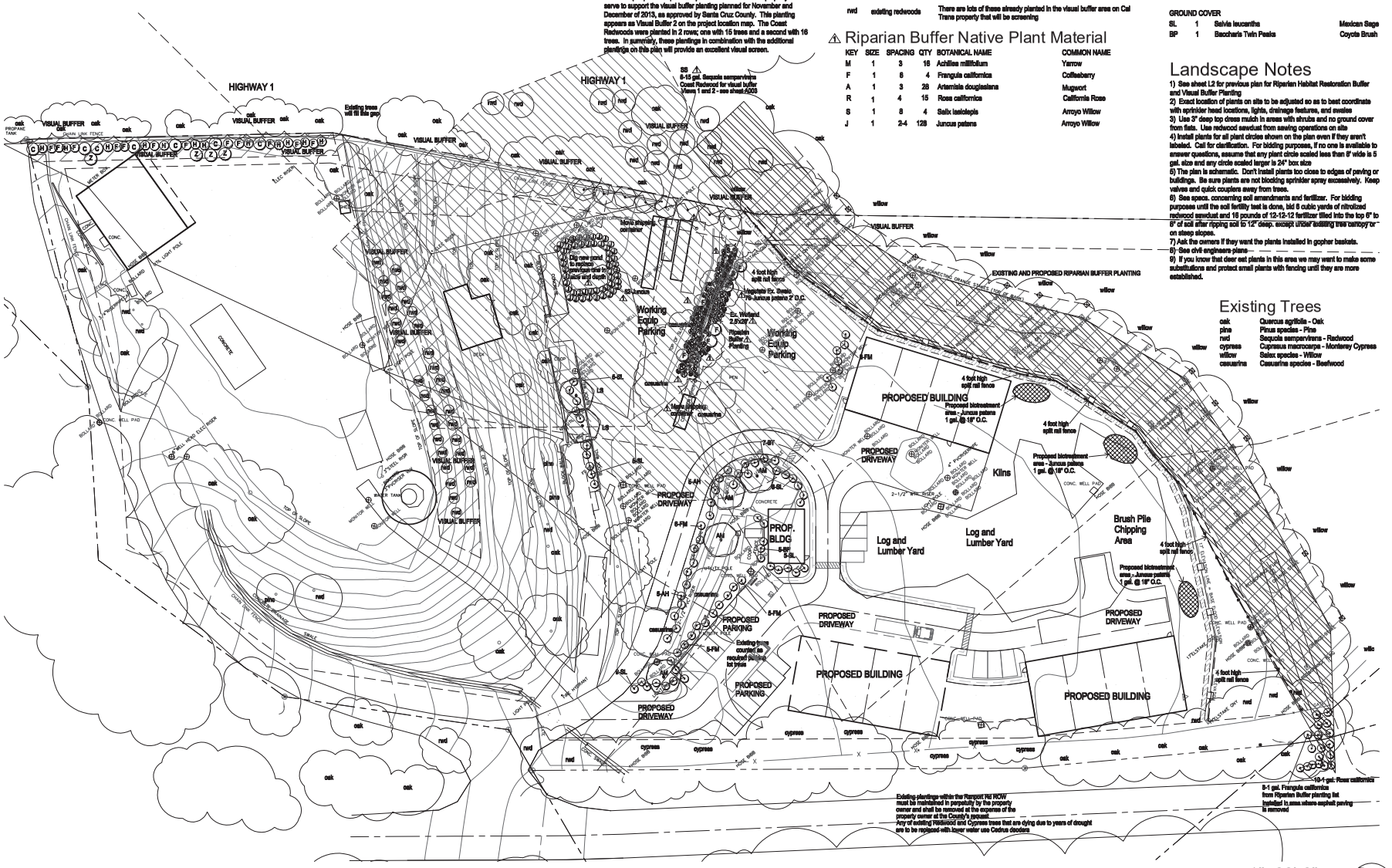


Planting Plan

1"=30'-0"

0' 30' 60'

Riparian Buffer Planting

1) See sheet L2 for list of proposed Riparian Buffer Planting. Install the proposed plants spaced out throughout the buffer area at the spacing specified in the original report at least 4 feet from any existing riparian buffer plants that have been previously installed
Table 1 on L2 of the landscape plan lists the plantings already made toward the restoration plan prepared by Watsonville Wetland Watch. Table 2 lists the plants that remain to be planted.

Visual Buffer Notes

1) The Visual Buffer and Riparian Restoration Plan are based on the Watsonville Wetlands Watch "Plan for Riparian Habitat Restoration Buffer and Visual Buffer Planting" which is included in this submittal for reference. The changes have been made (on the current plan) to the previous plan because the previous plan shows new plants in areas that already have screening of redwoods and oaks in the HWY right of way that are already established and will get wider and taller with age and will provide the necessary visual screen. The outline of these existing plants is shown on the plan.
Additionally, in spring of 2013, Williams Tree Service installed 31 Coast Redwood (Sequoia sempervirens) within the interior of the property that will serve to support the visual buffer planting planned for November and December of 2013, as approved by Santa Cruz County. This planting appears as Visual Buffer 2 on the project location map. The Coast Redwoods were planted in 2 rows; one with 15 trees and a second with 16 trees. In summary, these plantings in combination with the additional plantings on this plan will provide an excellent visual screen.

Visual Buffer Native Plant Material

KEY	SIZE	SPACING	QTY	BOTANICAL NAME	COMMON NAME
C	1	8	7	Ceanothus thryrsiflorus	Blue-blossom lilac
F	1	6	12	Frangula californica	Coffeeberry
H	1	6	11	Heteromeles arbutifolia	Toyon
Z	1	8	4	Ribes sanguinium	Red flowered gooseberry
SS	15	15	6	Sequoia sempervirens	Coast Redwood
S	none proposed			Salix lasiolepis	Arroyo Willow
				These are not shown on current plan. They are not necessary and require lots of water. We don't need more screening trees in the riparian area	
rwd	existing redwoods			There are lots of these already planted in the visual buffer area on Cal Trans property that will be screening	

Riparian Buffer Native Plant Material

KEY	SIZE	SPACING	QTY	BOTANICAL NAME	COMMON NAME
M	1	3	16	Achillea millifolium	Yarrow
F	1	6	4	Frangula californica	Coffeeberry
A	1	3	28	Artemisia douglasiana	Mugwort
R	1	4	15	Rosa californica	California Rose
S	1	8	4	Salix lasiolepis	Arroyo Willow
J	1	2-4	128	Juncus patens	Arroyo Willow

Plant List

KEY	SIZE	BOTANICAL NAME	COMMON NAME
TREES			
AM	15	Arbutus Marina	Strawberry Tree
LS	15	Laurus Saratoga	Hybrid Laurel
SHRUBS			
AH	5	Arctostaphylos Howard McMinn	Manzanita
FM	5	Frangula Mound San Bruno	Coffeeberry
BT	5	Berberis thunbergii	Barberry
GROUND COVER			
SL	1	Salvia leucantha	Mexican Sage
BP	1	Baccharis Twin Peaks	Coyote Brush

Landscape Notes

1) See sheet L2 for previous plan for Riparian Habitat Restoration Buffer and Visual Buffer Planting
2) Exact location of plants on site to be adjusted so as to best coordinate with sprinkler head locations, lights, drainage features, and swales
3) Use 3" deep top dress mulch in areas with shrubs and no ground cover from flats. Use redwood sawdust from sawing operations on site
4) Install plants for all plant circles shown on the plan even if they aren't labeled. Call for clarification. For bidding purposes, if no one is available to answer questions, assume that any plant circle scaled less than 6' wide is 5 gal. size and any circle scaled larger is 24" box size
5) The plan is schematic. Don't install plants too close to edges of paving or buildings. Be sure plants are not blocking sprinkler spray excessively. Keep valves and quick couplers away from trees.
6) See specs. concerning soil amendments and fertilizer. For bidding purposes until the soil fertility test is done, bid 6 cubic yards of nitrolized redwood sawdust and 16 pounds of 12-12-12 fertilizer tilled into the top 6" to 8" of soil after ripping soil to 12" deep. except under existing tree canopy or on steep slopes.
7) Ask the owners if they want the plants installed in gopher baskets.
8) See civil engineers plans
9) If you know that deer eat plants in this area we may want to make some substitutions and protect small plants with fencing until they are more established.

Existing Trees

oak	Quercus agrifolia - Oak
pine	Pinus species - Pine
rwd	Sequoia sempervirens - Redwood
cypress	Cupressus macrocarpa - Monterey Cypress
willow	Salex species - Willow
casuarina	Casuarina species - Beefwood

Revision
2-14-17

GREGORY LEWIS LANDSCAPE ARCHITECT #2176
736 Park Way Santa Cruz, CA 95065 (831) 425-4747
lewislandscape@sbcglobal.net

REGISTERED LANDSCAPE ARCHITECT GREGORY LEWIS No. 2176 6/30/16 STATE OF CALIFORNIA

Pacific Coast Hardwoods

1400 Ranport Road, Watsonville, CA

Date 6/30/16
Scale As Noted
Drawn Greg
Job
Sheet L1
of

Excerpts of "Plan for Riparian Habitat Restoration Buffer and Visual Buffer Planting" - October 2013 - Updated June 2016

Prepared by Watsonville Wetlands Watch - Jonathan Pilch, Director of Restoration Programs

Area A – 50 foot riparian buffer

Outstanding Requirements:

County Condition I.F.2 (pg. 3): Submit restoration plans that detail the riparian restoration to take place, including a 5 year monitoring and maintenance plan for the restoration project.

Area B – HWY 1 visual buffer area, which includes Cal Tran's right-of-way and areas on your property that would contribute to the visual buffer

Outstanding Requirements:

County Condition I.F.1 (pg. 3): Submit landscape plans that include details for a vegetative visual buffer to be planted on site and outside of Highway 1 right of way at the north property line of APN 052-511-06

Area C- Vegetation planted along Ranport Road

Outstanding Requirements:

County Condition V.E (pg. 5): Plantings within the Ranport Road right of way must be maintained in perpetuity by the property owner and shall be removed at the expense of the property owner at the County's request.

Restoration and Landscape Plans:

Area A – 50 foot Riparian Habitat Buffer

Existing Conditions: The Williams Tree Service Property contains 2.2 acres of riparian habitat on the east and west sides of the Harkins Slough channel that runs through the property, located on parcel APN 052-511-08. The riparian habitat is located near the headwaters of the east branch of upper Harkins Slough. Just downstream of the property, Harkins Slough opens into a larger habitat that supports willow scrub, emergent freshwater marsh, freshwater wetland, oak woodland and coastal prairie habitat and includes a number of permanently protected properties, including the Harkins Unit of the US Fish and Wildlife Service Ellicot Slough Reserve, the Harkins Unit of the Watsonville Sloughs Ecological Reserve owned by the California Department of Fish and Wildlife as well as a number of conservation easements. Harkins Slough is an important body of water within the greater Watsonville Slough System, supporting a diversity of wildlife species including important resident and migratory bird species, State and federally listed threatened, endangered, and species of special concern and provides water for recycled water distribution and groundwater recharge.

Riparian Habitat Buffer: The outstanding permit requirement by Santa Cruz County is County Condition I.F.2, which requires the submittal of a restoration plans that detail the riparian restoration to take place, including a 5 year monitoring and maintenance plan for the restoration project. The restoration plan was submitted to the County by Williams Tree Service in the fall of 2013 and the County subsequently required Williams Tree Service to implement the restoration plan.

A portion of the riparian buffer planting was planted in 2012 as in that year, at the request of Williams Tree Service, Watsonville Wetlands Watch directed Williams Tree Service staff in the installation of native plants adjacent to Harkins Slough within the 50 foot riparian habitat buffer. The County subsequently determined that those native plants that had survived from this original planting may be counted toward meeting the objective of restoring the riparian buffer. A survey of this area was conducted in June of 2013 and then again June of 2016 to determine the survival and coverage of native plants installed. The following native plants previously installed were recorded and will serve to support the effort to complete installation of the required 50 foot riparian buffer, per Santa Cruz County approval.

