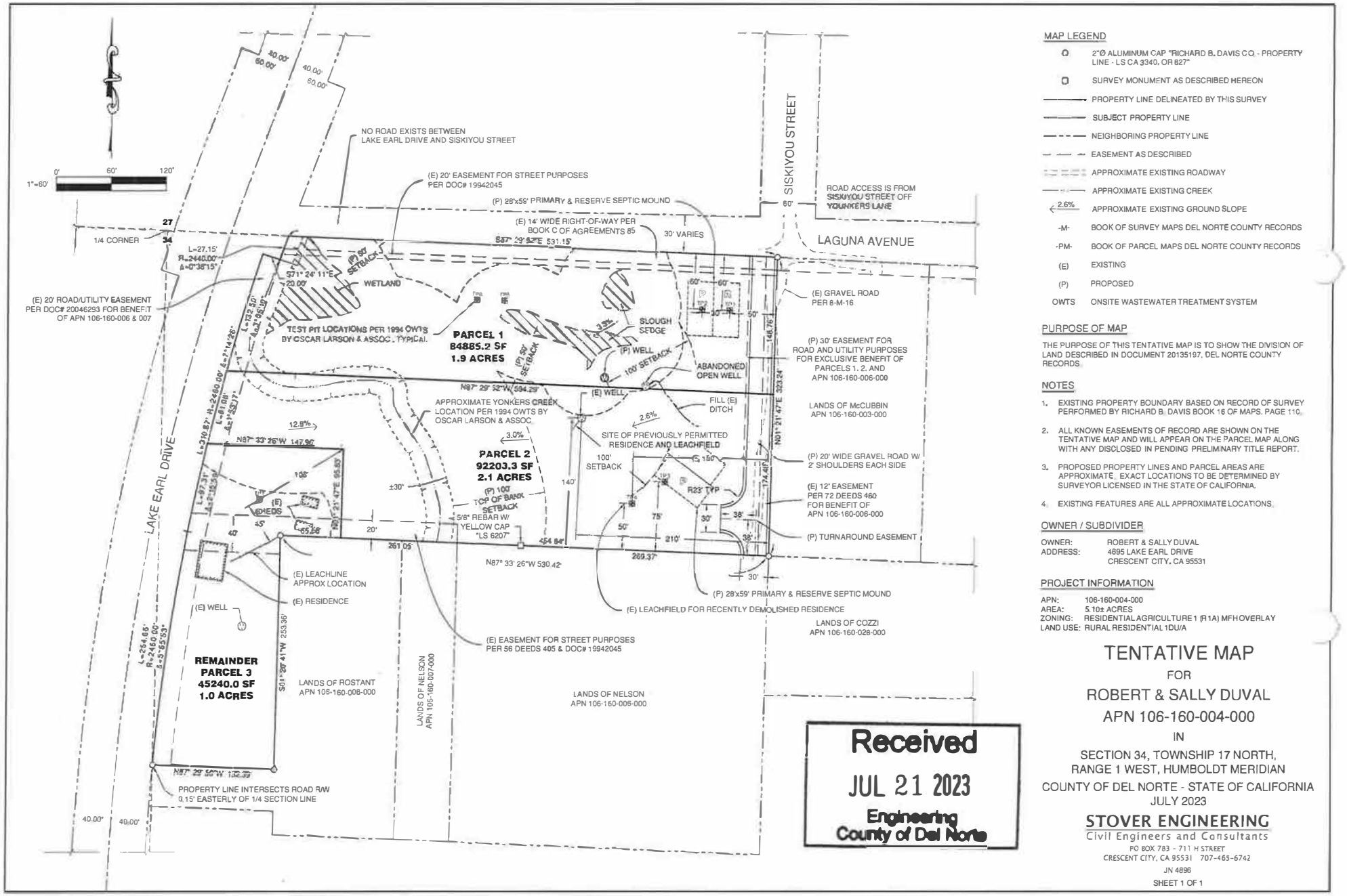


MAP LEGEND

○	2"Ø ALUMINUM CAP "RICHARD B. DAVIS C.O. - PROPERTY LINE - LS CA 3340, OR 827"
□	SURVEY MONUMENT AS DESCRIBED HEREON
———	PROPERTY LINE DELINEATED BY THIS SURVEY
———	SUBJECT PROPERTY LINE
— — —	NEIGHBORING PROPERTY LINE
— — —	EASEMENT AS DESCRIBED
	APPROXIMATE EXISTING ROADWAY
	APPROXIMATE EXISTING CREEK
2.6%	APPROXIMATE EXISTING GROUND SLOPE
-M-	BOOK OF SURVEY MAPS DEL NORTE COUNTY RECORDS
-PM-	BOOK OF PARCEL MAPS DEL NORTE COUNTY RECORDS
(E)	EXISTING
(P)	PROPOSED
OWTS	ONSITE WASTEWATER TREATMENT SYSTEM

PURPOSE OF MAP

THE PURPOSE OF THIS TENTATIVE MAP IS TO SHOW THE DIVISION OF LAND DESCRIBED IN DOCUMENT 20135197, DEL NORTE COUNTY RECORDS.

NOTES

1. EXISTING PROPERTY BOUNDARY BASED ON RECORD OF SURVEY PERFORMED BY RICHARD B. DAVIS BOOK 16 OF MAPS, PAGE 110.
2. ALL KNOWN EASEMENTS OF RECORD ARE SHOWN ON THE TENTATIVE MAP AND WILL APPEAR ON THE PARCEL MAP ALONG WITH ANY DISCLOSED IN PENDING PRELIMINARY TITLE REPORT.
3. PROPOSED PROPERTY LINES AND PARCEL AREAS ARE APPROXIMATE. EXACT LOCATIONS TO BE DETERMINED BY SURVEYOR LICENSED IN THE STATE OF CALIFORNIA.
4. EXISTING FEATURES ARE ALL APPROXIMATE LOCATIONS.

OWNER / SUBDIVIDER

OWNER: ROBERT & SALLY DUVAL
ADDRESS: 4695 LAKE EARL DRIVE
CRESCENT CITY, CA 95531

PROJECT INFORMATION

APN: 106-160-004-000
AREA: 5.10± ACRES
ZONING: RESIDENTIAL AGRICULTURE 1 (R1A) MFH OVERLAY
LAND USE: RURAL RESIDENTIAL 1DU/A

TENTATIVE MAP

FOR

ROBERT & SALLY DUVAL

APN 106-160-004-000

IN

SECTION 34, TOWNSHIP 17 NORTH,
RANGE 1 WEST, HUMBOLDT MERIDIAN

COUNTY OF DEL NORTE - STATE OF CALIFORNIA

JULY 2023

STOVER ENGINEERING
Civil Engineers and Consultants
PO BOX 783 - 711 H STREET
CRESCENT CITY, CA 95531 707-465-6742

JN 4896

SHEET 1 OF 1

Received
JUL 21 2023
Engineering
County of Del Norte



GALEA BIOLOGICAL CONSULTING

200 Raccoon Court Crescent City California 95531
Tel: 707-218-6039 E-mail: frankgalea@charter.net

BIOLOGICAL ASSESSMENT FOR PROPERTY SPLIT, APN # 106-160-004, DEL NORTE COUNTY

Submitted to: Robert and Sally Duval
4695 Lake Earl Drive
Crescent City, CA 95531

Prepared by: Frank Galea, Certified Wildlife Biologist
E-mail: frankgalea@charter.net

Galea Biological Consulting
200 Raccoon Court
Crescent City, CA 95531

Submitted: December, 2022

By:

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1.0 SUMMARY 1

A biological assessment was prepared for Robert and Sally Ducal (Applicants) for a 5.10-acre property located on Siskiyou Street in Del Norte County (Figure 1). The Applicants propose to split the property into three lots. Galea Biological Consulting (GBC) Incorporated was contracted to provide a general biological assessment to determine the potential impacts of the project on sensitive wildlife species, including federally or state listed species, and species of special concern. Additionally, GBC conducted a review of habitats within and adjacent to the project area to determine the location of any wetlands or watercourses which may be present and to ensure that such habitats were not impacted.

The property contained wetlands towards the northwest corner of the property, and Yonkers Creek flows east to west through the property. Potential habitat for the northern red-legged frog (*Rana aurora*), a local species of critical concern, was located along the creek.

The Applicant proposal to split 5.10 acres into three lots in a rural residential area should have no significant impacts upon any sensitive or rare species.

2.0 INTRODUCTION

2.1 Project Description

The Applicants propose to split a 5.10-acre property into three lots. Lot 3, which would become 1 acre in size, already has a home, well and outbuildings on it. The other two lots would be approximately 1.9 and 2.09 acres in size. Lots 1 and 2 will have road access via Siskiyou Street to the east, while lot 3 will retain access via Lake Earl Drive.

2.2 Environmental Setting

The property is located on the east side of Lake Earl Drive, just south of Younkers Lane. The area is rural residential. Immediately west of the property is a busy throughfare, Lake Earl Drive. Lake Earl is located .5 miles to the west.

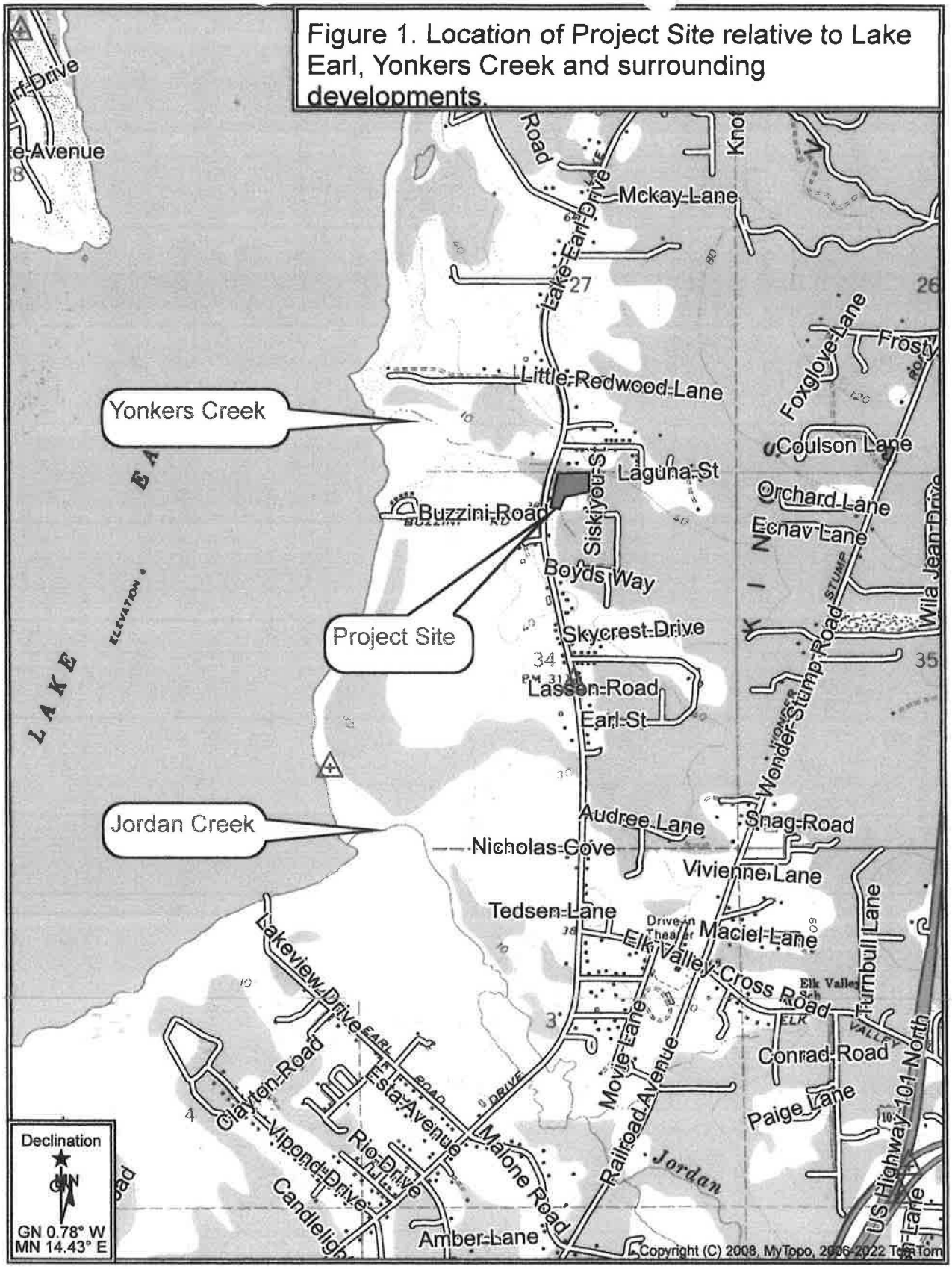
Yonkers Creek flows east to west through the property before running under Lake Earl Drives via a culvert. Yonkers Creek is considered an anadromous fish stream as it empties into Lake Earl and used to support runs of anadromous fish from the lake.

Much of the property is wooded, with redwood (*Sequoia sempervirons*) and Sitka spruce *(Picea sitchensis*) trees scattered throughout.

2.3 Physical Environment

The climate of northern California is characterized as Mediterranean, with cool, wet winters and warm, dry summers with frequent fog. Proximity to the Pacific Ocean produces high levels of humidity and results in abundant fog and fog drip precipitation. The maritime influence diminishes with distance from the coast, resulting in lesser amounts of fog, drier summer conditions and more variable temperatures. Annual precipitation in the project watershed ranges from 60 - 150 inches occurring primarily as rain during the winter months. Air temperatures measured in the Crescent City area vary from 41°F to 67°F annually.

Figure 1. Location of Project Site relative to Lake Earl, Yonkers Creek and surrounding developments.



SCALE 1:24000

0 1

Mile

3.0 METHODS

3.1 Records Search

A records search of the California Department of Fish and Wildlife's (CDF&W) Natural Diversity Data Base (December, 2022) was conducted to determine if special-status plant or animal species had been previously reported near the project area. Listed and sensitive wildlife species potentially occurring within two miles of the project area are presented in Table 1.

Special-Status Species and Significant Natural Communities.

The following special-status species and sensitive community types were considered in this evaluation:

- Species that are listed, or designated as candidates for listing, as threatened or endangered under the federal Endangered Species Act;
- Species that are listed, or designated as candidates for listing as rare (plants), threatened, or endangered under the California Endangered Species Act;
- Wildlife species listed by the CDF&W as species of special concern or fully protected species;
- Communities designated by the CDFW to be "significant" natural communities;
- Plant species on List 1A, List 1B, and List 2, in the California Native Plant Society's Inventory of Rare and Endangered Vascular Plants of California;
- Species that meet the definition of rare or endangered under the California Environmental Quality Act (under Section 15380 of CEQA, a species not included on any formal list "shall nevertheless be considered rare or endangered if the species can be shown to meet the criteria" for listing); and
- Taxa of special concern by local agencies.

