	420	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	68	1	49	13	0	25	4	545	1	10	457	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1056	1032	458	1080	1032	546	458			546		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1056	1032	458	1080	1032	546	458			546		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	65	100	92	93	100	95	100			99		
cM capacity (veh/h)	192	230	603	177	230	538	1103			1023		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	118	38	550	468
Volume Left	68	13	4	10
Volume Right	49	25	1	1
cSH	268	317	1103	1023
Volume to Capacity	0.44	0.12	0.00	0.01
Queue Length 95th (ft)	53	10	0	1
Control Delay (s)	28.6	17.9	0.1	0.3
Lane LOS	D	C	A	A
Approach Delay (s)	28.6	17.9	0.1	0.3
Approach LOS	D	C		

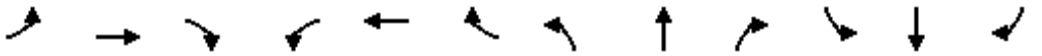
Intersection Summary				
Average Delay	3.6			
Intersection Capacity Utilization	45.7%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	51	175	369	149	195	247
Future Volume (vph)	51	175	369	149	195	247
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	55	190	401	162	212	268

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	245	563	480
Volume Left (vph)	55	0	212
Volume Right (vph)	190	162	0
Hadj (s)	-0.39	-0.14	0.12
Departure Headway (s)	6.1	5.3	5.7
Degree Utilization, x	0.42	0.83	0.76
Capacity (veh/h)	547	664	615
Control Delay (s)	13.5	29.1	24.1
Approach Delay (s)	13.5	29.1	24.1
Approach LOS	B	D	C

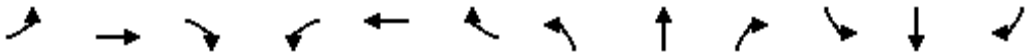
Intersection Summary			
Delay	24.3		
Level of Service	C		
Intersection Capacity Utilization	75.9%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	184	369	25	81	342	107	21	286	65	64	169	46
Future Volume (vph)	184	369	25	81	342	107	21	286	65	64	169	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.96		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1845		1770	1796		1770	1811		1770	1803	
Flt Permitted	0.95	1.00		0.95	1.00		0.56	1.00		0.36	1.00	
Satd. Flow (perm)	1770	1845		1770	1796		1050	1811		668	1803	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	200	401	27	88	372	116	23	311	71	70	184	50
RTOR Reduction (vph)	0	4	0	0	19	0	0	14	0	0	16	0
Lane Group Flow (vph)	200	424	0	88	469	0	23	368	0	70	218	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	8.5	22.9		4.2	18.6		19.5	19.5		19.5	19.5	
Effective Green, g (s)	8.5	22.9		4.2	18.6		19.5	19.5		19.5	19.5	
Actuated g/C Ratio	0.14	0.38		0.07	0.31		0.32	0.32		0.32	0.32	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	250	703		123	555		340	587		216	585	
v/s Ratio Prot	c0.11	c0.23		0.05	c0.26			c0.20			0.12	
v/s Ratio Perm							0.02			0.10		
v/c Ratio	0.80	0.60		0.72	0.85		0.07	0.63		0.32	0.37	
Uniform Delay, d1	25.0	15.0		27.4	19.4		14.0	17.2		15.3	15.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	16.5	1.5		17.9	11.4		0.4	5.0		3.9	1.8	
Delay (s)	41.5	16.4		45.3	30.8		14.4	22.2		19.3	17.4	
Level of Service	D	B		D	C		B	C		B	B	
Approach Delay (s)		24.4			33.0			21.8			17.8	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	25.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	60.1	Sum of lost time (s)	13.5
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		

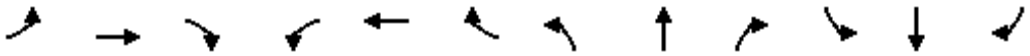
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	39	478	71	88	370	10	19	19	129	2	8	19
Future Volume (Veh/h)	39	478	71	88	370	10	19	19	129	2	8	19
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	42	520	77	96	402	11	21	21	140	2	9	21
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					654							
pX, platoon unblocked	0.81						0.81	0.81		0.81	0.81	0.81
vC, conflicting volume	413			597			1268	1248	558	1392	1280	408
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	164			597			1214	1190	558	1368	1230	157
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			90			80	84	74	97	93	97
cM capacity (veh/h)	1151			980			106	133	529	59	126	723

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	639	509	182	32
Volume Left	42	96	21	2
Volume Right	77	11	140	21
cSH	1151	980	293	237
Volume to Capacity	0.04	0.10	0.62	0.13
Queue Length 95th (ft)	3	8	96	11
Control Delay (s)	1.0	2.7	35.4	22.5
Lane LOS	A	A	E	C
Approach Delay (s)	1.0	2.7	35.4	22.5
Approach LOS			E	C

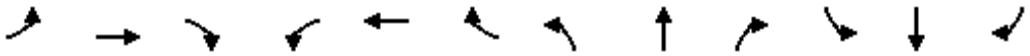
Intersection Summary			
Average Delay	6.7		
Intersection Capacity Utilization	70.4%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	595	101	22	460	0	14	0	24	0	0	0
Future Volume (Veh/h)	0	595	101	22	460	0	14	0	24	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	647	110	24	500	0	15	0	26	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		1317			1315							
pX, platoon unblocked				0.72			0.72	0.72	0.72	0.72	0.72	
vC, conflicting volume	500			757			1250	1250	702	1276	1305	500
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	500			469			1153	1153	393	1189	1229	500
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			97			88	100	95	100	100	100
cM capacity (veh/h)	1064			787			123	138	473	110	124	571

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	757	524	41	0
Volume Left	0	24	15	0
Volume Right	110	0	26	0
cSH	1064	787	231	1700
Volume to Capacity	0.00	0.03	0.18	0.00
Queue Length 95th (ft)	0	2	16	0
Control Delay (s)	0.0	0.8	23.9	0.0
Lane LOS		A	C	A
Approach Delay (s)	0.0	0.8	23.9	0.0
Approach LOS			C	A

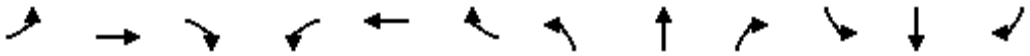
Intersection Summary				
Average Delay	1.1			
Intersection Capacity Utilization	52.1%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	127	584	15	6	346	57	77	352	8	70	149	21
Future Volume (vph)	127	584	15	6	346	57	77	352	8	70	149	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	1.00		1.00	0.98			1.00			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1770	1856		1770	1823			1842			1814	
Flt Permitted	0.41	1.00		0.21	1.00			0.90			0.79	
Satd. Flow (perm)	766	1856		388	1823			1677			1448	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	138	635	16	7	376	62	84	383	9	76	162	23
RTOR Reduction (vph)	0	2	0	0	12	0	0	1	0	0	7	0
Lane Group Flow (vph)	138	649	0	7	426	0	0	475	0	0	254	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	19.2	19.2		19.2	19.2			16.4			16.4	
Effective Green, g (s)	19.2	19.2		19.2	19.2			16.4			16.4	
Actuated g/C Ratio	0.43	0.43		0.43	0.43			0.37			0.37	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	329	798		167	784			616			532	
v/s Ratio Prot		c0.35			0.23							
v/s Ratio Perm	0.18			0.02				c0.28			0.18	
v/c Ratio	0.42	0.81		0.04	0.54			0.77			0.48	
Uniform Delay, d1	8.8	11.1		7.4	9.4			12.4			10.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.9	6.4		0.1	0.8			5.9			0.7	
Delay (s)	9.7	17.5		7.5	10.2			18.4			11.5	
Level of Service	A	B		A	B			B			B	
Approach Delay (s)		16.1			10.2			18.4			11.5	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	14.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	44.6	Sum of lost time (s)	9.0
Intersection Capacity Utilization	74.1%	ICU Level of Service	D
Analysis Period (min)	15		

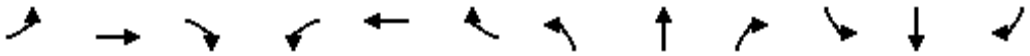
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	53	293	1	0	179	369	0	4	0	158	6	14
Future Volume (Veh/h)	53	293	1	0	179	369	0	4	0	158	6	14
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	58	318	1	0	195	401	0	4	0	172	7	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	596			319			848	1030	318	832	830	396
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	596			319			848	1030	318	832	830	396
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	94			100			100	98	100	37	98	98
cM capacity (veh/h)	980			1241			257	219	722	272	287	654

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	377	596	4	194
Volume Left	58	0	0	172
Volume Right	1	401	0	15
cSH	980	1241	219	285
Volume to Capacity	0.06	0.00	0.02	0.68
Queue Length 95th (ft)	5	0	1	114
Control Delay (s)	1.9	0.0	21.7	40.8
Lane LOS	A		C	E
Approach Delay (s)	1.9	0.0	21.7	40.8
Approach LOS			C	E

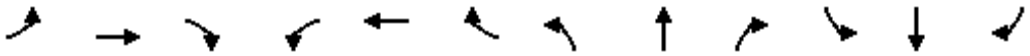
Intersection Summary			
Average Delay	7.5		
Intersection Capacity Utilization	77.1%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	10	160	197	2	71	8	442	13	15	34	66	3
Future Volume (vph)	10	160	197	2	71	8	442	13	15	34	66	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	174	214	2	77	9	480	14	16	37	72	3

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	399	88	510	112
Volume Left (vph)	11	2	480	37
Volume Right (vph)	214	9	16	3
Hadj (s)	-0.28	-0.02	0.20	0.08
Departure Headway (s)	5.7	6.7	5.8	6.5
Degree Utilization, x	0.63	0.16	0.83	0.20
Capacity (veh/h)	597	482	603	497
Control Delay (s)	18.1	11.0	30.6	11.2
Approach Delay (s)	18.1	11.0	30.6	11.2
Approach LOS	C	B	D	B

Intersection Summary				
Delay	22.6			
Level of Service	C			
Intersection Capacity Utilization	65.0%	ICU Level of Service	C	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	19	70	87	94	41	2	29	113	34	4	93	16
Future Volume (vph)	19	70	87	94	41	2	29	113	34	4	93	16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	76	95	102	45	2	32	123	37	4	101	17

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	192	149	192	122
Volume Left (vph)	21	102	32	4
Volume Right (vph)	95	2	37	17
Hadj (s)	-0.24	0.16	-0.05	-0.04
Departure Headway (s)	4.7	5.1	4.9	5.0
Degree Utilization, x	0.25	0.21	0.26	0.17
Capacity (veh/h)	713	650	688	659
Control Delay (s)	9.2	9.5	9.6	9.0
Approach Delay (s)	9.2	9.5	9.6	9.0
Approach LOS	A	A	A	A

Intersection Summary			
Delay	9.3		
Level of Service	A		
Intersection Capacity Utilization	43.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	13	300	228	15	436	424
Future Volume (vph)	13	300	228	15	436	424
Peak Hour Factor	0.78	0.78	0.82	0.82	0.87	0.87
Hourly flow rate (vph)	17	385	278	18	501	487

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2
Volume Total (vph)	17	385	296	501	487
Volume Left (vph)	0	0	278	501	0
Volume Right (vph)	0	385	0	0	487
Hadj (s)	0.03	-0.67	0.22	0.52	-0.68
Departure Headway (s)	7.5	6.8	7.2	7.3	6.1
Degree Utilization, x	0.04	0.73	0.59	1.01	0.82
Capacity (veh/h)	471	519	492	501	585
Control Delay (s)	9.6	24.5	20.3	70.3	29.9
Approach Delay (s)	23.8		20.3	50.4	
Approach LOS	C		C	F	

Intersection Summary			
Delay	38.8		
Level of Service	E		
Intersection Capacity Utilization	50.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	0	2	3	0	166	0	704	1	74	494	3
Future Volume (Veh/h)	4	0	2	3	0	166	0	704	1	74	494	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	0	2	3	0	180	0	765	1	80	537	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1644	1464	538	1464	1466	766	540			766		
vC1, stage 1 conf vol	698	698		766	766							
vC2, stage 2 conf vol	945	766		699	700							
vCu, unblocked vol	1644	1464	538	1464	1466	766	540			766		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	100	100	99	100	55	100			91		
cM capacity (veh/h)	91	272	543	287	302	403	1028			847		

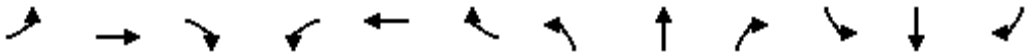
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	6	183	0	766	80	540
Volume Left	4	3	0	0	80	0
Volume Right	2	180	0	1	0	3
cSH	126	400	1700	1700	847	1700
Volume to Capacity	0.05	0.46	0.00	0.45	0.09	0.32
Queue Length 95th (ft)	4	58	0	0	8	0
Control Delay (s)	35.1	21.3	0.0	0.0	9.7	0.0
Lane LOS	E	C			A	
Approach Delay (s)	35.1	21.3	0.0		1.3	
Approach LOS	E	C				

Intersection Summary				
Average Delay	3.1			
Intersection Capacity Utilization	61.6%	ICU Level of Service		B
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	44	2	28	45	1	74	10	538	31	42	428	16
Future Volume (Veh/h)	44	2	28	45	1	74	10	538	31	42	428	16
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	48	2	30	49	1	80	11	585	34	46	465	17
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			TWLTL	
Median storage veh)											2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1253	1206	474	1212	1198	602	482			619		
vC1, stage 1 conf vol	566	566		624	624							
vC2, stage 2 conf vol	688	641		588	574							
vCu, unblocked vol	1253	1206	474	1212	1198	602	482			619		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	83	99	95	86	100	84	99			95		
cM capacity (veh/h)	278	347	591	340	363	500	1081			961		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	80	49	81	11	619	46	482
Volume Left	48	49	0	11	0	46	0
Volume Right	30	0	80	0	34	0	17
cSH	349	340	497	1081	1700	961	1700
Volume to Capacity	0.23	0.14	0.16	0.01	0.36	0.05	0.28
Queue Length 95th (ft)	22	12	14	1	0	4	0
Control Delay (s)	18.3	17.4	13.6	8.4	0.0	8.9	0.0
Lane LOS	C	C	B	A		A	
Approach Delay (s)	18.3	15.0		0.1		0.8	
Approach LOS	C	C					

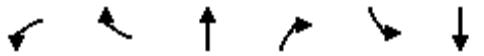
Intersection Summary				
Average Delay	2.9			
Intersection Capacity Utilization	52.5%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	63	1	45	12	0	23	4	515	1	9	449	1
Future Volume (Veh/h)	63	1	45	12	0	23	4	515	1	9	449	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	68	1	49	13	0	25	4	560	1	10	488	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1102	1078	488	1126	1078	560	489			561		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1102	1078	488	1126	1078	560	489			561		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	62	100	92	92	100	95	100			99		
cM capacity (veh/h)	178	216	579	164	216	527	1074			1010		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	118	38	565	499
Volume Left	68	13	4	10
Volume Right	49	25	1	1
cSH	251	300	1074	1010
Volume to Capacity	0.47	0.13	0.00	0.01
Queue Length 95th (ft)	58	11	0	1
Control Delay (s)	31.5	18.7	0.1	0.3
Lane LOS	D	C	A	A
Approach Delay (s)	31.5	18.7	0.1	0.3
Approach LOS	D	C		

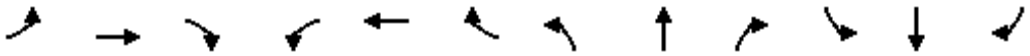
Intersection Summary				
Average Delay	3.8			
Intersection Capacity Utilization	46.8%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	51	175	383	149	195	276
Future Volume (vph)	51	175	383	149	195	276
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	55	190	416	162	212	300

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	245	578	512
Volume Left (vph)	55	0	212
Volume Right (vph)	190	162	0
Hadj (s)	-0.39	-0.13	0.12
Departure Headway (s)	6.3	5.4	5.7
Degree Utilization, x	0.43	0.87	0.81
Capacity (veh/h)	541	657	615
Control Delay (s)	13.8	33.4	28.8
Approach Delay (s)	13.8	33.4	28.8
Approach LOS	B	D	D

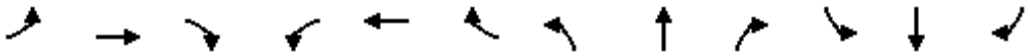
Intersection Summary			
Delay	28.0		
Level of Service	D		
Intersection Capacity Utilization	78.2%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	478	71	88	370	10	19	19	85	2	8	19
Future Volume (vph)	39	478	71	88	370	10	19	19	85	2	8	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5			4.5	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.98			1.00			0.91			0.91	
Flt Protected		1.00			0.99			0.99			1.00	
Satd. Flow (prot)		1826			1840			1677			1692	
Flt Permitted		0.95			0.83			0.94			0.98	
Satd. Flow (perm)		1740			1533			1596			1656	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	42	520	77	96	402	11	21	21	92	2	9	21
RTOR Reduction (vph)	0	8	0	0	1	0	0	73	0	0	17	0
Lane Group Flow (vph)	0	631	0	0	508	0	0	61	0	0	15	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		18.3			18.3			7.2			7.2	
Effective Green, g (s)		18.3			18.3			7.2			7.2	
Actuated g/C Ratio		0.53			0.53			0.21			0.21	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		922			813			333			345	
v/s Ratio Prot												
v/s Ratio Perm		c0.36			0.33			c0.04			0.01	
v/c Ratio		0.68			0.62			0.18			0.04	
Uniform Delay, d1		6.0			5.7			11.2			10.9	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		2.1			1.5			0.3			0.1	
Delay (s)		8.1			7.2			11.5			11.0	
Level of Service		A			A			B			B	
Approach Delay (s)		8.1			7.2			11.5			11.0	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	8.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	34.5	Sum of lost time (s)	9.0
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	53	286	1	0	164	310	0	4	0	148	6	14
Future Volume (vph)	53	286	1	0	164	310	0	4	0	148	6	14
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	58	311	1	0	178	337	0	4	0	161	7	15

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	370	515	4	183
Volume Left (vph)	58	0	0	161
Volume Right (vph)	1	337	0	15
Hadj (s)	0.06	-0.36	0.03	0.16
Departure Headway (s)	5.2	4.7	6.6	6.2
Degree Utilization, x	0.54	0.67	0.01	0.31
Capacity (veh/h)	659	750	446	524
Control Delay (s)	14.1	16.6	9.6	12.0
Approach Delay (s)	14.1	16.6	9.6	12.0
Approach LOS	B	C	A	B

Intersection Summary			
Delay	14.9		
Level of Service	B		
Intersection Capacity Utilization	71.7%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	13	266	208	15	362	380
Future Volume (vph)	13	266	208	15	362	380
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		0.96	0.95	1.00
Satd. Flow (prot)	1863	1583		1780	1787	1566
Flt Permitted	1.00	1.00		0.73	0.95	1.00
Satd. Flow (perm)	1863	1583		1356	1787	1566
Peak-hour factor, PHF	0.78	0.78	0.82	0.82	0.87	0.87
Adj. Flow (vph)	17	341	254	18	416	437
RTOR Reduction (vph)	0	222	0	0	0	266
Lane Group Flow (vph)	17	119	0	272	416	171
Confl. Bikes (#/hr)						1
Heavy Vehicles (%)	2%	2%	2%	2%	1%	1%
Turn Type	NA	Perm	Perm	NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases		4	8			2
Actuated Green, G (s)	12.1	12.1		12.1	13.5	13.5
Effective Green, g (s)	12.1	12.1		12.1	13.5	13.5
Actuated g/C Ratio	0.35	0.35		0.35	0.39	0.39
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	651	553		474	697	611
v/s Ratio Prot	0.01				c0.23	
v/s Ratio Perm		0.08		c0.20		0.11
v/c Ratio	0.03	0.22		0.57	0.60	0.28
Uniform Delay, d1	7.4	7.9		9.2	8.4	7.2
Progression Factor	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.0	0.2		1.7	1.4	0.3
Delay (s)	7.4	8.1		10.8	9.8	7.5
Level of Service	A	A		B	A	A
Approach Delay (s)	8.1			10.8	8.6	
Approach LOS	A			B	A	

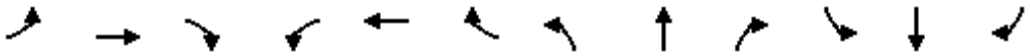
Intersection Summary			
HCM 2000 Control Delay	8.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	34.6	Sum of lost time (s)	9.0
Intersection Capacity Utilization	46.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	0	2	3	0	84	0	668	1	36	478	3
Future Volume (vph)	4	0	2	3	0	84	0	668	1	36	478	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5		4.5	4.5	
Lane Util. Factor		1.00			1.00			1.00		1.00	1.00	
Frt		0.95			0.87			1.00		1.00	1.00	
Flt Protected		0.97			1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1722			1617			1862		1770	1861	
Flt Permitted		0.93			0.99			1.00		0.34	1.00	
Satd. Flow (perm)		1647			1600			1862		626	1861	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	0	2	3	0	91	0	726	1	39	520	3
RTOR Reduction (vph)	0	5	0	0	83	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1	0	0	11	0	0	727	0	39	523	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		3.6			3.6			29.6		29.6	29.6	
Effective Green, g (s)		3.6			3.6			29.6		29.6	29.6	
Actuated g/C Ratio		0.09			0.09			0.70		0.70	0.70	
Clearance Time (s)		4.5			4.5			4.5		4.5	4.5	
Vehicle Extension (s)		3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		140			136			1306		439	1305	
v/s Ratio Prot								c0.39			0.28	
v/s Ratio Perm		0.00			c0.01					0.06		
v/c Ratio		0.00			0.08			0.56		0.09	0.40	
Uniform Delay, d1		17.7			17.8			3.1		2.0	2.6	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		0.0			0.3			0.5		0.1	0.2	
Delay (s)		17.7			18.0			3.6		2.1	2.8	
Level of Service		B			B			A		A	A	
Approach Delay (s)		17.7			18.0			3.6			2.8	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	4.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	42.2	Sum of lost time (s)	9.0
Intersection Capacity Utilization	48.0%	ICU Level of Service	A
Analysis Period (min)	15		