Table 1. Existing Native Plant Material from Previous Planting Efforts, June 24, 2013

Species	Common Name	
Carex barbarae	Santa Barbara Sedge	7
Euthamia occidentalis	Western Goldenrod	1
Frangula californica	Coffeeberry	1
Juncus effusus	Bog Rush	1
Juncus patens	Common Rush	1
Lonicera involucrata	Twinberry	2
Quercus agrifolia	Coast Live Oak	6
Ribes sanguineum	Pink Flowering Currant	1
Rubus ursinus	California Blackberry	7
Salix laevigata	Yellow Willow	4
Salix laesiolepis	Arroyo Willow	7
Sambucus nigra	Blue Elderberry	3
Satureja douglausii	Yerba buena	1
Total		42

Installation of Riparian Habitat Buffer

The total acreage for the riparian habitat buffer is .63 acres.

Summary of work completed between 2013 and the present: No additional work toward the completion of the riparian buffer has been undertaken since the submittal of the restoration plan by Williams Tree Service in October of 2013. Correspondingly, the number of live native plants counted in the 2013 census has decreased from 102 to 42 counted in the 2016 survey. While the number of native plants on site has decreased, the vigor of those native plants that have survived is high. The required plants to be installed within the riparian buffer have therefore been increased in order to compensate for the loss of previously planted native plants on site. Work towards completion of the riparian habitat buffer requirement will be initiated per the description below in accordance with the timeline determined by Santa Cruz County.

Site preparation: Due to a lack of maintenance of prior plantings, site preparation activities will be required to prepare the site prior to planting. In order to ensure survival of native plantings, invasive plant species growing within the riparian buffer area will need to be controlled prior to planting. In order to achieve this, all invasive plants, such as poison hemlock, *Conium maculatum*, will be mowed prior to seed set. In the fall months, any living invasive plants should be hand grubbed and removed from the site to the maximum extent feasible. A 4" – 5" wood chip mulch layer will then spread throughout the riparian buffer planting area in order to suppress the germination of invasive plants that would compete with the native plantings. No soil disturbance activities to prepare the site will be utilized due to the presence of native plants that were either installed in previous years or have begun to grow on site during the time since the set-back from the slough channel was established in the summer of 2012. There are small populations of perennial pepperweed, *Lepidium latifolium*, and Vinca, *Vinca minor*, that will be treated with an herbicide specified for use within a riparian buffer and applied by a licensed applicator. No other herbicide should be used within the riparian buffer due to impacts of sensitive plant species. Due to the proximity of water and associated impacts to aquatic life, no surfactants will be used with the herbicide.

Installation of Native Plant Material: Native plant material will be installed within the 50 foot buffer in order to create dense native riparian habitat. Existing vegetation constitutes approximately 8% of the area within the buffer and includes arroyo willow trees, coast live oak, Santa Barbara sedge, as well as other plants listed in the existing conditions section above. An additional 817 native plants will be installed throughout the buffer in the quantities listed below (Table 2.). Native plants will be installed at the planting spacing listed in Table 2 and are designed to constitute the listed total percent cover of area. Plants will be installed into native soil. No additional soil amendments will be utilized, due to the high fertility of the soil adjacent to Harkins Slough and the desire to not add nutrients to the slough environment that can impair water quality. Native plants will be installed so that the root crown is level with the soil surface and wood chip will be placed up to the stem of each plant so as to provide a weed free growing area around the native plant. All drainage swales within the riparian buffer areas will be planted and treated with standard erosion control best management practices, including the installation a biodegradable erosion control blankets and installation of native plants at no greater than 5 foot spacing.

Table 2. Native Plant Material for Installation of Riparian Buffer

Species	Common Name	spacing	% of Area	Qty
Existing Vegetation			8.0%	
Achillea millifolium	Yarrow	3	1.0%	27
Artemisia douglasiana	Mugwort	3	3.0%	80
Carex barbarae	Santa barbara sedge	3	2.0%	53
Elymus triticoides	Creeping wild rye	3	6.0%	160
Euthamia occidentalis	Marsh goldenrod	3	4.0%	107
Frangula californica	Coffeeberry	8	3.0%	11
Heracleum maximum	Cow parsnip	4	1.0%	15
Juncus patens	Spreading rush	4	3.0%	45
Juncus effusis	Bog rush	4	2.0%	30
Quercus agrifolia	Coast Live Oak	8	1.0%	4
Rosa californica	California rose	4	2.0%	30
Rubus ursinus	California blackberry	5	9.0%	86
Salix lasiolepis	Arroyo willow	10	36.0%	86
Salix lasiandra	Yellow willow	10	17.0%	41
Symphoricarpos albus	Snowberry	3	1.0%	27
Symphyotrichum chilense	California aster	4	1.0%	15
Total			100.0%	817

See L1 for hatching of Riparian Buffer Area

Irrigation: A drip irrigation system will be installed in order to apply irrigation water at a rate of 2 - 4 gallons per hour per plant and should be operated as needed for two years after the installation so as to ensure sufficient soil moisture in the root zone for the installed plants.

Installation of Exclusionary Fencing: A four foot high split rail fence will be installed along the perimeter of the habitat buffer in order to separate the working yard from the riparian habitat buffer.

Maintenance of Riparian Buffer: The entire riparian buffer will be maintained weed-free in order to prevent the establishment and spread of non-native weed species that will limit the establishment of the riparian buffer plantings. Most non-native invasive weed species on site will be removed by hand or with a weed-whip set at a height no lower than 4" above the soil surface in order to limit the impact of this activity on wildlife. All non-native weed species with that are annual or biannual with the exception of annual grasses will be removed by hand only. Invasive perennial plants, such as Vinca, Perennial pepperweed, Bermuda grass, Kukya grass, or other species that will not respond to hand removal methods will be treated with an herbicide approved for use adjacent to a wetland. Applications will be made by a licensed applicator. Planting basins of installed native plants should be maintained free of weeds and maintained regularly so that installed plants receive sufficient sunlight and soil moisture. In order to facilitate maintenance of the riparian plantings, each shrub will be flagged with colored flagging tape and each herbaceous plant should be flagged with either a pin flag or flagging tape. All flagging will be removed after two years.

Performance Measures: The riparian buffer installation is designed to meet or exceed the following performance measures:

Vegetative Cover, including all plant species: The performance standard for vegetative cover is important to ensure that bare ground does not persistent within the habitat buffer which could create conditions for soil erosion or establishment of invasive plants. Wood chip mulch used for weed suppression or naturally occurring litter would be included as a vegetation layer for the purpose of measuring this metric, as this will inhibit soil erosion or establishment of invasive plants.

Table 3. Riparian Buffer Cover Performance Metric

Riparian Buffer	Year I	Year II	Year III	Year IV	Year V
Total Percent Cover	70%	80%	90%	90%	90%

Native Plant Survival: The performance standard for native plantings will be measured in over-all plant survival.

Table 4. Riparian Buffer Native Plant Survival Performance Metric

Riparian Buffer	Year I	Year II	Year III	Year IV	Year V
Native Plant Species	90%	90%	90%	80%	80%

Native Plant Understory, including grasses and herbaceous plants: The performance standard for native grass and herbaceous plants will be measured in percent cover of native plant species. Percent herbaceous cover will be monitored along permanent transect lines, utilizing the point intercept method

to establish percent cover of native and non-native species with sufficient point collection to ensure statistical significance.

Table 5. Riparian Buffer Native Herbaceous Understory Performance Metric

Riparian Buffer	Year III	Year IV	Year V
Native herbaceous understory	30%	40%	40%

Area B: Highway 1 Visual Buffer

Existing Conditions and Work Completed to Date: The Williams Tree Service Property is currently in view from the Highway 1 corridor. A visual buffer should be planted on site and outside of the Highway 1 right of way at the north property line. Currently there are several native plant species growing in this area, including coast live oak, California blackberry, coyote brush and dogwood. Additionally in spring of 2013, Williams Tree Service installed 31 coast redwood, *Sequoia sempervirons*, within the interior of the property that will serve to support the visual buffer planting planned for November and December of 2013, as approved by Santa Cruz County. This planting appears as Visual Buffer 2 on the project location map. The coast redwoods were planted in 2 rows; one with 15 trees and a second with 16 trees. No other work has been completed since the submission of project plans in October 2013, however some existing native plants have increased growth and screening on site.

Installation of the Visual Buffer: The total acreage for this planting should be approximately .2 acres in order to install sufficient vegetation to block the view of the property from the Highway 1 corridor. The project proponent of permit application #161014 has provided a visual buffer landscape plan which specifies the quantities and species of native plants proposed for use to provide visual screening based on their simulation designs.

Site preparation: Little site preparation will be required for the installation of plant material to achieve the desired percent cover of native plant material within the visual buffer. No soil disturbance activities to prepare the site should be utilized due to the presence of native plants. The limited populations of non-native plants found growing on the site currently should be removed through hand grubbing methods prior to installation of native plants. No additional soil disturbance activities will be required or undertaken.

Installation of Native Plant Material: Native plant material should be installed within the visual buffer in order to create a dense and tall visual buffer. Existing native plants that support visual screening will be maintained in order to ensure ongoing visual screening. Plants will be installed into native soil. A slow release fertilizer will be utilized within the planting hole in order to provide fertility to support quick growth of installed plants. Native plants are to be installed so that the root crown is level with the soil surface. The planting basin will be covered with a layer of wood chips at a depth of 4 inches to extend out in a 2' circumference so as to reduce weed competition within the planting basin.

Irrigation: A drip irrigation system will be installed in order to apply irrigation water at a rate of 2 - 4 gallons per hour per plant and will be operated as needed for two years after the installation so as to ensure sufficient soil moisture in the root zone for the installed plants.

Maintenance of Visual Buffer: The entire visual buffer will be maintained weed-free in order to prevent the establishment and spread of non-native weed species that will limit the establishment of the riparian buffer plantings. Most non-native invasive weed species on site will be removed by hand or with a weed-whip set at a height in order to limit the impact of this activity on wildlife. Planting basins of installed native plants will be maintained free of weeds and maintained regularly so that installed plants receive sufficient sun-light and soil moisture. In order to facilitate maintenance of the plantings, each shrub will be flagged with colored flagging tape. All flagging should be removed after two years.

Performance Measures: The visual buffer installation is designed to meet or exceed the following performance measures:

Visual Buffer Planting Survival, including all tree and shrub species. This performance metric will include the percent survival of installed native plants to meet the following survival percentages:

Table 7. Visual Buffer Planting Survival

Visual Buffer	Year I	Year II	Year III	Year IV	Year V
Tree and Shrub Species	100%	100%	100%	90%	90%

Native Plant Vigor. This performance metric is designed to reflect the vigor of installed plants and ensure that vigor is maintained at a sufficient level to support good long term growth and establishment of the visual buffer. Vigor will be recorded on a scale of 1 – 5.

Table 8. Visual Buffer Vigor Rating

Visual Buffer	Year I	Year II	Year III	Year IV	Year V
Average Vigor	4	4	4	4	4

Annual Performance Monitoring:

Monitoring of performance of the riparian and visual buffer plantings will be conducted annually for a five year period, per the Santa Cruz County requirement. Annual monitoring will document existing conditions in relation to the performance metrics detailed within this restoration and landscape plan. Measurements of percent cover will be made in the late spring or early summer of each year. If a performance measure is not achieved, commensurate action, including replanting of native plant species or improved maintenance practices will be made so as to ensure the performance metric will be met in the following year.

An annual monitoring report will be provided to Santa Cruz County by January 1 of each year. The monitoring plan will document performance to date in relation to performance metrics, provide a summary of maintenance actions performed during the year, document any planned management requirements to meet future performance metrics based on that year's monitoring results, and make recommendations for maintenance in future years.

Monitoring and reporting will be conducted by a qualified biologist or botanist.