3.2 Regulatory Context

The project is located within the geographic range of several special- status plant and wildlife species. Biological resources on the site may be subject to agency jurisdictions and regulations, as described below.

(a) U.S. Fish and Wildlife Service (USFWS). The USFWS has jurisdiction over species listed as threatened or endangered under the federal Endangered Species Act (ESA). The ESA protects listed species from "take," broadly defined as to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct." An activity is defined as a "take" even if unintentional or accidental. An endangered plant or wildlife species is one that is considered in danger of becoming extinct throughout all, or a significant portion of its range. A threatened species is one that is likely to become endangered within the foreseeable future. In addition to endangered and threatened species, the USFWS has a list of candidate species, which are those for which the USFWS currently has enough information to support a proposal for listing. Section 9 of the ESA and its applicable regulations restrict certain activities with respect to endangered and threatened plants. However, these restrictions are less stringent than those applicable to fish and wildlife species. These provisions prohibit the removal of, malicious damage to, or destruction of any listed plant species "from areas under federal jurisdiction." Listed plants may not be cut, dug up, damaged or destroyed, or removed from any other area (including private lands) in knowing violation of a state law or regulation.

(b) Raptors & Migratory Bird Treaty Act (MBTA). The MBTA (16 United States Code [USC] 703) enacts the provisions of treaties between the United States, Great Britain, Mexico, Japan, and the Soviet Union and authorized the U.S. Secretary of the Interior to protect and regulate the taking of migratory birds. The MBTA sets seasons and bag limits for hunted species and protects migratory birds, their occupied nests, and their eggs (16 USC 703, 50 CFR 21, 50 CFR 10).

(c) U.S. Army Corps of Engineers. Under Section 404 of the Clean Water Act, the U.S. Army Corps of Engineers is responsible for regulating the discharge of fill material into waters of the U.S. Waters of the U.S. and their lateral limits are defined in 33 CFR (Code of Federal Regulations) Part 328.3 (a) and include streams that are tributary to navigable waters and their adjacent wetlands. Wetlands that are not adjacent to waters of the U.S. are termed "isolated wetlands" and may be subject to U.S. Army Corps of Engineers jurisdiction.

(d) California Department of Fish and Wildlife (CDF&W). The CDF&W has jurisdiction over threatened or endangered species that are formally listed by the State under the California Endangered Species Act (CESA). The CESA is similar to the federal Endangered Species Act both in process and substance; it is intended to provide additional protection to threatened and endangered species in California.

The CESA does not supersede the federal Endangered Species Act, but operates in conjunction with it. Species may be listed as threatened or endangered under both acts (in which case the provisions of both State and federal laws would apply) or under only one act. The California endangered species laws prohibit the taking of any plant listed as threatened, endangered, or rare. In California, an activity on private lands (such as development) will violate Section 9 of the Endangered Species Act if a plant species, listed under both State and federal endangered species laws, is intentionally removed, damaged, or destroyed. Under the State Fish and Game Code, the CDF&W also has jurisdiction over species that are designated as "fully protected." These species are protected against direct impacts. The CDF&W maintains informal lists of species of special concern, which are broadly defined as plants and wildlife that are of concern to CDF&W because of population declines and restricted distributions, and/or they are associated with habitats that are declining in California. These species, as well as threatened and endangered species, are inventoried in the California Natural Diversity Database.

The CDF&W also exerts jurisdiction over the bed and banks of watercourses according to the provisions of Section 1600 to 1616 of the Fish and Game Code. The Department requires a Streambed Alteration Permit for the fill or removal of any material from any natural drainage. CDF&W's jurisdiction extends to the top of banks and may include the outer edge of riparian vegetation canopy cover.

(e) California Native Plant Society (CNPS). The CNPS has developed lists of plants of special concern in California. A CNPS List IA plant is a species, subspecies, or variety that is considered to be extinct. A List 1B plant is considered rare, threatened, or endangered in California and elsewhere. A List 2 plant is considered rare, threatened, or endangered in California, but is more common elsewhere. A List 3 plant is a species for which CNPS lacks necessary information to determine if it should be assigned to a list or not. A List 4 plant has a limited distribution in California. All List 1 and List 2 plant species meet the requirements of Section 1901, Chapter 10 (Native Plant Protection Act) or Sections 2062 and 2067 (California Endangered Species Act) of the CDF&G Code, and are eligible for State listing. Therefore, List 1 and 2 species should be considered under CEQA. Very few List 3 and List 4 plants are eligible for listing, but may be locally important, and their listing status could be elevated if conditions change.

(f) CEQA Guidelines, Section 15380. Although threatened and endangered species are protected by specific federal and State statutes, the CEQA Guidelines in Section 15380(b) provide that a species not included on the federal or State lists of protected species may be considered rare or endangered if the species can be shown to meet certain specified criteria. These criteria have been modeled after the definitions in the federal Endangered Species Act and the CDFG Code. This section was included in the CEQA Guidelines primarily to deal with situations in which a public lead agency is reviewing a project that may have a significant effect on a species that has not yet been listed by either the USFWS or CDFW. Thus, CEQA provides a lead agency with the ability to protect a species from a project's potential impacts until government agencies have an opportunity to designate the species as protected, if warranted.

(g) Regional Water Quality Control Board. Pursuant to Section 401 of the Clean Water Act, projects that apply for a U.S. Army Corps of Engineers permit for discharge of dredge or fill material, and projects that qualify for a Nationwide Permit, must obtain water quality certification from the Regional Water Quality Control Board (RWQCB) that the project will uphold State water
quality standards. Alternatively, the RWQCB may elect to notify an applicant that the State may issue Waste Discharge Requirements in lieu of a Section 401 certification.

(h) California Coastal Commission. The California Coastal Commission (CCC) is a state regulatory agency whose primary role is the protection of coastal resources. This project is not located within the coastal appeal zone, therefore CCC protection measures would not apply.

3.3 Field Investigation

A field investigation of the project area was conducted in November of 2022. All potential wildlife habitats within the project area and within 1.3 mile around the project area were assessed for their potential for listed wildlife species. Certified Wildlife Biologist Frank Galea conducted the field review. The entire property was searched for potential wetlands. Trees were searched with high-power binoculars for nests. A wetland delineation was conducted to determine the extent of wetlands on the property. Wetland sample points were accurately mapped using a resource-grade GPS.

3.4 Wetland Delineation

Wetlands in the access corridor were delineated pursuant to the 1987 Corps of Engineers *Wetlands Delineation Manual* (Environmental Laboratory 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual Western Mountains, Valleys, and Coast Region (Version 2.0) (ACOE 2010).

Hydrophytic Vegetation: The wetland indicator status of each plant species in the sample plots was determined using the ACOE 2014 National Wetland Plant List. The indicator status of plants is based on the estimated probability of the species occurring in wetlands. The indicator status categories are:

Obligate Wetland Plants (OBL) Almost always occur in wetlands >99% frequency
Facultative Wetland Plants (FACW) Usually occur in wetlands 67%-99%
Facultative Plants (FAC) Equally occur wetlands and non-wetlands 33%-67%
Facultative Upland Plants (FACU) Sometimes occur in wetlands 1%-33%
Obligate Upland Plants (UPL) Rarely occur in wetlands <1%

If more than 50% of the dominant plants are OBL, FACW, or FAC, the vegetation is considered to be hydrophytic. Dominance of plants within the plots was determined using the "50/20" rule.

Hydric Soil

Indicators of hydric soil include, but are not limited to, a strong hydrogen sulfide (rotten egg) odor, redox concentrations, depleted matrix, and high organic matter content. Soil colors were determined by using a standard Munsell soil color chart.

Wetland Hydrology

Indicators of wetland hydrology include, but are not limited to, standing surface water, high water table, soil saturation, sediment deposits, soil cracks, and oxidized root channels along living roots.

4.0 RESULTS AND POTENTIAL IMPACTS

4.1 Records Search

The CDF&W Natural Diversity Data Base (CNDDB, 2022) provided a summary of those federal and state-listed and sensitive wildlife species and their mapped locations (Figure 2), reported to have occurred at least once within one mile of the project site.

A list of those sensitive or listed animal species potentially occurring in the vicinity of the project area is presented in Table 1, including the common and scientific names for each. The listing status of each species and if potential habitat (as determined by GBC, based upon a review of habitat available within the project area) was located within or near the project area is also indicated in Table 1.

4.2 Field Investigation

The eastern portion of the property had previously included a structure, well and outbuildings. Remnants of this previous structure remain within an open, grassy area approximately 0.4 acres in size, located on what will become Lot 2.

Except for the open area in Lot 2, the remainder of lots 1 and 2 were covered with mid-seral redwood and spruce forest with intermittent openings. Yonkers Creek flowed from south to north, through the western portions of Lots 1 and 2, before exiting the property in the extreme northwest corner.

Yonkers Creek was found to have relatively high banks and was well shaded by an overstory of mature redwoods and spruce. The creek contained a bed of black, rounded rock, with little indication of overfill by sediment.

The understory on lots 1 and 2 included evergreen huckleberry (*Vaccinium ovatum*), salal (*Gaultheria shalon*), bracken fern (*Pteridium aquilinum*) swordfern (*Polystichum munitum*), Hooker's fairybells (*Disporum hookeri*), false lily-of-the-valley (*Maianthemum dilatatum*) and Douglas iris (*Iris douglasiana*). Patches of slough sedge (*Carex obnupta*) was found along the banks of the creek, and in relatively open pathways which appeared to be old skid trails from historic logging.

BIOS Map (DUVAL PROJECT)



The southwest corner of the property, which will become Lot 3, is already developed with an existing home and outbuildings. Road access to this house is via Lake Earl Drive.

4.3 Habitat Analysis and Impact Assessment for Fish and Wildlife

Table 1 shows there were no records of threatened or endangered wildlife species in or near the project area. The following is an analysis of sensitive species potentially present and an assessment of their potential to be impacted by this project.

Table 1. Sensitive Wildlife Species Potentially Occurring Within 1 mile of the Proposed Project Area
(From CNDDB 2022 Quad search and GWC sources)

Common Name	Latin Name	Federal Status	State Status	Breeding Habitat in Project Area?	Forage Habitat in Project Area?
INVERTEBRATES					
Chase juga	*Juga chacei*	None	CSC	Yes	Yes
FISH					
S. OR./N. CA Coho salmon	*Oncorhynchus kisutch*	FT	T	No	No
Coastal cutthroat trout	*Oncorhynchus clarki clarki*	SC	NL	Yes	Yes
Summer-run steelhead trout	*Oncorhynchus mykiss irrideus*	None	CCE	No	No
AMPHIBIANS					
Del Norte salamander	*Plethodon elongatus*	SC	CSC	No	No
Northern red-legged frog	*Rana aurora aurora*	NL	CSC	Yes	Yes

Codes:

Federal Status
- FE Federally endangered
- FT Federally threatened
- FC Federal candidate for listing
- FSC Federal species of concern
- FPE Federally proposed for endangered listing

State Status
- CE California endangered
- CT California threatened
- CCE California candidate for endangered listing
- CSC California species of concern (CDFG)
- CFP California fully protected

The CNDDB noted the presence of the Chace juga snail as occurring in Yonkers Creek. This species prefers cold, highly oxygenated streams, a habitat type which is available within the project area. This project would have no impacts on this species. Yonkers Creek should be protected from future developments by at least a 50-foot non-development buffer from top of bank.

Salmonids

Yonkers Creek historically sustained populations of the federally-threatened Coho salmon and steelhead trout, a candidate species for State listing. However, barriers to fish migration upstream, and changes in Lake Earl management, have negatively impacted fish populations in and around Lake Earl. Yonkers Creek has the potential to be a salmonid spawning stream, and recent improvements in stream crossings under roadways will help improve conditions.

This project will have no impacts on salmonids or other fish species in Yonkers Creek, as there are no planned developments near the creek. Yonkers Creek and its associated fisheries should be protected from future developments by at least a 50-foot non-development buffer from top of bank.

Northern red-legged frog - The northern red legged frog was relatively common in riparian areas and ponds over most of non-desert areas of California. Loss of habitat and predation by non-native frogs has reduced or eliminated populations in southern and central California, but not the in northwest. It is designated as a Species of Special Concern by the California Department of Fish and Wildlife. Although this species is not a protected species in Del Norte County and is locally relatively abundant, population levels are not doing well within the remainder of its range.

In Del Norte County the red-legged frog is a relatively common species in a wide range of habitats. This species breeds in moist areas, requiring standing water. It feeds on a variety of invertebrates, and can forage in wet fields, backyards, and in woodlots. There is potential for the red-legged frog to occur in and around Yonkers Creek.

This project should not impact the red-legged frog as there are no planned developments near the creek. Yonkers Creek should be protected from future developments by at least a 50-foot non-development buffer from top of bank.

Table 1 also includes the Del Norte salamander. This species prefers soils with loose rock, providing interstitial spacing, within a forested area with canopy closure. The overall assessment area does not contain such habitats, preferred habitat for this species was not found in the project area as the ground does not provide the interstitial spacing preferred by this species.

Black-tailed deer (*Odicoileus hemionus*), black bear (*Ursus americanus*) and other local species are known in the area. No heron or egret rookeries are known of nearby and none were observed during field surveys. A barred owl (*Strix varia*) was observed on the property during field work however no nest sites were observed in any trees.

4.4 Sensitive Plants

The plants on the California Native Plant Society Inventory list 1B and 2 are considered rare, endangered, and threatened plants pursuant to Section 15380 of the California Environmental Quality Act (CEQA). The plants on these lists meet the definitions under the Native Plant Protection Act and/or the California Endangered Species Act of the California Department of Fish and Game Code and are eligible for state listing.

Table 2. Sensitive Plant Species Potentially Occurring in Assessment Area Based on 2022 CNDDB Records.

Common Name	Scientific Name	Federal Status	CNPS List	Preferred Habitat	Habitat in Project Area?
Western Lily	*Lilium occidentale*	FE	2B.2	Bogs, fens, wet gaps in coastal conifer forest	No

Codes:

Federal Status
- FE Federally endangered
- FT Federally threatened
- FSC Federal species of concern

State Status
- 2B.2 California endangered
- 2.2 Rare

Table 2 lists one sensitive plant species recorded in the CNDDB as occurring in the general area. The western lily is a federally listed species, and potential habitat for this species may be available on or near the property. However, even if present, this species would not be affected by this project as there is no planned development on the property at this time.

4.5 Wetland Habitats

Wetland habitats were located in the far northwest corner of the property, on the east bank of Yonkers Creek (Figure 3). Wetlands extended approximately 227 feet into the property from the West property line (Sample point 1b).