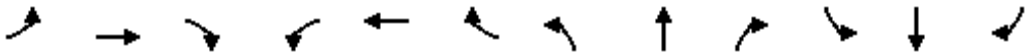
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	579	32	58	508	13	0	13	89	14	4	44
Future Volume (vph)	45	579	32	58	508	13	0	13	89	14	4	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5			4.5	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.99			1.00			0.88			0.90	
Flt Protected		1.00			1.00			1.00			0.99	
Satd. Flow (prot)		1844			1848			1643			1664	
Flt Permitted		0.94			0.89			1.00			0.90	
Satd. Flow (perm)		1732			1657			1643			1517	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	49	629	35	63	552	14	0	14	97	15	4	48
RTOR Reduction (vph)	0	3	0	0	1	0	0	79	0	0	39	0
Lane Group Flow (vph)	0	710	0	0	628	0	0	32	0	0	28	0
Turn Type	Perm	NA		Perm	NA			NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		20.7			20.7			6.7			6.7	
Effective Green, g (s)		20.7			20.7			6.7			6.7	
Actuated g/C Ratio		0.57			0.57			0.18			0.18	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		984			942			302			279	
v/s Ratio Prot								c0.02				
v/s Ratio Perm		c0.41			0.38						0.02	
v/c Ratio		0.72			0.67			0.11			0.10	
Uniform Delay, d1		5.7			5.5			12.4			12.3	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		2.6			1.8			0.2			0.2	
Delay (s)		8.4			7.2			12.5			12.5	
Level of Service		A			A			B			B	
Approach Delay (s)		8.4			7.2			12.5			12.5	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	8.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	36.4	Sum of lost time (s)	9.0
Intersection Capacity Utilization	62.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	25	198	2	0	209	181	0	2	2	165	2	61
Future Volume (vph)	25	198	2	0	209	181	0	2	2	165	2	61
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	215	2	0	227	197	0	2	2	179	2	66

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	244	424	4	247
Volume Left (vph)	27	0	0	179
Volume Right (vph)	2	197	2	66
Hadj (s)	0.05	-0.24	-0.27	0.02
Departure Headway (s)	5.3	4.8	5.8	5.6
Degree Utilization, x	0.36	0.56	0.01	0.38
Capacity (veh/h)	644	729	500	595
Control Delay (s)	11.1	13.6	8.8	12.0
Approach Delay (s)	11.1	13.6	8.8	12.0
Approach LOS	B	B	A	B

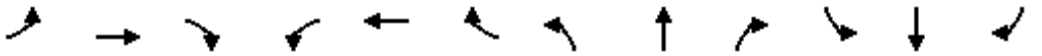
Intersection Summary				
Delay	12.5			
Level of Service	B			
Intersection Capacity Utilization	57.8%	ICU Level of Service	B	
Analysis Period (min)	15			



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	15	343	308	5	232	210
Future Volume (vph)	15	343	308	5	232	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		0.95	0.95	1.00
Satd. Flow (prot)	1863	1583		1775	1787	1565
Flt Permitted	1.00	1.00		0.72	0.95	1.00
Satd. Flow (perm)	1863	1583		1333	1787	1565
Peak-hour factor, PHF	0.78	0.78	0.82	0.82	0.87	0.87
Adj. Flow (vph)	19	440	376	6	267	241
RTOR Reduction (vph)	0	252	0	0	0	165
Lane Group Flow (vph)	19	188	0	382	267	76
Confl. Bikes (#/hr)						1
Heavy Vehicles (%)	2%	2%	2%	2%	1%	1%
Turn Type	NA	Perm	Perm	NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases		4	8			2
Actuated Green, G (s)	15.0	15.0		15.0	11.1	11.1
Effective Green, g (s)	15.0	15.0		15.0	11.1	11.1
Actuated g/C Ratio	0.43	0.43		0.43	0.32	0.32
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	796	676		569	565	494
v/s Ratio Prot	0.01				c0.15	
v/s Ratio Perm		0.12		c0.29		0.05
v/c Ratio	0.02	0.28		0.67	0.47	0.15
Uniform Delay, d1	5.8	6.5		8.1	9.6	8.6
Progression Factor	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.0	0.2		3.1	0.6	0.1
Delay (s)	5.8	6.8		11.2	10.3	8.8
Level of Service	A	A		B	B	A
Approach Delay (s)	6.7			11.2	9.6	
Approach LOS	A			B	A	

Intersection Summary			
HCM 2000 Control Delay	9.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	35.1	Sum of lost time (s)	9.0
Intersection Capacity Utilization	46.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	0	2	9	1	64	13	427	6	53	609	8
Future Volume (vph)	9	0	2	9	1	64	13	427	6	53	609	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.98			0.88		1.00	1.00		1.00	1.00	
Flt Protected		0.96			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1748			1635		1770	1859		1770	1859	
Flt Permitted		1.00			0.95		0.37	1.00		0.49	1.00	
Satd. Flow (perm)		1821			1569		682	1859		919	1859	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	0	2	10	1	70	14	464	7	58	662	9
RTOR Reduction (vph)	0	11	0	0	64	0	0	1	0	0	1	0
Lane Group Flow (vph)	0	1	0	0	17	0	14	470	0	58	670	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		3.6			3.6		28.0	28.0		28.0	28.0	
Effective Green, g (s)		3.6			3.6		28.0	28.0		28.0	28.0	
Actuated g/C Ratio		0.09			0.09		0.69	0.69		0.69	0.69	
Clearance Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		161			139		470	1282		633	1282	
v/s Ratio Prot								0.25			c0.36	
v/s Ratio Perm		0.00			c0.01		0.02			0.06		
v/c Ratio		0.01			0.12		0.03	0.37		0.09	0.52	
Uniform Delay, d1		16.9			17.0		2.0	2.6		2.1	3.1	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.0			0.4		0.0	0.2		0.1	0.4	
Delay (s)		16.9			17.4		2.0	2.8		2.2	3.4	
Level of Service		B			B		A	A		A	A	
Approach Delay (s)		16.9			17.4			2.8			3.3	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	4.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	40.6	Sum of lost time (s)	9.0
Intersection Capacity Utilization	52.3%	ICU Level of Service	A
Analysis Period (min)	15		

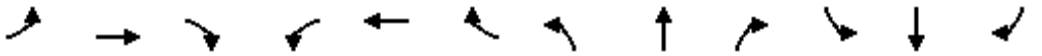
c Critical Lane Group



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	31	76	283	28	98	439
Future Volume (vph)	31	76	283	28	98	439
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.5			4.5
Lane Util. Factor	1.00		1.00			1.00
Frt	0.90		0.99			1.00
Flt Protected	0.99		1.00			0.99
Satd. Flow (prot)	1660		1840			1846
Flt Permitted	0.99		1.00			0.88
Satd. Flow (perm)	1660		1840			1643
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	34	83	308	30	107	477
RTOR Reduction (vph)	72	0	4	0	0	0
Lane Group Flow (vph)	45	0	334	0	0	584
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	5.4		28.0			28.0
Effective Green, g (s)	5.4		28.0			28.0
Actuated g/C Ratio	0.13		0.66			0.66
Clearance Time (s)	4.5		4.5			4.5
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	211		1215			1085
v/s Ratio Prot	c0.03		0.18			
v/s Ratio Perm						c0.36
v/c Ratio	0.21		0.27			0.54
Uniform Delay, d1	16.6		3.0			3.8
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	0.5		0.1			0.5
Delay (s)	17.1		3.1			4.3
Level of Service	B		A			A
Approach Delay (s)	17.1		3.1			4.3
Approach LOS	B		A			A

Intersection Summary			
HCM 2000 Control Delay	5.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	42.4	Sum of lost time (s)	9.0
Intersection Capacity Utilization	62.8%	ICU Level of Service	B
Analysis Period (min)	15		

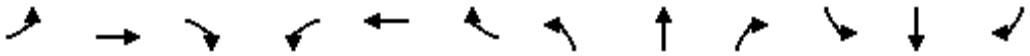
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	184	369	25	81	342	107	21	286	65	64	169	46
Future Volume (vph)	184	369	25	81	342	107	21	286	65	64	169	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.96		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1845		1770	1796		1770	1811		1770	1803	
Flt Permitted	0.95	1.00		0.95	1.00		0.56	1.00		0.36	1.00	
Satd. Flow (perm)	1770	1845		1770	1796		1050	1811		668	1803	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	200	401	27	88	372	116	23	311	71	70	184	50
RTOR Reduction (vph)	0	4	0	0	19	0	0	14	0	0	16	0
Lane Group Flow (vph)	200	424	0	88	469	0	23	368	0	70	218	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	8.5	22.9		4.2	18.6		19.5	19.5		19.5	19.5	
Effective Green, g (s)	8.5	22.9		4.2	18.6		19.5	19.5		19.5	19.5	
Actuated g/C Ratio	0.14	0.38		0.07	0.31		0.32	0.32		0.32	0.32	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	250	703		123	555		340	587		216	585	
v/s Ratio Prot	c0.11	c0.23		0.05	c0.26			c0.20			0.12	
v/s Ratio Perm							0.02			0.10		
v/c Ratio	0.80	0.60		0.72	0.85		0.07	0.63		0.32	0.37	
Uniform Delay, d1	25.0	15.0		27.4	19.4		14.0	17.2		15.3	15.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	16.5	1.5		17.9	11.4		0.4	5.0		3.9	1.8	
Delay (s)	41.5	16.4		45.3	30.8		14.4	22.2		19.3	17.4	
Level of Service	D	B		D	C		B	C		B	B	
Approach Delay (s)		24.4			33.0			21.8			17.8	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	25.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	60.1	Sum of lost time (s)	13.5
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		

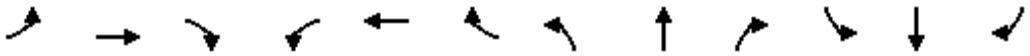
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	39	478	71	88	370	10	19	19	129	2	8	19
Future Volume (Veh/h)	39	478	71	88	370	10	19	19	129	2	8	19
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	42	520	77	96	402	11	21	21	140	2	9	21
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					654							
pX, platoon unblocked	0.81						0.81	0.81		0.81	0.81	0.81
vC, conflicting volume	413			597			1268	1248	558	1392	1280	408
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	164			597			1214	1190	558	1368	1230	157
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			90			80	84	74	97	93	97
cM capacity (veh/h)	1151			980			106	133	529	59	126	723

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	639	509	182	32
Volume Left	42	96	21	2
Volume Right	77	11	140	21
cSH	1151	980	293	237
Volume to Capacity	0.04	0.10	0.62	0.13
Queue Length 95th (ft)	3	8	96	11
Control Delay (s)	1.0	2.7	35.4	22.5
Lane LOS	A	A	E	C
Approach Delay (s)	1.0	2.7	35.4	22.5
Approach LOS			E	C

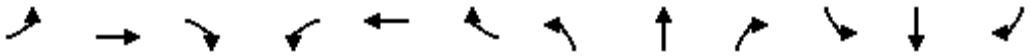
Intersection Summary			
Average Delay	6.7		
Intersection Capacity Utilization	70.4%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	595	101	22	460	0	14	0	24	0	0	0
Future Volume (Veh/h)	0	595	101	22	460	0	14	0	24	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	647	110	24	500	0	15	0	26	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		1317			1315							
pX, platoon unblocked				0.72			0.72	0.72	0.72	0.72	0.72	
vC, conflicting volume	500			757			1250	1250	702	1276	1305	500
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	500			469			1153	1153	393	1189	1229	500
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			97			88	100	95	100	100	100
cM capacity (veh/h)	1064			787			123	138	473	110	124	571

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	757	524	41	0
Volume Left	0	24	15	0
Volume Right	110	0	26	0
cSH	1064	787	231	1700
Volume to Capacity	0.00	0.03	0.18	0.00
Queue Length 95th (ft)	0	2	16	0
Control Delay (s)	0.0	0.8	23.9	0.0
Lane LOS		A	C	A
Approach Delay (s)	0.0	0.8	23.9	0.0
Approach LOS			C	A

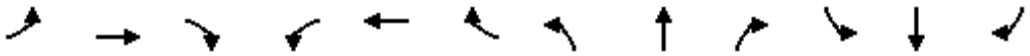
Intersection Summary				
Average Delay	1.1			
Intersection Capacity Utilization	52.1%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	127	584	15	6	346	57	77	352	8	70	149	21
Future Volume (vph)	127	584	15	6	346	57	77	352	8	70	149	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	1.00		1.00	0.98			1.00			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1770	1856		1770	1823			1842			1814	
Flt Permitted	0.41	1.00		0.21	1.00			0.90			0.79	
Satd. Flow (perm)	766	1856		388	1823			1677			1448	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	138	635	16	7	376	62	84	383	9	76	162	23
RTOR Reduction (vph)	0	2	0	0	12	0	0	1	0	0	7	0
Lane Group Flow (vph)	138	649	0	7	426	0	0	475	0	0	254	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	19.2	19.2		19.2	19.2			16.4			16.4	
Effective Green, g (s)	19.2	19.2		19.2	19.2			16.4			16.4	
Actuated g/C Ratio	0.43	0.43		0.43	0.43			0.37			0.37	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	329	798		167	784			616			532	
v/s Ratio Prot		c0.35			0.23							
v/s Ratio Perm	0.18			0.02				c0.28			0.18	
v/c Ratio	0.42	0.81		0.04	0.54			0.77			0.48	
Uniform Delay, d1	8.8	11.1		7.4	9.4			12.4			10.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.9	6.4		0.1	0.8			5.9			0.7	
Delay (s)	9.7	17.5		7.5	10.2			18.4			11.5	
Level of Service	A	B		A	B			B			B	
Approach Delay (s)		16.1			10.2			18.4			11.5	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	14.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	44.6	Sum of lost time (s)	9.0
Intersection Capacity Utilization	74.1%	ICU Level of Service	D
Analysis Period (min)	15		

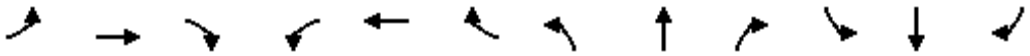
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	53	293	1	0	179	369	0	4	0	158	6	14
Future Volume (Veh/h)	53	293	1	0	179	369	0	4	0	158	6	14
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	58	318	1	0	195	401	0	4	0	172	7	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	596			319			848	1030	318	832	830	396
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	596			319			848	1030	318	832	830	396
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	94			100			100	98	100	37	98	98
cM capacity (veh/h)	980			1241			257	219	722	272	287	654

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	377	596	4	194
Volume Left	58	0	0	172
Volume Right	1	401	0	15
cSH	980	1241	219	285
Volume to Capacity	0.06	0.00	0.02	0.68
Queue Length 95th (ft)	5	0	1	114
Control Delay (s)	1.9	0.0	21.7	40.8
Lane LOS	A		C	E
Approach Delay (s)	1.9	0.0	21.7	40.8
Approach LOS			C	E

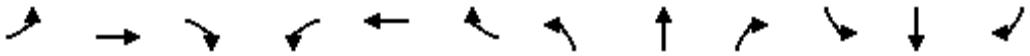
Intersection Summary			
Average Delay	7.5		
Intersection Capacity Utilization	77.1%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	10	160	197	2	71	8	442	13	15	34	66	3
Future Volume (vph)	10	160	197	2	71	8	442	13	15	34	66	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	174	214	2	77	9	480	14	16	37	72	3

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	399	88	510	112
Volume Left (vph)	11	2	480	37
Volume Right (vph)	214	9	16	3
Hadj (s)	-0.28	-0.02	0.20	0.08
Departure Headway (s)	5.7	6.7	5.8	6.5
Degree Utilization, x	0.63	0.16	0.83	0.20
Capacity (veh/h)	597	482	603	497
Control Delay (s)	18.1	11.0	30.6	11.2
Approach Delay (s)	18.1	11.0	30.6	11.2
Approach LOS	C	B	D	B

Intersection Summary				
Delay	22.6			
Level of Service	C			
Intersection Capacity Utilization	65.0%	ICU Level of Service	C	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	19	70	87	94	41	2	29	113	34	4	93	16
Future Volume (vph)	19	70	87	94	41	2	29	113	34	4	93	16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	76	95	102	45	2	32	123	37	4	101	17

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	192	149	192	122
Volume Left (vph)	21	102	32	4
Volume Right (vph)	95	2	37	17
Hadj (s)	-0.24	0.16	-0.05	-0.04
Departure Headway (s)	4.7	5.1	4.9	5.0
Degree Utilization, x	0.25	0.21	0.26	0.17
Capacity (veh/h)	713	650	688	659
Control Delay (s)	9.2	9.5	9.6	9.0
Approach Delay (s)	9.2	9.5	9.6	9.0
Approach LOS	A	A	A	A

Intersection Summary			
Delay	9.3		
Level of Service	A		
Intersection Capacity Utilization	43.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	13	300	228	15	436	424
Future Volume (vph)	13	300	228	15	436	424
Peak Hour Factor	0.78	0.78	0.82	0.82	0.87	0.87
Hourly flow rate (vph)	17	385	278	18	501	487

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2
Volume Total (vph)	17	385	296	501	487
Volume Left (vph)	0	0	278	501	0
Volume Right (vph)	0	385	0	0	487
Hadj (s)	0.03	-0.67	0.22	0.52	-0.68
Departure Headway (s)	7.5	6.8	7.2	7.3	6.1
Degree Utilization, x	0.04	0.73	0.59	1.01	0.82
Capacity (veh/h)	471	519	492	501	585
Control Delay (s)	9.6	24.5	20.3	70.3	29.9
Approach Delay (s)	23.8		20.3	50.4	
Approach LOS	C		C	F	

Intersection Summary			
Delay	38.8		
Level of Service	E		
Intersection Capacity Utilization	50.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	0	2	3	0	166	0	704	1	74	494	3
Future Volume (Veh/h)	4	0	2	3	0	166	0	704	1	74	494	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	0	2	3	0	180	0	765	1	80	537	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1644	1464	538	1464	1466	766	540			766		
vC1, stage 1 conf vol	698	698		766	766							
vC2, stage 2 conf vol	945	766		699	700							
vCu, unblocked vol	1644	1464	538	1464	1466	766	540			766		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	100	100	99	100	55	100			91		
cM capacity (veh/h)	91	272	543	287	302	403	1028			847		

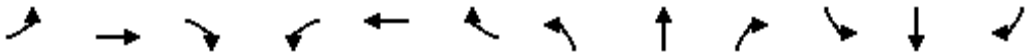
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	6	183	0	766	80	540
Volume Left	4	3	0	0	80	0
Volume Right	2	180	0	1	0	3
cSH	126	400	1700	1700	847	1700
Volume to Capacity	0.05	0.46	0.00	0.45	0.09	0.32
Queue Length 95th (ft)	4	58	0	0	8	0
Control Delay (s)	35.1	21.3	0.0	0.0	9.7	0.0
Lane LOS	E	C			A	
Approach Delay (s)	35.1	21.3	0.0		1.3	
Approach LOS	E	C				

Intersection Summary				
Average Delay	3.1			
Intersection Capacity Utilization	61.6%	ICU Level of Service		B
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	44	2	28	45	1	74	10	538	31	42	428	16
Future Volume (Veh/h)	44	2	28	45	1	74	10	538	31	42	428	16
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	48	2	30	49	1	80	11	585	34	46	465	17
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			TWLTL	
Median storage veh)											2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1253	1206	474	1212	1198	602	482			619		
vC1, stage 1 conf vol	566	566		624	624							
vC2, stage 2 conf vol	688	641		588	574							
vCu, unblocked vol	1253	1206	474	1212	1198	602	482			619		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	83	99	95	86	100	84	99			95		
cM capacity (veh/h)	278	347	591	340	363	500	1081			961		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	80	49	81	11	619	46	482
Volume Left	48	49	0	11	0	46	0
Volume Right	30	0	80	0	34	0	17
cSH	349	340	497	1081	1700	961	1700
Volume to Capacity	0.23	0.14	0.16	0.01	0.36	0.05	0.28
Queue Length 95th (ft)	22	12	14	1	0	4	0
Control Delay (s)	18.3	17.4	13.6	8.4	0.0	8.9	0.0
Lane LOS	C	C	B	A		A	
Approach Delay (s)	18.3	15.0		0.1		0.8	
Approach LOS	C	C					

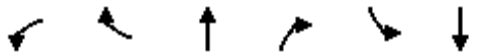
Intersection Summary				
Average Delay	2.9			
Intersection Capacity Utilization	52.5%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	63	1	45	12	0	23	4	515	1	9	449	1
Future Volume (Veh/h)	63	1	45	12	0	23	4	515	1	9	449	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	68	1	49	13	0	25	4	560	1	10	488	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1102	1078	488	1126	1078	560	489			561		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1102	1078	488	1126	1078	560	489			561		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	62	100	92	92	100	95	100			99		
cM capacity (veh/h)	178	216	579	164	216	527	1074			1010		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	118	38	565	499
Volume Left	68	13	4	10
Volume Right	49	25	1	1
cSH	251	300	1074	1010
Volume to Capacity	0.47	0.13	0.00	0.01
Queue Length 95th (ft)	58	11	0	1
Control Delay (s)	31.5	18.7	0.1	0.3
Lane LOS	D	C	A	A
Approach Delay (s)	31.5	18.7	0.1	0.3
Approach LOS	D	C		