Table 9. Annual Maintenance and Monitoring Schedule:

Williams Tree Service Visual and Riparian Buffer Maintenance Schedule												
Riparian Buffer	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Maintain installed plant's planting basin free of weeds												
Remove invasive plants throughout the planting area												
Maintain irrigation system, as needed												
Visual Buffer												
Maintain installed plant's planting basin free of weeds												
Remove invasive plants throughout the planting area												
Maintain irrigation system												
Performance Monitoring												
Coordinate Monitoring												
Install replacement native plants if required to meet the following year's performance metric, if necessary												
Review draft monitoring report												
Send annual monitoring report to Santa Cruz County												

Landscape Plan

Revision

GREGORY LEWIS LANDSCAPE ARCHITECT #2176
736 Park Way Santa Cruz, CA 95065 (831) 425-4747
lewislandscape@sbcglobal.net

LICENSED LANDSCAPE ARCHITECT
GREGORY LEWIS
No. 2176
4/30/2018
6/29/16
STATE OF CALIFORNIA

Pacific Coast Hardwoods
1400 Ranport Road, Watsonville, CA

Date	6/29/16
Scale	As Noted
Drawn	Greg
Job	
Sheet	L2
of	

Williams Tree Service Property
Plan for Riparian Habitat Restoration Buffer and Visual Buffer Planting

Prepared for:

Williams Tree Service

Prepared by: Watsonville

Wetlands Watch

Contact: Jonathan Pilch, Director of Restoration Programs

Watsonville Wetlands Watch

Originally Prepared **October 2013**

Updated June 2016

Monitoring and reporting will be conducted by a qualified biologist or botanist.

Table 9. Annual Maintenance and Monitoring Schedule:

Williams Tree Service Visual and Riparian Buffer Maintenance Schedule												
Riparian Buffer	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Maintain installed plant's planting basin free of weeds												
Remove invasive plants throughout the planting area												
Maintain irrigation system, as needed												
Visual Buffer												
Maintain installed plant's planting basin free of weeds												
Remove invasive plants throughout the planting area												
Maintain irrigation system												
Performance Monitoring												
Coordinate Monitoring												
Install replacement native plants if required to meet the following year's performance metric, if necessary												
Review draft monitoring report												
Send annual monitoring report to Santa Cruz County												

Table of Contents:

Figures and Tables

Introduction: The Williams Tree Service Property, located on parcels APN 052-511-06, 052-511-08, is located along Harkins Slough directly adjacent to Highway One and bound by Rampart Rd. to the southwest. In February 2013, Williams Tree Service contacted the Resource Conservation District of Santa Cruz County to support the completion of outstanding landscape and restoration requirements. A summary of outstanding requirements were provided in April 2013 and are attached to this document. The following plans were prepared for a riparian habitat restoration project and visual buffer planting at the request of Williams Tree Service in response to outstanding requirements to comply with Santa Cruz County permit, 05-0062. Original plans were submitted by Williams Tree Service in October of 2013. These plans were updated as of June of 2016 to reflect existing conditions and describe the actions necessary to meet the permit application requirements and complete the implementation of the restoration and landscape plans.

The following are the current outstanding landscape and restoration requirements for the following three areas:

Area A – 50 foot riparian buffer

Outstanding Requirements:

County Condition I.F.2 (pg. 3): Submit restoration plans that detail the riparian restoration to take place, including a 5 year monitoring and maintenance plan for the restoration project.

Area B – HWY 1 visual buffer area, which includes Cal Tran's right-of-way and areas on your property that would contribute to the visual buffer

Outstanding Requirements:

County Condition I.F.1 (pg. 3): Submit landscape plans that include details for a vegetative visual buffer to be planted on site and outside of Highway 1 right of way at the north property line of APN 052-511-06

Area C- Vegetation planted along Ranport Road

Outstanding Requirements:

County Condition V.E (pg. 5): Plantings within the Ranport Road right of way must be maintained in perpetuity by the property owner and shall be removed at the expense of the property owner at the County's request.

Figure 1. Restoration and Landscape Enhancement Locations

Restoration and Landscape Plans:

Area A – 50 foot Riparian Habitat Buffer

Existing Conditions: The Williams Tree Service Property contains 2.2 acres of riparian habitat on the east and west sides of the Harkins Slough channel that runs through the property, located on parcel APN 052-511-08. The riparian habitat is located near the headwaters of the east branch of upper Harkins Slough. Just downstream of the property, Harkins Slough opens into a larger habitat that supports willow scrub, emergent freshwater marsh, freshwater wetland, oak woodland and coastal prairie habitat and includes a number of permanently protected properties, including the Harkins Unit of the US Fish and Wildlife Service Ellicot Slough Reserve, the Harkins Unit of the Watsonville Sloughs Ecological Reserve owned by the California Department of Fish and Wildlife as well as a number of conservation easements. Harkins Slough is an important body of water within the greater Watsonville Slough System, supporting a diversity of wildlife species including important resident and migratory bird species, State and federally listed threatened, endangered, and species of special concern and provides water for recycled water distribution and groundwater recharge.

Riparian Habitat Buffer: The outstanding permit requirement by Santa Cruz County is County Condition I.F.2, which requires the submittal of a restoration plans that detail the riparian restoration to take place, including a 5 year monitoring and maintenance plan for the restoration project. The restoration plan was submitted to the County by Williams Tree Service in the fall of 2013 and the County subsequently required Williams Tree Service to implement the restoration plan.

A portion of the riparian buffer planting was planted in 2012 as in that year, at the request of Williams Tree Service, Watsonville Wetlands Watch directed Williams Tree Service staff in the installation of native plants adjacent to Harkins Slough within the 50 foot riparian habitat buffer. The County subsequently determined that those native plants that had survived from this original planting may be counted toward meeting the objective of restoring the riparian buffer. A survey of this area was conducted in June of 2013 and then again June of 2016 to determine the survival and coverage of native plants installed. The following native plants previously installed were recorded and will serve to support the effort to complete installation of the required 50 foot riparian buffer, per Santa Cruz County approval.

Table 1. Existing Native Plant Material from Previous Planting Efforts, June 24, 2013

Species	Common Name	
Carex barbarae	Santa Barbara Sedge	7
Euthamia occidentalis	Western Goldenrod	1
Frangula californica	Coffeeberry	1
Juncus effusus	Bog Rush	1
Juncus patens	Common Rush	1
Lonicera involucrata	Twinberry	2
Quercus agrifolia	Coast Live Oak	6
Ribes sanguineum	Pink Flowering Currant	1
Rubus ursinus	California Blackberry	7
Salix laevigata	Yellow Willow	4
Salix laesiolepis	Arroyo Willow	7
Sambucus nigra	Blue Elderberry	3
Satureja douglausii	Yerba buena	1
Total		42

Installation of Riparian Habitat Buffer

The total acreage for the riparian habitat buffer is .63 acres.

Summary of work completed between 2013 and the present: No additional work toward the completion of the riparian buffer has been undertaken since the submittal of the restoration plan by Williams Tree Service in October of 2013. Correspondingly, the number of live native plants counted in the 2013 census has decreased from 102 to 42 counted in the 2016 survey. While the number of native plants on site has decreased, the vigor of those native plants that have survived is high. The required plants to be installed within the riparian buffer have therefore been increased in order to compensate for the loss of previously planted native plants on site. Work towards completion of the riparian habitat buffer requirement will be initiated per the description below in accordance with the timeline determined by Santa Cruz County.

Site preparation: Due to a lack of maintenance of prior plantings, site preparation activities will be required to prepare the site prior to planting. In order to ensure survival of native plantings, invasive plant species growing within the riparian buffer area will need to be controlled prior to planting. In order to achieve this, all invasive plants, such as poison hemlock, *Conium maculatum*, will be mowed prior to seed set. In the fall months, any living invasive plants should be hand grubbed and removed from the site to the maximum extent feasible. A 4" – 5" wood chip mulch layer will then spread throughout the riparian buffer planting area in order to suppress the germination of invasive plants that would compete with the native plantings. No soil disturbance activities to prepare the site will be utilized due to the presence of native plants that were either installed in previous years or have begun to grow on site during the time since the set-back from the slough channel was established in the

summer of 2012. There are small populations of perennial pepperweed, *Lepidium latifolium*, and Vinca, *Vinca minor*, that will be treated with an herbicide specified for use within a riparian buffer and applied by a licensed applicator. No other herbicide should be used within the riparian buffer due to impacts of sensitive plant species. Due to the proximity of water and associated impacts to aquatic life, no surfactants will be used with the herbicide.

Installation of Native Plant Material: Native plant material will be installed within the 50 foot buffer in order to create dense native riparian habitat. Existing vegetation constitutes approximately 8% of the area within the buffer and includes arroyo willow trees, coast live oak, Santa Barbara sedge, as well as other plants listed in the existing conditions section above. An additional 817 native plants will be installed throughout the buffer in the quantities listed below (Table 2.). Native plants will be installed at the planting spacing listed in Table 2 and are designed to constitute the listed total percent cover of area. Plants will be installed into native soil. No additional soil amendments will be utilized, due to the high fertility of the soil adjacent to Harkins Slough and the desire to not add nutrients to the slough environment that can impair water quality. Native plants will be installed so that the root crown is level with the soil surface and wood chip will be placed up to the stem of each plant so as to provide a weed free growing area around the native plant. All drainage swales within the riparian buffer areas will be planted and treated with standard erosion control best management practices, including the installation a biodegradable erosion control blankets and installation of native plants at no greater than 5 foot spacing.

Table 2. Native Plant Material for Installation of Riparian Buffer

Species	Common Name	spacing	% of Area	Qty
Existing Vegetation			**8.0%**	
Achillea millifolium	Yarrow	3	1.0%	27
Artemisia douglasiana	Mugwort	3	3.0%	80
Carex barbarae	Santa barbara sedge	3	2.0%	53
Elymus triticoides	Creeping wild rye	3	6.0%	160
Euthamia occidentalis	Marsh goldenrod	3	4.0%	107
Frangula californica	Coffeeberry	8	3.0%	11
Heracleum maximum	Cow parsnip	4	1.0%	15
Juncus patens	Spreading rush	4	3.0%	45
Juncus effusis	Bog rush	4	2.0%	30
Quercus agrifolia	Coast Live Oak	8	1.0%	4
Rosa californica	California rose	4	2.0%	30
Rubus ursinus	California blackberry	5	9.0%	86
Salix lasiolepis	Arroyo willow	10	36.0%	86
Salix lasiandra	Yellow willow	10	17.0%	41
Symphoricarpos albus	Snowberry	3	1.0%	27
Symphyotrichum chilense	California aster	4	1.0%	15
Total			100.0%	817

Irrigation: A drip irrigation system will be installed in order to apply irrigation water at a rate of 2 - 4 gallons per hour per plant and should be operated as needed for two years after the installation so as to ensure sufficient soil moisture in the root zone for the installed plants.

Installation of Exclusionary Fencing: A four foot high split rail fence will be installed along the perimeter of the habitat buffer in order to separate the working yard from the riparian habitat buffer.

Maintenance of Riparian Buffer: The entire riparian buffer will be maintained weed-free in order to prevent the establishment and spread of non-native weed species that will limit the establishment of
the riparian buffer plantings. Most non-native invasive weed species on site will be removed by hand or with a weed-whip set at a height no lower than 4" above the soil surface in order to limit the impact of this activity on wildlife. All non-native weed species with that are annual or biannual with the exception of annual grasses will be removed by hand only. Invasive perennial plants, such as Vinca, Perennial pepperweed, Bermuda grass, Kukya grass, or other species that will not respond to hand removal methods will be treated with an herbicide approved for use adjacent to a wetland. Applications will be made by a licensed applicator. Planting basins of installed native plants should be maintained free of weeds and maintained regularly so that installed plants receive sufficient sunlight and soil moisture. In order to facilitate maintenance of the riparian plantings, each shrub will be flagged with colored flagging tape and each herbaceous plant should be flagged with either a pin flag or flagging tape. All flagging will be removed after two years.

Performance Measures: The riparian buffer installation is designed to meet or exceed the following performance measures:

Vegetative Cover, including all plant species: The performance standard for vegetative cover is important to ensure that bare ground does not persistent within the habitat buffer which could create conditions for soil erosion or establishment of invasive plants. Wood chip mulch used for weed suppression or naturally occurring litter would be included as a vegetation layer for the purpose of measuring this metric, as this will inhibit soil erosion or establishment of invasive plants.