Patches of slough sedge were potential indicators of hydric conditions; however, soil samples were not hydric in nature at sample points from the patches of slough sedge. Redwood trees grew over and all around the patches of slough sedge, which does not suggest hydric conditions, and no other wetland plants were found in association with the patches. Slough sedge is not a good indicator of wetland attributes as high annual rainfall allows this species to grow in upland habitats in Del Norte County.

A 163-foot-long drainage ditch was located in the eastern portion of the property, in the midst of the open clearing. The ditch apparently drains from southeast to northwest, however there was no outlet at the end of the ditch, and hydric conditions were not found at its terminus.

LEGEND

—G— MUNICIPAL UTILITY SUPPLY
—G— GAS SUPPLY
—W— WATER SUPPLY
—E— ELECTRICAL SUPPLY
— — — PROPERTY LINE
—P— PROPANE LINE

GENERAL NOTES

1. Designated parking for clean air vehicles, in new projects or additions or alterations that add 10 or more vehicular parking spaces, provide designated parking for any combination of low-emitting,fuel-efficient and carpool/van pool vehicles as follows: CGBSC 5.106.5.2 (10 or 25 parking spaces require one (1) clean air vehicle parking space.
2. Adequate sanitary facilities shall be provided per the requirements of Chapter 4 of the California Plumbing Code and CPC Table 422.1.
3. The Developer shall submit a pad elevation certification prepared by a licensed land surveyor or registered civil engineer to the Chief Building Official, certifying that the pad elevations and building location (setbacks) are pursuant to the approved plans prior to receiving a foundation inspection.
4. The project shall comply with the mark sheetthrow of the outdoor potable water reduction requirements of the California Green Building Standards Code 4.304 and the Montana Water Efficient Landscape Ordinance. Please note this on the plans.
5. The final utility layout will be finalized during the Improvement Plan/Building Permit Plan review.
6. All the utilities lines on the project are new proposed. The final utility layout will be finalized during the Improvement Plan/Building Permit Plan review Stream.

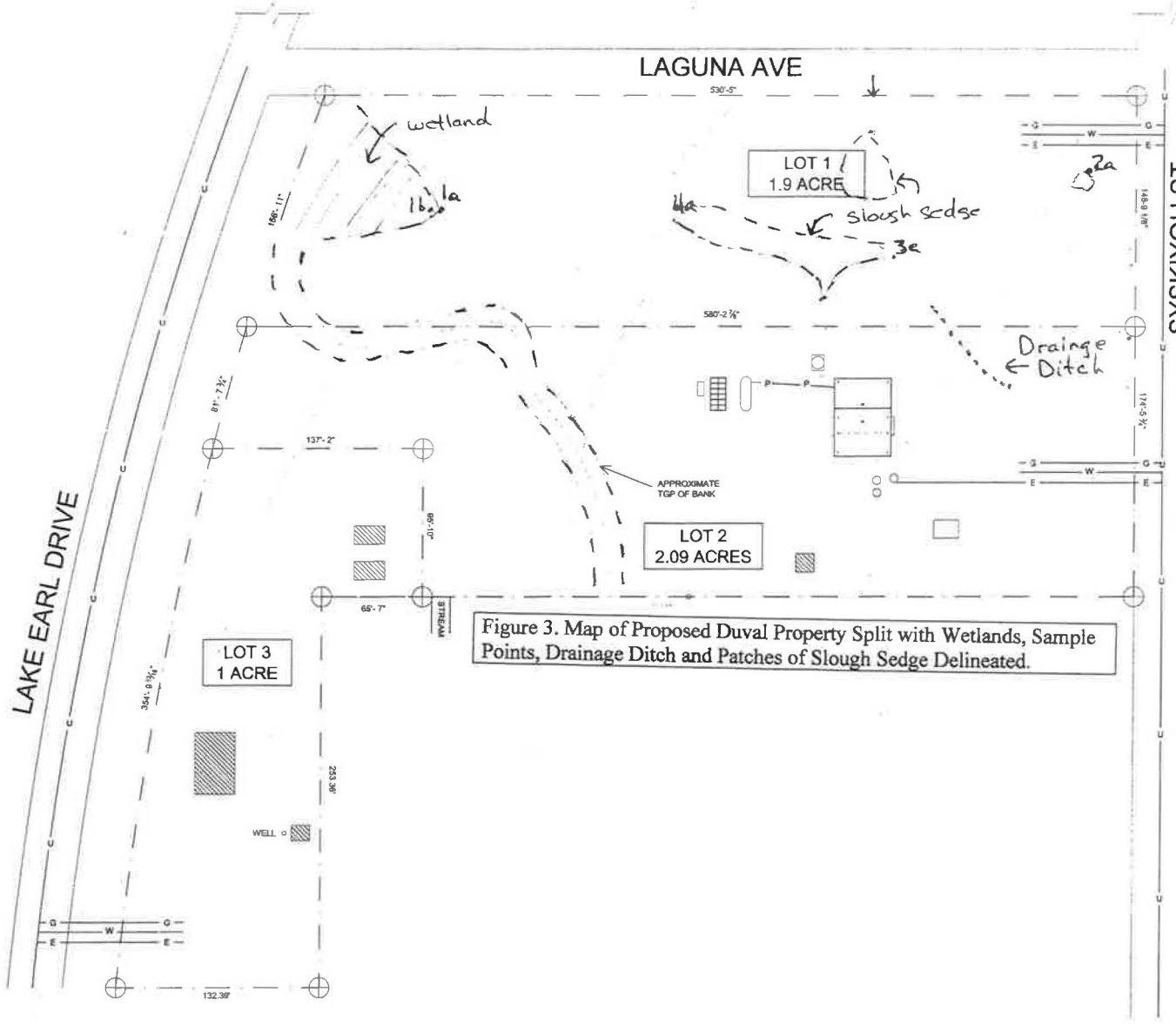


Figure 3. Map of Proposed Duval Property Split with Wetlands, Sample Points, Drainage Ditch and Patches of Slough Sedge Delineated.

UTILITY SITE PLAN
SCALE: 1/32" =1'-0"

Wilkins Studio
San Francisco CA

RELEASED AFC NOT FOR CONSTRUCTION

Architect
Wilkins Studio Architects
Contact: Karen Wilkins, AIA
785 Quintana Rd # 180
Morro Bay, CA 93442
(415) 273-9654

Owner
Thomas R. & Betty J. Duvall
Lake Earl Drive, Crescent City, CA

Subdivision of Property

4695 Lake Earl Dr, Crescent City CA 95531
APN: 106-160-004-000

No.	Description	Date
	Submitted	

Utility Site Plan

C1-3

Scale: As Noted

Ownership of Documents: This Document and the ideas incorporated herein, as an instrument of professional service are the property of Wilkins Studio Architects and are not to be used in whole or in part for any other project without the written authorization of Wilkins Studio Architects.

Along the far northern fence line, a drainage channel from an adjacent property was located, draining into the northern section of the property. Eighteen feet south of this drainage channel a patch of slough sedge was established, however wetland conditions were not found within this patch.

To summarize, the property contains wetland in the far northwest corner, however the remainder of the property does not support wetland habitats, except for Yonkers Creek.

5.0 STAFF QUALIFICATIONS

Habitat assessment and report writing for this project was conducted by Principal Biologist, Frank Galea. Frank is the primary Biological Consultant and owner of Galea Biological Consulting, established in 1989. Frank is certified as a Wildlife Biologist through the Wildlife Society. Frank's qualifications include a Master of Science Degree in Wildlife Management from Humboldt State University and a Bachelor of Science in Zoology from San Diego State University. Frank has been assessing habitat and conducting field surveys for Threatened and Endangered species in Del Norte County for over 30 years. Frank has taken an accredited class on wetland delineation through the Wetland Training Institute, and has successfully completed a Watershed Assessment and Erosion Treatment course through the Salmonid Restoration Federation.

APPENDIX A

CNDDB SEARCH SPECIES LIST

Scientific_Name	Common_Name	Federal_St	State_Stat	CDF	CA_Rare_Plant_R
Ascaphus truei	Pacific tailed frog	None	None	SSC	-
Plethodon elongatus	Del Norte salamander	None	None	WL	-
Rana aurora	northern red-legged frog	None	None	SSC	-
Rana boylii pop. 1	foothill yellow-legged frog - nort	None	None	SSC	-
Rhyacotriton variegatus	southern torrent salamander	None	None	SSC	-
Haliaeetus leucocephalus	bald eagle	Delisted	Endangere	FP	-
Cerorhinca monocerata	rhinoceros auklet	None	None	WL	-
Fratercula cirrhata	tufted puffin	None	None	SSC	-
Ardea alba	great egret	None	None	-	-
Ardea herodias	great blue heron	None	None	-	-
Egretta thula	snowy egret	None	None	-	-
Nycticorax nycticorax	black-crowned night heron	None	None	-	-
Charadrius nivosus nivosus	western snowy plover	Threatenec	None	SSC	-
Riparia riparia	bank swallow	None	Threatenec	-	-
Pelecanus occidentalis californic	California brown pelican	Delisted	Delisted	FP	-
Nannopterum auritum	double-crested cormorant	None	None	WL	-
Coturnicops noveboracensis	yellow rail	None	None	SSC	-
Strix occidentalis caurina	Northern Spotted Owl	Threatenec	Threatenec	-	-
Empidonax traillii brewsteri	little willow flycatcher	None	Endangere	-	-
Acipenser medirostris pop. 2	green sturgeon - northern DPS	None	None	SSC	-
Eucyclogobius newberryi	tidewater goby	Endangere	None	-	-
Thaleichthys pacificus	eulachon	Threatenec	None	-	-
Entosphenus tridentatus	*Pacific lamprey*	None	None	SSC	-
Lampetra richardsoni	western brook lamprey	None	None	SSC	-
Oncorhynchus clarkii clarkii	coast cutthroat trout	None	None	SSC	-
Oncorhynchus kisutch pop. 2	coho salmon - southern Oregon	Threatenec	Threatenec	-	-
Oncorhynchus mykiss irideus po	steelhead - Klamath Mountains	None	None	SSC	-
Oncorhynchus tshawytscha pop	chinook salmon - southern Oreg	None	None	SSC	-
Bombus occidentalis	western bumble bee	None	None	-	-
Limnephilus atercus	Fort Dick limnephilus caddisfly	None	None	-	-
Coenonympha tullia yontockett	Yontocket satyr	None	None	-	-
Speyeria zerene hippolyta	Oregon silverspot butterfly	Threatenec	None	-	-
Erethizon dorsatum	North American porcupine	None	None	-	-
Coastal and Valley Freshwater M	Coastal and Valley Freshwater M	None	None	-	-
Sulcaria spiralifera	twisted horsehair lichen	None	None	-	1B.2
Usnea longissima	Methuselah's beard lichen	None	None	-	4.2
Angelica lucida	sea-watch	None	None	-	4.2
Arnica spathulata	Klamath arnica	None	None	-	4.3
Hesperevax sparsiflora var. brev	short-leaved evax	None	None	-	1B.2
Cardamine angulata	seaside bittercress	None	None	-	2B.1
Cardamine nuttallii var. gemmat	yellow-tubered toothwort	None	None	-	3.3
Erysimum concinnum	bluff wallflower	None	None	-	1B.2
Sabulina howellii	Howell's sandwort	None	None	-	1B.3
Carex serpenticola	serpentine sedge	None	None	-	2B.3
Carex viridula ssp. viridula	green yellow sedge	None	None	-	2B.3
Arctostaphylos nortensis	Del Norte manzanita	None	None	-	4.3

Lathyrus japonicus	seaside pea	None	None	-	2B.1
Dicentra formosa ssp. oregana	Oregon bleeding heart	None	None	-	4.2
Ribes laxiflorum	trailing black currant	None	None	-	4.3
Phacelia argentea	sand dune phacelia	Proposed T	None	-	1B.1
Iris bracteata	Siskiyou iris	None	None	-	3.3
Iris innominata	Del Norte County iris	None	None	-	4.3
Pinguicula macroceras	horned butterwort	None	None	-	2B.2
Sidalcea malviflora ssp. patula	Siskiyou checkerbloom	None	None	-	1B.2
Sidalcea oregana ssp. eximia	coast checkerbloom	None	None	-	1B.2
Monotropa uniflora	ghost-pipe	None	None	-	2B.2
Pityopus californicus	California pinefoot	None	None	-	4.2
Oenothera wolfii	Wolf's evening-primrose	None	None	-	1B.1
Cypripedium californicum	California lady's-slipper	None	None	-	4.2
Listera cordata	*heart-leaved twayblade*	*None*	*None*	-	4.2
Castilleja litoralis	Oregon coast paintbrush	None	None	-	2B.2
Oxalis suksdorfii	Suksdorf's wood-sorrel	None	None	-	4.3
Anthoxanthum nitens ssp. niten	vanilla-grass	None	None	-	2B.3
Pleuropogon refractus	nodding semaphore grass	None	None	-	4.2
Gilia capitata ssp. pacifica	Pacific gilia	None	None	-	1B.2
Gilia millefoliata	dark-eyed gilia	None	None	-	1B.2
Polemonium carneum	Oregon polemonium	None	None	-	2B.2
Darlingtonia californica	California pitcherplant	None	None	-	4.2
Chrysosplenium glechomifolium	Pacific golden saxifrage	None	None	-	4.3
Mitellastra caulescens	leafy-stemmed mitrewort	None	None	-	4.2
Viola palustris	alpine marsh violet	None	None	-	2B.2

APPENDIX B

WETLAND DELINETION FORMS

WETLAND DETERMINATION DATA FORM

Project/Site: Duval City/County: Del Norte Sampling Date: 11/15/22

Applicant/Owner: Robert & Sally Duval State: CA Sampling Point: 1a

Investigator(s): F. Galea Section, Township, Range: Sec. 27, T17N, R1W

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 1-2

Subregion (LRR or MLRA): MLRA1 Lat: 41 4945.25 Long: 124 09 53.14 Datum: WGS 1984

Soil Map Unit Name: NWI classification: OL

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ 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: East of Yonkers Creek

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum moss (D8) **(LRR T, U)**

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:

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)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
10	3/2 5YR					dry, few 3" rocks in soil		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked 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)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ___ 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 observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☒

Remarks:

WETLAND DETERMINATION DATA FORM

Project/Site: Duval City/County: Del Norte Sampling Date: 11/15/22

Applicant/Owner: Robert & Sally Duval State: CA Sampling Point: 1b

Investigator(s): F. Galea Section, Township, Range: Sec. 27, T17N, R1W

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 1-2

Subregion (LRR or MLRA): MLRA1 Lat: 41 4945.25 Long: 124 09 53.14 Datum: WGS 1984

Soil Map Unit Name: NWI classification: OL

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ 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 _____ No X	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum moss (D8) **(LRR T, U)**

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:

From 1b to NW corner of property is wetlands, then Yonkers Creek.