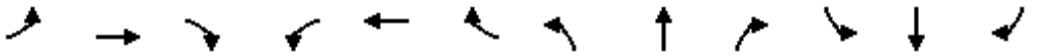
Intersection Summary				
Average Delay	3.8			
Intersection Capacity Utilization	46.8%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	51	175	383	149	195	276
Future Volume (vph)	51	175	383	149	195	276
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	55	190	416	162	212	300

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	245	578	512
Volume Left (vph)	55	0	212
Volume Right (vph)	190	162	0
Hadj (s)	-0.39	-0.13	0.12
Departure Headway (s)	6.3	5.4	5.7
Degree Utilization, x	0.43	0.87	0.81
Capacity (veh/h)	541	657	615
Control Delay (s)	13.8	33.4	28.8
Approach Delay (s)	13.8	33.4	28.8
Approach LOS	B	D	D

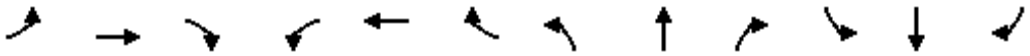
Intersection Summary			
Delay	28.0		
Level of Service	D		
Intersection Capacity Utilization	78.2%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	186	408	18	101	442	85	21	146	53	103	229	132
Future Volume (vph)	186	408	18	101	442	85	21	146	53	103	229	132
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	0.96		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1851		1770	1818		1770	1788		1770	1761	
Flt Permitted	0.95	1.00		0.95	1.00		0.31	1.00		0.57	1.00	
Satd. Flow (perm)	1770	1851		1770	1818		577	1788		1058	1761	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	202	443	20	110	480	92	23	159	58	112	249	143
RTOR Reduction (vph)	0	2	0	0	10	0	0	20	0	0	31	0
Lane Group Flow (vph)	202	461	0	110	562	0	23	197	0	112	361	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	9.3	26.4		5.4	22.5		19.5	19.5		19.5	19.5	
Effective Green, g (s)	9.3	26.4		5.4	22.5		19.5	19.5		19.5	19.5	
Actuated g/C Ratio	0.14	0.41		0.08	0.35		0.30	0.30		0.30	0.30	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	254	754		147	631		173	538		318	529	
v/s Ratio Prot	c0.11	c0.25		0.06	c0.31			0.11			c0.20	
v/s Ratio Perm							0.04			0.11		
v/c Ratio	0.80	0.61		0.75	0.89		0.13	0.37		0.35	0.68	
Uniform Delay, d1	26.8	15.1		29.0	20.0		16.5	17.8		17.7	19.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	15.7	1.5		18.6	14.4		1.6	1.9		3.0	6.9	
Delay (s)	42.5	16.6		47.7	34.4		18.1	19.7		20.8	26.9	
Level of Service	D	B		D	C		B	B		C	C	
Approach Delay (s)		24.5			36.6			19.6			25.5	
Approach LOS		C			D			B			C	

Intersection Summary			
HCM 2000 Control Delay	28.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	64.8	Sum of lost time (s)	13.5
Intersection Capacity Utilization	78.0%	ICU Level of Service	D
Analysis Period (min)	15		

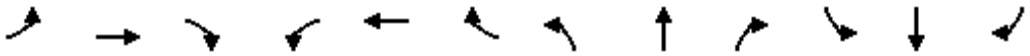
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	579	32	58	508	13	0	13	123	14	4	44
Future Volume (Veh/h)	45	579	32	58	508	13	0	13	123	14	4	44
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	49	629	35	63	552	14	0	14	134	15	4	48
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					654							
pX, platoon unblocked	0.74						0.74	0.74		0.74	0.74	0.74
vC, conflicting volume	566			664			1480	1436	646	1570	1447	559
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	232			664			1472	1414	646	1596	1428	222
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			93			100	84	72	59	95	92
cM capacity (veh/h)	984			925			63	90	471	37	88	602

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	713	629	148	67
Volume Left	49	63	0	15
Volume Right	35	14	134	48
cSH	984	925	336	125
Volume to Capacity	0.05	0.07	0.44	0.54
Queue Length 95th (ft)	4	5	54	64
Control Delay (s)	1.3	1.8	23.9	63.0
Lane LOS	A	A	C	F
Approach Delay (s)	1.3	1.8	23.9	63.0
Approach LOS			C	F

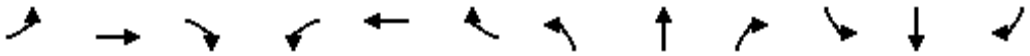
Intersection Summary			
Average Delay	6.3		
Intersection Capacity Utilization	66.5%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	631	122	15	664	0	18	0	16	0	0	0
Future Volume (Veh/h)	0	631	122	15	664	0	18	0	16	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	686	133	16	722	0	20	0	17	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		1317			1315							
pX, platoon unblocked	0.87			0.69			0.76	0.76	0.69	0.76	0.76	0.87
vC, conflicting volume	722			819			1506	1506	752	1524	1573	722
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	607			518			1127	1127	422	1150	1215	607
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			85	100	96	100	100	100
cM capacity (veh/h)	846			727			135	152	438	126	134	432

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	819	738	37	0
Volume Left	0	16	20	0
Volume Right	133	0	17	0
cSH	846	727	198	1700
Volume to Capacity	0.00	0.02	0.19	0.00
Queue Length 95th (ft)	0	2	17	0
Control Delay (s)	0.0	0.6	27.3	0.0
Lane LOS		A	D	A
Approach Delay (s)	0.0	0.6	27.3	0.0
Approach LOS			D	A

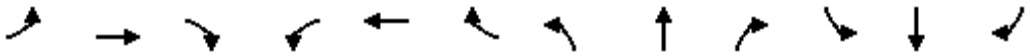
Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	57.0%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	602	27	6	526	74	45	188	6	86	220	54
Future Volume (vph)	90	602	27	6	526	74	45	188	6	86	220	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.98			1.00			0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1770	1851		1770	1828			1839			1803	
Flt Permitted	0.23	1.00		0.21	1.00			0.89			0.87	
Satd. Flow (perm)	434	1851		385	1828			1657			1596	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	98	654	29	7	572	80	49	204	7	93	239	59
RTOR Reduction (vph)	0	3	0	0	8	0	0	2	0	0	11	0
Lane Group Flow (vph)	98	680	0	7	644	0	0	258	0	0	380	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	22.9	22.9		22.9	22.9			16.7			16.7	
Effective Green, g (s)	22.9	22.9		22.9	22.9			16.7			16.7	
Actuated g/C Ratio	0.47	0.47		0.47	0.47			0.34			0.34	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	204	872		181	861			569			548	
v/s Ratio Prot		c0.37			0.35							
v/s Ratio Perm	0.23			0.02				0.16			c0.24	
v/c Ratio	0.48	0.78		0.04	0.75			0.45			0.69	
Uniform Delay, d1	8.8	10.7		6.9	10.5			12.4			13.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	1.8	4.6		0.1	3.6			0.6			3.8	
Delay (s)	10.6	15.3		7.0	14.1			13.0			17.5	
Level of Service	B	B		A	B			B			B	
Approach Delay (s)		14.7			14.0			13.0			17.5	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	14.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	48.6	Sum of lost time (s)	9.0
Intersection Capacity Utilization	77.4%	ICU Level of Service	D
Analysis Period (min)	15		

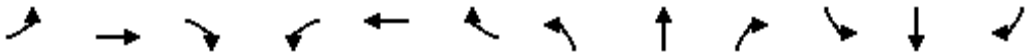
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	214	2	0	220	226	0	2	2	188	2	61
Future Volume (Veh/h)	25	214	2	0	220	226	0	2	2	188	2	61
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	233	2	0	239	246	0	2	2	204	2	66
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	485			235			717	773	234	653	651	362
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	485			235			717	773	234	653	651	362
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			100			100	99	100	45	99	90
cM capacity (veh/h)	1078			1332			304	322	805	371	378	683

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	262	485	4	272
Volume Left	27	0	0	204
Volume Right	2	246	2	66
cSH	1078	1332	460	417
Volume to Capacity	0.03	0.00	0.01	0.65
Queue Length 95th (ft)	2	0	1	113
Control Delay (s)	1.1	0.0	12.9	28.5
Lane LOS	A		B	D
Approach Delay (s)	1.1	0.0	12.9	28.5
Approach LOS			B	D

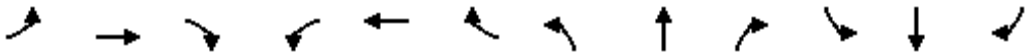
Intersection Summary			
Average Delay	7.9		
Intersection Capacity Utilization	59.9%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	10	63	324	13	84	3	292	19	4	2	111	4
Future Volume (vph)	10	63	324	13	84	3	292	19	4	2	111	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	68	352	14	91	3	317	21	4	2	121	4

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	431	108	342	127
Volume Left (vph)	11	14	317	2
Volume Right (vph)	352	3	4	4
Hadj (s)	-0.45	0.04	0.21	0.02
Departure Headway (s)	5.1	6.1	5.8	6.1
Degree Utilization, x	0.61	0.18	0.55	0.21
Capacity (veh/h)	672	503	579	509
Control Delay (s)	15.6	10.5	15.8	10.7
Approach Delay (s)	15.6	10.5	15.8	10.7
Approach LOS	C	B	C	B

Intersection Summary				
Delay	14.5			
Level of Service	B			
Intersection Capacity Utilization	55.9%	ICU Level of Service	B	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	4	46	28	120	73	4	27	114	42	7	82	3
Future Volume (vph)	4	46	28	120	73	4	27	114	42	7	82	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	50	30	130	79	4	29	124	46	8	89	3

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	84	213	199	100
Volume Left (vph)	4	130	29	8
Volume Right (vph)	30	4	46	3
Hadj (s)	-0.17	0.14	-0.08	0.03
Departure Headway (s)	4.8	4.9	4.7	4.9
Degree Utilization, x	0.11	0.29	0.26	0.14
Capacity (veh/h)	688	690	719	669
Control Delay (s)	8.4	9.9	9.4	8.7
Approach Delay (s)	8.4	9.9	9.4	8.7
Approach LOS	A	A	A	A

Intersection Summary				
Delay	9.3			
Level of Service	A			
Intersection Capacity Utilization	40.6%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	15	421	355	5	288	244
Future Volume (vph)	15	421	355	5	288	244
Peak Hour Factor	0.78	0.78	0.82	0.82	0.87	0.87
Hourly flow rate (vph)	19	540	433	6	331	280

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2
Volume Total (vph)	19	540	439	331	280
Volume Left (vph)	0	0	433	331	0
Volume Right (vph)	0	540	0	0	280
Hadj (s)	0.03	-0.67	0.23	0.52	-0.68
Departure Headway (s)	7.4	6.7	7.3	8.0	6.8
Degree Utilization, x	0.04	1.01	0.89	0.74	0.53
Capacity (veh/h)	473	540	488	442	524
Control Delay (s)	9.5	65.8	45.7	28.9	16.0
Approach Delay (s)	63.8		45.7	23.0	
Approach LOS	F		E	C	

Intersection Summary			
Delay	43.4		
Level of Service	E		
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	0	2	9	1	126	13	455	6	139	648	8
Future Volume (Veh/h)	9	0	2	9	1	126	13	455	6	139	648	8
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	0	2	10	1	137	14	495	7	151	704	9
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1671	1540	708	1534	1542	498	713			502		
vC1, stage 1 conf vol	1010	1010		526	526							
vC2, stage 2 conf vol	660	530		1008	1015							
vCu, unblocked vol	1671	1540	708	1534	1542	498	713			502		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	93	100	100	95	100	76	98			86		
cM capacity (veh/h)	153	231	434	216	236	572	887			1062		

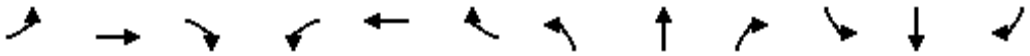
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	12	148	14	502	151	713
Volume Left	10	10	14	0	151	0
Volume Right	2	137	0	7	0	9
cSH	172	510	887	1700	1062	1700
Volume to Capacity	0.07	0.29	0.02	0.30	0.14	0.42
Queue Length 95th (ft)	6	30	1	0	12	0
Control Delay (s)	27.6	14.9	9.1	0.0	8.9	0.0
Lane LOS	D	B	A		A	
Approach Delay (s)	27.6	14.9	0.2		1.6	
Approach LOS	D	B				

Intersection Summary				
Average Delay	2.6			
Intersection Capacity Utilization	56.1%	ICU Level of Service		B
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	6	16	50	4	81	15	281	62	138	450	38
Future Volume (Veh/h)	35	6	16	50	4	81	15	281	62	138	450	38
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	38	7	17	54	4	88	16	305	67	150	489	41
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			TWLTL	
Median storage veh)											2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1236	1214	510	1180	1200	338	530			372		
vC1, stage 1 conf vol	810	810		370	370							
vC2, stage 2 conf vol	427	404		810	830							
vCu, unblocked vol	1236	1214	510	1180	1200	338	530			372		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	86	98	97	81	99	87	98			87		
cM capacity (veh/h)	263	297	564	277	299	704	1037			1186		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	62	54	92	16	372	150	530
Volume Left	38	54	0	16	0	150	0
Volume Right	17	0	88	0	67	0	41
cSH	313	277	665	1037	1700	1186	1700
Volume to Capacity	0.20	0.19	0.14	0.02	0.22	0.13	0.31
Queue Length 95th (ft)	18	18	12	1	0	11	0
Control Delay (s)	19.3	21.1	11.3	8.5	0.0	8.5	0.0
Lane LOS	C	C	B	A		A	
Approach Delay (s)	19.3	14.9		0.4		1.9	
Approach LOS	C	B					

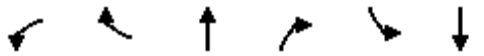
Intersection Summary				
Average Delay	3.7			
Intersection Capacity Utilization	49.2%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	2	3	1	5	0	330	1	22	491	18
Future Volume (Veh/h)	5	0	2	3	1	5	0	330	1	22	491	18
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	0	2	3	1	5	0	359	1	24	534	20
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	957	952	544	954	962	360	554			360		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	957	952	544	954	962	360	554			360		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	100	99	100	99	100			98		
cM capacity (veh/h)	231	254	539	234	251	685	1016			1199		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	7	9	360	578
Volume Left	5	3	0	24
Volume Right	2	5	1	20
cSH	276	373	1016	1199
Volume to Capacity	0.03	0.02	0.00	0.02
Queue Length 95th (ft)	2	2	0	2
Control Delay (s)	18.4	14.9	0.0	0.6
Lane LOS	C	B		A
Approach Delay (s)	18.4	14.9	0.0	0.6
Approach LOS	C	B		

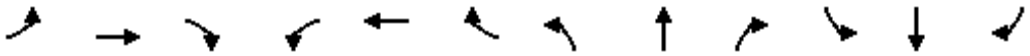
Intersection Summary				
Average Delay	0.6			
Intersection Capacity Utilization	54.9%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	31	76	314	28	98	462
Future Volume (vph)	31	76	314	28	98	462
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	34	83	341	30	107	502

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	117	371	609
Volume Left (vph)	34	0	107
Volume Right (vph)	83	30	0
Hadj (s)	-0.33	-0.01	0.07
Departure Headway (s)	5.8	5.0	4.8
Degree Utilization, x	0.19	0.51	0.81
Capacity (veh/h)	565	700	739
Control Delay (s)	10.2	13.2	25.1
Approach Delay (s)	10.2	13.2	25.1
Approach LOS	B	B	D

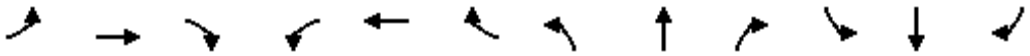
Intersection Summary			
Delay	19.5		
Level of Service	C		
Intersection Capacity Utilization	64.4%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	478	71	88	370	10	19	19	129	2	8	19
Future Volume (vph)	39	478	71	88	370	10	19	19	129	2	8	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5			4.5	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.98			1.00			0.90			0.91	
Flt Protected		1.00			0.99			0.99			1.00	
Satd. Flow (prot)		1826			1840			1660			1692	
Flt Permitted		0.95			0.83			0.96			0.97	
Satd. Flow (perm)		1740			1534			1601			1652	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	42	520	77	96	402	11	21	21	140	2	9	21
RTOR Reduction (vph)	0	8	0	0	1	0	0	110	0	0	17	0
Lane Group Flow (vph)	0	631	0	0	508	0	0	72	0	0	15	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		18.5			18.5			7.4			7.4	
Effective Green, g (s)		18.5			18.5			7.4			7.4	
Actuated g/C Ratio		0.53			0.53			0.21			0.21	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		922			813			339			350	
v/s Ratio Prot												
v/s Ratio Perm		c0.36			0.33			c0.04			0.01	
v/c Ratio		0.68			0.62			0.21			0.04	
Uniform Delay, d1		6.0			5.8			11.3			10.9	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		2.1			1.5			0.3			0.1	
Delay (s)		8.2			7.3			11.7			11.0	
Level of Service		A			A			B			B	
Approach Delay (s)		8.2			7.3			11.7			11.0	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	8.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	34.9	Sum of lost time (s)	9.0
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	53	293	1	0	179	369	0	4	0	158	6	14
Future Volume (vph)	53	293	1	0	179	369	0	4	0	158	6	14
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	58	318	1	0	195	401	0	4	0	172	7	15

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	377	596	4	194
Volume Left (vph)	58	0	0	172
Volume Right (vph)	1	401	0	15
Hadj (s)	0.06	-0.37	0.03	0.16
Departure Headway (s)	5.4	4.8	6.9	6.4
Degree Utilization, x	0.57	0.79	0.01	0.34
Capacity (veh/h)	637	741	438	516
Control Delay (s)	15.2	23.0	9.9	12.7
Approach Delay (s)	15.2	23.0	9.9	12.7
Approach LOS	C	C	A	B

Intersection Summary				
Delay	18.7			
Level of Service	C			
Intersection Capacity Utilization	77.1%	ICU Level of Service	D	
Analysis Period (min)	15			



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	13	300	228	15	436	424
Future Volume (vph)	13	300	228	15	436	424
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		0.96	0.95	1.00
Satd. Flow (prot)	1863	1583		1779	1787	1566
Flt Permitted	1.00	1.00		0.73	0.95	1.00
Satd. Flow (perm)	1863	1583		1354	1787	1566
Peak-hour factor, PHF	0.78	0.78	0.82	0.82	0.87	0.87
Adj. Flow (vph)	17	385	278	18	501	487
RTOR Reduction (vph)	0	252	0	0	0	280
Lane Group Flow (vph)	17	133	0	296	501	207
Confl. Bikes (#/hr)						1
Heavy Vehicles (%)	2%	2%	2%	2%	1%	1%
Turn Type	NA	Perm	Perm	NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases		4	8			2
Actuated Green, G (s)	13.5	13.5		13.5	16.6	16.6
Effective Green, g (s)	13.5	13.5		13.5	16.6	16.6
Actuated g/C Ratio	0.35	0.35		0.35	0.42	0.42
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	643	546		467	758	664
v/s Ratio Prot	0.01				c0.28	
v/s Ratio Perm		0.08		c0.22		0.13
v/c Ratio	0.03	0.24		0.63	0.66	0.31
Uniform Delay, d1	8.5	9.1		10.7	9.0	7.5
Progression Factor	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.0	0.2		2.8	2.2	0.3
Delay (s)	8.5	9.4		13.5	11.2	7.7
Level of Service	A	A		B	B	A
Approach Delay (s)	9.3			13.5	9.5	
Approach LOS	A			B	A	

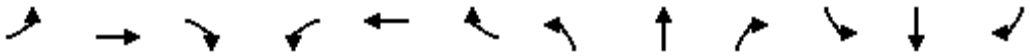
Intersection Summary			
HCM 2000 Control Delay	10.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	39.1	Sum of lost time (s)	9.0
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	0	2	3	0	166	0	704	1	74	494	3
Future Volume (vph)	4	0	2	3	0	166	0	704	1	74	494	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5		4.5	4.5	
Lane Util. Factor		1.00			1.00			1.00		1.00	1.00	
Frt		0.95			0.87			1.00		1.00	1.00	
Flt Protected		0.97			1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1722			1614			1862		1770	1861	
Flt Permitted		0.76			0.99			1.00		0.29	1.00	
Satd. Flow (perm)		1355			1606			1862		537	1861	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	0	2	3	0	180	0	765	1	80	537	3
RTOR Reduction (vph)	0	5	0	0	153	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1	0	0	30	0	0	766	0	80	540	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		5.3			5.3			26.4		26.4	26.4	
Effective Green, g (s)		5.3			5.3			26.4		26.4	26.4	
Actuated g/C Ratio		0.13			0.13			0.65		0.65	0.65	
Clearance Time (s)		4.5			4.5			4.5		4.5	4.5	
Vehicle Extension (s)		3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		176			209			1207		348	1207	
v/s Ratio Prot								c0.41			0.29	
v/s Ratio Perm		0.00			c0.02					0.15		
v/c Ratio		0.00			0.14			0.63		0.23	0.45	
Uniform Delay, d1		15.4			15.7			4.3		3.0	3.5	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		0.0			0.3			1.1		0.3	0.3	
Delay (s)		15.4			16.0			5.4		3.3	3.8	
Level of Service		B			B			A		A	A	
Approach Delay (s)		15.4			16.0			5.4			3.7	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	6.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	40.7	Sum of lost time (s)	9.0
Intersection Capacity Utilization	62.9%	ICU Level of Service	B
Analysis Period (min)	15		