Table 3. Riparian Buffer Cover Performance Metric

Riparian Buffer	Year I	Year II	Year III	Year IV	Year V
Total Percent Cover	70%	80%	90%	90%	90%

Native Plant Survival: The performance standard for native plantings will be measured in over-all plant survival.

Table 4. Riparian Buffer Native Plant Survival Performance Metric

Riparian Buffer	Year I	Year II	Year III	Year IV	Year V
Native Plant Species	90%	90%	90%	80%	80%

Native Plant Understory, including grasses and herbaceous plants: The performance standard for native grass and herbaceous plants will be measured in percent cover of native plant species. Percent herbaceous cover will be monitored along permanent transect lines, utilizing the point intercept method to establish percent cover of native and non-native species with sufficient point collection to ensure statistical significance.

Table 5. Riparian Buffer Native Herbaceous Understory Performance Metric

Riparian Buffer	**Year III**	**Year IV**	**Year V**
Native herbaceous understory	30%	40%	40%

Area B: Highway 1 Visual Buffer

Existing Conditions and Work Completed to Date: The Williams Tree Service Property is currently in view from the Highway 1 corridor. A visual buffer should be planted on site and outside of the Highway 1 right of way at the north property line. Currently there are several native plant species growing in this area, including coast live oak, California blackberry, coyote brush and dogwood. Additionally in spring of 2013, Williams Tree Service installed 31 coast redwood, *Sequoia sempervirons*, within the interior of the property that will serve to support the visual buffer planting planned for November and December of 2013, as approved by Santa Cruz County. This planting appears as Visual Buffer 2 on the project location map. The coast redwoods were planted in 2 rows; one with 15 trees and a second with 16 trees. No other work has been completed since the submission of project plans in October 2013, however some existing native plants have increased growth and screening on site.

Installation of the Visual Buffer: The total acreage for this planting should be approximately .2 acres in order to install sufficient vegetation to block the view of the property from the Highway 1 corridor. The project proponent of permit application #161014 has provided a visual buffer landscape plan which specifies the quantities and species of native plants proposed for use to provide visual screening based on their simulation designs.

Site preparation: Little site preparation will be required for the installation of plant material to achieve the desired percent cover of native plant material within the visual buffer. No soil disturbance activities to prepare the site should be utilized due to the presence of native plants. The limited populations of non-native plants found growing on the site currently should be removed through hand grubbing methods prior to installation of native plants. No additional soil disturbance activities will be required or undertaken.

Installation of Native Plant Material: Native plant material should be installed within the visual buffer in order to create a dense and tall visual buffer. Existing native plants that support visual screening will be maintained in order to ensure ongoing visual screening. Plants will be installed into native soil. A slow release fertilizer will be utilized within the planting hole in order to provide fertility to support quick growth of installed plants. Native plants are to be installed so that the root crown is level with the soil surface. The planting basin will be covered with a layer of wood chips at a depth of 4 inches to extend out in a 2' circumference so as to reduce weed competition within the planting basin.

Irrigation: A drip irrigation system will be installed in order to apply irrigation water at a rate of 2 - 4 gallons per hour per plant and will be operated as needed for two years after the installation so as to ensure sufficient soil moisture in the root zone for the installed plants.

Maintenance of Visual Buffer: The entire visual buffer will be maintained weed-free in order to prevent the establishment and spread of non-native weed species that will limit the establishment of the riparian buffer plantings. Most non-native invasive weed species on site will be removed by hand

or with a weed-whip set at a height in order to limit the impact of this activity on wildlife. Planting basins of installed native plants will be maintained free of weeds and maintained regularly so that installed plants receive sufficient sun-light and soil moisture. In order to facilitate maintenance of the plantings, each shrub will be flagged with colored flagging tape. All flagging should be removed after two years.

Performance Measures: The visual buffer installation is designed to meet or exceed the following performance measures:

Visual Buffer Planting Survival, including all tree and shrub species. This performance metric will include the percent survival of installed native plants to meet the following survival percentages:

Table 7. Visual Buffer Planting Survival

Visual Buffer	Year I	Year II	Year III	Year IV	Year V
Tree and Shrub Species	100%	100%	100%	90%	90%

Native Plant Vigor. This performance metric is designed to reflect the vigor of installed plants and ensure that vigor is maintained at a sufficient level to support good long term growth and establishment of the visual buffer. Vigor will be recorded on a scale of 1 – 5.

Table 8. Visual Buffer Vigor Rating

Visual Buffer	Year I	Year II	Year III	Year IV	Year V
Average Vigor	4	4	4	4	4

Annual Performance Monitoring:

Monitoring of performance of the riparian and visual buffer plantings will be conducted annually for a five year period, per the Santa Cruz County requirement. Annual monitoring will document existing conditions in relation to the performance metrics detailed within this restoration and landscape plan. Measurements of percent cover will be made in the late spring or early summer of each year. If a performance measure is not achieved, commensurate action, including replanting of native plant species or improved maintenance practices will be made so as to ensure the performance metric will be met in the following year.

An annual monitoring report will be provided to Santa Cruz County by January 1 of each year. The monitoring plan will document performance to date in relation to performance metrics, provide a summary of maintenance actions performed during the year, document any planned management requirements to meet future performance metrics based on that year's monitoring results, and make recommendations for maintenance in future years.

Biotic Resources Group

Biotic Assessments ◆ Resource Management ◆ Permitting

Pacific Coast Hardwoods
(APN 052-511-06, 052-511-08)
1400 Ranport Road
Watsonville, CA

Biotic Report

Prepared for
Pacific Coast Hardwoods

Prepared by:
Biotic Resources Group
Kathleen Lyons, Plant Ecologist

With

Dana Bland & Associates
Dana Bland, Wildlife Biologist

October 20, 2016

2551 South Rodeo Gulch Road #12 ◆ Soquel, Californica 95073 ◆ (831) 476-4803 ◆ brg@cruzio.com

This page intentionally blank.

INTRODUCTION

Pacific Coast Hardwoods proposes to utilize portions of two parcels on Ranport Road for lumber mill operations. The proposed project will occur on APN 052-511-06 and 052-511-08, two properties that also support operations of Williams Tree Service. The parcels are located in the southern portion of Santa Cruz County, with access from Ranport Road, a public roadway located between Buena Vista Drive and Airport Boulevard. The two parcels encompass approximately 8.4 acres and are located in an unincorporated portion of the County that is within the Highway 1 scenic corridor and the coastal zone (Figure 1). The parcels have a general plan designation of agriculture (AG).

Pacific Coast Hardwoods proposes to obtain a permit from the County to construct a lumber mill, office, and two storage buildings on a portion of APN 052-511-08. The lumber mill, storage buildings, and office are proposed for an area currently used by Williams Tree Service for downed tree storage and mulching operation. Additional lumber storage will occur on APN 052-511-06; this parcel currently supports a shop/warehouse and storage buildings that will continue to be utilized by Williams Tree Service. Other existing facilities on site that are part of the Williams Tree Services will be retained and are not part of this biological review.

The purpose of this report is to evaluate potential impacts to sensitive habitats, plants and wildlife from the proposed Pacific Coast Hardwoods use. A previous biotic report prepared for the property in 2008 (Williams Tree Service Biotic Report, November 2008) was reviewed.

Project Background

The two parcels, located east of Ranport Road, consist of 8.3 acres in an upper and lower area. The site is fenced along Ranport Road and the Highway 1 right-of way. The parcels support asphalt and gravel roads and parking areas. According to the 2008 biotic report, there are monitoring wells that belong to Shell Oil Company pursuant to a completed toxic clean-up and closure plan.

The lower area abuts a portion of Harkins Slough. The creek flows in a predominately east-west direction, eventually reaching Watsonville Slough near Beach Road. Existing tree service activities by Williams Tree Service (i.e., wood storage and chipping) occur in the lower area. The lower area also includes an office building and gravel parking areas. A man-made depression was located east of the office and a storage building in April 2016, yet the area was re-sloped and the depression was absent in October 2016.

The upper area is utilized primarily for equipment storage, with some storage of chip material. The upper area includes an existing warehouse, workshop and storage area for equipment and materials. There are several portable sea/land containers, also used for storage.

The two parcels support native and non-native landscape trees and shrubs, primarily around existing buildings and along Ranport Road. Native riparian vegetation occurs along Harkins Slough. Recent native tree and shrub plantings occur within the 50-foot creek setback area. These planting were installed pursuant to a recommendation in the 2008 biotic report.

The proposed project retains a 50-foot riparian setback between tree company activities and the creek (Harkins Slough) that traverses the lower parcel (052-511-08).

The Biotic Resources Group and Dana Bland & Associates assessed the biotic resources of the project site in March 2016. Biotic Resources Group conducted another site visit in October 2016. These visits were in addition to previous site visits conducted for the Williams Tree Service in 2005, 2007 and 2008. The focus of the assessment was to identify sensitive biotic resources on the two parcels and evaluate the proposed activities relative to such resources.

Intended Use of this Report

The findings presented in this biological report are intended for the sole use of Pacific Coast Hardwoods, their representatives, and the County of Santa Cruz in evaluating the proposed development activities for the two parcels. The findings presented by the Biotic Resources Group in this report are for information purposes only; they are not intended to represent the interpretation of any State, Federal or County law or ordinance pertaining to permitting actions within sensitive habitat or endangered species. The interpretation of such laws and/or ordinances is the responsibility of the applicable governing body.

EXISTING BIOTIC RESOURCES

METHODOLOGY

The biotic resources of the two parcels were assessed through literature review and field observations. The site was surveyed in March 2016 and was visited again in October 2016. Previous vegetation mapping of the area from 2008 was re-checked. Modifications to the 2008 map were made to accurately depict the current condition. The plant communities were mapped onto the survey topographic map (Figure 2). The *Jepson Manual* (2012) was the principal taxonomic references used for the botanical work.

To assess the potential occurrence of special status biotic resources, two electronic databases were accessed to determine recorded occurrences of sensitive plant communities and sensitive species. Information was obtained from the California Native Plant Society's (CNPS) Electronic Inventory (2016), and California Department of Fish & Wildlife (CDFW) RareFind database (CDFW, 2016) for the Watsonville West USGS quadrangle and surrounding eight quadrangles.

This report summarizes the findings of the biotic assessment for the proposed project. The potential impacts of the proposed development (i.e., use of the parcels for lumber mill, office storage buildings and timber storage) on sensitive resources are discussed below. Measures to reduce significant impacts to a level of less-than-significant are recommended, as applicable.

EXISTING BIOTIC RESOURCES

The two parcels lie within the outer Central Coast geographic region (Sawyer and Keeler-Wolf, 1995). The property currently supports several buildings, trailers and storage/warehouse facilities. The site also supports areas of tree mulch, downed tree trunks, and related tree service facilities. The eastern portion of the lower parcel (APN 052-511-08) supports a portion of the upper section of Harkins Slough; the creek area and lands within the 50-foot wide riparian setback area are undeveloped and support willow riparian woodland.

Collectively, the two parcels support bare/developed areas (some comprised of wood chips), riparian woodland, landscape trees/tree groves, oak trees/tree groves, riparian woodland, and ruderal (weedy) areas. A small man-made depression, located near the Williams Tree Service office, supported seasonal open water and a mosaic of native and non-native wet-tolerant plants in March 2016; however, this feature was absent in October 2016. These communities are listed in Table 1.

The distribution of plant community types on the two parcels is depicted on Figure 2.

Table 1. Vegetation Types on APN 052-511-06 and 052-511-08

CNDDB Code[1]	Plant Community Type	Alliance [1]	Rarity Rank[3]
61.201.00	Riparian Woodland	*Salix lasiolepis* alliance	S-3
71.060.00	Oak Trees/Tree Groves	*Quercus agrifolia* alliance	S-4
None[2]	Landscape Trees/Tree Groves	*Sequoia sempervirens, Pinus attenuata, Cupressus macrocarpa* [2]	None
44.150.00	California Annual Grassland/Ruderal	*Avena – Bromus* semi – natural non-native alliance	None

[1] List of California Vegetation Alliances, CDFG December 2010
[2] Vegetation type /alliance not recorded by CDFG
[3] Alliances ranked S1 - S3 are considered of high inventory priority; S4-S5 alliances are generally considered common (CDFG, 2010)

Two soil types are mapped in the project area. The soil on the lower parcel abutting Harkins Slough is identified as Clear Lake clay, moderately wet (119). The upper parcel is mapped as Tierra-Watsonville complex, 15-30% slopes (174) (Soil Survey of Santa Cruz County, USDA/SCS).