VEGETATION (Five Strata) – Use scientific names of plants. Sampling Point: 15

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: _____)			
1. Sequoia sempervirens	30	Y	FACU
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		
50% of total cover: _____ 20% of total cover: _____			
Sapling Stratum (Plot size: _____)			
1. Rhamnus purshiana	20	N	UP
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		
50% of total cover: _____ 20% of total cover: _____			
Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		
50% of total cover: _____ 20% of total cover: _____			
Herb Stratum (Plot size: _____)			
1. Carex obnupta	40	Y	OBL
2. Symplocarpus foetidus	10	N	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	0 = Total Cover		
50% of total cover: _____ 20% of total cover: _____			
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total cover: _____ 20% of total cover: _____			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (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:	0 (A)		0 (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]
- ☐ Problematic Hydrophytic Vegetation[1] *(Explain)*

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: 15

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
10	3/2 7.5 YR			moist,	with		mottling in soil	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked 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)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ___ 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 observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes [X] No [ ]

Remarks:

WETLAND DETERMINATION DATA FORM

Project/Site: Duval City/County: Del Norte Sampling Date: 11/15/22

Applicant/Owner: Robert & Sally Duval State: CA Sampling Point: 2A

Investigator(s): F. Galea Section, Township, Range: Sec. 27, T17N, R1W

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 1-2

Subregion (LRR or MLRA): MLRA1 Lat: 41 4945.25 Long: 124 09 53.14 Datum: WGS 1984

Soil Map Unit Name: NWI classification: OL

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ 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: Slough sedge only, not a good indicator in D. N. County.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum moss (D8) **(LRR T, U)**

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:

Patch of slough sedge in a low area, 20' x 10'.

No other hydrophites.

VEGETATION (Five Strata) – *Use scientific names of plants.*

Sampling Point: 2a

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: _____)			
1. Sequoia sempervirens	50	Y	FACU
2. Alnus rubra	10	N	FAC
3.			
4.			
5.			
6.			
	0	= Total Cover	
50% of total cover: _____	20% of total cover: _____		
Sapling Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
6.			
	0	= Total Cover	
50% of total cover: _____	20% of total cover: _____		
Shrub Stratum (Plot size: _____)			
1. Cortaderia selloana	5	N	FACU
2.			
3.			
4.			
5.			
6.			
	0	= Total Cover	
50% of total cover: _____	20% of total cover: _____		
Herb Stratum (Plot size: _____)			
1. Carex obnupta	50	Y	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	0	= Total Cover	
50% of total cover: _____	20% of total cover: _____		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
50% of total cover: _____	20% of total cover: _____		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (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: 0 (A)	0 (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]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes [X] No [ ]

Remarks: (If observed, list morphological adaptations below).

Only slough sedge hydrophytic; not a good indicator in D.N. County.

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)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
10	3/3 7.5 YR						dry, crumbly soil.	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked 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)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ___ 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 observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☒

Remarks:

WETLAND DETERMINATION DATA FORM

Project/Site: Duval City/County: Del Norte Sampling Date: 11/15/22

Applicant/Owner: Robert & Sally Duval State: CA Sampling Point: 3a

Investigator(s): F. Galea Section, Township, Range: Sec. 27, T17N, R1W

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 1-2

Subregion (LRR or MLRA): MLRA1 Lat: 41 4945.25 Long: 124 09 53.14 Datum: WGS 1984

Soil Map Unit Name: NWI classification: OL

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ 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:
3a is on the edge of patch of slough sedge, not a good indicator.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum moss (D8) **(LRR T, U)**

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:
East side of slough sedge patch.

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: 3a

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus rubra	40	Y	FAC
2. Morella californica	10	N	FACW
3.			
4.			
5.			
6.			
	0 = Total Cover		

50% of total cover: _____ 20% of total cover: _____

Sapling Stratum (Plot size:)			
1. Rhamnus purshiana	20	N	UP
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		

50% of total cover: _____ 20% of total cover: _____

Shrub Stratum (Plot size:)			
1. Vaccinium parvifolium	20	N	FACU
2. Vaccinium ovatum	40	Y	FACU
3. Gaultheria shallon	20	N	FACU
4.			
5.			
6.			
	0 = Total Cover		

50% of total cover: _____ 20% of total cover: _____

Herb Stratum (Plot size:)			
1. Carex obnupta	5	N	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	0 = Total Cover		

50% of total cover: _____ 20% of total cover: _____

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		

50% of total cover: _____ 20% of total cover: _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (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:	0 (A)		0 (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]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks: (If observed, list morphological adaptations below).

West of 3a is large slough patch.

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)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
10		3/3	7.5 YR			dry,	minimum	signs of mottles

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked 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)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

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- ___ Reduced Vertic (F18) **(outside MLRA 150A,B)**
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- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ___ 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 observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☒

Remarks:

RECEIVED
MAY 26 2023
PLANNING
COUNTY OF DEL NORTE

GALEA BIOLOGICAL CONSULTING

200 Raccoon Court Crescent City California 95531
Tel: 707-218-6039 E-mail: frankgalea@charter.net

ADDENDUM TO BIOLOGICAL ASSESSMENT FOR PROPERTY SPLIT, APN # 106-160-004, DEL NORTE COUNTY

This addendum supplies additional information needed for the Duval property split.

Upon investigation, Yonkers Creek was found to flow from the southeast to the northwest, and is on average 30 feet wide, bank to bank.

The small ditch found on the east side of proposed Lot 2 is not a drainage ditch, but a surface water catchment ditch which leads northwest to an abandoned, open well site. Apparently, the ditch was historically dug to improve the water supply to the well. There are no wetlands associated with this ditch.

The small patch of slough sedge found in the northeast corner of the proposed Lot 1 does not constitute a wetland, as soils and hydrology are not supportive of such a determination.

It is recommended that Yonkers Creek, a Class 1 system with potential for anadromous fish runs, should have a 100-foot non-development buffer. Wetlands delineated on the proposed Lot 1 should have a non-development buffer of 50 feet. As the wetlands on the proposed Lot1 are essentially non-functional wetlands, and are only patches of slough sedge, it is my opinion that a well and water line within the 50 foot buffer would not cause any negative impacts to wetlands on the property.

Received
JUL 21 2023
Engineering
County of Del Norte

Oscar Larson & Associates
Consulting Engineers • Land Surveyors

317 Third Street • P.O. Box 3806 • Eureka • CA 95502 • (707) 445-2043 • FAX (707) 445-8230

Mr Hubert Duke
1451 Temple Street
Stockton CA 95206

Reply to: OL:04274:TLB:30495

27 April 1994

Subject: Onsite Sewage Disposal Evaluation - APN 106-016-04

Dear Mr. Duke:

At your request, Oscar Larson & Associates conducted a site evaluation on 21 and 24 March 1994. The purpose of the testing was to determine soil suitability for leachfield sites of a proposed subdivision on the subject parcel. It is our understanding that three parcels plus a remainder are planned, with all parcels containing at least one acre.

We conducted evaluations for both primary and reserve wastewater disposal fields on each of the proposed parcels. Please refer to the site map for test pit and percolation pit locations. The disposal areas are relatively flat-lying and heavily vegetated with redwoods and alders. Drainage for the parcels trends to be in southerly and westerly directions.

Our site work revealed that the water table is shallow, ranging from 2.5 feet to greater than 9.0 feet in depth. Based on this information, a Wisconsin mound sewage disposal system is the only system that is allowed by Del Norte County ordinances and state standards for three of the four parcels to be created.

A soils exploration test pit (TP7) was logged and a percolation test (P7) was conducted for the reserve leachfield area of the existing residence. Results conclude that a standard leachfield system can be constructed. Design and support calculations for the reserve area are enclosed.

Elsewhere, percolation testing (P1 through P6) was conducted near each primary and reserve area test pits (see site map) to determine the maximum percolation rate for the proposed parcels. Percolation rates ranged from 7 to 40 minutes per inch and are suitable for a mound disposal system. There is sufficient area for each mound at the test pit sites. A preliminary mound system design, using an assumed wastewater loading (three-bedroom home) and 40 minutes per inch percolation rate, is also enclosed. A final site-specific disposal mound design will be required prior to each parcel development, and a topographic survey will be necessary at that time to ensure proper mound positioning.

You should be aware that any clearing and grubbing in the proposed wastewater disposal areas should be done with extreme care to not alter the depth or permeability of the surface soils or site drainage patterns. If you find it to be necessary, we can assist you in the development of a grading plan and assessing the impacts to the wastewater disposal sites.

I trust this report provides the necessary information for presentation to the Del Norte County Planning Division for tentative map evaluation. If you have any questions or concerns, please feel free contacting Steve Paynter or myself. We have enjoyed working with you on this important project.



Sincerely,

OSCAR LARSON & ASSOCIATES

Timothy L. Boese, P.E.

TLB:ikb2

Encl.

OSCAR LARSON
& ASSOCIATES
CONSULTING ENGINEERS
& LAND SURVEYORS

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Client HUBERT DIKE Project MINOR SUBDIVISION APN 106-16-04

By TRB Date 4/27/94 Ckd. by _____ Job No. 30495 Sheet 1 of 1

ON-SITE WASTEWATER SOILS EVALUATION

TABLE OF CONTENTS

DESCRIPTION	PAGE #
SITE EVALUATION SUMMARY	1
SITE MAP	2
SOIL EXPLORATION TEST LOG	3-9
SOIL PERCOLATION TEST DATA	10-16
STANDARD LEACHFIELD SYSTEM DESIGN (for EXIST. RESIDENCE RESERVE LEACHFIELD)	17-19
PRELIMINARY WISCONSIN MOUND DESIGN (for PROPOSED UNDEVELOPED PARCELS)	20-26

REGISTERED PROFESSIONAL ENGINEER
TIMOTHY L. BOESE
No. 40536
CIVIL
STATE OF CALIFORNIA

26 Sheets of 26

Osca, Larson & Associates

SITE EVALUATION SUMMARY

OWNER: HUBERT DUKE DATE: 3/20/94

ADDRESS: 1451 TEMPLE ST. JOB NO. 30495

STOCKTON, CA 95206 A.P.N. 106-16-04

LOCATION: LAKE EARL DRIVE AND LAGUNA, CRESCENT CITY, CA.

LOT SIZE: 1 AC WATER SYSTEM PRIVATE (PROPOSED)

GROUND SLOPE ±2%

SETBACKS (Del Norte County Minimum)	SEPTIC TANK	LEACHFIELD
Property Line	(10')	(10')
Well	(100')	(100')
Water Line	(10')	(10')
Stream	(100')	(100')
Drainage Channel	(50')	(50')
Ocean, Lake, etc.	(50')	(100')
Bluff or cutbank	(25')	(25')

SEE SITE MAP

PRIMARY AREA SITES: TP2, TP4, & TP5

REPLACEMENT AREA SITES: TP1, TP3, TP6, & TP7

OTHER EXCAVATIONS: P1, P2, P3, P4, P5, P6 & P7

DEPTH TO HARDPAN, BEDROCK, ETC.: +8'FT

DEPTH TO GROUNDWATER: 2.5 FT TO +9.0 FT

DEPTH TO MOTTLING: NOT ENCOUNTERED.

OTHER FACTORS: WISCONSIN MOUND SYSTEM DESIGN FOR TP1, TP2, TP3, TP4, TP5, & TP6, STANDARD SYSTEM DESIGN FOR TP7.

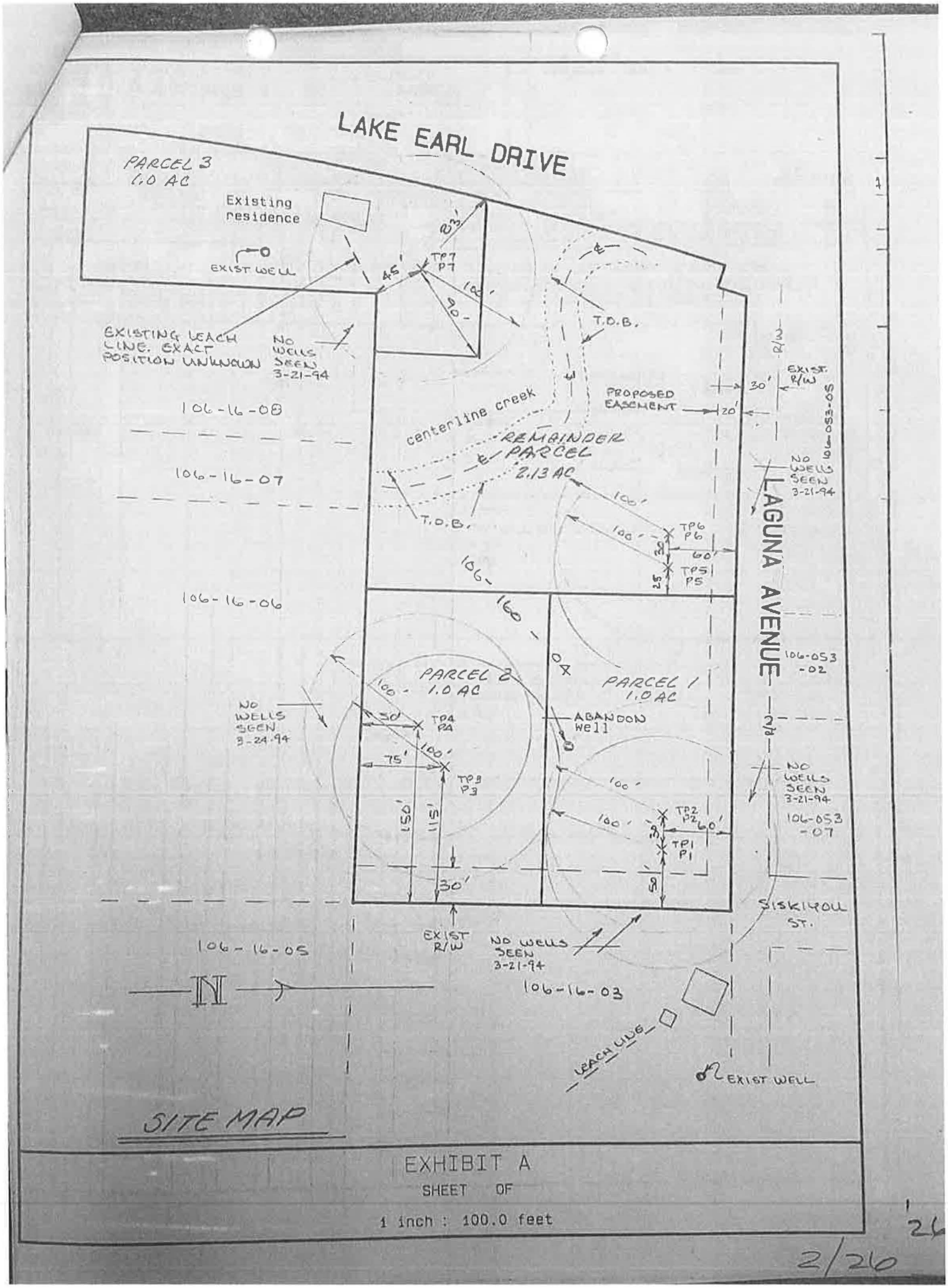
SOIL ANALYSIS ZONE: T.A. NOT PERFORMED PERCOLATION RATE: 7-40 MPI

DEPTH OF SOIL UNDER LEACHFIELD REQUIRED: 2 FT (MOUND) 5 FT (STANDARD) ACTUAL DEPTH AVAILABLE: 2.5 FT (MOUND) +5 FT (STANDARD)