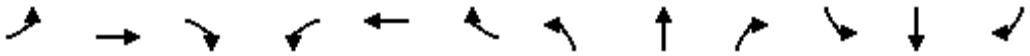
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	579	32	58	508	13	0	13	123	14	4	44
Future Volume (vph)	45	579	32	58	508	13	0	13	123	14	4	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5			4.5	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.99			1.00			0.88			0.90	
Flt Protected		1.00			1.00			1.00			0.99	
Satd. Flow (prot)		1844			1848			1635			1664	
Flt Permitted		0.94			0.89			1.00			0.89	
Satd. Flow (perm)		1732			1657			1635			1504	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	49	629	35	63	552	14	0	14	134	15	4	48
RTOR Reduction (vph)	0	3	0	0	1	0	0	109	0	0	39	0
Lane Group Flow (vph)	0	710	0	0	628	0	0	39	0	0	28	0
Turn Type	Perm	NA		Perm	NA			NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		20.8			20.8			6.9			6.9	
Effective Green, g (s)		20.8			20.8			6.9			6.9	
Actuated g/C Ratio		0.57			0.57			0.19			0.19	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		981			939			307			282	
v/s Ratio Prot								c0.02				
v/s Ratio Perm		c0.41			0.38						0.02	
v/c Ratio		0.72			0.67			0.13			0.10	
Uniform Delay, d1		5.8			5.5			12.4			12.3	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		2.7			1.8			0.2			0.2	
Delay (s)		8.5			7.4			12.6			12.5	
Level of Service		A			A			B			B	
Approach Delay (s)		8.5			7.4			12.6			12.5	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	8.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	36.7	Sum of lost time (s)	9.0
Intersection Capacity Utilization	68.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	25	214	2	0	220	226	0	2	2	188	2	61
Future Volume (vph)	25	214	2	0	220	226	0	2	2	188	2	61
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	233	2	0	239	246	0	2	2	204	2	66

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	262	485	4	272
Volume Left (vph)	27	0	0	204
Volume Right (vph)	2	246	2	66
Hadj (s)	0.05	-0.27	-0.27	0.04
Departure Headway (s)	5.5	4.9	6.2	5.8
Degree Utilization, x	0.40	0.66	0.01	0.44
Capacity (veh/h)	617	712	465	571
Control Delay (s)	12.1	16.8	9.2	13.3
Approach Delay (s)	12.1	16.8	9.2	13.3
Approach LOS	B	C	A	B

Intersection Summary				
Delay	14.6			
Level of Service	B			
Intersection Capacity Utilization	59.9%	ICU Level of Service	B	
Analysis Period (min)	15			



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	15	421	355	5	288	244
Future Volume (vph)	15	421	355	5	288	244
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		0.95	0.95	1.00
Satd. Flow (prot)	1863	1583		1775	1787	1565
Flt Permitted	1.00	1.00		0.72	0.95	1.00
Satd. Flow (perm)	1863	1583		1333	1787	1565
Peak-hour factor, PHF	0.78	0.78	0.82	0.82	0.87	0.87
Adj. Flow (vph)	19	540	433	6	331	280
RTOR Reduction (vph)	0	294	0	0	0	189
Lane Group Flow (vph)	19	246	0	439	331	91
Confl. Bikes (#/hr)						1
Heavy Vehicles (%)	2%	2%	2%	2%	1%	1%
Turn Type	NA	Perm	Perm	NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases		4	8			2
Actuated Green, G (s)	18.6	18.6		18.6	13.3	13.3
Effective Green, g (s)	18.6	18.6		18.6	13.3	13.3
Actuated g/C Ratio	0.45	0.45		0.45	0.33	0.33
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	847	719		606	581	508
v/s Ratio Prot	0.01				c0.19	
v/s Ratio Perm		0.16		c0.33		0.06
v/c Ratio	0.02	0.34		0.72	0.57	0.18
Uniform Delay, d1	6.1	7.2		9.1	11.4	9.9
Progression Factor	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.0	0.3		4.3	1.3	0.2
Delay (s)	6.2	7.5		13.4	12.7	10.1
Level of Service	A	A		B	B	B
Approach Delay (s)	7.4			13.4	11.5	
Approach LOS	A			B	B	

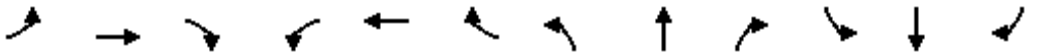
Intersection Summary			
HCM 2000 Control Delay	10.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	40.9	Sum of lost time (s)	9.0
Intersection Capacity Utilization	53.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	0	2	9	1	126	13	455	6	139	648	8
Future Volume (vph)	9	0	2	9	1	126	13	455	6	139	648	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.98			0.88		1.00	1.00		1.00	1.00	
Flt Protected		0.96			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1748			1624		1770	1859		1770	1859	
Flt Permitted		0.80			0.97		0.33	1.00		0.46	1.00	
Satd. Flow (perm)		1448			1588		606	1859		861	1859	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	0	2	10	1	137	14	495	7	151	704	9
RTOR Reduction (vph)	0	11	0	0	120	0	0	1	0	0	1	0
Lane Group Flow (vph)	0	1	0	0	28	0	14	501	0	151	712	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		5.2			5.2		27.5	27.5		27.5	27.5	
Effective Green, g (s)		5.2			5.2		27.5	27.5		27.5	27.5	
Actuated g/C Ratio		0.12			0.12		0.66	0.66		0.66	0.66	
Clearance Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		180			198		399	1225		567	1225	
v/s Ratio Prot								0.27			c0.38	
v/s Ratio Perm		0.00			c0.02		0.02			0.18		
v/c Ratio		0.01			0.14		0.04	0.41		0.27	0.58	
Uniform Delay, d1		16.0			16.3		2.5	3.3		2.9	3.9	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.0			0.3		0.0	0.2		0.3	0.7	
Delay (s)		16.0			16.6		2.5	3.5		3.2	4.6	
Level of Service		B			B		A	A		A	A	
Approach Delay (s)		16.0			16.6			3.5			4.4	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	5.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	41.7	Sum of lost time (s)	9.0
Intersection Capacity Utilization	58.2%	ICU Level of Service	B
Analysis Period (min)	15		

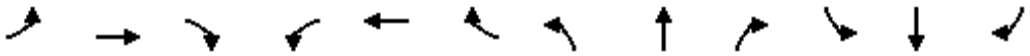
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	202	432	31	88	426	133	26	356	81	80	198	57
Future Volume (vph)	202	432	31	88	426	133	26	356	81	80	198	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.96		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1844		1770	1796		1770	1811		1770	1800	
Flt Permitted	0.95	1.00		0.95	1.00		0.47	1.00		0.20	1.00	
Satd. Flow (perm)	1770	1844		1770	1796		870	1811		371	1800	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	220	470	34	96	463	145	28	387	88	87	215	62
RTOR Reduction (vph)	0	3	0	0	15	0	0	11	0	0	14	0
Lane Group Flow (vph)	220	501	0	96	593	0	28	464	0	87	263	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	11.2	32.4		5.6	26.8		23.5	23.5		23.5	23.5	
Effective Green, g (s)	11.2	32.4		5.6	26.8		23.5	23.5		23.5	23.5	
Actuated g/C Ratio	0.15	0.43		0.07	0.36		0.31	0.31		0.31	0.31	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	264	796		132	641		272	567		116	564	
v/s Ratio Prot	c0.12	0.27		0.05	c0.33			c0.26			0.15	
v/s Ratio Perm							0.03			0.23		
v/c Ratio	0.83	0.63		0.73	0.93		0.10	0.82		0.75	0.47	
Uniform Delay, d1	31.0	16.6		34.0	23.1		18.3	23.8		23.1	20.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	19.7	1.6		18.0	19.3		0.8	12.4		35.4	2.8	
Delay (s)	50.7	18.2		52.0	42.4		19.0	36.2		58.5	23.5	
Level of Service	D	B		D	D		B	D		E	C	
Approach Delay (s)		28.0			43.7			35.2			31.8	
Approach LOS		C			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	35.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	84.8%	ICU Level of Service	E
Analysis Period (min)	15		

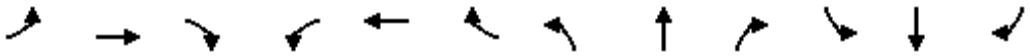
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	49	595	88	110	461	12	24	24	106	2	10	24
Future Volume (Veh/h)	49	595	88	110	461	12	24	24	106	2	10	24
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	53	647	96	120	501	13	26	26	115	2	11	26
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					654							
pX, platoon unblocked	0.72						0.72	0.72		0.72	0.72	0.72
vC, conflicting volume	514			743			1580	1555	695	1676	1596	508
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	137			743			1611	1576	695	1744	1633	128
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			86			40	60	74	91	82	96
cM capacity (veh/h)	1047			864			43	65	442	22	60	667

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	796	634	167	39
Volume Left	53	120	26	2
Volume Right	96	13	115	26
cSH	1047	864	132	124
Volume to Capacity	0.05	0.14	1.26	0.32
Queue Length 95th (ft)	4	12	259	31
Control Delay (s)	1.3	3.4	228.2	46.9
Lane LOS	A	A	F	E
Approach Delay (s)	1.3	3.4	228.2	46.9
Approach LOS			F	E

Intersection Summary			
Average Delay	26.4		
Intersection Capacity Utilization	82.9%	ICU Level of Service	E
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	741	105	27	573	0	17	0	30	0	0	0
Future Volume (Veh/h)	0	741	105	27	573	0	17	0	30	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	805	114	29	623	0	18	0	33	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		1317			1315							
pX, platoon unblocked	0.98			0.61			0.62	0.62	0.61	0.62	0.62	0.98
vC, conflicting volume	623			919			1543	1543	862	1576	1600	623
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	607			549			1503	1503	456	1556	1595	607
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			95			70	100	91	100	100	100
cM capacity (veh/h)	954			624			60	72	369	50	63	487

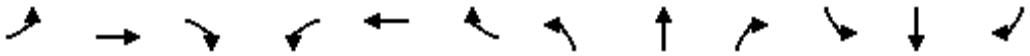
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	919	652	51	0
Volume Left	0	29	18	0
Volume Right	114	0	33	0
cSH	954	624	131	1700
Volume to Capacity	0.00	0.05	0.39	0.00
Queue Length 95th (ft)	0	4	41	0
Control Delay (s)	0.0	1.3	49.2	0.0
Lane LOS		A	E	A
Approach Delay (s)	0.0	1.3	49.2	0.0
Approach LOS			E	A

Intersection Summary				
Average Delay	2.1			
Intersection Capacity Utilization	62.1%	ICU Level of Service	B	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	158	714	19	7	431	71	68	392	10	78	173	26
Future Volume (vph)	158	714	19	7	431	71	68	392	10	78	173	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	1.00		1.00	0.98			1.00			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1770	1855		1770	1823			1844			1814	
Flt Permitted	0.32	1.00		0.15	1.00			0.92			0.72	
Satd. Flow (perm)	598	1855		279	1823			1703			1333	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	172	776	21	8	468	77	74	426	11	85	188	28
RTOR Reduction (vph)	0	2	0	0	10	0	0	1	0	0	6	0
Lane Group Flow (vph)	172	795	0	8	535	0	0	510	0	0	295	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	26.7	26.7		26.7	26.7			20.0			20.0	
Effective Green, g (s)	26.7	26.7		26.7	26.7			20.0			20.0	
Actuated g/C Ratio	0.48	0.48		0.48	0.48			0.36			0.36	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	286	889		133	873			611			478	
v/s Ratio Prot		c0.43			0.29							
v/s Ratio Perm	0.29			0.03				c0.30			0.22	
v/c Ratio	0.60	0.89		0.06	0.61			0.83			0.62	
Uniform Delay, d1	10.6	13.2		7.8	10.7			16.3			14.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	3.5	11.4		0.2	1.3			9.6			2.4	
Delay (s)	14.1	24.6		8.0	12.0			25.9			17.1	
Level of Service	B	C		A	B			C			B	
Approach Delay (s)		22.8			11.9			25.9			17.1	
Approach LOS		C			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	20.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	55.7	Sum of lost time (s)	9.0
Intersection Capacity Utilization	82.4%	ICU Level of Service	E
Analysis Period (min)	15		

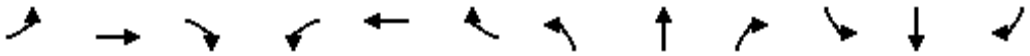
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	66	356	1	0	204	386	0	5	0	184	7	17
Future Volume (Veh/h)	66	356	1	0	204	386	0	5	0	184	7	17
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	72	387	1	0	222	420	0	5	0	200	8	18
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	642			388			986	1174	388	966	964	432
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	642			388			986	1174	388	966	964	432
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			100			100	97	100	7	97	97
cM capacity (veh/h)	943			1170			202	177	661	216	236	624

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	460	642	5	226
Volume Left	72	0	0	200
Volume Right	1	420	0	18
cSH	943	1170	177	228
Volume to Capacity	0.08	0.00	0.03	0.99
Queue Length 95th (ft)	6	0	2	227
Control Delay (s)	2.2	0.0	25.9	102.4
Lane LOS	A		D	F
Approach Delay (s)	2.2	0.0	25.9	102.4
Approach LOS			D	F

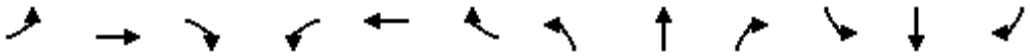
Intersection Summary			
Average Delay	18.2		
Intersection Capacity Utilization	85.1%	ICU Level of Service	E
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	12	199	224	2	88	10	458	16	19	42	61	4
Future Volume (vph)	12	199	224	2	88	10	458	16	19	42	61	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	13	216	243	2	96	11	498	17	21	46	66	4

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	472	109	536	116
Volume Left (vph)	13	2	498	46
Volume Right (vph)	243	11	21	4
Hadj (s)	-0.27	-0.02	0.20	0.09
Departure Headway (s)	6.1	7.2	6.3	7.2
Degree Utilization, x	0.79	0.22	0.93	0.23
Capacity (veh/h)	565	463	565	453
Control Delay (s)	28.4	12.2	47.5	12.3
Approach Delay (s)	28.4	12.2	47.5	12.3
Approach LOS	D	B	E	B

Intersection Summary				
Delay	33.7			
Level of Service	D			
Intersection Capacity Utilization	71.5%	ICU Level of Service	C	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	24	87	108	92	51	2	36	86	42	5	116	20
Future Volume (vph)	24	87	108	92	51	2	36	86	42	5	116	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	26	95	117	100	55	2	39	93	46	5	126	22

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	238	157	178	153
Volume Left (vph)	26	100	39	5
Volume Right (vph)	117	2	46	22
Hadj (s)	-0.24	0.15	-0.08	-0.05
Departure Headway (s)	4.8	5.2	5.1	5.1
Degree Utilization, x	0.31	0.23	0.25	0.22
Capacity (veh/h)	702	630	653	639
Control Delay (s)	9.9	9.8	9.7	9.5
Approach Delay (s)	9.9	9.8	9.7	9.5
Approach LOS	A	A	A	A

Intersection Summary				
Delay	9.8			
Level of Service	A			
Intersection Capacity Utilization	50.4%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	16	331	259	19	451	473
Future Volume (vph)	16	331	259	19	451	473
Peak Hour Factor	0.78	0.78	0.82	0.82	0.87	0.87
Hourly flow rate (vph)	21	424	316	23	518	544

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2
Volume Total (vph)	21	424	339	518	544
Volume Left (vph)	0	0	316	518	0
Volume Right (vph)	0	424	0	0	544
Hadj (s)	0.03	-0.67	0.22	0.52	-0.68
Departure Headway (s)	7.6	6.9	7.3	7.6	6.3
Degree Utilization, x	0.04	0.81	0.69	1.09	0.96
Capacity (veh/h)	464	513	476	486	561
Control Delay (s)	9.8	32.2	25.1	93.3	52.0
Approach Delay (s)	31.1		25.1	72.2	
Approach LOS	D		D	F	

Intersection Summary			
Delay	53.6		
Level of Service	F		
Intersection Capacity Utilization	53.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	2	4	0	105	0	831	1	45	595	4
Future Volume (Veh/h)	5	0	2	4	0	105	0	831	1	45	595	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	0	2	4	0	114	0	903	1	49	647	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1764	1651	649	1650	1652	904	651			904		
vC1, stage 1 conf vol	747	747		904	904							
vC2, stage 2 conf vol	1017	904		747	749							
vCu, unblocked vol	1764	1651	649	1650	1652	904	651			904		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	100	100	98	100	66	100			93		
cM capacity (veh/h)	131	251	470	253	272	336	935			752		

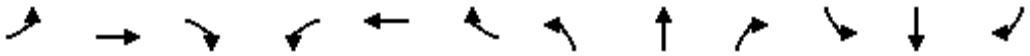
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	7	118	0	904	49	651
Volume Left	5	4	0	0	49	0
Volume Right	2	114	0	1	0	4
cSH	165	332	1700	1700	752	1700
Volume to Capacity	0.04	0.36	0.00	0.53	0.07	0.38
Queue Length 95th (ft)	3	39	0	0	5	0
Control Delay (s)	27.8	21.7	0.0	0.0	10.1	0.0
Lane LOS	D	C			B	
Approach Delay (s)	27.8	21.7	0.0		0.7	
Approach LOS	D	C				

Intersection Summary				
Average Delay	1.9			
Intersection Capacity Utilization	57.1%	ICU Level of Service	B	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	2	35	20	1	47	12	670	21	32	533	20
Future Volume (Veh/h)	55	2	35	20	1	47	12	670	21	32	533	20
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	60	2	38	22	1	51	13	728	23	35	579	22
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			TWLTL	
Median storage veh)											2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1466	1437	590	1454	1436	740	601			751		
vC1, stage 1 conf vol	660	660		766	766							
vC2, stage 2 conf vol	806	777		688	671							
vCu, unblocked vol	1466	1437	590	1454	1436	740	601			751		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	76	99	93	92	100	88	99			96		
cM capacity (veh/h)	248	300	508	279	311	417	976			858		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	100	22	52	13	751	35	601
Volume Left	60	22	0	13	0	35	0
Volume Right	38	0	51	0	23	0	22
cSH	309	279	414	976	1700	858	1700
Volume to Capacity	0.32	0.08	0.13	0.01	0.44	0.04	0.35
Queue Length 95th (ft)	34	6	11	1	0	3	0
Control Delay (s)	22.1	19.0	14.9	8.7	0.0	9.4	0.0
Lane LOS	C	C	B	A		A	
Approach Delay (s)	22.1	16.1		0.1		0.5	
Approach LOS	C	C					

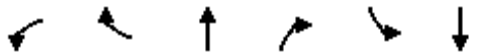
Intersection Summary				
Average Delay	2.4			
Intersection Capacity Utilization	55.2%	ICU Level of Service		B
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	78	1	56	15	0	29	5	624	1	11	523	1
Future Volume (Veh/h)	78	1	56	15	0	29	5	624	1	11	523	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	85	1	61	16	0	32	5	678	1	12	568	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1313	1282	568	1342	1282	678	569			679		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1313	1282	568	1342	1282	678	569			679		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	31	99	88	86	100	93	100			99		
cM capacity (veh/h)	124	162	522	112	162	452	1003			913		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	147	48	684	581
Volume Left	85	16	5	12
Volume Right	61	32	1	1
cSH	182	225	1003	913
Volume to Capacity	0.81	0.21	0.00	0.01
Queue Length 95th (ft)	139	20	0	1
Control Delay (s)	76.9	25.3	0.1	0.4
Lane LOS	F	D	A	A
Approach Delay (s)	76.9	25.3	0.1	0.4
Approach LOS	F	D		

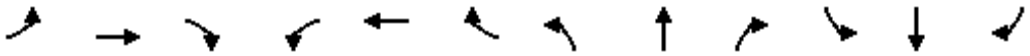
Intersection Summary				
Average Delay	8.8			
Intersection Capacity Utilization	55.2%	ICU Level of Service	B	
Analysis Period (min)	15			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	63	218	459	185	243	307
Future Volume (vph)	63	218	459	185	243	307
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	68	237	499	201	264	334

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	305	700	598
Volume Left (vph)	68	0	264
Volume Right (vph)	237	201	0
Hadj (s)	-0.39	-0.14	0.12
Departure Headway (s)	6.6	5.8	6.1
Degree Utilization, x	0.56	1.14	1.01
Capacity (veh/h)	542	620	598
Control Delay (s)	17.6	102.4	65.3
Approach Delay (s)	17.6	102.4	65.3
Approach LOS	C	F	F

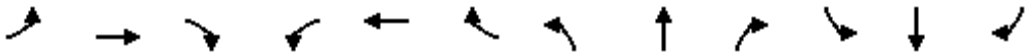
Intersection Summary			
Delay	72.4		
Level of Service	F		
Intersection Capacity Utilization	91.9%	ICU Level of Service	F
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	210	487	22	96	550	106	26	182	66	128	256	164
Future Volume (vph)	210	487	22	96	550	106	26	182	66	128	256	164
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	0.96		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1851		1770	1818		1770	1788		1770	1754	
Flt Permitted	0.95	1.00		0.95	1.00		0.19	1.00		0.44	1.00	
Satd. Flow (perm)	1770	1851		1770	1818		360	1788		825	1754	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	228	529	24	104	598	115	28	198	72	139	278	178
RTOR Reduction (vph)	0	2	0	0	9	0	0	17	0	0	31	0
Lane Group Flow (vph)	228	551	0	104	704	0	28	253	0	139	425	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	11.1	35.9		5.8	30.6		20.7	20.7		20.7	20.7	
Effective Green, g (s)	11.1	35.9		5.8	30.6		20.7	20.7		20.7	20.7	
Actuated g/C Ratio	0.15	0.47		0.08	0.40		0.27	0.27		0.27	0.27	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	258	875		135	732		98	487		225	478	
v/s Ratio Prot	c0.13	0.30		0.06	c0.39			0.14			c0.24	
v/s Ratio Perm							0.08			0.17		
v/c Ratio	0.88	0.63		0.77	0.96		0.29	0.52		0.62	0.89	
Uniform Delay, d1	31.8	15.0		34.4	22.1		21.8	23.4		24.1	26.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	27.9	1.4		23.3	24.1		7.2	3.9		12.1	21.3	
Delay (s)	59.7	16.4		57.7	46.2		29.0	27.3		36.2	47.8	
Level of Service	E	B		E	D		C	C		D	D	
Approach Delay (s)		29.1			47.7			27.4			45.1	
Approach LOS		C			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	38.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	75.9	Sum of lost time (s)	13.5
Intersection Capacity Utilization	89.7%	ICU Level of Service	E
Analysis Period (min)	15		