Riparian Woodland
In the upper watershed area, Harkins Slough flows as a stream within Larkin Valley, a narrow, linear valley. The upper portion of Harkins Slough enters APN 052-511-08 from culverts beneath Highway 1 and continues as a riparian forest-lined creek channel until Ranport Road. The creek then opens into a low-gradient, perennially open water slough. In this area the valley floor is underlain by peat soils (*Watsonville Slough Resource Enhancement Plan, 2011).*

On APN 052-511-08 the creek channel supports riparian woodland. The woodland is dominated by arroyo willow (*Salix lasiolepis)*, yellow willow (*S. lucida ssp. lasiandra),* California blackberry (*Rubus ursinus)*, stinging nettle (*Urtica dioica),* and poison oak (*Toxicodendron diversilobum)*. Herbaceous plant species grow along the creek channel edge and include water smartweed (*Polygonum persicaria)*, water hemlock (*Ciscuta douglasii)*, and velvet grass (*Holcus lanatus)*. The riparian woodland also supports stands of poison hemlock (*Conium maculatum)*, periwinkle (*Vinca major)*, and Himalaya berry (*Rubus discolor)*, three invasive, non-native species. Figures 3 and 4 shows the character of the riparian woodland. Recent tree and shrub plantings have occurred within the creek's 50-foot wide setback area. Willow, blue elderberry (*Sambucus mexicana)*, twinberry (*Lonicera involucrata),* coast live oak (*Quercus agrifolia)*, coffee berry (*Frangula californica)*, sedge (*Carex sp.),* and rush (*Juncus patens)* were observed in this area.

The riparian habitat is one of the highest value habitats for wildlife species diversity and abundance in California. Factors which contribute to the high wildlife value include the presence of surface water, the variety of niches provided by the high structural complexity of the habitat, and the abundance of plant growth. Riparian habitat along the project site may be used by a diversity of wildlife species for food, water, escape cover, nesting, migration and dispersal corridors, and thermal cover. The value of riparian areas to wildlife is underscored by the limited amount of remaining habitat which has not been disturbed or substantially altered by flood control projects, agriculture, and urbanization.

Common wildlife species that are expected to inhabit the riparian habitat include Pacific treefrog *(Hyla regilla),* bullfrog (*Rana catesbeiana*), western aquatic garter snake (*Thamnophis couchii*), Wilson's warbler *(Wilsonia pusilla),* Bewick's wren (*Thryomanes bewickii*), several species of swallows, red-shouldered hawk (*Buteo lineatus*), raccoon (*Procyon lotor*), opossum (*Didelphis virginiana*), and California myotis (*Myotis californicus*).

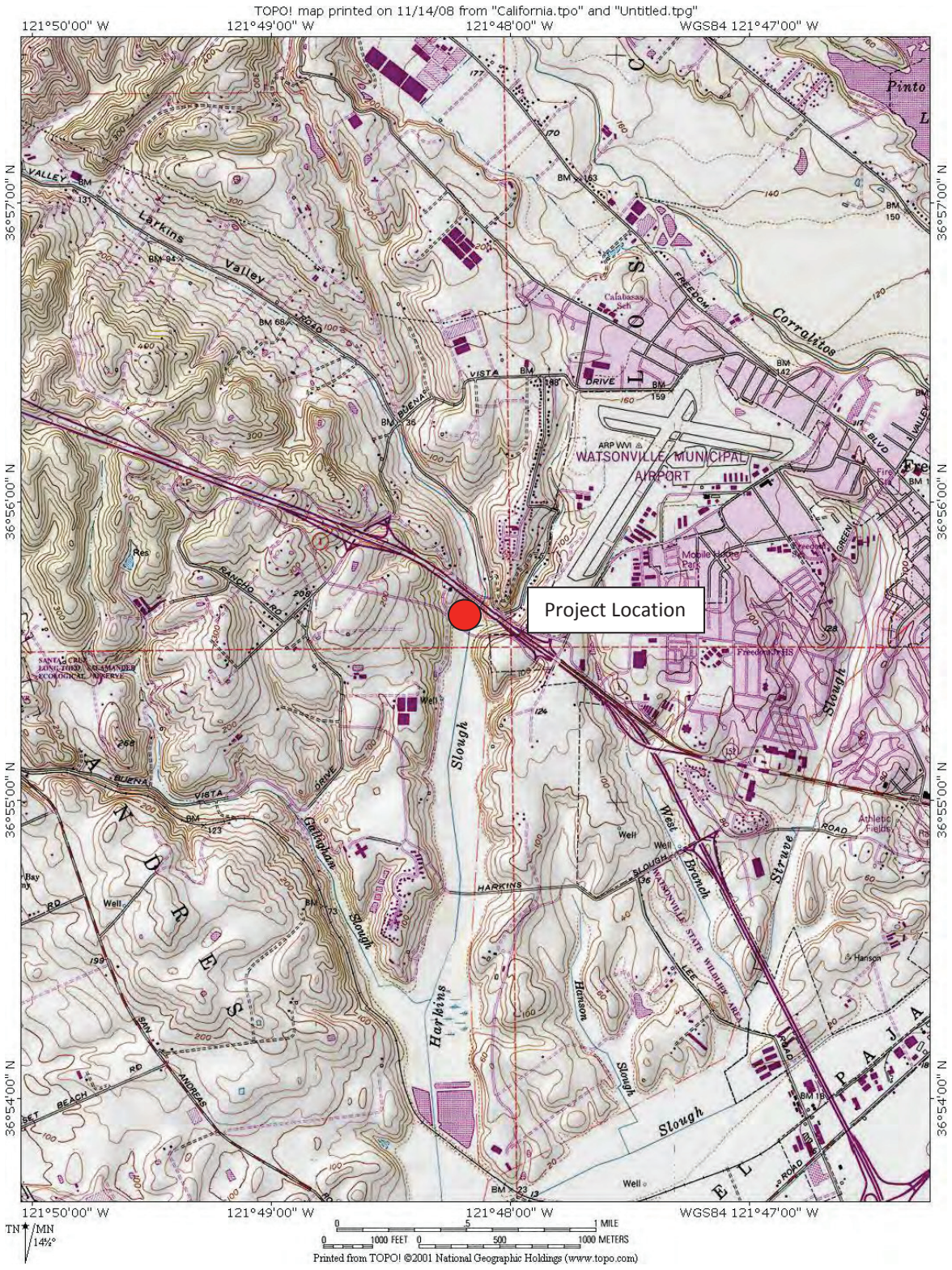


Figure 1. Project Location

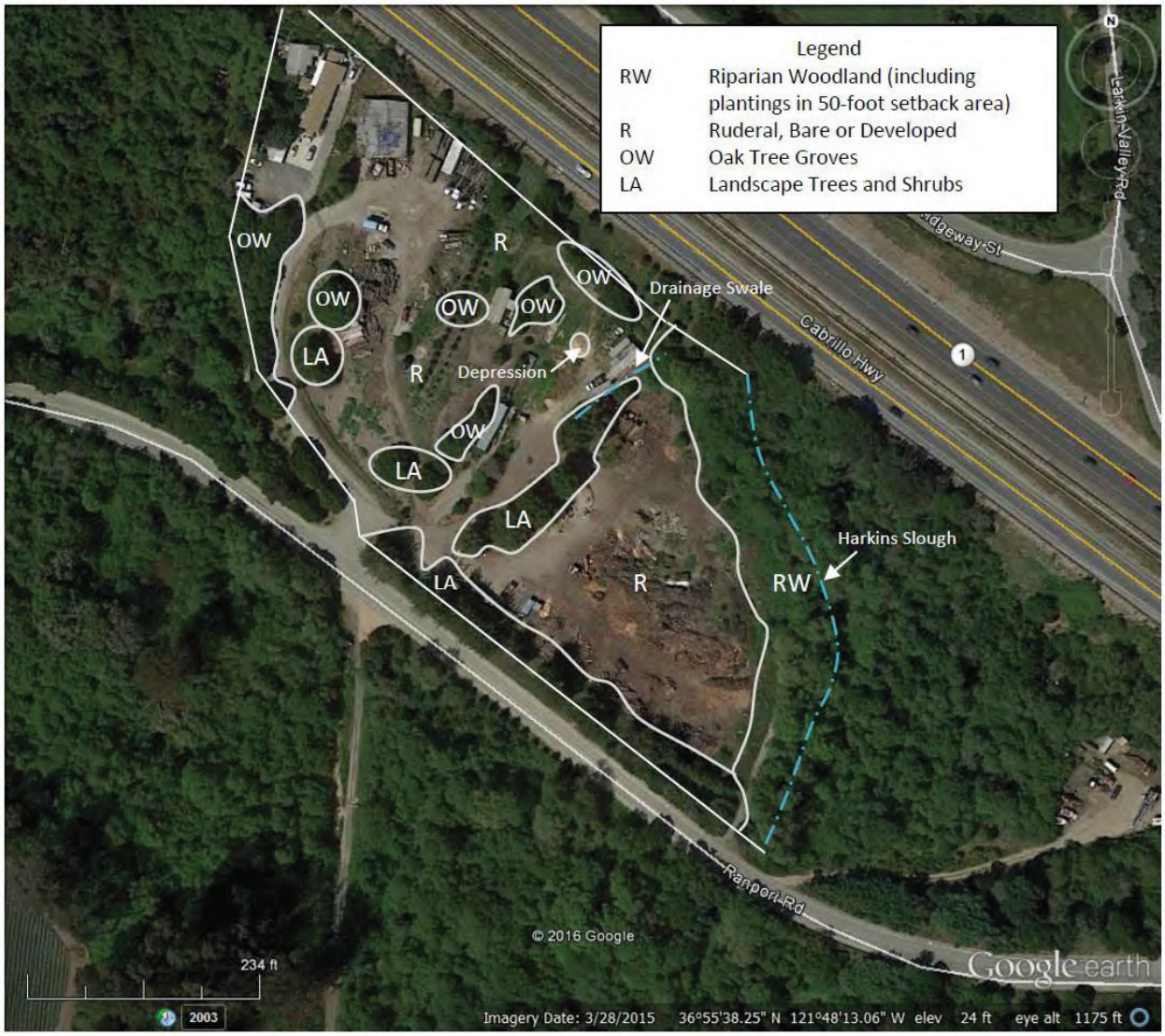


Figure 2. Distribution of Vegetation Types, April 2016

Figure 3. Willow riparian woodland along Harkins Slough on APN 052-511-08

Figure 4. Willow riparian woodland along west bank of Harkins Slough on APN 052-511-08

Ruderal

Ruderal (weedy) areas occur on the upper parcel and in some areas on the lower parcel. The areas are dominated by annual, non-native grasses and forbs typical of previously disturbed areas. The most commonly observed plant species is poison hemlock. Other species include wild oat (*Avena fatua)*, ripgut brome (*Bromus diandrus)*, Italian ryegrass (*Lolium multiflorum)*, rattail fescue (*Festuca myuros),* Bermuda grass (*Cynodon dactylon)*, soft chess (*Bromus hordeaceus)*, wild radish (*Raphanus sativa)*, narrow-leaved clover (*Trifolium angustifolium)*, bur clover (*Medicago polymorpha)*, mallow (*Malva sp.)*, wild mustard (*Brassica sp.)*, and ice plant (*Carpobrotus edulis)*. Native plant species are limited; deerweed (*Acmispon glaber)*, bracken fern (*Pteridium aquilinum)*, coyote brush (*Baccharis pilularis),* and young coast live oak (*Quercus agrifolia)* were observed. Figure 5 shows a typical ruderal area on APN 052-511-06.