REPLACEMENT AREA AVAILABLE: YES ADEQUATE: YES

OTHER COMMENTS:

1/26



SITE MAP

EXHIBIT A

SHEET OF

1 inch : 100.0 feet

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& Associates
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FAX (707) 464-9791

EXPLORATION

TEST LOG

PROJECT NAME = Hubert Duke | PROJECT NO = 30495 | SAMPLE DATE = 3/24/94

HOLE NUMBER = #1 | HOLE TYPE = BACKHOE | LOGGED BY = [illegible] | HOLE ELEV. = — | DATUM = —

LAB DATA: MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSION (PSF)	LIQUID LIMIT	PLASTICITY INDEX	RELATIVE COMPACTION	SAMPLE	SOIL TYPE	DEPTH (FEET)	SOIL DESCRIPTION: SOIL, COLOR, MOISTURE, CONSISTENCY, REMARKS, WATER LEVEL(S) AND DATE(S) (UNIFIED SOIL CLASSIFICATION SYSTEM)
							CL	0–1	CLAY LOAM SOFT MOIST COMMON ROOTS DARK BROWN 10YR 3/3 ↙ ABRUPT
					95% MPR	TP 1	SC	1–3	CLAYEY SAND SOFT - FIRM MOIST - WET FEW ROOTS ▽ 3/24/94 YELLOWISH BROWN 10YR 4/3 ↙ ABRUPT
							SC	3–6	CLAYEY SAND WITH RIVER GRAVELS FIRM WET YELLOWISH BROWN 10YR 4/3 ↙ VERY GRADUAL
							SC	6–8	CLAYEY SAND FIRM - HARD WET LIGHT OLIVE BROWN 2.5Y 5/4
								8–14	↑ BOTTOM OF HOLE

3/24

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EXPLORATION TEST LOG

PROJECT NAME = Hubert Duke | PROJECT NO = 30495 | SAMPLE DATE = 3/21/94

HOLE NUMBER = #2 | HOLE TYPE = BACKHOE | LOGGED BY = Sa | HOLE ELEV. = — | DATUM = —

LAB DATA: MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSION (PSF)	LIQUID LIMIT	PLASTICITY INDEX	RELATIVE COMPACTION	SAMPLE	SOIL TYPE	DEPTH (FEET)	SOIL DESCRIPTION
							CL	0	CLAY LOAM SOFT MOIST COMMON ROOTS DARK BROWN 10YR 3/3
					TYPE	TP2	SC	1	CLAYEY SAND SOFT - FIRM MOIST - WET FEW ROOTS ABRUPT ▽ 3/24/94 YELLOWISH BROWN 10YR 4/3
								2	
								3	ABRUPT
								4	CLAYEY SAND SOME RIVER GRAVELS FIRM WET YELLOWISH BROWN 10YR 4/3
							SC	5	
								6	VERY GRADUAL
								7	CLAYEY SAND FIRM - HARD WET LIGHT OLIVE BROWN 2.5Y 5/4
							SC	8	
								9	BOTTOM OF HOLE
								10	
								11	
								12	* NOTE, LEFT PIT OPEN UNTIL 3/24/94
								13	
								14	

4/26

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EXPLORATION TEST LOG

PROJECT NAME = Hubert Duke | PROJECT NO = 30495 | SAMPLE DATE = 3/24/94

HOLE NUMBER = #3 | HOLE TYPE = BACKHOE | LOGGED BY = [illegible] | HOLE ELEV. = — | DATUM = —

LAB DATA: Moisture Content (%)	Dry Density (PCF)	Unconfined Compression (PSF)	Liquid Limit	Plasticity Index	Relative Compaction	Sample	Soil Type	Depth (Feet)	SOIL DESCRIPTION: Soil, Color, Moisture, Consistency, Remarks, Water Level(s) and Date(s) (Unified Soil Classification System)
					27 MPH		CL	0–1	CLAY LOAM, DARK BROWN 10YR 3/3, SOFT, MOIST
						TP3			ABRUPT
							SC	2–3	CLAYEY SAND, YELLOWISH BROWN 10YR 5/4, SOFT, MOIST–WET, ▽ 3/24/94
								4	ABRUPT
							SC	5–7	CLAYEY SAND WITH RIVER GRAVELS, YELLOWISH BROWN 10YR 5/4, FIRM, WET
									GRADUAL
							SP	8–9	SAND, SOME RIVER GRAVELS, OLIVE 5Y4/3, FIRM, WET
								10	
								11	
								12	
								13	
								14	

5/26

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EXPLORATION TEST LOG

PROJECT NAME = HUBERT DUKE | PROJECT NO = 30495 | SAMPLE DATE = 3/24/94

HOLE NUMBER = #4 | HOLE TYPE = BACKHOE | LOGGED BY = SM | HOLE ELEV. = — | DATUM = —

LAB DATA									SOIL DESCRIPTION
MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSION (PSF)	LIQUID LIMIT	PLASTICITY INDEX	RELATIVE COMPACTION	SAMPLE	SOIL TYPE	DEPTH (FEET)	SOIL, COLOR, MOISTURE, CONSISTENCY, REMARKS, WATER LEVEL(S) AND DATE(S) (UNIFIED SOIL CLASSIFICATION SYSTEM)
					180 HPF		CL	0–1	CLAY LOAM — DARK BROWN, 10YR 3/3 SOFT MOIST
						TP4	SC	1–4	CLAYEY SAND — YELLOWISH BROWN 10YR 5/4 SOFT MOIST 3/24/94 ▽
							SC	4–8	CLAYEY SAND WITH RIVER GRAVELS — YELLOWISH BROWN 10YR 5/4 FIRM WET GRADUAL
							SP	8–9	SAND — OLIVE 5Y 4/3 SOME RIVER GRAVELS FIRM, WET

CR6

6/26

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EXPLORATION

TEST LOG

PROJECT NAME = HUBERT DUKE | PROJECT NO = 30495 | SAMPLE DATE = 3/21/94

HOLE NUMBER = #5 | HOLE TYPE = BACKHOE | LOGGED BY = [illegible] | HOLE ELEV. = — | DATUM = —

LAB DATA: MOISTURE CONTENT (%)	DAY DENSITY (PCF)	UNCONFINED COMPRESSION (PSF)	LIQUID LIMIT	PLASTICITY INDEX	RELATIVE COMPACTION	SAMPLE	SOIL TYPE	DEPTH (FEET)	SOIL DESCRIPTION: SOIL, COLOR, MOISTURE, CONSISTENCY, REMARKS, WATER LEVEL(S) AND DATE(S) (UNIFIED SOIL CLASSIFICATION SYSTEM)
							CL	0	CLAY LOAM — DARK BROWN 10YR 3/3 SOFT, MOIST, COMMON ROOTS
						TP5	SC	1	CLAYEY SAND — STRONG BROWN 7.5YR 5/8 SOME RIVER GRAVELS — ABRUPT FIRM DAMP FEW ROOTS
					IMPERVIOUS			2	CLEAR
							SC	3	CLAYEY SAND — YELLOWISH BROWN 10YR 5/4 WITH RIVER GRAVELS FIRM DAMP – WET ▽ 3/24/94
								4	DIFFUSE
							SC	5	CLAYEY SAND — YELLOWISH BROWN 10YR 5/6 WITH RIVER GRAVELS FIRM WET
								6	
								7	ABRUPT
							SW	8	SAND — OLIVE 5Y 5/4 FIRM – HARD WET SOME
								9	BOTTOM OF HOLE
								10	
								11	NOTE, LEFT PIT OPEN UNTIL 3/24/94
								12	
								13	
								14	

TP6

7/26

PAGE 8 MISSING FROM
DEL NORTE COUNTY COPY OF
1994 OSCAR LARSON OWTS REPORT

Oscar Larson
& Associates
Consulting Engineers &
Land Surveyors
825 F STREET
P.O. BOX 1600
CRESCENT CITY, CA 95531
(707) 464-9708
FAX (707) 464-9791

EXPLORATION
TEST LOG

PROJECT NAME = HUBERT DUKE | PROJECT NO = 30495 | SAMPLE DATE = 3/21/94

HOLE NUMBER = #7 | HOLE TYPE = BACKHOE | LOGGED BY = [signature] | HOLE ELEV. = — | DATUM = —

LAB DATA: MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSION (PSF)	LIQUID LIMIT	PLASTICITY INDEX	RELATIVE COMPACTION	SAMPLE	SOIL TYPE	DEPTH (FEET)	SOIL DESCRIPTION: SOIL, COLOR, MOISTURE, CONSISTENCY, REMARKS, WATER LEVEL(S) AND DATE(S) (UNIFIED SOIL CLASSIFICATION SYSTEM)
							SC	0–2	CLAY LOAM SOFT DAMP COMMON ROOTS DARK RED 10R 3/6 ABRUPT
					HPH	TP7	SC	2–6	CLAYEY SAND WITH RIVER GRAVELS FIRM DAMP YELLOWISH BROWN 10YR 4/4 ABRUPT
							SP	6–7	SAND FIRM-HARD MOIST OLIVE 5Y 4/4
							SP	7–8	SAND HARD MOIST PARTLY CEMENTED GRADUAL OLIVE 5Y 4/4
								9–14	BOTTOM OF HOLE NO GROUND WATER FOUND.

TP6

9/26

A # 32

DATE 3/24/94

SOIL PERCOLATION TEST DATA

Owner: HUBERT DUKE

AP. No.: 106-16-04

Address: —

Water Supply: private ✓

Phone: _____

public _____

Test By: GM

Soil Type: CLAYEY SAND

Water Table 2.5 FT.

Job No. 30495

TEST HOLE NO. 1

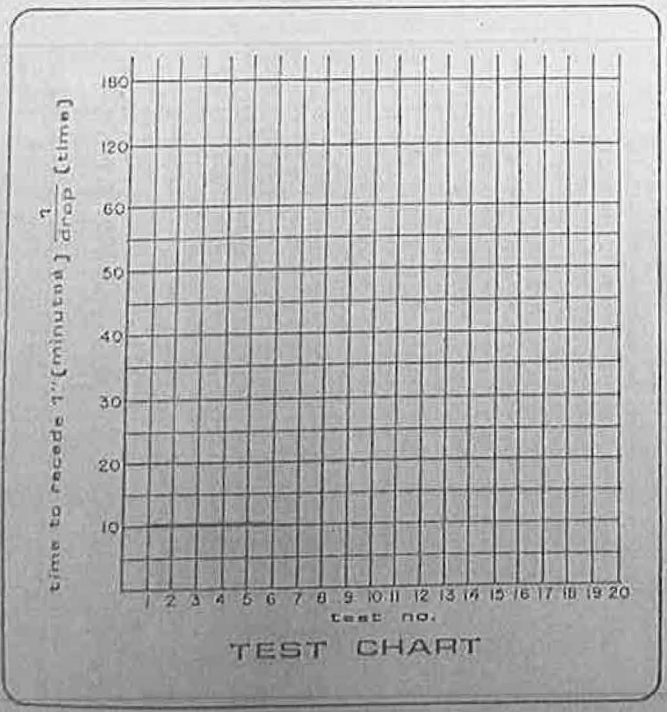
Test No.	Time fill	Time meas	Min.	Drop (in.)	Rate
1	15:00	15:20	20	2.0	10
2	15:20	15:40	20	2.0	10
3	15:40	16:00	20	2.0	10
4	16:00	16:20	20	2.0	10
5	16:20	16:40	20	2.0	10
6	16:40	17:00	20	2.0	10
7					
8					
9					
10					

Test No.	Time fill	Time meas.	Min.	Drop (in.)	Rate
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

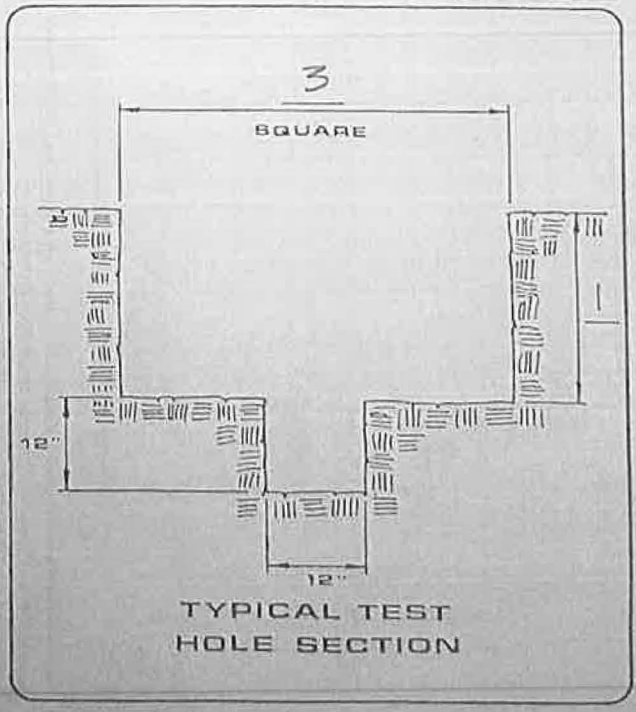
Max. Percolation Rate = 5 min./inch

Min. Percolation Rate = 60 min./inch

Stabilization Rate (min./in.) = 10



TEST CHART



TYPICAL TEST HOLE SECTION

10/26

OLA # 32

DATE 3/1/94

SOIL PERCOLATION TEST DATA

Owner: Hubert Duke

AP. No.: 106-16-04

Address: —

Water Supply: private ✓

Phone: _____

public _____

Test By: Sm

Soil Type: CLAYEY SAND

Water Table 2.5 FT.