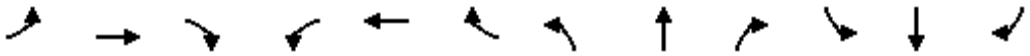
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	56	721	40	72	633	16	0	16	111	17	5	55
Future Volume (Veh/h)	56	721	40	72	633	16	0	16	111	17	5	55
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	61	784	43	78	688	17	0	17	121	18	5	60
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					654							
pX, platoon unblocked	0.65						0.65	0.65		0.65	0.65	0.65
vC, conflicting volume	705			827			1842	1788	806	1910	1802	696
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	282			827			2025	1942	806	2128	1962	269
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	93			90			100	52	68	0	86	88
cM capacity (veh/h)	836			804			19	36	382	9	35	502

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	888	783	138	83
Volume Left	61	78	0	18
Volume Right	43	17	121	60
cSH	836	804	174	36
Volume to Capacity	0.07	0.10	0.79	2.28
Queue Length 95th (ft)	6	8	133	230
Control Delay (s)	1.9	2.5	77.3	821.7
Lane LOS	A	A	F	F
Approach Delay (s)	1.9	2.5	77.3	821.7
Approach LOS			F	F

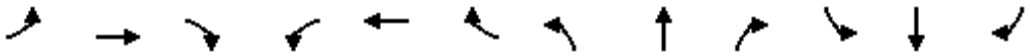
Intersection Summary			
Average Delay	43.6		
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	786	104	19	827	0	22	0	20	0	0	0
Future Volume (Veh/h)	0	786	104	19	827	0	22	0	20	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	854	113	21	899	0	24	0	22	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		1317			1315							
pX, platoon unblocked	0.75			0.59			0.71	0.71	0.59	0.71	0.71	0.75
vC, conflicting volume	899			967			1852	1852	910	1874	1908	899
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	702			592			1214	1214	495	1245	1293	702
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			96			78	100	93	100	100	100
cM capacity (veh/h)	674			577			109	124	337	97	111	330

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	967	920	46	0
Volume Left	0	21	24	0
Volume Right	113	0	22	0
cSH	674	577	162	1700
Volume to Capacity	0.00	0.04	0.28	0.00
Queue Length 95th (ft)	0	3	28	0
Control Delay (s)	0.0	1.1	35.9	0.0
Lane LOS		A	E	A
Approach Delay (s)	0.0	1.1	35.9	0.0
Approach LOS			E	A

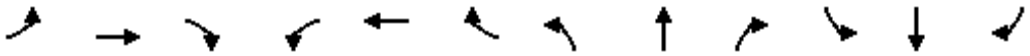
Intersection Summary				
Average Delay	1.4			
Intersection Capacity Utilization	68.8%	ICU Level of Service	C	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	112	721	34	7	655	92	35	199	7	87	245	67
Future Volume (vph)	112	721	34	7	655	92	35	199	7	87	245	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.98			1.00			0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1770	1850		1770	1828			1842			1801	
Flt Permitted	0.14	1.00		0.14	1.00			0.90			0.86	
Satd. Flow (perm)	269	1850		256	1828			1676			1571	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	122	784	37	8	712	100	38	216	8	95	266	73
RTOR Reduction (vph)	0	3	0	0	8	0	0	2	0	0	12	0
Lane Group Flow (vph)	122	818	0	8	804	0	0	260	0	0	422	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	31.2	31.2		31.2	31.2			19.2			19.2	
Effective Green, g (s)	31.2	31.2		31.2	31.2			19.2			19.2	
Actuated g/C Ratio	0.53	0.53		0.53	0.53			0.32			0.32	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	141	971		134	960			541			507	
v/s Ratio Prot		0.44			0.44							
v/s Ratio Perm	c0.45			0.03				0.16			c0.27	
v/c Ratio	0.87	0.84		0.06	0.84			0.48			0.83	
Uniform Delay, d1	12.3	12.0		6.9	12.0			16.1			18.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	38.8	6.7		0.2	6.5			0.7			11.2	
Delay (s)	51.1	18.7		7.1	18.4			16.8			29.9	
Level of Service	D	B		A	B			B			C	
Approach Delay (s)		22.9			18.3			16.8			29.9	
Approach LOS		C			B			B			C	

Intersection Summary			
HCM 2000 Control Delay	22.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	59.4	Sum of lost time (s)	9.0
Intersection Capacity Utilization	91.4%	ICU Level of Service	F
Analysis Period (min)	15		

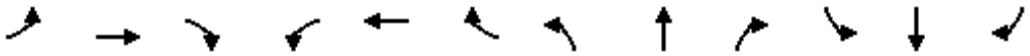
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	31	246	2	0	260	225	0	2	2	205	2	76
Future Volume (Veh/h)	31	246	2	0	260	225	0	2	2	205	2	76
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	34	267	2	0	283	245	0	2	2	223	2	83
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	528			269			826	864	268	744	742	406
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	528			269			826	864	268	744	742	406
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			100			100	99	100	30	99	87
cM capacity (veh/h)	1039			1295			246	282	771	320	332	645

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	303	528	4	308
Volume Left	34	0	0	223
Volume Right	2	245	2	83
cSH	1039	1295	413	370
Volume to Capacity	0.03	0.00	0.01	0.83
Queue Length 95th (ft)	3	0	1	189
Control Delay (s)	1.3	0.0	13.8	48.2
Lane LOS	A		B	E
Approach Delay (s)	1.3	0.0	13.8	48.2
Approach LOS			B	E

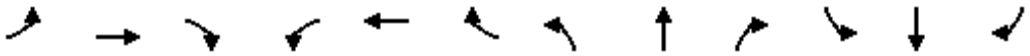
Intersection Summary				
Average Delay	13.4			
Intersection Capacity Utilization	68.5%	ICU Level of Service	C	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	12	78	355	16	105	4	294	24	5	2	90	5
Future Volume (vph)	12	78	355	16	105	4	294	24	5	2	90	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	13	85	386	17	114	4	320	26	5	2	98	5

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	484	135	351	105
Volume Left (vph)	13	17	320	2
Volume Right (vph)	386	4	5	5
Hadj (s)	-0.44	0.04	0.21	0.01
Departure Headway (s)	5.2	6.2	6.0	6.4
Degree Utilization, x	0.69	0.23	0.59	0.19
Capacity (veh/h)	667	499	559	470
Control Delay (s)	19.0	11.1	17.3	10.8
Approach Delay (s)	19.0	11.1	17.3	10.8
Approach LOS	C	B	C	B

Intersection Summary				
Delay	16.7			
Level of Service	C			
Intersection Capacity Utilization	59.4%	ICU Level of Service	B	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	5	57	35	91	91	5	34	100	52	9	102	4
Future Volume (vph)	5	57	35	91	91	5	34	100	52	9	102	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	62	38	99	99	5	37	109	57	10	111	4

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	105	203	203	125
Volume Left (vph)	5	99	37	10
Volume Right (vph)	38	5	57	4
Hadj (s)	-0.17	0.12	-0.10	0.03
Departure Headway (s)	4.8	5.0	4.8	5.0
Degree Utilization, x	0.14	0.28	0.27	0.17
Capacity (veh/h)	676	675	709	663
Control Delay (s)	8.6	9.9	9.5	9.0
Approach Delay (s)	8.6	9.9	9.5	9.0
Approach LOS	A	A	A	A

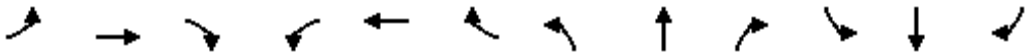
Intersection Summary				
Delay	9.4			
Level of Service	A			
Intersection Capacity Utilization	40.4%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	19	427	383	6	289	261
Future Volume (vph)	19	427	383	6	289	261
Peak Hour Factor	0.78	0.78	0.82	0.82	0.87	0.87
Hourly flow rate (vph)	24	547	467	7	332	300

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2
Volume Total (vph)	24	547	474	332	300
Volume Left (vph)	0	0	467	332	0
Volume Right (vph)	0	547	0	0	300
Hadj (s)	0.03	-0.67	0.23	0.52	-0.68
Departure Headway (s)	7.5	6.8	7.3	8.1	6.9
Degree Utilization, x	0.05	1.04	0.97	0.74	0.57
Capacity (veh/h)	466	530	486	438	508
Control Delay (s)	9.7	73.8	60.1	29.9	17.5
Approach Delay (s)	71.1		60.1	24.0	
Approach LOS	F		F	C	

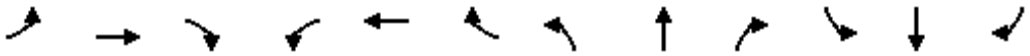
Intersection Summary			
Delay	50.3		
Level of Service	F		
Intersection Capacity Utilization	54.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	0	2	11	1	80	16	531	7	66	758	10
Future Volume (Veh/h)	11	0	2	11	1	80	16	531	7	66	758	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	0	2	12	1	87	17	577	8	72	824	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1672	1592	830	1585	1594	581	835			585		
vC1, stage 1 conf vol	974	974		615	615							
vC2, stage 2 conf vol	698	619		970	979							
vCu, unblocked vol	1672	1592	830	1585	1594	581	835			585		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	94	100	99	95	100	83	98			93		
cM capacity (veh/h)	201	254	370	234	253	514	798			990		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	14	100	17	585	72	835
Volume Left	12	12	17	0	72	0
Volume Right	2	87	0	8	0	11
cSH	215	445	798	1700	990	1700
Volume to Capacity	0.07	0.22	0.02	0.34	0.07	0.49
Queue Length 95th (ft)	5	21	2	0	6	0
Control Delay (s)	22.9	15.4	9.6	0.0	8.9	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	22.9	15.4	0.3		0.7	
Approach LOS	C	C				

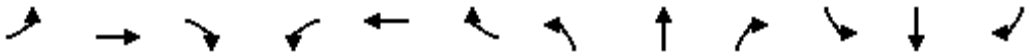
Intersection Summary				
Average Delay	1.6			
Intersection Capacity Utilization	59.2%	ICU Level of Service	B	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	44	7	20	34	5	66	19	350	39	123	560	47
Future Volume (Veh/h)	44	7	20	34	5	66	19	350	39	123	560	47
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	48	8	22	37	5	72	21	380	42	134	609	51
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			TWLTL	
Median storage veh)											2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1399	1366	634	1346	1371	401	660			422		
vC1, stage 1 conf vol	902	902		443	443							
vC2, stage 2 conf vol	496	464		903	928							
vCu, unblocked vol	1399	1366	634	1346	1371	401	660			422		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	80	97	95	84	98	89	98			88		
cM capacity (veh/h)	235	270	479	236	264	649	928			1137		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	78	37	77	21	422	134	660
Volume Left	48	37	0	21	0	134	0
Volume Right	22	0	72	0	42	0	51
cSH	279	236	593	928	1700	1137	1700
Volume to Capacity	0.28	0.16	0.13	0.02	0.25	0.12	0.39
Queue Length 95th (ft)	28	14	11	2	0	10	0
Control Delay (s)	22.9	23.1	12.0	9.0	0.0	8.6	0.0
Lane LOS	C	C	B	A		A	
Approach Delay (s)	22.9	15.6		0.4		1.4	
Approach LOS	C	C					

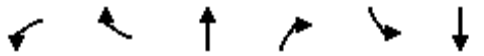
Intersection Summary				
Average Delay	3.4			
Intersection Capacity Utilization	56.3%	ICU Level of Service		B
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	0	2	4	1	6	0	372	1	27	583	22
Future Volume (Veh/h)	6	0	2	4	1	6	0	372	1	27	583	22
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	0	2	4	1	7	0	404	1	29	634	24
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1116	1109	646	1110	1120	404	658			405		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1116	1109	646	1110	1120	404	658			405		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	100	100	98	100	99	100			97		
cM capacity (veh/h)	179	204	472	182	201	646	930			1154		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	9	12	405	687
Volume Left	7	4	0	29
Volume Right	2	7	1	24
cSH	207	318	930	1154
Volume to Capacity	0.04	0.04	0.00	0.03
Queue Length 95th (ft)	3	3	0	2
Control Delay (s)	23.2	16.8	0.0	0.7
Lane LOS	C	C		A
Approach Delay (s)	23.2	16.8	0.0	0.7
Approach LOS	C	C		

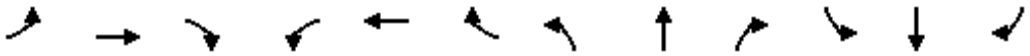
Intersection Summary				
Average Delay	0.8			
Intersection Capacity Utilization	64.1%	ICU Level of Service	C	
Analysis Period (min)	15			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	39	95	352	35	122	546
Future Volume (vph)	39	95	352	35	122	546
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	42	103	383	38	133	593

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	145	421	726
Volume Left (vph)	42	0	133
Volume Right (vph)	103	38	0
Hadj (s)	-0.33	-0.02	0.07
Departure Headway (s)	6.2	5.3	5.0
Degree Utilization, x	0.25	0.61	1.02
Capacity (veh/h)	556	677	707
Control Delay (s)	11.2	16.2	60.2
Approach Delay (s)	11.2	16.2	60.2
Approach LOS	B	C	F

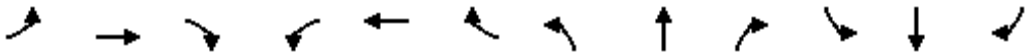
Intersection Summary			
Delay	40.4		
Level of Service	E		
Intersection Capacity Utilization	74.1%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	595	88	110	461	12	24	24	106	2	10	24
Future Volume (vph)	49	595	88	110	461	12	24	24	106	2	10	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5			4.5	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.98			1.00			0.91			0.91	
Flt Protected		1.00			0.99			0.99			1.00	
Satd. Flow (prot)		1826			1840			1677			1691	
Flt Permitted		0.94			0.78			0.94			0.98	
Satd. Flow (perm)		1717			1456			1590			1659	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	53	647	96	120	501	13	26	26	115	2	11	26
RTOR Reduction (vph)	0	7	0	0	1	0	0	94	0	0	21	0
Lane Group Flow (vph)	0	789	0	0	633	0	0	73	0	0	18	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		25.3			25.3			7.5			7.5	
Effective Green, g (s)		25.3			25.3			7.5			7.5	
Actuated g/C Ratio		0.61			0.61			0.18			0.18	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1039			881			285			297	
v/s Ratio Prot												
v/s Ratio Perm		c0.46			0.43			c0.05			0.01	
v/c Ratio		0.76			0.72			0.25			0.06	
Uniform Delay, d1		6.0			5.8			14.7			14.2	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		3.2			2.8			0.5			0.1	
Delay (s)		9.3			8.6			15.2			14.3	
Level of Service		A			A			B			B	
Approach Delay (s)		9.3			8.6			15.2			14.3	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	9.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	41.8	Sum of lost time (s)	9.0
Intersection Capacity Utilization	83.7%	ICU Level of Service	E
Analysis Period (min)	15		

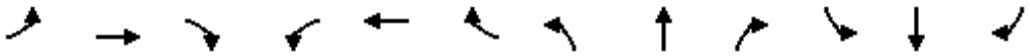
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	741	105	27	573	0	17	0	30	0	0	0
Future Volume (vph)	0	741	105	27	573	0	17	0	30	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5				
Lane Util. Factor		1.00			1.00			1.00				
Frt		0.98			1.00			0.91				
Flt Protected		1.00			1.00			0.98				
Satd. Flow (prot)		1832			1859			1671				
Flt Permitted		1.00			0.95			0.89				
Satd. Flow (perm)		1832			1768			1506				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	805	114	29	623	0	18	0	33	0	0	0
RTOR Reduction (vph)	0	7	0	0	0	0	0	28	0	0	0	0
Lane Group Flow (vph)	0	912	0	0	652	0	0	23	0	0	0	0
Turn Type		NA		Perm	NA		Perm	NA				
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		28.5			28.5			6.5				
Effective Green, g (s)		28.5			28.5			6.5				
Actuated g/C Ratio		0.65			0.65			0.15				
Clearance Time (s)		4.5			4.5			4.5				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		1186			1145			222				
v/s Ratio Prot		c0.50										
v/s Ratio Perm					0.37			c0.02				
v/c Ratio		0.77			0.57			0.10				
Uniform Delay, d1		5.4			4.3			16.2				
Progression Factor		1.00			1.00			1.00				
Incremental Delay, d2		3.1			0.7			0.2				
Delay (s)		8.5			5.0			16.4				
Level of Service		A			A			B				
Approach Delay (s)		8.5			5.0			16.4			0.0	
Approach LOS		A			A			B			A	

Intersection Summary			
HCM 2000 Control Delay	7.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	44.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	66	356	1	0	204	386	0	5	0	184	7	17
Future Volume (vph)	66	356	1	0	204	386	0	5	0	184	7	17
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	72	387	1	0	222	420	0	5	0	200	8	18

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	460	642	5	226
Volume Left (vph)	72	0	0	200
Volume Right (vph)	1	420	0	18
Hadj (s)	0.06	-0.36	0.03	0.16
Departure Headway (s)	5.7	5.1	7.6	6.8
Degree Utilization, x	0.73	0.92	0.01	0.43
Capacity (veh/h)	609	689	416	502
Control Delay (s)	23.0	38.9	10.7	14.9
Approach Delay (s)	23.0	38.9	10.7	14.9
Approach LOS	C	E	B	B

Intersection Summary			
Delay	29.2		
Level of Service	D		
Intersection Capacity Utilization	85.1%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	199	224	2	88	10	458	16	19	42	61	4
Future Volume (vph)	12	199	224	2	88	10	458	16	19	42	61	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5			4.5	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.93			0.99			0.99			1.00	
Flt Protected		1.00			1.00			0.96			0.98	
Satd. Flow (prot)		1731			1836			1771			1818	
Flt Permitted		0.99			0.99			0.66			0.77	
Satd. Flow (perm)		1719			1822			1222			1426	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	13	216	243	2	96	11	498	17	21	46	66	4
RTOR Reduction (vph)	0	64	0	0	7	0	0	2	0	0	2	0
Lane Group Flow (vph)	0	408	0	0	102	0	0	534	0	0	114	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		15.9			15.9			26.7			26.7	
Effective Green, g (s)		15.9			15.9			26.7			26.7	
Actuated g/C Ratio		0.31			0.31			0.52			0.52	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		529			561			632			737	
v/s Ratio Prot												
v/s Ratio Perm		c0.24			0.06			c0.44			0.08	
v/c Ratio		0.77			0.18			0.84			0.15	
Uniform Delay, d1		16.2			13.1			10.7			6.5	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		6.9			0.2			10.0			0.1	
Delay (s)		23.1			13.2			20.7			6.6	
Level of Service		C			B			C			A	
Approach Delay (s)		23.1			13.2			20.7			6.6	
Approach LOS		C			B			C			A	

Intersection Summary			
HCM 2000 Control Delay	19.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	51.6	Sum of lost time (s)	9.0
Intersection Capacity Utilization	72.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	16	331	259	19	451	473
Future Volume (vph)	16	331	259	19	451	473
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		0.96	0.95	1.00
Satd. Flow (prot)	1863	1583		1780	1787	1566
Flt Permitted	1.00	1.00		0.73	0.95	1.00
Satd. Flow (perm)	1863	1583		1351	1787	1566
Peak-hour factor, PHF	0.78	0.78	0.82	0.82	0.87	0.87
Adj. Flow (vph)	21	424	316	23	518	544
RTOR Reduction (vph)	0	272	0	0	0	315
Lane Group Flow (vph)	21	152	0	339	518	229
Confl. Bikes (#/hr)						1
Heavy Vehicles (%)	2%	2%	2%	2%	1%	1%
Turn Type	NA	Perm	Perm	NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases		4	8			2
Actuated Green, G (s)	14.6	14.6		14.6	17.2	17.2
Effective Green, g (s)	14.6	14.6		14.6	17.2	17.2
Actuated g/C Ratio	0.36	0.36		0.36	0.42	0.42
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	666	566		483	753	660
v/s Ratio Prot	0.01				c0.29	
v/s Ratio Perm		0.10		c0.25		0.15
v/c Ratio	0.03	0.27		0.70	0.69	0.35
Uniform Delay, d1	8.5	9.3		11.2	9.6	8.0
Progression Factor	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.0	0.3		4.6	2.6	0.3
Delay (s)	8.5	9.6		15.8	12.2	8.3
Level of Service	A	A		B	B	A
Approach Delay (s)	9.5			15.8	10.2	
Approach LOS	A			B	B	