Figure 5. Ruderal vegetation on slope on APN 052-511-06

A drainage swale travels along the boundary of APN 052-511-08 and empties into a drainage ditch within the CalTrans Highway 1 right-of-way. This swale supports ruderal vegetation, such as poison hemlock and Italian thistle (*Carduus sp.)* A wetland delineation was conducted in October 2016, wherein a portion of the swale was found to support an herbaceous component of a riparian corridor. Most of the corridor exhibits intermittent flow; however, a short section (20 feet) in the central portion has perennial flow. Saturated soil and shallow water (0.5 inch) was observed in October 2016. Wetland plant species were observed in this area, such as pennyroyal (*Mentha pulegium)*, rabbitsfoot grass (*Polypogon monspeliensis)*, and nutsedge (*Cyperus eragrostis)*. The condition of the swale is depicted in Figures 6 and 7. The wetland delineation is on file with the County of Santa Cruz Planning Department.

Figure 6. Condition of drainage swale, October 2016

Figure 7. Character of area with perennial flow and wetland vegetation in drainage swale

A man-made depression was located on APN 052-511-06, north of the existing Williams tree Service office (observed in March 2016). This low area collects rainwater and was found to support weedy wet-tolerant plant species, such as rabbitsfoot grass, brass buttons (*Cotula coronopifolia)*, and willow lettuce (*Lactuca sp.)*. Figure 8 shows the ruderal condition around the man-made depression in March. The depression was filled and condition of the area in October 2016 is depicted in Figure 9.

The ruderal grassland areas on the project site are highly disturbed by current and past land use, and provide only marginal habitat for native wildlife species. Adaptable wildlife such as white-crowned sparrow (*Zonotrichia leucophrys*) and American goldfinch (*Carduelis tristis*) may occasionally find seed forage in the predominantly non-native, ruderal grassland areas on the site. Small mammals such as California meadow vole (*Microtus californicus*) and Botta's pocket gopher (*Thomomys bottae*) may inhabit the more open, undisturbed portions of the grassland where plant roots and seeds are abundant.

Figure 8. Wet-tolerant ruderal vegetation around man-made depression on APN 052-511-06, March 2016

Figure 9. Area of former depression, October 2016

Coast Live Oak Trees/Tree Groves
Coast live oak trees and oak tree groves occur on both parcels. Non-native annual grasses and forbs dominate the understory. A tree grove is depicted in Figure 5.

Use of the oak trees and groves by native wildlife is expected to be seasonal as acorns are available, and occasionally species more tolerant of surrounding human uses may nest in trees with denser canopy. The oak trees do not provide a uniform oak woodland habitat at this site, and as such are not expected to provide a habitat for a unique fauna, but wildlife from the surrounding areas of denser oak and riparian habitat are expected to occasional forage and nest in some oak trees on site. Common wildlife species expected to utilize the oaks on site for forage include acorn woodpecker (*Melanerpes formicivorus*), western scrub-jay (*Aphelocoma californica*), and black-tailed deer (*Odocoileus hemionus*). In addition, several common resident birds such as northern mockingbird (*Mimus polyglottos*) and spotted towhee *(Pipilo maculatus*) may find suitable nesting habitat in individual oak trees on the site.

Landscape Trees/Tree Groves
The two parcels support groves of planted landscape trees and shrubs. Planted trees occur along Ranport Road and elsewhere in the upper and lower parcels. Planted trees include Monterey cypress (*Cupressus macrocarpa)*, Monterey pine (*Pinus radiata)*, coast redwood (*Sequoia sempervirens)*, casuarina (*Casuarina sp.),* as well as other ornamental species.

The landscape trees on the site do not provide a unique habitat type for wildlife, but may be used by native wildlife, primarily birds, for roosting and nesting where canopy is dense and limb structure suitable for nest construction. As noted above for the oak trees, wildlife species tolerant of the surrounding human use are most likely to utilize the landscape trees.

SENSITIVE BIOTIC RESOURCES

Sensitive habitats are defined by local, State, or Federal agencies as those habitats that support special status species, provide important habitat values for wildlife, represent areas of unusual or regionally restricted habitat types, and/or provide high biological diversity. The project area is located within Santa Cruz County outside the urban and rural service lines, but within the coastal zone.

Regulated Habitats

The project area is located adjacent to a perennial waterway, Harkins Slough. According to County Code (Section 16.32), all lakes, wetlands, estuaries, lagoons, streams and rivers are considered sensitive habitat. According to County Code (Section 16.30) the riparian corridor along perennial channels extends 50 feet outward from the bank-full flow line or to the edge of riparian vegetation, whichever is greater. The proposed project is located outside the 50-foot riparian corridor along Harkins Slough Creek. Pending confirmation by the County, the intermittent/partially perennial drainage swale may also meet the definition of a riparian corridor. Under County Code development adjacent to this this swale may be subject to either a 30 or 50-foot setback.

California Department of Fish and Wildlife (CDFW) is a trustee agency that has jurisdiction under Section 1600 et seq. of the CDFW Code. Under Sections 1600-1603 of the California Fish and Game Code, CDFW regulates all diversions, obstructions, or changes to the natural flow or bed, channel or bank of any river, stream or lake which supports fish or wildlife. CDFW also regulates alterations to ponds and impoundments. CDFW jurisdictional limits typically extend to the top of bank or to the edge of riparian habitat if such habitat extends beyond top of bank (outer drip line), whichever is greater. The proposed project is located outside CDFW's jurisdiction, as the project features area located outside of the Harkins Slough Creek corridor and outside the drainage swale.

Water quality in California is governed by the Porter-Cologne Water Quality Control Act and certification authority under Section 401 of the Clean Water Act, as administered by the Regional Water Quality Control Board (RWQCB). The Section 401 water quality certification program allows the State to ensure that activities requiring a Federal permit or license comply with State water quality standards. Water quality certification must be based on a finding that the proposed discharge will comply with water quality standards which are in the regional board's basin plans. The Porter-Cologne Act requires any person discharging waste or proposing to discharge waste in any region that could affect the quality of the waters of the state to file a report of waste discharge. The RWQCB issues a permit or waiver that includes implementing water quality control plans that take into account the beneficial uses to be protected. Waters of the State subject to RWQCB regulation extend to the top of bank, as well as isolated water/wetland features and saline waters. Should there be no Section 404 nexus (i.e., isolated feature not subject to USACE jurisdiction), a report of waste discharge (ROWD) is filed with the RWQCB. The RWQCB interprets waste to include fill placed into water bodies. The proposed project is located outside RWQCB jurisdiction as the project features are located outside of the Harkins Slough Creek corridor and outside the drainage swale..

The US Army Corps of Engineers (USACE) regulates activities within waters of the United States pursuant to congressional acts: Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act (1977, as amended). Section 10 of the Rivers and Harbors Act requires a permit for any work in, over, or under navigable waters of the United States. Navigable waters are defined as those waters subject to the ebb and flow of the tide to the Mean High Water mark (tidal areas) or below the Ordinary High Water mark (freshwater areas). The proposed project is located above the Ordinary High Water Mark (OHWM) of the perennial creek and outside the drainage swale

Sensitive Habitats
CDFW classifies and ranks the State's natural communities to assist in the determining the level of rarity and imperilment. Vegetation types are ranked between S1 and S5. For vegetation types with ranks of S1-S3, all associations within the type are considered to be highly imperiled. If a vegetation alliance is ranked as S4 or S5, these alliances are generally considered common enough to not be of concern; however, it does not mean that certain associations contained within them are not rare (CDFW, 2007 and 2010). APN 052-511-08 supports arroyo willow riparian woodland that is ranked S3 (sensitive) (see Table 1).

According to County Code, development activities shall conform to permitted uses and impacts to sensitive habitat be avoided. If development occurs within any sensitive habitat area the County requires projects mitigate significant environmental impacts and restoration of any area which is degraded sensitive habitat or has caused or is causing the degradation, with restoration commensurate with the scale of the development.

Special Status Plant Species
Plant species of concern include those listed by either the Federal or State resource agencies as well as those identified as rare by CNPS (List 1B). The search of the CNPS and CNDDB inventories identified the special status plant species with potential to occur in the project area. These species are listed on Table 2. Surveys for rare plants were conducted for Williams Tree Service in spring 2007. Site visits were made in April, May, June and July 2007 to assess the proposed development areas for potential rare plant habitat and presence/absence of special status plant species. No special status plant species were detected within the project site. No suitable habitat for species status plant species was found on site during the 2016 re-evaluation.

Table 2. List of Special Status Plant Species with Potential to Occur in the Vicinity of APN 052-511-06 and 052-511-08, October 2016

Species	CNPS	State Status	Federal Status	Habitat Preference Observed on Site?
Watsonville West Quadrangle				
Anderson's manzanita *(Arctostaphylos andersonii*)	List 1B.2	None	None	Sandy slopes, often intermixed with chaparral; not observed
Hooker's manzanita *(Arctostaphylos hookeri*)	List 1B.2	None	None	Sandy slopes, often intermixed with oak woodland; known from Buena Vista area; not observed
Pajaro manzanita *(Arctostaphylos pajaroensis*)	List 1B.1	None	None	Sandy slopes, often intermixed with oak woodland; recorded from NW of Watsonville and in Prunedale area; not observed
Congdon's tarplant (*Centromadia parryi ssp. congdonii)*	List 1B.1	None	None	Mesic grassland, heavy clay; not observed
Monterey spineflower *(Chorizanthe pungens var. pungens)*	List 1B.2	None	Threatened	Sandy slopes, can be intermixed with oak woodland/maritime chaparral; recorded from Manresa and Sunset State beaches; Day Valley area; Pajaro Dunes; not observed

Table 2. List of Special Status Plant Species with Potential to Occur in the Vicinity of APN 052-511-06 and 052-511-08, October 2016

Species	CNPS	State Status	Federal Status	Habitat Preference Observed on Site?
Robust spineflower *(Chorizanthe robusta var. robusta)*	List 1B.1	None	Endangered	Sandy slopes, often intermixed with oak woodland/maritime chaparral; recorded from Manresa State Beach; NE of Ellicott Pond, Aptos HS area; not observed
Sand-loving wallflower *(Erysimum ammophilium)*	List 1B.2	None	None	Coastal dunes; recorded from Sunset State Beach, along Shell Road; not observed
Monterey gilia *(Gilia tenuiflora ssp. arenaria)*	List 1B.2	Threatened	Endangered	Coastal dunes; recorded from Sunset State Beach; not observed
Santa Cruz tarplant *(Holocarpha macradenia)*	List 1B.1	Endangered	Threatened	Grasslands, often on coastal terrace deposits; recorded from upper Harkins Slough area and Watsonville area; not observed
Kellogg's horkelia *(Horkelia cuneata ssp. sericea)*	List 1B.1	None	None	Oak woodland and edges of grasslands; recorded from NW of Watsonville; not observed
Woodland woollythreads *(Monolopia gracilens)*	List 1B.2	None	None	Oak woodland and edges of grasslands; serpentine; not observed
Choris's popcorn flower *(Plagiobothrys chorisianus var. chorisianus)*	List 1B.2	None	None	Mesic grasslands, often on coastal terrace deposits; recorded from Watsonville Airport; not observed
Surrounding Quadrangles (Laurel, Loma Prieta, Watsonville East, Prunedale, Mt. Madonna, Soquel and Moss Landing)				
Bent-flowered fiddleneck (*Amsinckia lunaris)*	List 1B.2	None	None	Grassland; recorded from Scotts Valley and Davenport; not observed
King's Mountain manzanita (*Arctostaphylos regismontana)*	List 1B.2	None	None	Chaparral and forests; recorded from Skyline area; not observed
Bonny Doon manzanita *(Arctostaphylos silvicola*)	List 1B.2	None	None	Zayante sands; not observed
Deceiving sedge (*Carex saliniformis)*	List 1B.2	None	None	Mesic areas, marshes; historic record from Scotts Valley; not observed
Coyote ceanothus (*Ceanothus ferrisae)*	List 1B.1	None	Endangered	Chaparral, on serpentine; recorded from Anderson Reservoir and Uvas Canyon area; not observed
Ben Lomond spineflower *(Chorizanthe pungens var. hartwegiana)*	List 1B.1	None	Endangered	Ponderosa pine and chaparral in Zayante sands; recorded from Bonny Doon and Felton areas; not observed
Scotts Valley spineflower *(Chorizanthe robusta var. hartwegii)*	List 1B.1	None	Endangered	Grassland on sandstone outcrops; known only from Scotts Valley area; not observed
Seaside birds-beak (*Cordylanthus rigidus ssp. littoralis)*	List 1B.1	Endangered	None	Maritime chaparral and closed cone forests; recorded from Monterey Co.; not observed
Santa Clara Valley dudleya (*Dudleya setchellii)*	List 1B.1	None	Endangered	Serpentine chaparral and rock outcrops; not observed
Eastwood's goldenbush	List 1B.1	None	None	Chaparral and coastal scrub; recorded from