Job No. 30495

TEST HOLE NO. 2

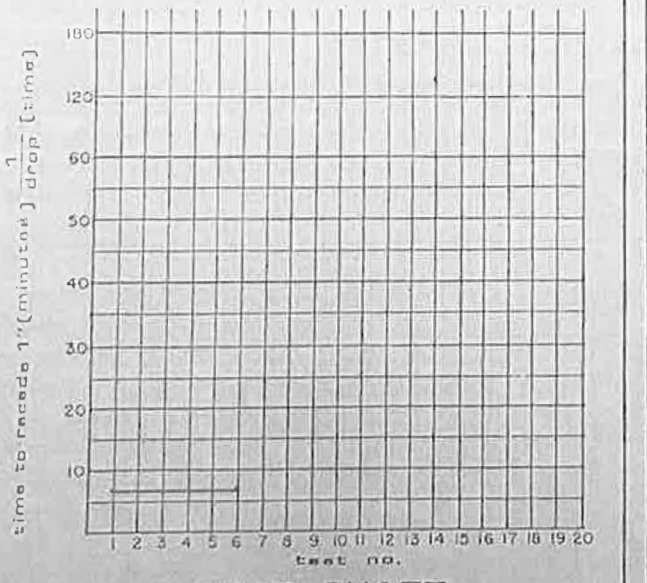
Test No.	Time fill	Time meas	Min.	Drop (in.)	Rate
1	15:45	16:05	20	2 3/4	7
2	16:05	16:25	20	2 3/4	7
3	16:25	16:45	20	2 3/4	7
4	16:45	17:05	20	2 3/4	7
5	17:05	17:25	20	2 3/4	7
6	17:25	17:45	20	2 3/4	7
7					
8					
9					
10					

Test No.	Time fill	Time meas.	Min.	Drop (in.)	Rate
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

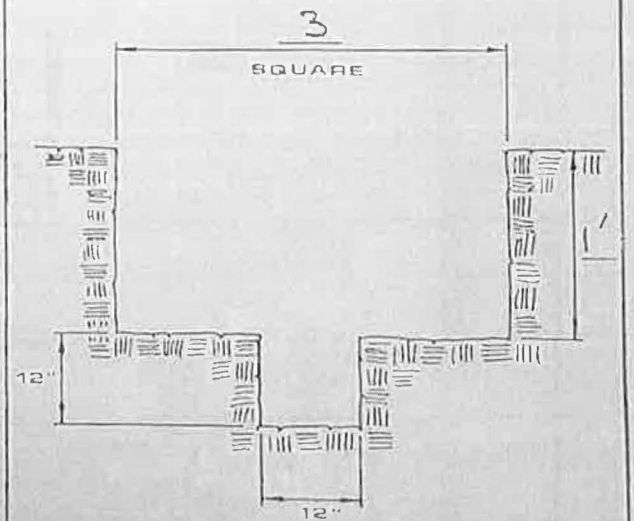
Max. Percolation Rate = 5 min./inch

Min. Percolation Rate = 60 min./inch

Stabilization Rate (min./in.) = 7



TEST CHART



TYPICAL TEST HOLE SECTION

11/26

LA # 38

Date: 3/24/94

SOIL PERCOLATION TEST DATA

Owner: HUBERT DUKE

AP. No.: 106-16-04

Address: _____

Water Supply: private ✓

Phone: _____

public _____

Test By: _____

Soil Type: CLAY LOAM

Water Table 3.0 FT

Job No. 30465

TEST HOLE NO. 3

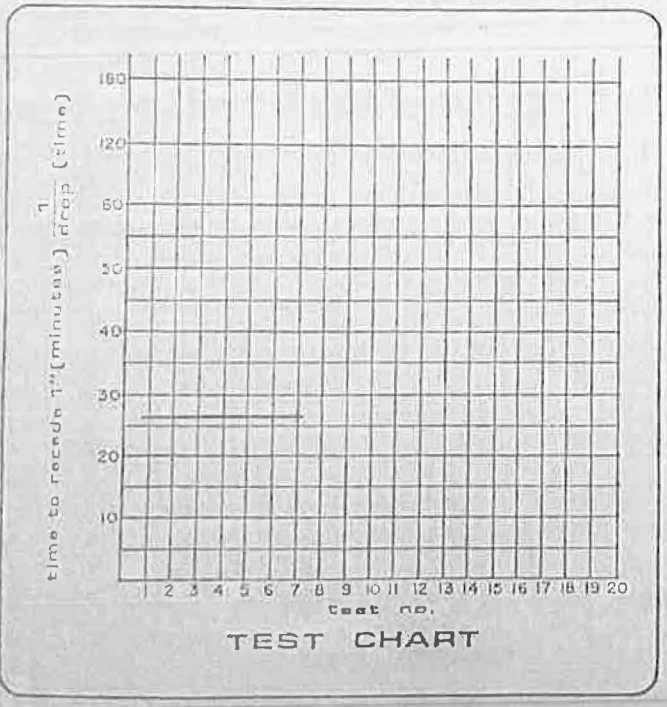
Test No.	Time fill	Time meas	Min.	Drop (in.)	Rate
1	15:05	15:25	20	3/4	27
2	15:25	15:45	20	3/4	27
3	15:45	16:05	20	3/4	27
4	16:05	16:25	20	3/4	27
5	16:25	16:45	20	3/4	27
6	16:45	17:05	20	3/4	27
7					
8					
9					
10					

Test No.	Time fill	Time meas.	Min.	Drop (in.)	Rate
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

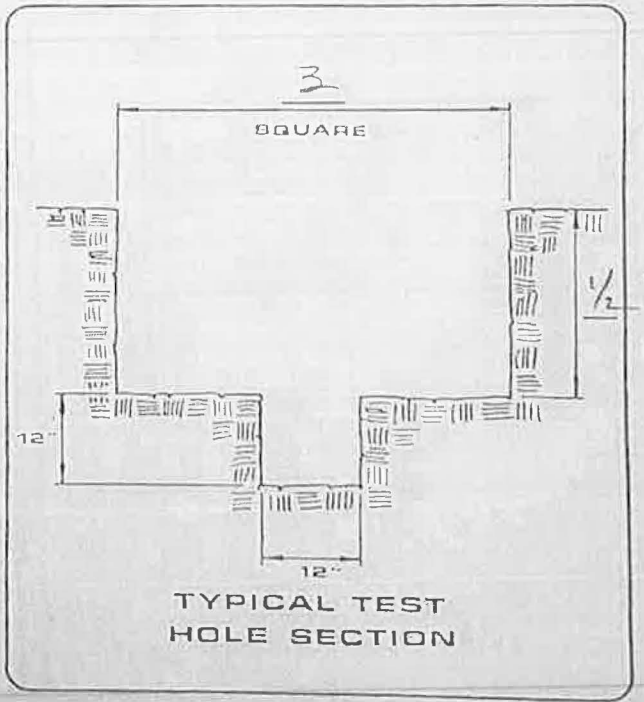
Max. Percolation Rate = 5 min./inch

Min. Percolation Rate = 60 min./inch

Stabilization Rate (min./in.) = 27



TEST CHART



TYPICAL TEST HOLE SECTION

12/26

LA # 38

DATE 1/24/94

SOIL PERCOLATION TEST DATA

Owner: HUBERT PUKE AP. No.: 106-16-04

Address: _____ Water Supply: private ✓

Phone: _____ public _____

Test By: _____ Soil Type: CLAY LOAM

Water Table 4.0 FT Job No. 30495

TEST HOLE NO. 4

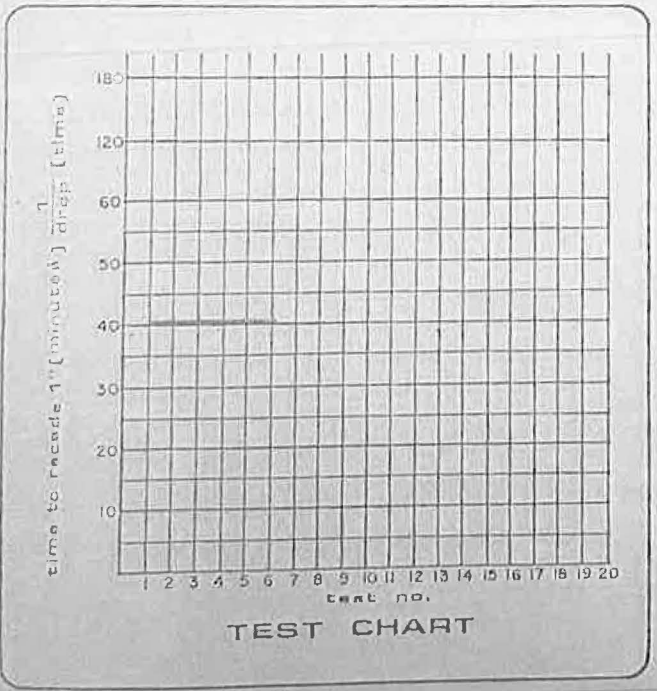
Test No.	Time fill	Time meas.	Min.	Drop (in.)	Rate
1	15:06	15:26	20	1/2	40
2	15:26	15:46	20	1/2	40
3	15:46	16:06	20	1/2	40
4	16:06	16:26	20	1/2	40
5	16:26	16:46	20	1/2	40
6	16:46	17:06	20	1/2	40
7					
8					
9					
10					

Test No.	Time fill	Time meas.	Min.	Drop (in.)	Rate
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

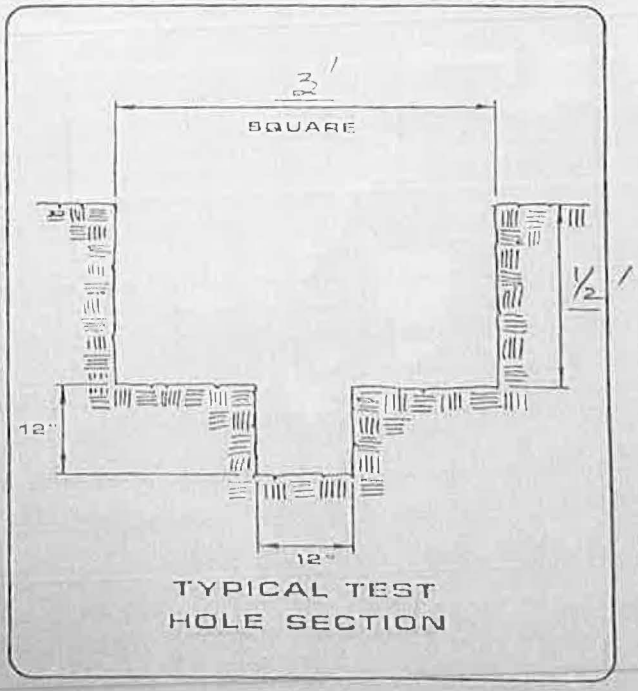
Max. Percolation Rate = 5 min./inch

Min. Percolation Rate = 60 min./inch

Stabilization Rate (min./in.) = 40



TEST CHART



TYPICAL TEST HOLE SECTION

13/26

LA # 32

DATE 3/21/94

SOIL PERCOLATION TEST DATA

Owner: HUBERT DUKE AP. No.: 106-16-04

Address: _____ Water Supply: private ✓

Phone: _____ public _____

Test By: SM Soil Type: CLAYEY SAND

Water Table 3.0 FT Job No. 30495

TEST HOLE NO. 5

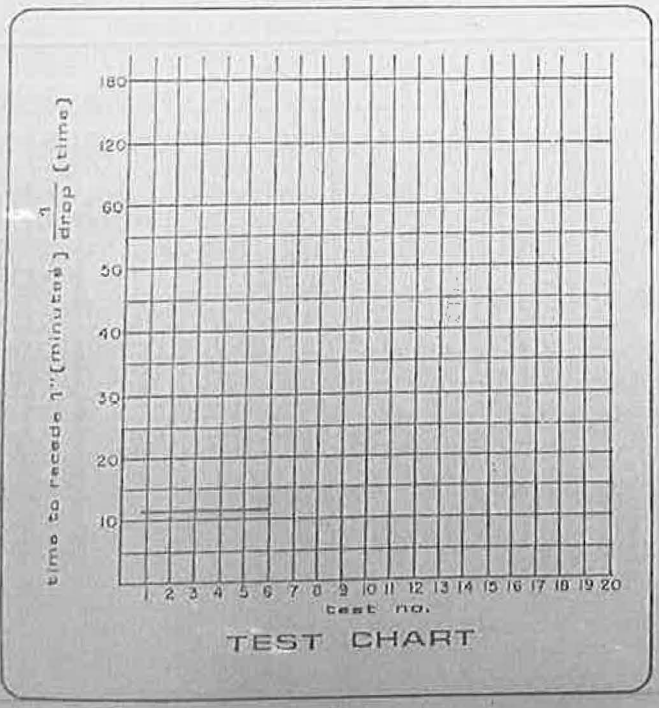
Test No.	Time fill	Time meas	Min.	Drop (in.)	Rate
1	15:49	16:09	20	1 3/4	11
2	16:09	16:29	20	1 3/4	11
3	16:29	16:49	20	1 3/4	11
4	16:49	17:09	20	1 3/4	11
5	17:09	17:29	20	1 3/4	11
6	17:29	17:49	20	1 3/4	11
7					
8					
9					
10					

Test No.	Time fill	Time meas.	Min.	Drop (in.)	Rate
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

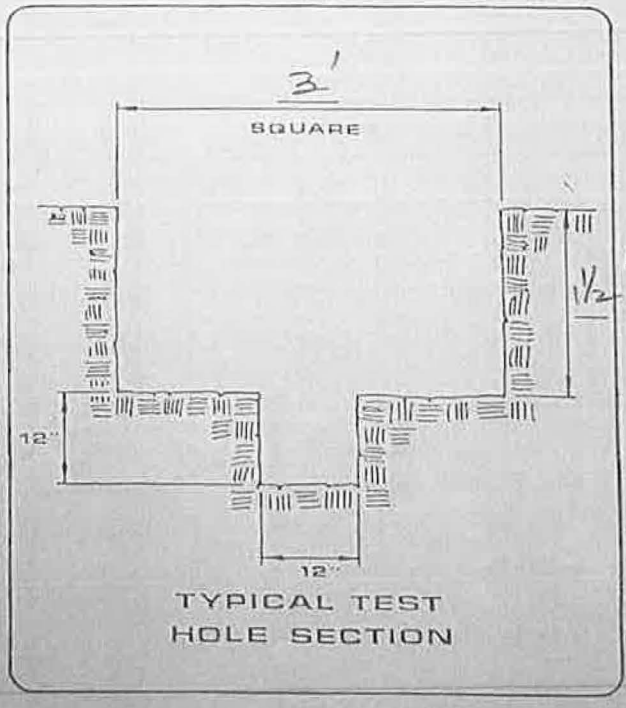
Max. Percolation Rate = 5 min./inch

Min. Percolation Rate = 60 min./inch

Stabilization Rate (min./in.) = 11



TEST CHART



TYPICAL TEST HOLE SECTION

14/26

OLA # 32

DATE 3/21/94

SOIL PERCOLATION TEST DATA

Owner: Hubert Duke

AP. No.: 106-16-04

Address:

Water Supply: private ✓

Phone:

public

Test By: S

Soil Type: CLAYEY SAND

Water Table 3.0 FT

Job No. 30495

TEST HOLE NO. 6

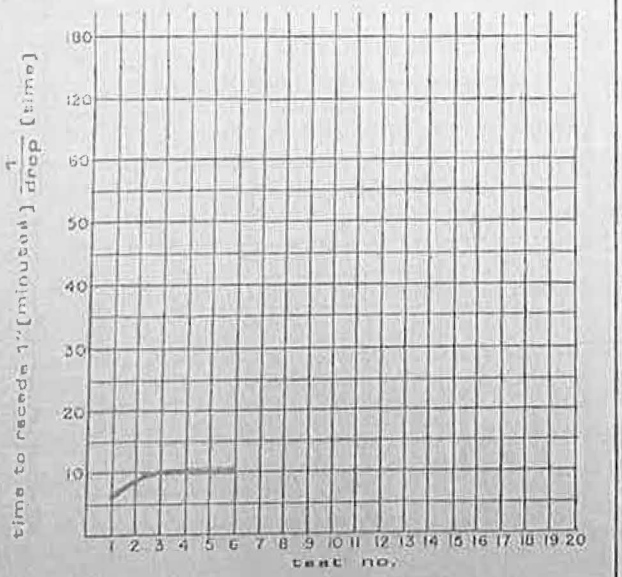
Test No.	Time fill	Time meas	Min.	Drop (in.)	Rate
1	15:50	16:10	20	3	7
2	16:10	16:30	20	2½	8
3	16:30	16:50	20	2	10
4	16:50	17:10	20	2	10
5	17:10	17:30	20	2	10
6	17:30	17:50	20	2	10
7					
8					
9					
10					

Test No.	Time fill	Time meas.	Min.	Drop (in.)	Rate
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

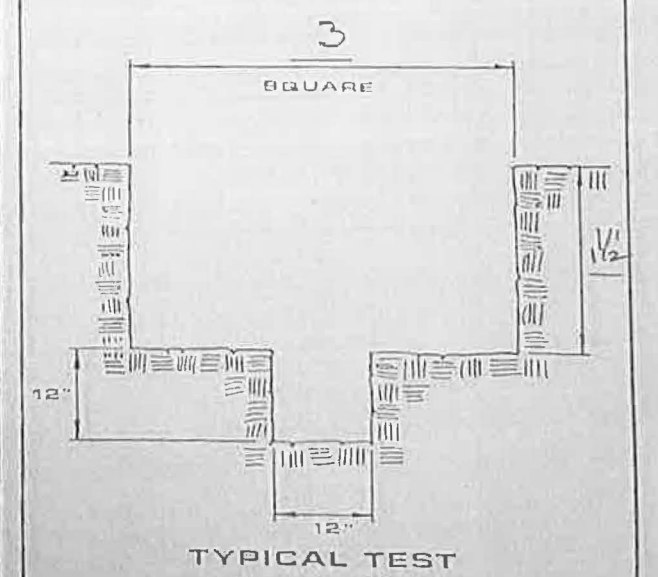
Max. Percolation Rate = 5 min./inch

Min. Percolation Rate = 60 min./inch

Stabilization Rate (min./in.) = _____



TEST CHART



TYPICAL TEST HOLE SECTION

15/26

LA # 32

DATE 3/24/94

SOIL PERCOLATION TEST DATA

Owner: HUBERT DUKE

AP. No.: 106-16-04

Address: _____

Water Supply: private ✓

Phone: _____

public _____

Test By: SA

Soil Type: CLAYEY SAND

Water Table +9 FT

Job No. 30495

TEST HOLE NO. 7

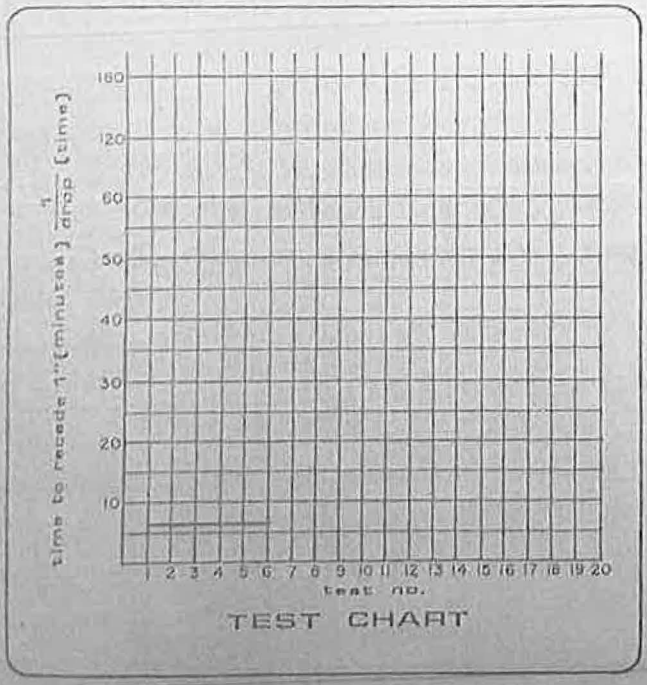
Test No.	Time fill	Time meas	Min.	Drop (in.)	Rate
1	15:10	15:30	20	3¼	6
2	15:30	15:50	20	3¼	6
3	15:50	16:10	20	3¼	6
4	16:10	16:30	20	3¼	6
5	16:30	16:50	20	3¼	6
6	16:50	17:10	20	3¼	6
7					
8					
9					
10					

Test No.	Time fill	Time meas.	Min.	Drop (in.)	Rate
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

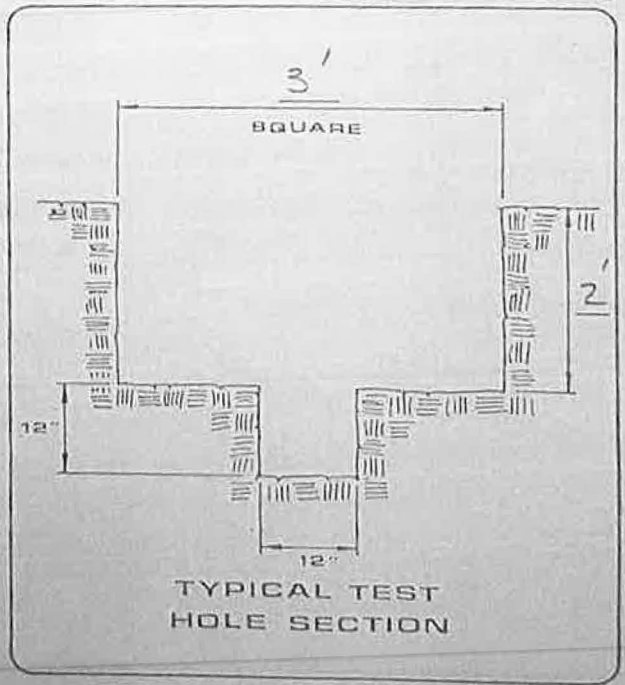
Max. Percolation Rate = 5 min./inch

Min. Percolation Rate = 60 min./inch

Stabilization Rate (min./in.) = 6



TEST CHART



TYPICAL TEST HOLE SECTION

16/26

OSCAR LARSON
& ASSOCIATES
CONSULTING ENGINEERS
& LAND SURVEYORS

☐ 317 THIRD STREET
P. O. BOX 3806
EUREKA, CA 95501
(707) 445-2043
FAX (707) 445-8230

☑ 235 H STREET
P. O. BOX 1600
CRESCENT CITY, CA 95531
(707) 464-9788
FAX (707) 464-9791

Client HUBERT DUKE Project APN 106-16-04

By SA Date 3/31/94 Ckd. by _____ Job No. 3049S Sheet 17 of 26

DESIGN CALCULATIONS FOR
EXISTING RESIDENCE RESERVE LEACHFIELD

ON-SITE SEWAGE DISPOSAL SYSTEM

(STANDARD LEACHFIELD SYSTEM)

* DESIGN BASED ON "MANUAL OF SEPTIC TANK PRACTICE" AND E.P.A. DESIGN MANUAL 625.

* DESIGN FOR: 3 BEDROOM, SINGLE FAMILY RESIDENCE AT 450 GPD (PER D.N. CO. ORD.).

SEPTIC TANK

MINIMUM SIZE PER SEPTIC ORD. 1200 GAL.

NOTE: THIS SYSTEM WAS DESIGNED UNDER THE GUIDELINES OF THE DEL NORTE COUNTY ON-SITE SEWAGE DISPOSAL SYSTEMS ORDINANCE (CHAPTER 14.12)

OLA 54

OSCAR LARSON & ASSOCIATES
CONSULTING ENGINEERS & LAND SURVEYORS

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235 H STREET
P.O. BOX 1600
CRESCENT CITY, CA 95531
(707) 464-9788
FAX (707) 464-9791

Client Hubert Duke Project APN 106-16-04

By SM Date 3/31/94 Ckd. by _____ Job No. 30495 Sheet 18 of 26

LEACHFIELD:

PERCOLATION RATE: 6 MPI

DEPTH TO GROUNDWATER: +9FT

USE: 3 FT. DEEP, 3 FT. WIDE TRENCH.
USE: 1.5 FT. UNDER LEACH LINE.

REQUIRED ABSORPTION AREA.

M.S.T.P.

(TABLE 1.) @ 6 MPI = 135 SF/BEDROOM
(FIGURE 3.)

∴ 3 BEDROOMS × 135 SF/BEDRM = 405 SF REQ

PERCENT OF STANDARD TRENCH:

$$\frac{W+2}{W+1+2d} = 0.71$$

W = WIDTH OF TRENCH IN FEET
d = DEPTH OF GRAVEL BELOW APE IN FT.

$$\left(\begin{array}{c}\%\text{ OF STANDARD TRENCH}\end{array}\right) \times \frac{\text{SF REQUIRED}}{\text{WIDTH OF TRENCH (FT)}} = \text{LF OF TRENCH REQ.}$$

$$0.71 \times \frac{405 \text{ SF}}{3 \text{ FT}} = 96 \text{ FT.}$$

USE: 3 - 35' LATERALS

E.P.A.

@ 6 MPI = 0.8 GPD/SF (TABLE 7-2)

PER DEL NORTE COUNTY ORD.
450 GPD/RESIDENCE

$$\frac{450 \text{ GPD}}{0.8 \text{ GPD/SF}} = 563 \text{ SF REQUIRED}$$

COMMON PRACTICE, PG 216, PARAGRAPH 2: DO NOT COUNT 6 INCHES OF SIDE WALL, COUNT REMAINING EXPOSED SIDEWALL WITH TRENCH BOTTOM.

1.5' - 6" = 1 × 2
+ 3 FT WIDE = 5 SF/FT

$$\frac{563 \text{ SF REQUIRED}}{5 \text{ SF/FT}} = 112.5 \text{ FT}$$

USE: 3 - 38' LATERALS

USE

18/24

OLA 54

OSCAR LARSON & ASSOCIATES
CONSULTING ENGINEERS & LAND SURVEYORS

317 THIRD STREET
P.O. BOX 3806
EUREKA, CA 95501
(707) 445-2043
FAX (707) 445-0230

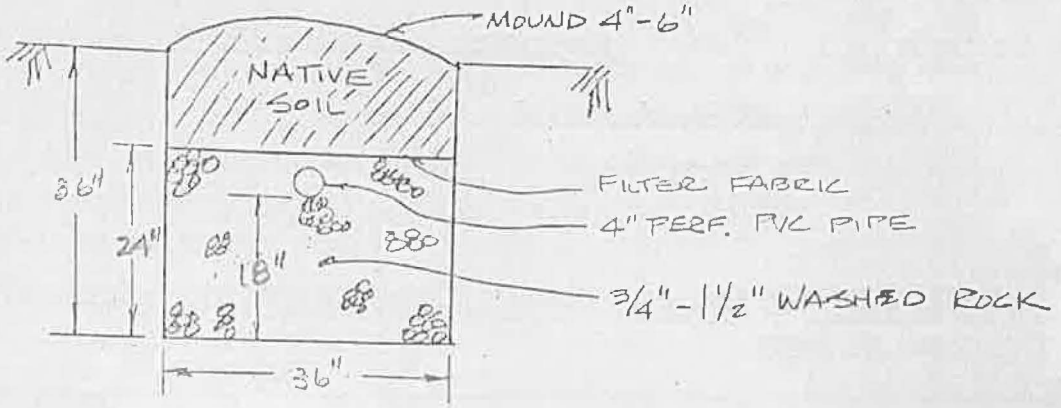
433 EAST STREET
P. O. BOX 1375
HEALDSBURG, CA 95448
(707) 433-7179
FAX (707) 433-1204

235 H STREET
P. O. BOX 1600
CRESCENT CITY, CA 95531
(707) 464-9788
FAX (707) 464-9791

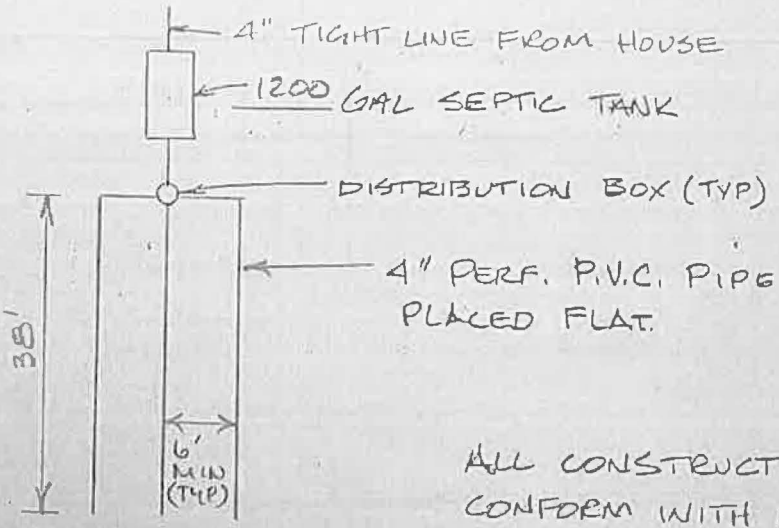
Client HUBERT DUKE Project APN 106-16-04

By [illegible] Date 3/31/94 Ckd. by _____ Job No. 30495 Sheet 19 of 26

TRENCH SECTION (NOT TO SCALE)



LAYOUT (TYPICAL, NOT TO SCALE)



ALL CONSTRUCTION SHALL CONFORM WITH DEL NORTE COUNTY ADOPTED CODES & STANDARDS.