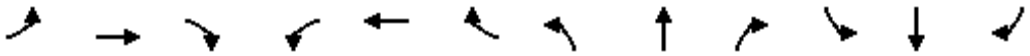
Intersection Summary			
HCM 2000 Control Delay	11.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	40.8	Sum of lost time (s)	9.0
Intersection Capacity Utilization	54.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	2	4	0	105	0	831	1	45	595	4
Future Volume (vph)	5	0	2	4	0	105	0	831	1	45	595	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5		4.5	4.5	
Lane Util. Factor		1.00			1.00			1.00		1.00	1.00	
Frt		0.96			0.87			1.00		1.00	1.00	
Flt Protected		0.97			1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1729			1617			1862		1770	1861	
Flt Permitted		0.84			0.99			1.00		0.24	1.00	
Satd. Flow (perm)		1505			1599			1862		443	1861	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	0	2	4	0	114	0	903	1	49	647	4
RTOR Reduction (vph)	0	6	0	0	102	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1	0	0	16	0	0	904	0	49	651	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		5.1			5.1			35.0		35.0	35.0	
Effective Green, g (s)		5.1			5.1			35.0		35.0	35.0	
Actuated g/C Ratio		0.10			0.10			0.71		0.71	0.71	
Clearance Time (s)		4.5			4.5			4.5		4.5	4.5	
Vehicle Extension (s)		3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		156			166			1327		315	1326	
v/s Ratio Prot								c0.49			0.35	
v/s Ratio Perm		0.00			c0.01					0.11		
v/c Ratio		0.00			0.10			0.68		0.16	0.49	
Uniform Delay, d1		19.7			19.9			3.9		2.3	3.1	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		0.0			0.3			1.5		0.2	0.3	
Delay (s)		19.7			20.2			5.4		2.5	3.4	
Level of Service		B			C			A		A	A	
Approach Delay (s)		19.7			20.2			5.4			3.3	
Approach LOS		B			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	5.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	49.1	Sum of lost time (s)	9.0
Intersection Capacity Utilization	57.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	78	1	56	15	0	29	5	624	1	11	523	1
Future Volume (vph)	78	1	56	15	0	29	5	624	1	11	523	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5			4.5	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.94			0.91			1.00			1.00	
Flt Protected		0.97			0.98			1.00			1.00	
Satd. Flow (prot)		1709			1667			1862			1860	
Flt Permitted		0.79			0.89			1.00			0.99	
Satd. Flow (perm)		1397			1512			1856			1837	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	85	1	61	16	0	32	5	678	1	12	568	1
RTOR Reduction (vph)	0	51	0	0	27	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	96	0	0	21	0	0	684	0	0	581	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		6.9			6.9			25.3			25.3	
Effective Green, g (s)		6.9			6.9			25.3			25.3	
Actuated g/C Ratio		0.17			0.17			0.61			0.61	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		233			253			1139			1128	
v/s Ratio Prot												
v/s Ratio Perm		c0.07			0.01			c0.37			0.32	
v/c Ratio		0.41			0.08			0.60			0.52	
Uniform Delay, d1		15.3			14.5			4.9			4.5	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.2			0.1			0.9			0.4	
Delay (s)		16.5			14.6			5.8			4.9	
Level of Service		B			B			A			A	
Approach Delay (s)		16.5			14.6			5.8			4.9	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	6.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	41.2	Sum of lost time (s)	9.0
Intersection Capacity Utilization	56.0%	ICU Level of Service	B
Analysis Period (min)	15		

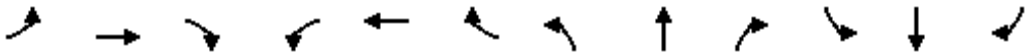
c Critical Lane Group



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	63	218	459	185	243	307
Future Volume (vph)	63	218	459	185	243	307
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.5			4.5
Lane Util. Factor	1.00		1.00			1.00
Frt	0.90		0.96			1.00
Flt Protected	0.99		1.00			0.98
Satd. Flow (prot)	1649		1791			1823
Flt Permitted	0.99		1.00			0.48
Satd. Flow (perm)	1649		1791			893
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	68	237	499	201	264	334
RTOR Reduction (vph)	149	0	13	0	0	0
Lane Group Flow (vph)	156	0	687	0	0	598
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	12.2		64.2			64.2
Effective Green, g (s)	12.2		64.2			64.2
Actuated g/C Ratio	0.14		0.75			0.75
Clearance Time (s)	4.5		4.5			4.5
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	235		1346			671
v/s Ratio Prot	c0.09		0.38			
v/s Ratio Perm						c0.67
v/c Ratio	0.66		0.51			0.89
Uniform Delay, d1	34.7		4.3			8.0
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	6.9		0.3			14.1
Delay (s)	41.5		4.6			22.0
Level of Service	D		A			C
Approach Delay (s)	41.5		4.6			22.0
Approach LOS	D		A			C

Intersection Summary			
HCM 2000 Control Delay	18.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	85.4	Sum of lost time (s)	9.0
Intersection Capacity Utilization	93.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	721	40	72	633	16	0	16	111	17	5	55
Future Volume (vph)	56	721	40	72	633	16	0	16	111	17	5	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5			4.5	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.99			1.00			0.88			0.90	
Flt Protected		1.00			1.00			1.00			0.99	
Satd. Flow (prot)		1844			1848			1642			1663	
Flt Permitted		0.92			0.86			1.00			0.89	
Satd. Flow (perm)		1699			1601			1642			1500	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	61	784	43	78	688	17	0	17	121	18	5	60
RTOR Reduction (vph)	0	2	0	0	1	0	0	103	0	0	51	0
Lane Group Flow (vph)	0	886	0	0	782	0	0	35	0	0	32	0
Turn Type	Perm	NA		Perm	NA			NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		31.0			31.0			6.9			6.9	
Effective Green, g (s)		31.0			31.0			6.9			6.9	
Actuated g/C Ratio		0.66			0.66			0.15			0.15	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1123			1058			241			220	
v/s Ratio Prot								0.02				
v/s Ratio Perm		c0.52			0.49						c0.02	
v/c Ratio		0.79			0.74			0.14			0.14	
Uniform Delay, d1		5.6			5.3			17.4			17.4	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		3.8			2.7			0.3			0.3	
Delay (s)		9.4			8.0			17.7			17.7	
Level of Service		A			A			B			B	
Approach Delay (s)		9.4			8.0			17.7			17.7	
Approach LOS		A			A			B			B	

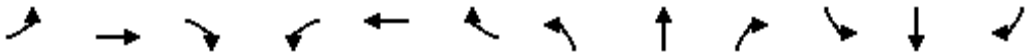
Intersection Summary			
HCM 2000 Control Delay	9.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	46.9	Sum of lost time (s)	9.0
Intersection Capacity Utilization	78.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	786	104	19	827	0	22	0	20	0	0	0
Future Volume (vph)	0	786	104	19	827	0	22	0	20	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5				
Lane Util. Factor		1.00			1.00			1.00				
Frt		0.98			1.00			0.94				
Flt Protected		1.00			1.00			0.97				
Satd. Flow (prot)		1833			1861			1698				
Flt Permitted		1.00			0.97			0.84				
Satd. Flow (perm)		1833			1815			1456				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	854	113	21	899	0	24	0	22	0	0	0
RTOR Reduction (vph)	0	5	0	0	0	0	0	20	0	0	0	0
Lane Group Flow (vph)	0	962	0	0	920	0	0	26	0	0	0	0
Turn Type		NA		Perm	NA		Perm	NA				
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		39.6			39.6			6.6				
Effective Green, g (s)		39.6			39.6			6.6				
Actuated g/C Ratio		0.72			0.72			0.12				
Clearance Time (s)		4.5			4.5			4.5				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		1314			1302			174				
v/s Ratio Prot		c0.52										
v/s Ratio Perm					0.51			c0.02				
v/c Ratio		0.73			0.71			0.15				
Uniform Delay, d1		4.6			4.5			21.8				
Progression Factor		1.00			1.00			1.00				
Incremental Delay, d2		2.1			1.8			0.4				
Delay (s)		6.8			6.2			22.2				
Level of Service		A			A			C				
Approach Delay (s)		6.8			6.2			22.2			0.0	
Approach LOS		A			A			C			A	

Intersection Summary			
HCM 2000 Control Delay	6.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	55.2	Sum of lost time (s)	9.0
Intersection Capacity Utilization	70.5%	ICU Level of Service	C
Analysis Period (min)	15		

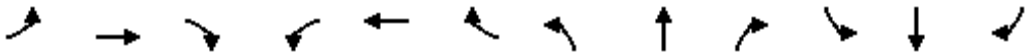
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	31	246	2	0	260	225	0	2	2	205	2	76
Future Volume (vph)	31	246	2	0	260	225	0	2	2	205	2	76
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	34	267	2	0	283	245	0	2	2	223	2	83

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	303	528	4	308
Volume Left (vph)	34	0	0	223
Volume Right (vph)	2	245	2	83
Hadj (s)	0.05	-0.24	-0.27	0.02
Departure Headway (s)	5.8	5.2	6.7	6.1
Degree Utilization, x	0.49	0.76	0.01	0.52
Capacity (veh/h)	589	677	437	549
Control Delay (s)	14.1	22.8	9.8	15.6
Approach Delay (s)	14.1	22.8	9.8	15.6
Approach LOS	B	C	A	C

Intersection Summary				
Delay	18.5			
Level of Service	C			
Intersection Capacity Utilization	68.5%	ICU Level of Service	C	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	78	355	16	105	4	294	24	5	2	90	5
Future Volume (vph)	12	78	355	16	105	4	294	24	5	2	90	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5			4.5	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.89			1.00			1.00			0.99	
Flt Protected		1.00			0.99			0.96			1.00	
Satd. Flow (prot)		1660			1844			1778			1849	
Flt Permitted		0.99			0.93			0.67			0.99	
Satd. Flow (perm)		1645			1724			1247			1838	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	13	85	386	17	114	4	320	26	5	2	98	5
RTOR Reduction (vph)	0	271	0	0	2	0	0	1	0	0	3	0
Lane Group Flow (vph)	0	213	0	0	133	0	0	350	0	0	102	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		10.2			10.2			15.0			15.0	
Effective Green, g (s)		10.2			10.2			15.0			15.0	
Actuated g/C Ratio		0.30			0.30			0.44			0.44	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		490			514			546			806	
v/s Ratio Prot												
v/s Ratio Perm		c0.13			0.08			c0.28			0.06	
v/c Ratio		0.43			0.26			0.64			0.13	
Uniform Delay, d1		9.7			9.1			7.5			5.7	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.6			0.3			2.6			0.1	
Delay (s)		10.3			9.4			10.1			5.8	
Level of Service		B			A			B			A	
Approach Delay (s)		10.3			9.4			10.1			5.8	
Approach LOS		B			A			B			A	

Intersection Summary			
HCM 2000 Control Delay	9.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	34.2	Sum of lost time (s)	9.0
Intersection Capacity Utilization	60.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	19	427	383	6	289	261
Future Volume (vph)	19	427	383	6	289	261
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		0.95	0.95	1.00
Satd. Flow (prot)	1863	1583		1775	1787	1565
Flt Permitted	1.00	1.00		0.71	0.95	1.00
Satd. Flow (perm)	1863	1583		1326	1787	1565
Peak-hour factor, PHF	0.78	0.78	0.82	0.82	0.87	0.87
Adj. Flow (vph)	24	547	467	7	332	300
RTOR Reduction (vph)	0	287	0	0	0	204
Lane Group Flow (vph)	24	260	0	474	332	96
Confl. Bikes (#/hr)						1
Heavy Vehicles (%)	2%	2%	2%	2%	1%	1%
Turn Type	NA	Perm	Perm	NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases		4	8			2
Actuated Green, G (s)	20.9	20.9		20.9	14.0	14.0
Effective Green, g (s)	20.9	20.9		20.9	14.0	14.0
Actuated g/C Ratio	0.48	0.48		0.48	0.32	0.32
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	886	753		631	569	499
v/s Ratio Prot	0.01				c0.19	
v/s Ratio Perm		0.16		c0.36		0.06
v/c Ratio	0.03	0.35		0.75	0.58	0.19
Uniform Delay, d1	6.1	7.2		9.4	12.5	10.8
Progression Factor	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.0	0.3		5.0	1.5	0.2
Delay (s)	6.1	7.5		14.4	14.0	11.0
Level of Service	A	A		B	B	B
Approach Delay (s)	7.4			14.4	12.6	
Approach LOS	A			B	B	

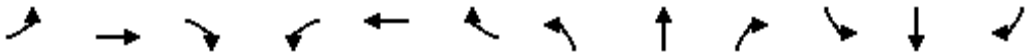
Intersection Summary			
HCM 2000 Control Delay	11.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	43.9	Sum of lost time (s)	9.0
Intersection Capacity Utilization	55.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	0	2	11	1	80	16	531	7	66	758	10
Future Volume (vph)	11	0	2	11	1	80	16	531	7	66	758	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.98			0.88		1.00	1.00		1.00	1.00	
Flt Protected		0.96			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1752			1634		1770	1859		1770	1859	
Flt Permitted		0.89			0.95		0.27	1.00		0.41	1.00	
Satd. Flow (perm)		1629			1569		504	1859		770	1859	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	0	2	12	1	87	17	577	8	72	824	11
RTOR Reduction (vph)	0	12	0	0	78	0	0	1	0	0	1	0
Lane Group Flow (vph)	0	2	0	0	22	0	17	584	0	72	834	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		5.1			5.1		33.3	33.3		33.3	33.3	
Effective Green, g (s)		5.1			5.1		33.3	33.3		33.3	33.3	
Actuated g/C Ratio		0.11			0.11		0.70	0.70		0.70	0.70	
Clearance Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		175			168		354	1306		540	1306	
v/s Ratio Prot								0.31			c0.45	
v/s Ratio Perm		0.00			c0.01		0.03			0.09		
v/c Ratio		0.01			0.13		0.05	0.45		0.13	0.64	
Uniform Delay, d1		18.9			19.1		2.2	3.1		2.3	3.8	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.0			0.4		0.1	0.2		0.1	1.0	
Delay (s)		18.9			19.5		2.2	3.3		2.4	4.8	
Level of Service		B			B		A	A		A	A	
Approach Delay (s)		18.9			19.5			3.3			4.7	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	5.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	47.4	Sum of lost time (s)	9.0
Intersection Capacity Utilization	61.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	0	2	4	1	6	0	372	1	27	583	22
Future Volume (vph)	6	0	2	4	1	6	0	372	1	27	583	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5			4.5	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.97			0.92			1.00			1.00	
Flt Protected		0.96			0.98			1.00			1.00	
Satd. Flow (prot)		1739			1688			1862			1850	
Flt Permitted		1.00			1.00			1.00			0.98	
Satd. Flow (perm)		1807			1716			1862			1814	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	0	2	4	1	7	0	404	1	29	634	24
RTOR Reduction (vph)	0	9	0	0	7	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	0	0	0	5	0	0	405	0	0	686	0
Turn Type	Perm	NA		Perm	NA			NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		0.8			0.8			30.6			30.6	
Effective Green, g (s)		0.8			0.8			30.6			30.6	
Actuated g/C Ratio		0.02			0.02			0.76			0.76	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		35			33			1410			1373	
v/s Ratio Prot								0.22				
v/s Ratio Perm		0.00			c0.00						c0.38	
v/c Ratio		0.01			0.16			0.29			0.50	
Uniform Delay, d1		19.4			19.5			1.5			1.9	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.1			2.2			0.1			0.3	
Delay (s)		19.5			21.7			1.6			2.2	
Level of Service		B			C			A			A	
Approach Delay (s)		19.5			21.7			1.6			2.2	
Approach LOS		B			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	2.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	40.4	Sum of lost time (s)	9.0
Intersection Capacity Utilization	65.7%	ICU Level of Service	C
Analysis Period (min)	15		

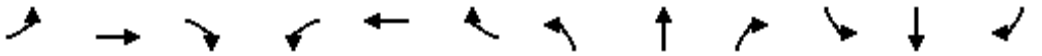
c Critical Lane Group



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	39	95	352	35	122	546
Future Volume (vph)	39	95	352	35	122	546
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.5			4.5
Lane Util. Factor	1.00		1.00			1.00
Frt	0.90		0.99			1.00
Flt Protected	0.99		1.00			0.99
Satd. Flow (prot)	1660		1840			1846
Flt Permitted	0.99		1.00			0.86
Satd. Flow (perm)	1660		1840			1594
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	42	103	383	38	133	593
RTOR Reduction (vph)	91	0	4	0	0	0
Lane Group Flow (vph)	54	0	417	0	0	726
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	5.8		33.6			33.6
Effective Green, g (s)	5.8		33.6			33.6
Actuated g/C Ratio	0.12		0.69			0.69
Clearance Time (s)	4.5		4.5			4.5
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	198		1277			1106
v/s Ratio Prot	c0.03		0.23			
v/s Ratio Perm						c0.46
v/c Ratio	0.27		0.33			0.66
Uniform Delay, d1	19.4		2.9			4.2
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	0.8		0.2			1.4
Delay (s)	20.1		3.1			5.6
Level of Service	C		A			A
Approach Delay (s)	20.1		3.1			5.6
Approach LOS	C		A			A

Intersection Summary			
HCM 2000 Control Delay	6.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	48.4	Sum of lost time (s)	9.0
Intersection Capacity Utilization	75.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	224	454	31	98	426	133	26	356	81	80	208	57
Future Volume (vph)	224	454	31	98	426	133	26	356	81	80	208	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.96		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1845		1770	1796		1770	1811		1770	1803	
Flt Permitted	0.95	1.00		0.95	1.00		0.45	1.00		0.21	1.00	
Satd. Flow (perm)	1770	1845		1770	1796		838	1811		388	1803	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	243	493	34	107	463	145	28	387	88	87	226	62
RTOR Reduction (vph)	0	3	0	0	17	0	0	13	0	0	16	0
Lane Group Flow (vph)	243	524	0	107	591	0	28	462	0	87	272	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	10.2	27.7		5.5	23.0		19.2	19.2		19.2	19.2	
Effective Green, g (s)	10.2	27.7		5.5	23.0		19.2	19.2		19.2	19.2	
Actuated g/C Ratio	0.15	0.42		0.08	0.35		0.29	0.29		0.29	0.29	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	273	775		147	626		244	527		113	525	
v/s Ratio Prot	c0.14	0.28		0.06	c0.33			c0.26			0.15	
v/s Ratio Perm							0.03			0.22		
v/c Ratio	0.89	0.68		0.73	0.94		0.11	0.88		0.77	0.52	
Uniform Delay, d1	27.3	15.5		29.5	20.8		17.1	22.2		21.3	19.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	28.1	2.3		16.4	23.0		1.0	18.3		38.8	3.6	
Delay (s)	55.4	17.8		45.9	43.8		18.1	40.5		60.1	23.1	
Level of Service	E	B		D	D		B	D		E	C	
Approach Delay (s)		29.7			44.1			39.3			31.7	
Approach LOS		C			D			D			C	

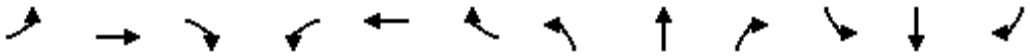
Intersection Summary			
HCM 2000 Control Delay	36.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	65.9	Sum of lost time (s)	13.5
Intersection Capacity Utilization	86.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	49	595	88	110	461	12	24	24	150	2	10	24
Future Volume (Veh/h)	49	595	88	110	461	12	24	24	150	2	10	24
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	53	647	96	120	501	13	26	26	163	2	11	26
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					654							
pX, platoon unblocked	0.73						0.73	0.73		0.73	0.73	0.73
vC, conflicting volume	514			743			1580	1555	695	1724	1596	508
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	156			743			1609	1575	695	1806	1632	147
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			86			41	61	63	88	82	96
cM capacity (veh/h)	1045			864			44	66	442	17	61	660

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	796	634	215	39
Volume Left	53	120	26	2
Volume Right	96	13	163	26
cSH	1045	864	159	116
Volume to Capacity	0.05	0.14	1.35	0.34
Queue Length 95th (ft)	4	12	328	33
Control Delay (s)	1.3	3.4	248.5	51.2
Lane LOS	A	A	F	F
Approach Delay (s)	1.3	3.4	248.5	51.2
Approach LOS			F	F

Intersection Summary				
Average Delay	34.8			
Intersection Capacity Utilization	85.6%	ICU Level of Service	E	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	741	122	27	573	0	17	0	30	0	0	0
Future Volume (Veh/h)	0	741	122	27	573	0	17	0	30	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	805	133	29	623	0	18	0	33	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		1317			1315							
pX, platoon unblocked				0.60			0.60	0.60	0.60	0.60	0.60	
vC, conflicting volume	623			938			1552	1552	872	1586	1619	623
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	623			557			1588	1588	446	1643	1700	623
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			95			64	100	91	100	100	100
cM capacity (veh/h)	958			604			50	61	365	42	52	486

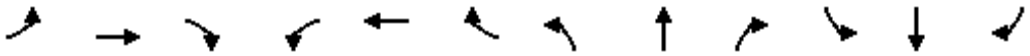
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	938	652	51	0
Volume Left	0	29	18	0
Volume Right	133	0	33	0
cSH	958	604	113	1700
Volume to Capacity	0.00	0.05	0.45	0.00
Queue Length 95th (ft)	0	4	49	0
Control Delay (s)	0.0	1.3	60.5	0.0
Lane LOS		A	F	A
Approach Delay (s)	0.0	1.3	60.5	0.0
Approach LOS			F	A