Table 2. List of Special Status Plant Species with Potential to Occur in the Vicinity of APN 052-511-06 and 052-511-08, October 2016

Species	CNPS	State Status	Federal Status	Habitat Preference Observed on Site?
(*Ericameria fasciculata)*				Monterey Co.; not observed
Ben Lomond wallflower *(Erysimum teretifolium)*	List 1B.1	Endangered	Endangered	Ponderosa pine and chaparral in Zayante sands; known from Felton and Ben Lomond area; not observed
Minute pocket moss (*Fissidens pauperculus)*	List 1B.2	None	None	Sandstone outcrops in grassland and oak woodland; recorded from Scotts Valley; not observed
Fragrant fritillary *(Fritillaria liliacea)*	List 1B.2	None	None	Moist serpentine areas in grassland; recorded from Santa Clara Co.; not observed
Loma Prieta hoita *(Hoita strobilina)*	List 1B.1	None	None	Talus in chaparral and woodlands; 1936 herbarium record from Santa Cruz; not observed
Smooth lessingia *(Lessingia micradenia var. glabrata)*	List 1B.2	None	None	Serpentine soils in chaparral and grasslands; recorded from Santa Clara Co.; not observed
Arcuate bush-mallow *(Malacothamnus arcuatus)*	List 1B.2	None	None	Serpentine chaparral; not observed
Hall's bush-mallow *(Malacothamnus hallii)*	List 1B.2	None	None	Serpentine chaparral; not observed
Dudley's lousewort *(Pedicularis dudleyi)*	List 1B.2	None	None	Woodlands; historic (1884) occurrence from Aptos; not observed
Santa Cruz Mtns. beards tongue *(Penstemon rattanii var. kleei)*	List 1B.2	None	None	Woodland and chaparral; herbarium collections from Ben Lomond Mtn.; not observed
White-rayed pentachaeta *(Pentachaeta bellidiflora)*	List 1B.1	None	None	Serpentine grasslands; grassland; not observed
Yadon's piperia (*Piperia yadonii)*	List 1B.1	None	Endangered	Coastal scrub and oak woodland, often on talus/rocky areas; not observed
San Francisco popcorn flower (*Plagiobothrys diffusus)*	List 1B.2	Endangered	None	Mesic grasslands, often on coastal terrace deposits; not observed
Scotts Valley polygonum (*Polygonum hickmanii)*	List 1B.1	None	Endangered	Grasslands, on coastal terrace deposits; not observed
Pine rose (*Rosa pinetorum)*	List 1B.2	None	None	Closed cone pine forests; not observed
Most-beautiful jewel-flower (*Streptanthus albidus ssp. peramoenus)*	List 1B.2	None	None	Serpentine grassland; not observed
Santa Cruz Clover *(Trifolium buckwestiorum)*	List 1B.1	None	None	Mesic grasslands; not observed
Saline clover (*Trifolium depauperatum var. hydrophilum)*	List 1B.2	None	None	Mesic grasslands, alkaline; not observed

Key for CNPS Status: **List 1B:** These plants (predominately endemic) are rare through their range and are currently vulnerable or have a high potential for vulnerability due to limited or threatened habitat, few individuals per population, or a limited number of populations. List 1B plants meet the definitions of Section 1901, Chapter 10 of the CDF&G Code. **List 4:** List 4 is a watch list of plants with limited distribution in the state that have low vulnerability and threat at this time. These plants are uncommon, often significant locally, and should be monitored.

Special Status Wildlife Species
Special status wildlife species include those listed, proposed or candidate species by the Federal or the State resource agencies as well as those identified as State species of special concern. In addition, all raptor nests are protected by Fish and Game Code, and all migratory bird nests are protected by the Federal Migratory Bird Treaty Act. Special status wildlife species were evaluated for their potential presence in the project area as described in Table 3 below.

None of the special status wildlife species listed in Table 3 below area expected to inhabit the operational areas of the Williams Tree Service property because they do not provide suitable habitat. Two amphibian special status species (Santa Cruz long-toed salamander and California red-legged frog) and one reptile (pond turtle) occur in the general project vicinity. The frog and turtle may possibly utilize the willow riparian habitat and adjacent portion of Harkins Slough that occurs on the eastern edge of the property. California red-legged frog and western pond turtle occur in low numbers in downstream portions of the slough system where the slough widens and flows are very slow, and where adjacent upland habitats are undisturbed by agriculture, and the frog also occurs upstream in ponds adjacent to the Harkins Slough Gulch in Larkin Valley. The depression discussed above no longer holds water, and thus provides no habitat for either the frog or turtle. The swale has a small, shallow area that is perennial; however, its potential for frog or turtle habitat is unlikely and no part of the proposed project will impact the swale.

The site is included in Designated Critical Habitat (Unit SCZ-2) for the California red-legged frog (USFWS 2010). Critical Habitat is evaluated and may receive additional protection to habitat only when the project meets two basic conditions: 1) There is a federal nexus involved in the project, e.g. funding, permit, etc, and 2) the project area contains the Primary Constituent Elements (PCEs) as listed in the federal register notice (USFWS 2006, USFWS 2010). The proposed project does not involve any federal nexus, and the proposed project development area does not contain any of the PCEs for the California red-legged frog. Harkins Slough Creek does contain PCEs for the frog, but the project will not impact the creek and the structures will be at least 50 feet from the creek as described in the project description. Please refer to the USFWS 2006 and 2010 federal register notices for more detailed information on Critical Habitat. This project does not qualify for additional evaluation or habitat protection for the California red-legged frog under the rules and regulations that govern Designated Critical Habitat.

Santa Cruz long-toed salamanders have not been found to-date in the slough system downstream of the project site, but do occur approximately 2.5 mi upstream in ponds near Harkins Slough Gulch in Larkin Valley . A multitude of non-native predatory species (e.g., several fish, crawfish, bullfrogs) occur within the downstream portions of the slough system, and severely restrict or eliminate the occurrence of these three native species. The closest known location of Santa Cruz long-toed salamander to the Williams Tree Service property is the Buena Vista pond (approx. 1.5 mile west), which is now a preserve and surrounded by hundreds of acres of suitable upland habitat for the species. This salamander is also known from ponds approximately 2+ miles upstream in the Harkins Slough watershed. However, Harkins Slough along this property does not provide suitable breeding habitat for this species because water flows through the channel rapidly during winter, and this salamander does not breed in flowing water. Also, the property does not contain suitable upland habitat for this salamander. As noted above, the many non-native predators of this salamander present in the slough are also a detriment to its potential occurrence in this water system.

Table 3. Special Status Wildlife Species and Their Predicted Occurrence on APN 052-511-06 and 052-511-08, October 2016

SPECIES	STATUS[1]	HABITAT	POTENTIAL OCCURRENCE ON SITE
Invertebrates			
Monarch butterfly *Danaus plexippus*	*	Eucalyptus, acacia and pine trees groves provide winter habitat when they have adequate protection from wind and nearby source of water	None, no suitable habitat on site.
Fish			
Steelhead *Oncorhynchus mykiss*	FT	Perennial creeks and rivers with gravels for spawning.	None, no suitable habitat on site.
Tidewater goby *Eucyclogobius newberryi*	FE, CSC	Coastal lagoons and associated creeks up to 1-mile inland	None, no suitable habitat on site.
Amphibians			
California tiger salamander *Ambystoma californiense*	FT, CSC	Ponds, vernal pools for breeding, grasslands with burrows for upland habitat	None, no suitable habitat on site.
Santa Cruz long-toed salamander *Ambystoma macrodactylum croceum*	FE, SE	Ponds for breeding with water at least into June. Riparian, oak woodland, coastal scrub for upland habitat.	No suitable breeding or upland habitat on site; closest known occurrence is 1.5 mi W at Buena Vista Ecological Preserve. Unlikely to occur at this site.
Foothill yellow-legged frog *Rana boylii*	CSC	Perennial creeks with cobble substrate for egg attachment.	None. No suitable habitat.
California red-legged frog *Rana draytonii*	FT, CSC	Riparian, marshes, estuaries and ponds with still water at least into June.	No suitable breeding habitat on site; may occasionally utilize the portion of Harkins Slough on eastern edge of property for foraging or movement corridor. Closest known occurrence is 1.5 mi NE in Larkin Valley.
Reptiles			
Western pond turtle *Emys marmorata*	CSC	Creeks and ponds with water of sufficient depth for escape cover, and structure for basking; grasslands or bare areas for nesting.	No suitable habitat within project area, but may occasionally utilize the portion of Harkins Slough on east edge of property for movement corridor.
Black legless lizard *Anniella pulchra nigra*	CSC	Sand dunes with native vegetation	None, no suitable habitat on site.
Birds			
Western snowy plover *Charadrius alexandrinum nivosus*	FT, CSC	Nests on sandy beach, shores of salt ponds	None, no suitable habitat on site.
Burrowing owl *Athene cunicularia*	CSC	Nests and winters in grasslands with burrows and short vegetation	Began wintering in restored grassland near Watsonville High School in 2010, between West Struve Slough and Harkins Slough; however, no suitable habitat on this site.

Table 3. Special Status Wildlife Species and Their Predicted Occurrence on APN 052-511-06 and 052-511-08, October 2016

SPECIES	STATUS[1]	HABITAT	POTENTIAL OCCURRENCE ON SITE
Bank swallow *Riparia riparia*	ST	Vertical banks of rivers, lakes, ocean shorelines with sandy soils for digging nests	None, no suitable habitat on site.
Tricolored blackbird *Agelaius tricolor*	CSC	Dense bulrush and/or cattail vegetation adjacent to freshwater marshes	None, no suitable habitat on site.
Mammals			
Santa Cruz kangaroo rat *Dipodomys venustus venustus*	*	Silverleaf manzanita and mixed scrub in Zayante soils	None, no suitable habitat on site.
American badger *Taxidea taxus*	CSC	Grasslands with friable soils for digging dens	None, no suitable habitat on site.

[1] Key to status:

FE = Federally listed as endangered species
FT = Federally listed as threatened species
SE = State listed as endangered species
ST = State listed as threatened species
CSC = California species of special concern
* = Species of local concern under County LCP

IMPACT AND MITIGATION DISCUSSION

IMPACT CRITERIA

The thresholds of significance presented in the California Environmental Quality Act (CEQA) were used to evaluate project impacts and to determine if the proposed development of the single-family residence poses significant impacts to biological resources. In addition, Santa Cruz County Code was also used to develop the significance criteria. For this analysis, significant impacts are those that substantially affect, either directly or through habitat modifications:

- A species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by CDFW or USFWS or NMFS;
- Riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by CDFW or USFWS;
- Federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means;
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance;
- Conflict with the provisions of an adopted Habitat Conservation plan, Natural Community Conservation plan, or other approved local, regional, or state habitat conservation plan.

POTENTIAL IMPACTS AND RECOMMENDED MITIGATION MEASURES

The proposed use of the two parcels for a lumber milling operation was evaluated for its potential direct and indirect impacts to biotic resources. Impacts to sensitive habitats/resources were considered potentially significant.

Impacts to Sensitive Habitats. The project proposes continued use of the two parcels for tree-related operations. The project proposes to maintain a 50-foot setback from Harkins Slough. This buffer area has been revegetated with native trees and shrubs. Large rocks are located along the outer edge of the buffer to restrict unauthorized access into the buffer area. The proposed project is not expected to directly or indirectly affect the riparian woodland along this portion of Harkins Slough. In addition, the 50-foot setback area has been planted with native trees and shrubs, as recommended in the 2008 biotic report. These plantings provide a vegetative buffer between the riparian woodland and the proposed lumber operations. The project does not propose to alter the drainage swale, therefore no impacts to this swale are anticipated from this project.