OLA 64

OSCAR LARSON & ASSOCIATES
CONSULTING ENGINEERS & LAND SURVEYORS

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235 H STREET
P. O. BOX 1600
CRESCENT CITY, CA 95531
(707) 464-9788
FAX (707) 464-9791

Client Hubert Duke Project APN 106-16-04

By SC Date 3/31/94 Ckd. by _____ Job No. 30495 Sheet 20 of 26

This "Mound System" design is generalized for the property being subdivided and intended for estimate purposes. Therefore, a specific "Mound System" design must be prepared for each parcel.

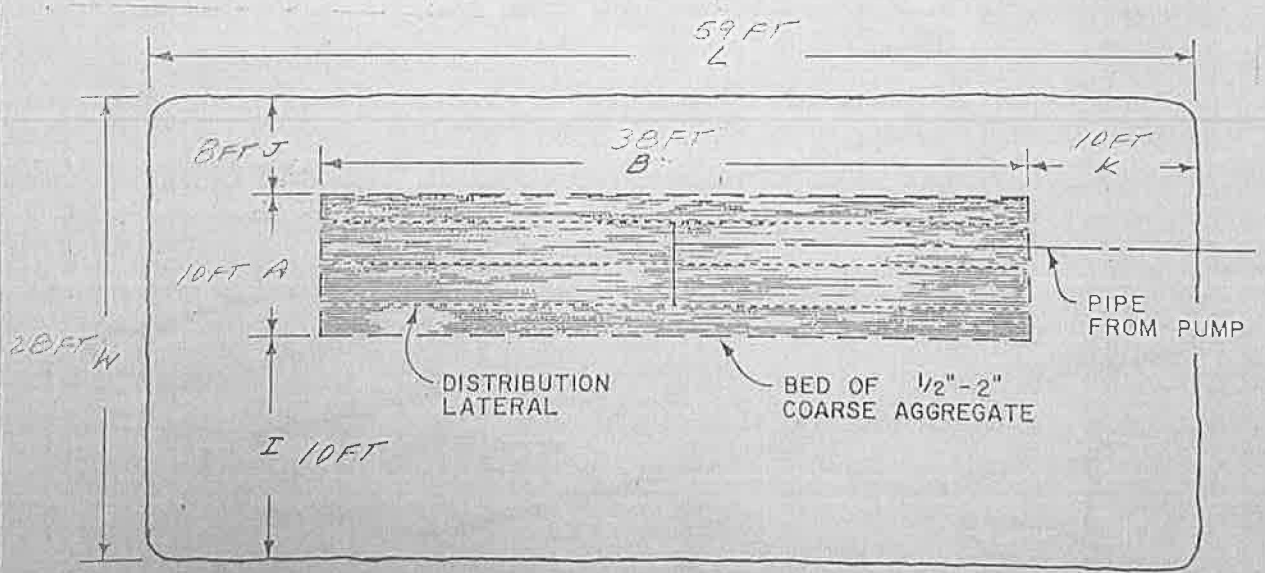
ONSITE SEWAGE DISPOSAL SYSTEM
"WISCONSIN MOUND"

PRELIMINARY DESIGN

* DESIGN BASED ON "DESIGN AND CONSTRUCTION MANUAL FOR WISCONSIN MOUNDS," UNIVERSITY OF WISCONSIN - MADISON, SEPTEMBER 1978.

* 3 BEDROOM, SINGLE FAMILY RESIDENCE: 450 GPD. D.N. CO. ORD.

* SEPTIC TANK: 1200 GAL. D.N. CO. ORD.



PLAN
NTS

OLA-64

OSCAR LARSON
& ASSOCIATES
CONSULTING ENGINEERS
& LAND SURVEYORS

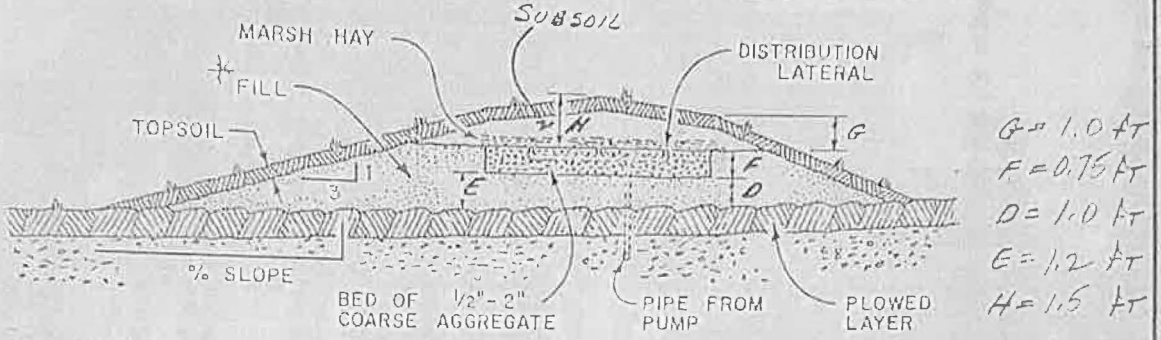
317 THIRD STREET
P. O. BOX 3806
EUREKA, CA 95501
(707) 445-2043
FAX (707) 445-8230

235 H STREET
P. O. BOX 1600
CRESCENT CITY, CA 95531
(707) 464-9788
FAX (707) 464-9781

Client HUBERT DUKE Project APN 106-16-04

By [illegible] Date 3/31/14 Ckd. by _____ Job No 30495 Sheet 21 of 26

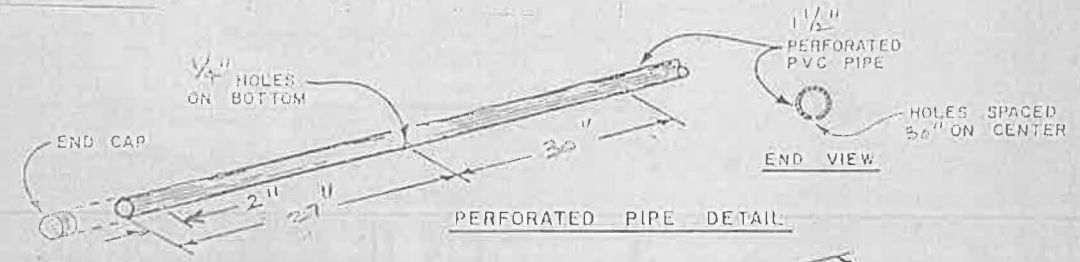
This "Mound System" design is generalized for the property being subdivided and intended for estimate purposes. Therefore, a specific "Mound System" design must be prepared for each parcel.



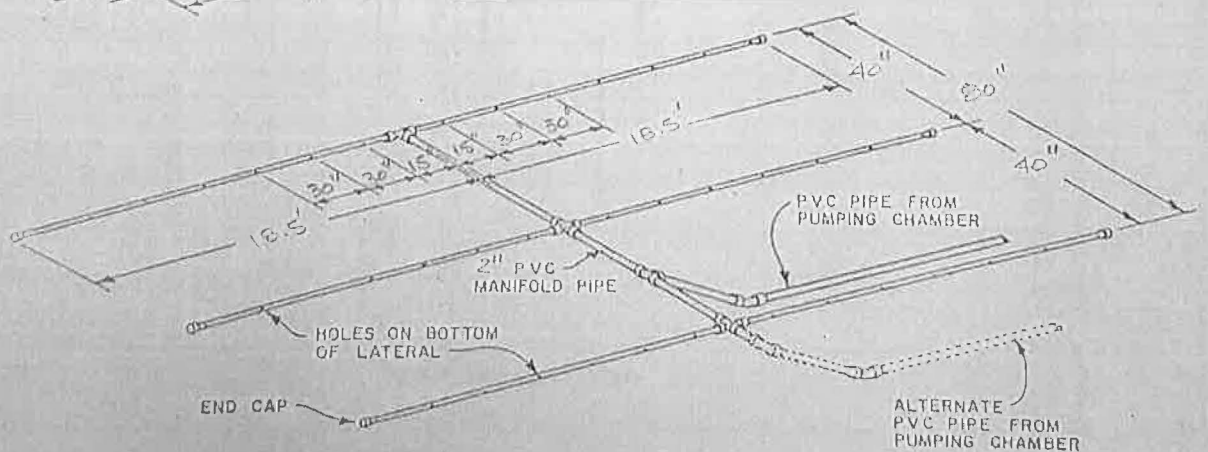
PROFILE

NTS

* MEDIUM SAND TEXTURE MATERIAL. SEE PAGE OF THIS DESIGN.



PERFORATED PIPE DETAIL



PIPE LATERAL LAYOUT

NTS

PRELIMINARY

OLA 54

21/26

OSCAR LARSON & ASSOCIATES
CONSULTING ENGINEERS & LAND SURVEYORS
317 THIRD STREET
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235 H STREET
P. O. BOX 1600
CRESCENT CITY, CA 95531
(707) 464-9788
FAX (707) 464-9791

Client Hubert Duke Project APN 100-110-04

By SP Date 3/31/94 Ckd. by ____ Job No. 30415 Sheet 22 of 26

OLA 54

DOSING TANK ASSEMBLY DETAIL

NTS

NOTE:

This "Mound System" design is generalized for the property being subdivided and intended for estimate purposes. Therefore, a specific "Mound System" design must be prepared for each parcel.

PRELIMINARY

22/26

OSCAR LARSON
& ASSOCIATES
CONSULTING ENGINEERS
& LAND SURVEYORS

317 THIRD STREET
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Client HUBERT DUKE Project APN 106-116-04

By [illegible] Date 3/31/16 Ckd. by _____ Job No. 30495 Sheet 23 of 26

DESIGN:

SLOPE: 0-12% (USE 2%)
PERCOLATION RATE: 7 TO 40 (USE 40 MPI)
GROUNDWATER: 2.5 FT TO 4 FT (USE 2.5 FT)
WASTEWATER LOAD: ASSUMED 3 BEDROOM HOUSE - USE 450 GPD.
FILL MATERIAL: MEDIUM SAND TEXTURE MATERIAL (25% VERY COARSE, COARSE, AND MEDIUM SAND WITH < 50% FINE AND VERY FINE SAND.)

USE: 1.2 GAL/FT²/DAY ABSORPTION.

ABSORPTION AREA REQUIRED: 450 GAL/DAY ÷ 1.2 GAL/FT²/DAY = 375 FT²

BASAL AREA ABSORPTION RATE: 40 MIN/IN.
3-29 MIN/IN USE 1.2 GAL/FT²/DAY
⇒ 30-60 MIN/IN USE .74 GAL/FT²/DAY
60-120 MIN/IN USE .24 GAL/FT²/DAY

BEING PERMEABLE SOIL WITH HIGH GROUNDWATER WAS ENCOUNTERED, USE "BED" SYSTEM. BECAUSE OF SOIL PERMEABLITY, USE "BED" WIDTH OF 10 FEET.

LENGTH OF "BED" = 375 FT² ÷ 10 FT = 37.5 FT
SAY: 38 FT.

PRELIMINARY

OLA 54

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MOUND HEIGHT:

FILL depth (D) = 1 FT

FILL depth (E) = D + SLOPE (SLOPE X BED WIDTH)
= 1FT + .02 X 10
= 1.2 FT.

BED depth (F) = 0.75 FT (9 INCHES) WITH MIN OF .5 FT (6 INCHES) BELOW DISTRIBUTION SYSTEM.

CAP AND TOP SOIL (TOP OF MOUND) (H) = 1.5 FT (1 FT SUBSOIL)
CAP AND TOP SOIL (AT EDGE OF BED) (G) = 1.0 FT (.5 FT SUBSOIL)

MOUND LENGTH AND WIDTH:

END SLOPES (K) = MOUND DEPTH AT CENTER X 3:1 SLOPE
= (((D+E) ÷ 2) + F + H) X 3
= (((1 + 1.2) ÷ 2) + 0.75' + 1.5) * 3
= 10.05 FT. SAY 10 FT

UPSLOPE WIDTH (J) = MOUND DEPTH AT UPSLOPE EDGE X 3:1 SLOPE X SLOPE CORRECTION (TABLE 3, PG 16)
= (D + F + G) X 3 X
= (1 + 0.75 + 1) X 3 X 0.94
= 7.76 FT. SAY 8 FT

PRELIMINARY

OLA 5A

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Client HUBERT DUKE Project APN 106-116-04

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DOWNSLOPE WIDTH (E) = MOUND DEPTH AT DOWNSLOPE EDGE
× 3:1 SLOPE × CORRECTION. (TABLE 3, PG. 16)
= (E+F+G) × 3 ×
= (1.2 + 0.75 + 1.0) × 3 × 1.06
= 9.38 FT. SAY 10 FT

MOUND LENGTH (L) = B + (2 K)
= 38 FT + (2 × 10 FT)
= 58.10 FT. SAY 59 FT

BASAL AREA:

BASEL AREA REQUIRED = DAILY FLOW ÷ INFILTRATIVE CAPACITY OF SOIL.

= 450 GAL/DAY ÷ 0.74 GAL/FT²/DAY
= 608 FT²

BASEL AREA AVAILABLE = B × (A + E)
= 38 FT × (10 FT + 10 FT)
= 760 FT²

☑ SUFFICIENT AREA EXISTS

DISTRIBUTION SYSTEM:

HOLE SPACING = 30 INCHES.
HOLE SIZE = 1/4 - INCHES.

LATERAL LENGTH = 38 ÷ 2 - .5 FT = 18.5 FT.

PRELIMINARY

OLA 54

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Client Hubert Duke Project APN 106-16-01-

By SC Date 3/31/94 Ckd. by _____ Job No. 30495 Sheet 26 of 26

HOLE SPACING = 30 INCHES, 8 HOLES PER LATERAL

LATERAL DIAMETER = 1 1/2 INCHES (TABLE 4, PG. 18).

LATERAL SPACING = 40 INCHES

MANIFOLD LENGTH = 6.66 FT. (80 INCHES)

MANIFOLD DIAMETER = 2 INCHES

PUMPING CHAMBER SIZE = ALLOWING 115 GAL/DOSE

PUMPING CAPACITY TO PUMP GPM (TABLE 8, PG. 22) + HEAD LOSSES, RESULTING WITH 2.5 FT HEAD AT SUPPLY END OF LATERALS.

DOSING QUANITY = USE: 115 GAL/DOSE (TABLE 5, PG. 20)

TO CHECK: DOSE QUANTITY x 10 TIMES VOID VOLUME

1 1/2" Ø PIPE = .092 GAL/FT (TABLE 6, PG. 20)
0.092 GAL/FT x 114 FT (TOTAL LATERAL LENGTH) x 10 = 105

THEREFORE 105 < 115 USE 115 GAL/DOSE

PRELIMINARY

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