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	62.1%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	158	724	19	7	431	71	90	429	10	85	183	26
Future Volume (vph)	158	724	19	7	431	71	90	429	10	85	183	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	1.00		1.00	0.98			1.00			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1770	1855		1770	1823			1842			1815	
Flt Permitted	0.30	1.00		0.13	1.00			0.89			0.70	
Satd. Flow (perm)	561	1855		240	1823			1647			1283	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	172	787	21	8	468	77	98	466	11	92	199	28
RTOR Reduction (vph)	0	2	0	0	8	0	0	1	0	0	5	0
Lane Group Flow (vph)	172	806	0	8	537	0	0	574	0	0	314	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	31.0	31.0		31.0	31.0			26.1			26.1	
Effective Green, g (s)	31.0	31.0		31.0	31.0			26.1			26.1	
Actuated g/C Ratio	0.47	0.47		0.47	0.47			0.39			0.39	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	263	869		112	854			650			506	
v/s Ratio Prot		c0.43			0.29							
v/s Ratio Perm	0.31			0.03				c0.35			0.24	
v/c Ratio	0.65	0.93		0.07	0.63			0.88			0.62	
Uniform Delay, d1	13.4	16.5		9.6	13.2			18.6			16.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	5.7	15.7		0.3	1.5			13.4			2.4	
Delay (s)	19.2	32.2		9.9	14.7			32.0			18.4	
Level of Service	B	C		A	B			C			B	
Approach Delay (s)		29.9			14.6			32.0			18.4	
Approach LOS		C			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	25.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	66.1	Sum of lost time (s)	9.0
Intersection Capacity Utilization	87.2%	ICU Level of Service	E
Analysis Period (min)	15		

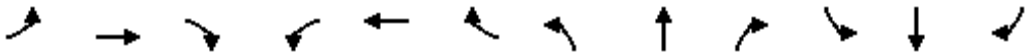
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	66	363	1	0	219	445	0	5	0	194	7	17
Future Volume (Veh/h)	66	363	1	0	219	445	0	5	0	194	7	17
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	72	395	1	0	238	484	0	5	0	211	8	18
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	722			396			1042	1262	396	1022	1020	480
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	722			396			1042	1262	396	1022	1020	480
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			100			100	97	100	0	96	97
cM capacity (veh/h)	880			1163			184	156	654	196	217	586

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	468	722	5	237
Volume Left	72	0	0	211
Volume Right	1	484	0	18
cSH	880	1163	156	207
Volume to Capacity	0.08	0.00	0.03	1.14
Queue Length 95th (ft)	7	0	2	287
Control Delay (s)	2.3	0.0	28.8	154.6
Lane LOS	A		D	F
Approach Delay (s)	2.3	0.0	28.8	154.6
Approach LOS			D	F

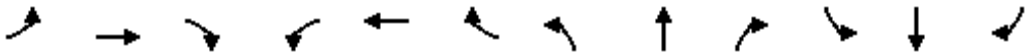
Intersection Summary			
Average Delay	26.4		
Intersection Capacity Utilization	90.5%	ICU Level of Service	E
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	12	199	241	2	88	10	532	16	19	42	78	4
Future Volume (vph)	12	199	241	2	88	10	532	16	19	42	78	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	13	216	262	2	96	11	578	17	21	46	85	4

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	491	109	616	135
Volume Left (vph)	13	2	578	46
Volume Right (vph)	262	11	21	4
Hadj (s)	-0.28	-0.02	0.20	0.08
Departure Headway (s)	6.2	7.4	6.5	7.3
Degree Utilization, x	0.84	0.22	1.10	0.27
Capacity (veh/h)	491	450	559	450
Control Delay (s)	33.7	12.5	94.1	13.0
Approach Delay (s)	33.7	12.5	94.1	13.0
Approach LOS	D	B	F	B

Intersection Summary				
Delay	57.5			
Level of Service	F			
Intersection Capacity Utilization	76.6%	ICU Level of Service	D	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	24	87	108	112	51	2	36	130	42	5	116	20
Future Volume (vph)	24	87	108	112	51	2	36	130	42	5	116	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	26	95	117	122	55	2	39	141	46	5	126	22

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	238	179	226	153
Volume Left (vph)	26	122	39	5
Volume Right (vph)	117	2	46	22
Hadj (s)	-0.24	0.16	-0.05	-0.05
Departure Headway (s)	5.0	5.5	5.2	5.3
Degree Utilization, x	0.33	0.27	0.33	0.23
Capacity (veh/h)	666	605	631	611
Control Delay (s)	10.4	10.5	10.7	9.9
Approach Delay (s)	10.4	10.5	10.7	9.9
Approach LOS	B	B	B	A

Intersection Summary				
Delay	10.4			
Level of Service	B			
Intersection Capacity Utilization	53.8%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	16	365	279	19	525	517
Future Volume (vph)	16	365	279	19	525	517
Peak Hour Factor	0.78	0.78	0.82	0.82	0.87	0.87
Hourly flow rate (vph)	21	468	340	23	603	594

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2
Volume Total (vph)	21	468	363	603	594
Volume Left (vph)	0	0	340	603	0
Volume Right (vph)	0	468	0	0	594
Hadj (s)	0.03	-0.67	0.22	0.52	-0.68
Departure Headway (s)	7.7	7.0	7.5	7.8	6.6
Degree Utilization, x	0.04	0.91	0.75	1.31	1.08
Capacity (veh/h)	462	504	473	471	560
Control Delay (s)	9.8	45.1	29.9	174.8	86.9
Approach Delay (s)	43.6		29.9	131.2	
Approach LOS	E		D	F	

Intersection Summary			
Delay	92.3		
Level of Service	F		
Intersection Capacity Utilization	58.9%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	2	4	0	187	0	867	1	83	611	4
Future Volume (Veh/h)	5	0	2	4	0	187	0	867	1	83	611	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	0	2	4	0	203	0	942	1	90	664	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1991	1789	666	1788	1790	942	668			943		
vC1, stage 1 conf vol	846	846		942	942							
vC2, stage 2 conf vol	1145	943		846	848							
vCu, unblocked vol	1991	1789	666	1788	1790	942	668			943		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	66	100	100	98	100	36	100			88		
cM capacity (veh/h)	15	206	459	222	242	319	922			727		

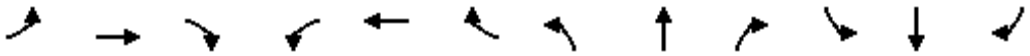
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	7	207	0	943	90	668
Volume Left	5	4	0	0	90	0
Volume Right	2	203	0	1	0	4
cSH	21	316	1700	1700	727	1700
Volume to Capacity	0.34	0.66	0.00	0.55	0.12	0.39
Queue Length 95th (ft)	25	108	0	0	11	0
Control Delay (s)	252.8	35.6	0.0	0.0	10.6	0.0
Lane LOS	F	E			B	
Approach Delay (s)	252.8	35.6	0.0		1.3	
Approach LOS	F	E				

Intersection Summary				
Average Delay	5.3			
Intersection Capacity Utilization	72.0%	ICU Level of Service	C	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	2	35	49	1	83	12	670	35	48	533	20
Future Volume (Veh/h)	55	2	35	49	1	83	12	670	35	48	533	20
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	60	2	38	53	1	90	13	728	38	52	579	22
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			TWLTL	
Median storage veh)											2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1538	1486	590	1495	1478	747	601			766		
vC1, stage 1 conf vol	694	694		773	773							
vC2, stage 2 conf vol	844	792		722	705							
vCu, unblocked vol	1538	1486	590	1495	1478	747	601			766		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	70	99	93	80	100	78	99			94		
cM capacity (veh/h)	199	280	508	267	299	413	976			847		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	100	53	91	13	766	52	601
Volume Left	60	53	0	13	0	52	0
Volume Right	38	0	90	0	38	0	22
cSH	261	267	411	976	1700	847	1700
Volume to Capacity	0.38	0.20	0.22	0.01	0.45	0.06	0.35
Queue Length 95th (ft)	43	18	21	1	0	5	0
Control Delay (s)	27.1	21.8	16.2	8.7	0.0	9.5	0.0
Lane LOS	D	C	C	A		A	
Approach Delay (s)	27.1	18.3		0.1		0.8	
Approach LOS	D	C					

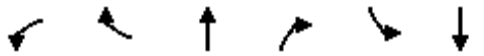
Intersection Summary				
Average Delay	3.6			
Intersection Capacity Utilization	58.5%	ICU Level of Service		B
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	78	1	56	15	0	29	5	638	1	11	552	1
Future Volume (Veh/h)	78	1	56	15	0	29	5	638	1	11	552	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	85	1	61	16	0	32	5	693	1	12	600	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1360	1328	600	1390	1328	694	601			694		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1360	1328	600	1390	1328	694	601			694		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	26	99	88	84	100	93	99			99		
cM capacity (veh/h)	115	152	501	103	152	443	976			901		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	147	48	699	613
Volume Left	85	16	5	12
Volume Right	61	32	1	1
cSH	169	211	976	901
Volume to Capacity	0.87	0.23	0.01	0.01
Queue Length 95th (ft)	154	21	0	1
Control Delay (s)	92.5	27.0	0.1	0.4
Lane LOS	F	D	A	A
Approach Delay (s)	92.5	27.0	0.1	0.4
Approach LOS	F	D		

Intersection Summary				
Average Delay	10.1			
Intersection Capacity Utilization	56.1%	ICU Level of Service	B	
Analysis Period (min)	15			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	63	218	473	185	243	336
Future Volume (vph)	63	218	473	185	243	336
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	68	237	514	201	264	365

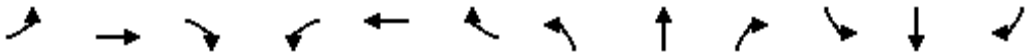
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	305	715	629
Volume Left (vph)	68	0	264
Volume Right (vph)	237	201	0
Hadj (s)	-0.39	-0.13	0.12
Departure Headway (s)	6.6	5.9	6.1
Degree Utilization, x	0.56	1.16	1.07
Capacity (veh/h)	542	621	600
Control Delay (s)	17.6	111.7	80.3
Approach Delay (s)	17.6	111.7	80.3
Approach LOS	C	F	F

Intersection Summary			
Delay	82.3		
Level of Service	F		
Intersection Capacity Utilization	94.2%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	227	504	22	120	550	106	26	182	66	128	279	164
Future Volume (vph)	227	504	22	120	550	106	26	182	66	128	279	164
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	0.96		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1851		1770	1818		1770	1788		1770	1759	
Flt Permitted	0.95	1.00		0.95	1.00		0.18	1.00		0.44	1.00	
Satd. Flow (perm)	1770	1851		1770	1818		337	1788		819	1759	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	247	548	24	130	598	115	28	198	72	139	303	178
RTOR Reduction (vph)	0	2	0	0	8	0	0	17	0	0	27	0
Lane Group Flow (vph)	247	570	0	130	705	0	28	253	0	139	454	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	12.6	35.5		8.9	31.8		22.1	22.1		22.1	22.1	
Effective Green, g (s)	12.6	35.5		8.9	31.8		22.1	22.1		22.1	22.1	
Actuated g/C Ratio	0.16	0.44		0.11	0.40		0.28	0.28		0.28	0.28	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	278	821		196	722		93	493		226	485	
v/s Ratio Prot	c0.14	c0.31		0.07	c0.39			0.14			c0.26	
v/s Ratio Perm							0.08			0.17		
v/c Ratio	0.89	0.69		0.66	0.98		0.30	0.51		0.62	0.94	
Uniform Delay, d1	33.0	17.9		34.1	23.7		22.9	24.4		25.2	28.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	27.1	2.6		8.2	27.3		8.1	3.8		11.9	27.8	
Delay (s)	60.1	20.4		42.3	51.0		31.0	28.2		37.1	56.0	
Level of Service	E	C		D	D		C	C		D	E	
Approach Delay (s)		32.4			49.7			28.5			51.8	
Approach LOS		C			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	42.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	91.8%	ICU Level of Service	F
Analysis Period (min)	15		

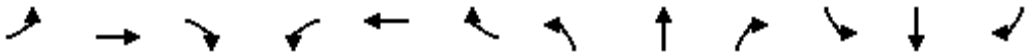
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	56	721	40	72	633	16	0	16	145	17	5	55
Future Volume (Veh/h)	56	721	40	72	633	16	0	16	145	17	5	55
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	61	784	43	78	688	17	0	17	158	18	5	60
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					654							
pX, platoon unblocked	0.65						0.65	0.65		0.65	0.65	0.65
vC, conflicting volume	705			827			1842	1788	806	1946	1802	696
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	278			827			2026	1943	806	2186	1963	265
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	93			90			100	52	59	0	85	88
cM capacity (veh/h)	836			804			19	35	382	7	34	503

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	888	783	175	83
Volume Left	61	78	0	18
Volume Right	43	17	158	60
cSH	836	804	196	29
Volume to Capacity	0.07	0.10	0.89	2.87
Queue Length 95th (ft)	6	8	173	248
Control Delay (s)	1.9	2.5	88.8	1130.3
Lane LOS	A	A	F	F
Approach Delay (s)	1.9	2.5	88.8	1130.3
Approach LOS			F	F

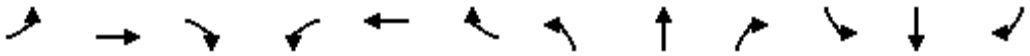
Intersection Summary			
Average Delay	58.6		
Intersection Capacity Utilization	79.8%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	786	143	19	827	0	22	0	20	0	0	0
Future Volume (Veh/h)	0	786	143	19	827	0	22	0	20	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	854	155	21	899	0	24	0	22	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		1317			1315							
pX, platoon unblocked	0.75			0.57			0.70	0.70	0.57	0.70	0.70	0.75
vC, conflicting volume	899			1009			1872	1872	932	1894	1950	899
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	694			643			1214	1214	508	1246	1325	694
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			96			78	100	93	100	100	100
cM capacity (veh/h)	672			540			108	122	324	95	105	330

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	1009	920	46	0
Volume Left	0	21	24	0
Volume Right	155	0	22	0
cSH	672	540	158	1700
Volume to Capacity	0.00	0.04	0.29	0.00
Queue Length 95th (ft)	0	3	28	0
Control Delay (s)	0.0	1.2	36.9	0.0
Lane LOS		A	E	A
Approach Delay (s)	0.0	1.2	36.9	0.0
Approach LOS			E	A

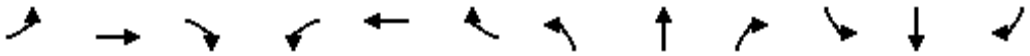
Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	68.8%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	112	744	34	7	655	92	52	227	7	103	268	67
Future Volume (vph)	112	744	34	7	655	92	52	227	7	103	268	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.98			1.00			0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1770	1851		1770	1828			1839			1803	
Flt Permitted	0.14	1.00		0.12	1.00			0.84			0.81	
Satd. Flow (perm)	254	1851		224	1828			1559			1480	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	122	809	37	8	712	100	57	247	8	112	291	73
RTOR Reduction (vph)	0	2	0	0	8	0	0	1	0	0	10	0
Lane Group Flow (vph)	122	844	0	8	804	0	0	311	0	0	466	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	33.3	33.3		33.3	33.3			21.6			21.6	
Effective Green, g (s)	33.3	33.3		33.3	33.3			21.6			21.6	
Actuated g/C Ratio	0.52	0.52		0.52	0.52			0.34			0.34	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	132	964		116	952			526			500	
v/s Ratio Prot		0.46			0.44							
v/s Ratio Perm	c0.48			0.04				0.20			c0.31	
v/c Ratio	0.92	0.88		0.07	0.84			0.59			0.93	
Uniform Delay, d1	14.1	13.5		7.6	13.1			17.5			20.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	55.3	8.9		0.3	7.0			1.8			24.4	
Delay (s)	69.5	22.4		7.9	20.1			19.3			44.8	
Level of Service	E	C		A	C			B			D	
Approach Delay (s)		28.3			19.9			19.3			44.8	
Approach LOS		C			B			B			D	

Intersection Summary			
HCM 2000 Control Delay	27.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	63.9	Sum of lost time (s)	9.0
Intersection Capacity Utilization	92.7%	ICU Level of Service	F
Analysis Period (min)	15		

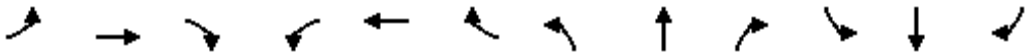
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	31	262	2	0	271	270	0	2	2	228	2	76
Future Volume (Veh/h)	31	262	2	0	271	270	0	2	2	228	2	76
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	34	285	2	0	295	293	0	2	2	248	2	83
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	588			287			880	942	286	798	796	442
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	588			287			880	942	286	798	796	442
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			100			100	99	100	15	99	87
cM capacity (veh/h)	987			1275			225	254	753	293	309	616

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	321	588	4	333
Volume Left	34	0	0	248
Volume Right	2	293	2	83
cSH	987	1275	380	337
Volume to Capacity	0.03	0.00	0.01	0.99
Queue Length 95th (ft)	3	0	1	273
Control Delay (s)	1.3	0.0	14.6	81.6
Lane LOS	A		B	F
Approach Delay (s)	1.3	0.0	14.6	81.6
Approach LOS			B	F

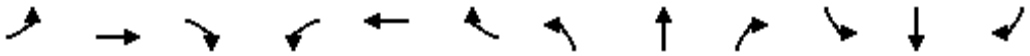
Intersection Summary			
Average Delay	22.2		
Intersection Capacity Utilization	70.6%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	12	78	394	16	105	4	350	24	5	2	129	5
Future Volume (vph)	12	78	394	16	105	4	350	24	5	2	129	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	13	85	428	17	114	4	380	26	5	2	140	5

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	526	135	411	147
Volume Left (vph)	13	17	380	2
Volume Right (vph)	428	4	5	5
Hadj (s)	-0.45	0.04	0.21	0.02
Departure Headway (s)	5.7	7.0	6.5	7.0
Degree Utilization, x	0.83	0.26	0.74	0.29
Capacity (veh/h)	616	448	530	460
Control Delay (s)	30.0	12.5	25.9	12.8
Approach Delay (s)	30.0	12.5	25.9	12.8
Approach LOS	D	B	D	B

Intersection Summary				
Delay	24.6			
Level of Service	C			
Intersection Capacity Utilization	68.8%	ICU Level of Service	C	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	5	57	35	138	91	5	34	134	52	9	102	4
Future Volume (vph)	5	57	35	138	91	5	34	134	52	9	102	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	62	38	150	99	5	37	146	57	10	111	4

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	105	254	240	125
Volume Left (vph)	5	150	37	10
Volume Right (vph)	38	5	57	4
Hadj (s)	-0.17	0.14	-0.08	0.03
Departure Headway (s)	5.1	5.1	5.0	5.2
Degree Utilization, x	0.15	0.36	0.33	0.18
Capacity (veh/h)	639	656	669	626
Control Delay (s)	8.9	11.0	10.4	9.4
Approach Delay (s)	8.9	11.0	10.4	9.4
Approach LOS	A	B	B	A

Intersection Summary				
Delay	10.2			
Level of Service	B			
Intersection Capacity Utilization	44.8%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	19	505	430	6	345	295
Future Volume (vph)	19	505	430	6	345	295
Peak Hour Factor	0.78	0.78	0.82	0.82	0.87	0.87
Hourly flow rate (vph)	24	647	524	7	397	339

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2
Volume Total (vph)	24	647	531	397	339
Volume Left (vph)	0	0	524	397	0
Volume Right (vph)	0	647	0	0	339
Hadj (s)	0.03	-0.67	0.23	0.52	-0.68
Departure Headway (s)	7.6	6.9	7.5	8.1	6.9
Degree Utilization, x	0.05	1.25	1.11	0.89	0.65
Capacity (veh/h)	463	527	492	433	511
Control Delay (s)	9.8	147.5	100.8	47.6	20.6
Approach Delay (s)	142.6		100.8	35.1	
Approach LOS	F		F	E	

Intersection Summary			
Delay	90.3		
Level of Service	F		
Intersection Capacity Utilization	62.1%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	0	2	11	1	142	16	559	7	152	797	10
Future Volume (Veh/h)	11	0	2	11	1	142	16	559	7	152	797	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	0	2	12	1	154	17	608	8	165	866	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1998	1852	872	1844	1853	612	877			616		
vC1, stage 1 conf vol	1202	1202		646	646							
vC2, stage 2 conf vol	796	650		1198	1207							
vCu, unblocked vol	1998	1852	872	1844	1853	612	877			616		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	85	100	99	92	99	69	98			83		
cM capacity (veh/h)	82	177	350	158	180	493	770			964		

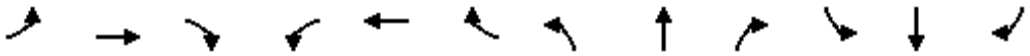
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	14	167	17	616	165	877
Volume Left	12	12	17	0	165	0
Volume Right	2	154	0	8	0	11
cSH	92	424	770	1700	964	1700
Volume to Capacity	0.15	0.39	0.02	0.36	0.17	0.52
Queue Length 95th (ft)	13	46	2	0	15	0
Control Delay (s)	51.2	18.9	9.8	0.0	9.5	0.0
Lane LOS	F	C	A		A	
Approach Delay (s)	51.2	18.9	0.3		1.5	
Approach LOS	F	C				

Intersection Summary				
Average Delay	3.0			
Intersection Capacity Utilization	65.1%	ICU Level of Service	C	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	44	7	20	57	5	94	19	350	70	162	560	47
Future Volume (Veh/h)	44	7	20	57	5	94	19	350	70	162	560	47
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	48	8	22	62	5	102	21	380	76	176	609	51
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			TWLTL	
Median storage veh)											2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1513	1484	634	1447	1472	418	660			456		
vC1, stage 1 conf vol	986	986		460	460							
vC2, stage 2 conf vol	526	498		987	1012							
vCu, unblocked vol	1513	1484	634	1447	1472	418	660			456		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	75	97	95	69	98	84	98			84		
cM capacity (veh/h)	188	231	479	200	230	635	928			1105		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	78	62	107	21	456	176	660
Volume Left	48	62	0	21	0	176	0
Volume Right	22	0	102	0	76	0	51
cSH	233	200	587	928	1700	1105	1700
Volume to Capacity	0.34	0.31	0.18	0.02	0.27	0.16	0.39
Queue Length 95th (ft)	35	31	17	2	0	14	0
Control Delay (s)	28.1	30.9	12.5	9.0	0.0	8.9	0.0
Lane LOS	D	D	B	A		A	
Approach Delay (s)	28.1	19.3		0.4		1.9	
Approach LOS	D	C					

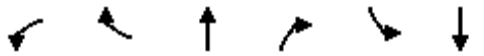
Intersection Summary				
Average Delay	4.6			
Intersection Capacity Utilization	56.3%	ICU Level of Service		B
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	0	2	4	1	6	0	403	1	27	606	22
Future Volume (Veh/h)	6	0	2	4	1	6	0	403	1	27	606	22
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	0	2	4	1	7	0	438	1	29	659	24
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1175	1168	671	1170	1180	438	683			439		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1175	1168	671	1170	1180	438	683			439		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	100	100	98	99	99	100			97		
cM capacity (veh/h)	163	188	456	166	185	618	910			1121		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	9	12	439	712
Volume Left	7	4	0	29
Volume Right	2	7	1	24
cSH	190	294	910	1121
Volume to Capacity	0.05	0.04	0.00	0.03
Queue Length 95th (ft)	4	3	0	2
Control Delay (s)	24.9	17.8	0.0	0.7
Lane LOS	C	C		A
Approach Delay (s)	24.9	17.8	0.0	0.7
Approach LOS	C	C		

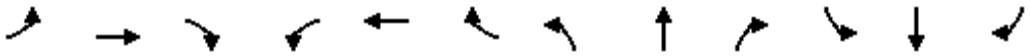
Intersection Summary				
Average Delay	0.8			
Intersection Capacity Utilization	65.2%	ICU Level of Service	C	
Analysis Period (min)	15			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	39	95	383	35	122	569
Future Volume (vph)	39	95	383	35	122	569
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	42	103	416	38	133	618

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	145	454	751
Volume Left (vph)	42	0	133
Volume Right (vph)	103	38	0
Hadj (s)	-0.33	-0.02	0.07
Departure Headway (s)	6.2	5.3	5.1
Degree Utilization, x	0.25	0.66	1.06
Capacity (veh/h)	549	668	703
Control Delay (s)	11.3	18.0	72.9
Approach Delay (s)	11.3	18.0	72.9
Approach LOS	B	C	F

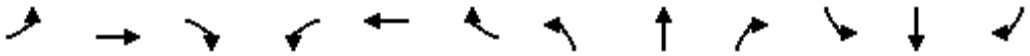
Intersection Summary			
Delay	47.8		
Level of Service	E		
Intersection Capacity Utilization	77.0%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	595	88	110	461	12	24	24	150	2	10	24
Future Volume (vph)	49	595	88	110	461	12	24	24	150	2	10	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5			4.5	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.98			1.00			0.90			0.91	
Flt Protected		1.00			0.99			0.99			1.00	
Satd. Flow (prot)		1826			1840			1662			1691	
Flt Permitted		0.94			0.79			0.95			0.98	
Satd. Flow (perm)		1716			1458			1596			1667	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	53	647	96	120	501	13	26	26	163	2	11	26
RTOR Reduction (vph)	0	7	0	0	1	0	0	133	0	0	21	0
Lane Group Flow (vph)	0	789	0	0	633	0	0	82	0	0	18	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		25.3			25.3			7.8			7.8	
Effective Green, g (s)		25.3			25.3			7.8			7.8	
Actuated g/C Ratio		0.60			0.60			0.19			0.19	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1031			876			295			308	
v/s Ratio Prot												
v/s Ratio Perm		c0.46			0.43			c0.05			0.01	
v/c Ratio		0.77			0.72			0.28			0.06	
Uniform Delay, d1		6.2			5.9			14.7			14.1	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		3.4			3.0			0.5			0.1	
Delay (s)		9.6			8.9			15.3			14.2	
Level of Service		A			A			B			B	
Approach Delay (s)		9.6			8.9			15.3			14.2	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	10.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	42.1	Sum of lost time (s)	9.0
Intersection Capacity Utilization	86.4%	ICU Level of Service	E
Analysis Period (min)	15		

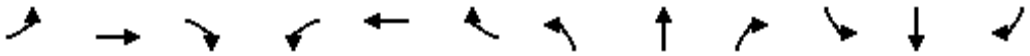
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	741	122	27	573	0	17	0	30	0	0	0
Future Volume (vph)	0	741	122	27	573	0	17	0	30	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5				
Lane Util. Factor		1.00			1.00			1.00				
Frt		0.98			1.00			0.91				
Flt Protected		1.00			1.00			0.98				
Satd. Flow (prot)		1827			1859			1671				
Flt Permitted		1.00			0.95			0.89				
Satd. Flow (perm)		1827			1766			1505				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	805	133	29	623	0	18	0	33	0	0	0
RTOR Reduction (vph)	0	8	0	0	0	0	0	28	0	0	0	0
Lane Group Flow (vph)	0	930	0	0	652	0	0	23	0	0	0	0
Turn Type		NA		Perm	NA		Perm	NA				
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		29.9			29.9			6.5				
Effective Green, g (s)		29.9			29.9			6.5				
Actuated g/C Ratio		0.66			0.66			0.14				
Clearance Time (s)		4.5			4.5			4.5				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		1203			1163			215				
v/s Ratio Prot		c0.51										
v/s Ratio Perm					0.37			c0.02				
v/c Ratio		0.77			0.56			0.11				
Uniform Delay, d1		5.4			4.2			16.9				
Progression Factor		1.00			1.00			1.00				
Incremental Delay, d2		3.2			0.6			0.2				
Delay (s)		8.6			4.8			17.1				
Level of Service		A			A			B				
Approach Delay (s)		8.6			4.8			17.1			0.0	
Approach LOS		A			A			B			A	

Intersection Summary			
HCM 2000 Control Delay	7.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	45.4	Sum of lost time (s)	9.0
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	66	363	1	0	219	445	0	5	0	194	7	17
Future Volume (vph)	66	363	1	0	219	445	0	5	0	194	7	17
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	72	395	1	0	238	484	0	5	0	211	8	18

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	468	722	5	237
Volume Left (vph)	72	0	0	211
Volume Right (vph)	1	484	0	18
Hadj (s)	0.06	-0.37	0.03	0.17
Departure Headway (s)	5.8	5.2	7.8	6.9
Degree Utilization, x	0.76	1.05	0.01	0.45
Capacity (veh/h)	608	685	412	501
Control Delay (s)	24.8	69.9	10.9	15.5
Approach Delay (s)	24.8	69.9	10.9	15.5
Approach LOS	C	F	B	C

Intersection Summary				
Delay	45.9			
Level of Service	E			
Intersection Capacity Utilization	90.5%	ICU Level of Service	E	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	262	2	0	271	270	0	2	2	228	2	76
Future Volume (vph)	31	262	2	0	271	270	0	2	2	228	2	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5			4.5	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		1.00			0.93			0.93			0.97	
Flt Protected		0.99			1.00			1.00			0.96	
Satd. Flow (prot)		1851			1737			1737			1735	
Flt Permitted		0.85			1.00			1.00			0.78	
Satd. Flow (perm)		1584			1737			1737			1402	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	34	285	2	0	295	293	0	2	2	248	2	83
RTOR Reduction (vph)	0	1	0	0	78	0	0	1	0	0	29	0
Lane Group Flow (vph)	0	320	0	0	510	0	0	3	0	0	304	0
Turn Type	Perm	NA			NA			NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		14.8			14.8			12.7			12.7	
Effective Green, g (s)		14.8			14.8			12.7			12.7	
Actuated g/C Ratio		0.41			0.41			0.35			0.35	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		642			704			604			487	
v/s Ratio Prot					c0.29			0.00				
v/s Ratio Perm		0.20									c0.22	
v/c Ratio		0.50			0.72			0.00			0.62	
Uniform Delay, d1		8.1			9.1			7.8			9.9	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.6			3.7			0.0			2.5	
Delay (s)		8.7			12.8			7.8			12.4	
Level of Service		A			B			A			B	
Approach Delay (s)		8.7			12.8			7.8			12.4	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM 2000 Control Delay	11.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	36.5	Sum of lost time (s)	9.0
Intersection Capacity Utilization	71.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	199	241	2	88	10	532	16	19	42	78	4
Future Volume (vph)	12	199	241	2	88	10	532	16	19	42	78	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5			4.5	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.93			0.99			1.00			1.00	
Flt Protected		1.00			1.00			0.96			0.98	
Satd. Flow (prot)		1726			1836			1771			1824	
Flt Permitted		0.99			0.99			0.64			0.77	
Satd. Flow (perm)		1715			1826			1196			1433	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	13	216	262	2	96	11	578	17	21	46	85	4
RTOR Reduction (vph)	0	63	0	0	6	0	0	2	0	0	2	0
Lane Group Flow (vph)	0	428	0	0	103	0	0	614	0	0	133	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		17.5			17.5			33.8			33.8	
Effective Green, g (s)		17.5			17.5			33.8			33.8	
Actuated g/C Ratio		0.29			0.29			0.56			0.56	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		497			529			670			803	
v/s Ratio Prot												
v/s Ratio Perm		c0.25			0.06			c0.51			0.09	
v/c Ratio		0.86			0.19			0.92			0.17	
Uniform Delay, d1		20.2			16.1			12.0			6.4	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		14.2			0.2			17.2			0.1	
Delay (s)		34.4			16.3			29.2			6.5	
Level of Service		C			B			C			A	
Approach Delay (s)		34.4			16.3			29.2			6.5	
Approach LOS		C			B			C			A	

Intersection Summary			
HCM 2000 Control Delay	27.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	60.3	Sum of lost time (s)	9.0
Intersection Capacity Utilization	77.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	16	365	279	19	525	517
Future Volume (vph)	16	365	279	19	525	517
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		0.96	0.95	1.00
Satd. Flow (prot)	1863	1583		1779	1787	1566
Flt Permitted	1.00	1.00		0.72	0.95	1.00
Satd. Flow (perm)	1863	1583		1349	1787	1566
Peak-hour factor, PHF	0.78	0.78	0.82	0.82	0.87	0.87
Adj. Flow (vph)	21	468	340	23	603	594
RTOR Reduction (vph)	0	301	0	0	0	328
Lane Group Flow (vph)	21	167	0	363	603	266
Confl. Bikes (#/hr)						1
Heavy Vehicles (%)	2%	2%	2%	2%	1%	1%
Turn Type	NA	Perm	Perm	NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases		4	8			2
Actuated Green, G (s)	16.5	16.5		16.5	20.7	20.7
Effective Green, g (s)	16.5	16.5		16.5	20.7	20.7
Actuated g/C Ratio	0.36	0.36		0.36	0.45	0.45
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	665	565		481	800	701
v/s Ratio Prot	0.01				c0.34	
v/s Ratio Perm		0.11		c0.27		0.17
v/c Ratio	0.03	0.30		0.75	0.75	0.38
Uniform Delay, d1	9.7	10.7		13.1	10.6	8.5
Progression Factor	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.0	0.3		6.6	4.1	0.3
Delay (s)	9.7	11.0		19.7	14.7	8.8
Level of Service	A	B		B	B	A
Approach Delay (s)	10.9			19.7	11.8	
Approach LOS	B			B	B	

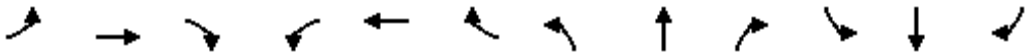
Intersection Summary			
HCM 2000 Control Delay	13.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	46.2	Sum of lost time (s)	9.0
Intersection Capacity Utilization	59.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	2	4	0	187	0	867	1	83	611	4
Future Volume (vph)	5	0	2	4	0	187	0	867	1	83	611	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5		4.5	4.5	
Lane Util. Factor		1.00			1.00			1.00		1.00	1.00	
Frt		0.96			0.87			1.00		1.00	1.00	
Flt Protected		0.97			1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1729			1615			1862		1770	1861	
Flt Permitted		0.84			1.00			1.00		0.18	1.00	
Satd. Flow (perm)		1497			1608			1862		344	1861	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	0	2	4	0	203	0	942	1	90	664	4
RTOR Reduction (vph)	0	6	0	0	109	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1	0	0	98	0	0	943	0	90	668	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		8.6			8.6			35.5		35.5	35.5	
Effective Green, g (s)		8.6			8.6			35.5		35.5	35.5	
Actuated g/C Ratio		0.16			0.16			0.67		0.67	0.67	
Clearance Time (s)		4.5			4.5			4.5		4.5	4.5	
Vehicle Extension (s)		3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		242			260			1244		229	1244	
v/s Ratio Prot								c0.51			0.36	
v/s Ratio Perm		0.00			c0.06					0.26		
v/c Ratio		0.00			0.38			0.76		0.39	0.54	
Uniform Delay, d1		18.7			19.9			5.9		4.0	4.5	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		0.0			0.9			2.7		1.1	0.4	
Delay (s)		18.7			20.8			8.6		5.1	5.0	
Level of Service		B			C			A		A	A	
Approach Delay (s)		18.7			20.8			8.6			5.0	
Approach LOS		B			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	53.1	Sum of lost time (s)	9.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	78	1	56	15	0	29	5	638	1	11	552	1
Future Volume (vph)	78	1	56	15	0	29	5	638	1	11	552	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5			4.5	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.94			0.91			1.00			1.00	
Flt Protected		0.97			0.98			1.00			1.00	
Satd. Flow (prot)		1709			1667			1862			1861	
Flt Permitted		0.79			0.89			1.00			0.99	
Satd. Flow (perm)		1397			1514			1856			1837	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	85	1	61	16	0	32	5	693	1	12	600	1
RTOR Reduction (vph)	0	51	0	0	27	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	96	0	0	21	0	0	699	0	0	613	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		7.0			7.0			26.0			26.0	
Effective Green, g (s)		7.0			7.0			26.0			26.0	
Actuated g/C Ratio		0.17			0.17			0.62			0.62	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		232			252			1148			1137	
v/s Ratio Prot												
v/s Ratio Perm		c0.07			0.01			c0.38			0.33	
v/c Ratio		0.41			0.08			0.61			0.54	
Uniform Delay, d1		15.7			14.8			4.9			4.6	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.2			0.1			0.9			0.5	
Delay (s)		16.9			14.9			5.8			5.1	
Level of Service		B			B			A			A	
Approach Delay (s)		16.9			14.9			5.8			5.1	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	6.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	42.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	57.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	63	218	473	185	243	336
Future Volume (vph)	63	218	473	185	243	336
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.5			4.5
Lane Util. Factor	1.00		1.00			1.00
Frt	0.90		0.96			1.00
Flt Protected	0.99		1.00			0.98
Satd. Flow (prot)	1649		1792			1824
Flt Permitted	0.99		1.00			0.48
Satd. Flow (perm)	1649		1792			901
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	68	237	514	201	264	365
RTOR Reduction (vph)	131	0	12	0	0	0
Lane Group Flow (vph)	174	0	703	0	0	629
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	13.8		73.7			73.7
Effective Green, g (s)	13.8		73.7			73.7
Actuated g/C Ratio	0.14		0.76			0.76
Clearance Time (s)	4.5		4.5			4.5
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	235		1368			688
v/s Ratio Prot	c0.11		0.39			
v/s Ratio Perm						c0.70
v/c Ratio	0.74		0.51			0.91
Uniform Delay, d1	39.6		4.4			8.9
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	11.5		0.3			16.7
Delay (s)	51.2		4.8			25.6
Level of Service	D		A			C
Approach Delay (s)	51.2		4.8			25.6
Approach LOS	D		A			C

Intersection Summary			
HCM 2000 Control Delay	21.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	96.5	Sum of lost time (s)	9.0
Intersection Capacity Utilization	95.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	66	363	1	0	219	445	0	5	0	194	7	17
Future Volume (vph)	66	363	1	0	219	445	0	5	0	194	7	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5			4.5	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		1.00			0.91			1.00			0.99	
Flt Protected		0.99			1.00			1.00			0.96	
Satd. Flow (prot)		1848			1694			1863			1765	
Flt Permitted		0.66			1.00			1.00			0.75	
Satd. Flow (perm)		1238			1694			1863			1375	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	72	395	1	0	238	484	0	5	0	211	8	18
RTOR Reduction (vph)	0	0	0	0	128	0	0	0	0	0	5	0
Lane Group Flow (vph)	0	468	0	0	594	0	0	5	0	0	232	0
Turn Type	Perm	NA			NA			NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		22.2			22.2			13.1			13.1	
Effective Green, g (s)		22.2			22.2			13.1			13.1	
Actuated g/C Ratio		0.50			0.50			0.30			0.30	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		620			848			550			406	
v/s Ratio Prot					0.35			0.00				
v/s Ratio Perm		c0.38									c0.17	
v/c Ratio		0.75			0.70			0.01			0.57	
Uniform Delay, d1		8.9			8.5			11.0			13.2	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		5.2			2.6			0.0			1.9	
Delay (s)		14.1			11.1			11.0			15.2	
Level of Service		B			B			B			B	
Approach Delay (s)		14.1			11.1			11.0			15.2	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	12.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	44.3	Sum of lost time (s)	9.0
Intersection Capacity Utilization	91.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

APPENDIX I

Native American Consultation

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RE: North McKay Tract Project

Ted Hernandez <ted@wiyot.us>

Fri 3/6/2020 2:40 PM

To: Estlow, Trevor <TEstlow@co.humboldt.ca.us>
Cc: Jacob Pounds <JPounds@bluelakerancheria-nsn.gov>; jpeidsness@yahoo.com <jpeidsness@yahoo.com>; Hazel James <hazel@wiyot.us>; Adam Canter <adam@wiyot.us>; Erika Cooper <erikacooper@brb-nsn.gov>; Janet Eidsness <JEidsness@bluelakerancheria-nsn.gov>; Hazel James <hazel@wiyot.us>

Hello Trevor
I will concur with Janet and Erika on the standard inadvertent discovery protocol as well.

Rra'dutwas (respectfully),
Ted Hernandez
Wiyot Chairman/Cultural Director
ted@wiyot.us
(707)733-5055
1000 Wiyot Dr
Loleta, CA., 95551

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> **From:** Erika Cooper <erikacooper@brb-nsn.gov>
> **Sent:** Thursday, March 5, 2020 12:17 PM
> **To:** Janet Eidsness <JEidsness@bluelakerancheria-nsn.gov>
> **Cc:** Estlow, Trevor <TEstlow@co.humboldt.ca.us>; Ted Hernandez <ted@wiyot.us>; Jacob Pounds <JPounds@bluelakerancheria-nsn.gov>; jpeidsness@yahoo.com; Hazel James <hazel@wiyot.us>; Adam Canter <adam@wiyot.us>
> **Subject:** Re: North McKay Tract Project
>
> Hi Trevor,
>
> Bear River does not request any further consultation for this project, but please do include the standard inadvertent discovery language.
>
> Thanks.
>
> Erika Cooper, M.A.
> Tribal Historic Preservation Officer
> Bear River Band of the Rohnerville Rancheria
> 266 Keisner Road
> Loleta, CA 95551

707-733-1900 x233 Office
707-502-5233 Cell
707-733-1727 Fax
erikacooper@brb-nsn.gov

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On Wed, Mar 4, 2020 at 2:04 PM Janet Eidsness <JEidsness@bluelakerancheria-nsn.gov> wrote:

> Trevor,
>
> I don't think survey of the water tank site is necessary, low sensitivity and already disturbed by the looks of it. I recommend that work also be conditioned with Inadvertent Archaeological Discovery.
>
> I am fine with no further SB 18 consultion…
>
> HOWEVER, I believe the Wiyot Tribe does have interests in culturally significant plants on the North McKay Tract and I'm forwarding this to their tribal ethnobotanist Adam Canter and THPO/Chair Ted Hernandez to respond to.
>
> I do not know if Bear River has further interests.
>
> Thanks,
>
> Janet P. Eidsness, THPO Blue Lake Rancheria
> P.O. Box 428 (428 Chartin Road), Blue Lake, CA 95525
> Office (707) 668-5101 ext. 1037
> jeidsness@bluelakerancheria-nsn.gov
> cell (530) 623-0663 jpeidsness@yahoo.com
>
> Jacob Pounds, Assistant THPO
> jpounds@bluelakerancheria-nsn.gov
> Office (707) 668-5101 ext. 1038
>
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From: Estlow, Trevor [mailto:TEstlow@co.humboldt.ca.us]
Sent: Tuesday, March 3, 2020 2:01 PM
To: Janet Eidsness <JEidsness@bluelakerancheria-nsn.gov>; ted@wiyot.us; Erika Cooper <erikacooper@brb-nsn.gov>
Cc: Jacob Pounds <JPounds@bluelakerancheria-nsn.gov>; jpeidsness@yahoo.com
Subject: North McKay Tract Project

Hi all-

I have inherited the North McKay Tract General Plan Amendment, Rezone and Subdivision project from Michael Wheeler and wanted to check in with you all. I see that initially, consultation was requested per SB18 and Jamie Roscoe did a survey of the site. The attached comments indicate that Blue Lake no longer wished to engage in SB 18 consultation and recommended the inadvertent discovery condition.

One, I wanted to make sure we are all on the same page and two, I wanted to check regarding a potential development outside of the original scope of Jamie's report. There is a possibility of the need for an additional water tank at an existing HCSD site (see attached maps). This would entail some grading and possible tree removal around the periphery, but not disturbance beyond that (i.e. tie in to existing infrastructure). I wanted to get your thoughts on this proposal and any recommendations you may have as it relates to SB18 and AB52.

Thanks for any input you can provide and let me know if you have any questions.

Thanks.

Trevor Estlow
Senior Planner
Planning and Building Department
707.268.3740

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