Impacts to Sensitive Wildlife Resources. The area currently occupied by the Williams Tree Service company has been in operation for the past five years, and prior to that was used for agricultural support services, such as equipment and chemical storage areas, for at least 30 years. This site has been in constant use for decades, and as such, has provided no or very little habitat for native wildlife within the operational areas. The highest value wildlife habitat on site is the riparian corridor and open water of this portion of Harkins Slough, as shown on Figure 2. As discussed above, the riparian canopy provides valuable habitat for migrating birds and the waters of the Harkins Slough provide habitat to some aquatic and terrestrial species. This project includes establishment of a minimum 50-foot wide vegetated buffer between the existing tree

service activities as well as the proposed lumber operations and the riparian area of Harkins Slough. This would provide a beneficial effect to wildlife compared to existing and previous conditions at the site.

The landscaped, ruderal, and small oak groves habitats on the Williams Tree Service property do not provide habitat for special status wildlife species. The soils are compacted from decades of equipment use and materials storage. The bare areas, wood chip piles, storage buildings, roads, and other facilities do not provide suitable habitat for any special status wildlife species.

The seasonal man-made depression on the property near the office does not provide suitable habitat for special status amphibians or the pond turtle. After a winter with normal rains, the March 2016 site visit observed only six inches of water in the man-made pond. The pond was only 15-20 feet wide maximum. The small size and low depth of the pond does not provide potential breeding habitat for special status amphibians or pond turtle. The depression was dry in summer 2016 (Dave Joseph, pers. comm., 2016). At the October 2016 site visit the depression area had been re-sloped and the depression filled5

The riparian habitat on the property may provide occasional forage and movement corridor California red-legged frog and western pond turtle, as well as nesting habitat for several special status birds as described in Table 3. However, these species are not expected to reside in the current or proposed operational areas of the property. Both the frog and turtle are capable of traversing openings within the operational area during seasonal movements between suitable habitat areas, but it is considered unlikely that they would traverse the site on any regular basis because the riparian corridor along Harkins Slough provides these species suitable cover and there are no ponds on adjacent areas that would attract the frog or turtle causing them to cross this property. Measures are detailed below to avoid and minimize potential impacts during construction to California red-legged frog or pond turtles which may occasionally traverse the operational areas.

If special status birds nest in the riparian corridor, it is reasonable to expect that that they choose nest sites with enough visual screening from the adjacent site use, and that they can tolerate the operation noise, as well as the noise from the adjacent Highway 1. Providing the 50-foot buffer as described above would help protect the riparian habitat along Harkins Slough that traverses this property, and would be beneficial to protecting water quality of this portion of the slough, and additional screening for the riparian habitat, and any special status species that may occasionally utilize it. At this time, the project does not propose the remove or trim any trees. However, if that changes during implementation of the project, measures are listed below to avoid impacts to nesting birds.

The proposed use of the property as a lumber operation is not expected to cause significant impacts to any special status wildlife species.

Impact BIO-1. If any trees must be removed or trimmed to implement the proposed lumber project, nesting migratory birds may potentially be destroyed or disturbed.

Mitigation Measure BIO-1. Schedule tree removal or trimming to occur between August 1 and March 1 of any given year. If that is not practical, then a qualified biologist shall conduct surveys for nesting birds no more than 14 days prior to tree removal or trimming. If nesting birds are observed in the trees scheduled for removal or trimming, then the removal or trimming shall be postponed until the biologist determines that all chicks have fledged the nest.

Impact BIO-2. Preparation of the site for construction of the proposed lumber mill facilities has the potential to injure or kill California red-legged frogs or pond turtles, if any are present during stripping and grading or other ground disturbance. Both the frog and the turtle are closely tied to their aquatic habitats, but are able to

traverse disturbed and open areas (such as the existing Williams Tree Service operational areas), usually during the rainy season, during movements to/from breeding ponds to summer foraging sites (e.g. creeks). Exterior lighting of the proposed new lumber mill facilities has the potential to disturb these species, as well as other more common wildlife.

Mitigation Measure BIO-2. Schedule clearing, stripping, and grading to occur between August 1 and October 15th of any given year, which is typically the driest time of the year at this site, and therefore, the least likely time for California red-legged frogs or pond turtles to traverse the project area. If that is not practical, then a qualified biologist shall conduct preconstruction surveys for red-legged frogs or pond turtles no more than 48 hours prior to commencement of ground disturbance, using both a daytime and nighttime survey protocol. If red-legged frogs are observed, construction will be postponed until monitoring by the biologist confirms that the frog has left the work area of its own accord. If that is not practical, then the applicant shall immediately contact the USFWS regarding red-legged frog, and for pond turtles contact the CDFW. No frogs or turtles shall be relocated unless approved by USFWS and CDFW, respectively.

Mitigation Measure BIO-3. Have a biologist present a tail-gate type worker educational session just prior to commencement of ground disturbance. The educational session should contain a brief ecology of the red-legged frog and pond turtle, photos, measures to avoid any potential impacts to the species, and their protected status. Flyers or books with this information may be used for the presentation.

LITERATURE CITED AND REFERENCES

Baldwin (ed.). 2012. The Jepson manual. Vascular Plants of California, University of California Press, Berkeley, CA.

Barbour & Major, 1988. Terrestrial Vegetation of California. California Native Plant Society, Sacramento, CA

Biotic Resources Group. 2008. Williams Tree Service Biotic Report. Prepared for Williams Tree Service, November 2008.

California Native Plant Society. 2016. Inventory of Rare and Endangered Vascular Plants of California. CNPS, Sacramento CA.

California, State of, Department of Fish & Game. 2107. List of California Vegetation Alliances. Vegetation Classification and Mapping Program, Sacramento, CA.

California, State of, Department of Fish & Wildlife. 2016. Natural Diversity DataBase, RareFind Program.

Sawyer & Keller-Wolf, 1995. A Manual of California Vegetation. California Native Plant Society, Sacramento, CA

USDA, 1974. Soil Survey of Santa Cruz County, California. United States Department of Agriculture, Soil Conservation Service in cooperation with University of California Agricultural Experiment Station.

USGS. 1980. Watsonville West, California 7-1/2-minute topographic quadrangle.

U. S. Fish and Wildlife Service. 2006. Endangered and threatened wildlife and plants; designation of critical habitat for the California red-legged frog, and special rule exemption associated with final listing for existing routine ranching activities; final rule. Fed. Register Vol. 71, No. 71:19244-19346.

U. S. Fish and Wildlife Service. 2010. Endangered and threatened wildlife and plants: Revised designation of critical habitat for the California red-legged frog; Final rule. Fed. Register Vol. 75, No. 51:12816-12959.

COUNTY OF SANTA CRUZ

PLANNING DEPARTMENT
701 OCEAN STREET, 4TH FLOOR, SANTA CRUZ, CA 95060
(831) 454-2580 FAX: (831) 454-2131 TDD: (831) 454-2123
KATHLEEN MOLLOY PREVISICH, PLANNING DIRECTOR

April 7, 2017

David Joseph
250 Ocean View Ave
Santa Cruz, CA 95062

APN: 052-511-06
App #: REV161071

Dear Mr. Joseph:

The letter dated November 8, 2016, described two deficiencies to be addressed, prior to acceptance of the biotic report, restoration plan and wetland delineation. The restoration of the pond to previous conditions with the revegetation plan has been reviewed and is acceptable as designed. This satisfies the requirement for revisions to the wetland delineation, and as such, the wetland delineation can now be accepted as well. The final issue that was noted in the above referenced letter was the removal of the storage containers from the riparian area. The current proposed plans show retaining some of the containers in that location. It will be a condition of approval that those containers are relocated to an appropriate site on-site outside of the riparian area, or removed from the property altogether if no longer necessary. The area beneath the containers will need to be revegetated based upon the plant pallet submitted for the restoration plan and included in the monitoring and maintenance of the entire restoration plan.

Regarding the working equipment parking, this does not seem to be a pre-existing use and there is some concern about the proximity to the drainage. Examination of historic photos shows this area to be disturbed by various stockpile activities. In order to ensure sufficient area around the riparian drainage and to prevent accidental incursion by working equipment, it shall be a condition of approval to install a split rail fence or similar barrier 30 feet from the top of bank to the east and south of the drainage.

The following mitigations still apply:

BIOTIC REPORT

The biotic report identifies the potential presence of California red-legged frogs (CRLF), western pond turtles, and migratory birds, any of which may be impacted as a result of construction activities. To ensure to take of these protected species occurs, the following measures shall be incorporated into conditions of approval for this project:

Impact BIO-1. If any trees must be removed or trimmed to implement the proposed lumber project, nesting migratory birds may potentially be destroyed or disturbed.

Mitigation Measure BIO-1. Schedule tree removal or trimming to occur between August 1 and March 1 of any given year. If that is not practical, then a qualified biologist shall conduct surveys for nesting birds no more than 14 days prior to tree removal or trimming. If nesting birds are observed in the trees

scheduled for removal or trimming, then the removal or trimming shall be postponed until the biologist determines that all chicks have fledged the nest.

Impact BIO-2. Preparation of the site for construction of the proposed lumber mill facilities has the potential to injure or kill California red-legged frogs or pond turtles, if any are present during stripping and grading or other ground disturbance. Both the frog and the turtle are closely tied to their aquatic habitats, but are able to traverse disturbed and open areas (such as the existing Williams Tree Service operational areas), usually during the rainy season, during movements to/from breeding ponds to summer foraging sites (e.g. creeks).

Mitigation Measure BIO-2. A qualified biologist shall conduct preconstruction surveys of the disturbance area for red-legged frogs and pond turtles no more than 48 hours prior to commencement of ground disturbance, using both a daytime and nighttime survey protocol. If red-legged frogs are observed, construction will be postponed until monitoring by the biologist confirms that the frog has left the work area of its own accord. In this case, the biologist will be required to clear the project site each morning prior to initiation of construction activities. If that is not practical, then the applicant shall immediately contact the USFWS regarding red-legged frog, and for pond turtles contact the CDFW. No frogs or turtles shall be relocated unless approved by USFWS and CDFW, respectively. If no frogs or turtles are found in the disturbance area during the day and night surveys, no further surveying will be required unless either species is encountered during construction.

Mitigation Measure BIO-3. Have a biologist present a tail-gate type worker educational session just prior to commencement of ground disturbance. The educational session should contain a brief ecology of the red-legged frog and pond turtle, photos, measures to avoid any potential impacts to the species, and their protected status. Flyers or books with this information may be used for the presentation.

Impact BIO-3. Exterior lighting of the proposed new lumber mill facilities has the potential to disturb riparian species, as well as other more common wildlife.

Mitigation Measure BIO-4: In order to mitigate impacts from a new light source, prior to final approval plans shall be revised to comply with the following requirements:

a) All site, building, security and landscape lighting shall be directed onto the site and away from riparian areas.
b) Area lighting shall be high-pressure sodium vapor, metal halide, fluorescent, or equivalent energy-efficient fixtures.
c) All lighted parking and circulation areas shall utilize low-rise light standards. Light standards to a maximum height of 15 feet are allowed.
d) Security lighting shall be on a timer and/or motion sensor.

Sincerely,

Matthew Johnston
Environmental Planning

Cc: Todd Sexauer, Environmental Coordinator
Antonella Gentile, Project Resource Planner
Annette Olson, Project Planner

RANPORT ROAD, WATSONVILLE, CA

APN 054-511-06, 08

PACIFIC COAST HARDWOODS PROJECT

Santa Cruz County, California

Delineation of Jurisdictional Waters

October 6, 2016

Biotic Resources Group

Biotic Assessments • Resource Management • Permitting

Biotic Resources Group

Biotic Assessments • Resource Management • Permitting

RANPORT ROAD, WATSONVILLE, CA

APN 054-511-06, 08

PACIFIC COAST HARDWOODS PROJECT

Santa Cruz County, California

Delineation of Jurisdictional Waters

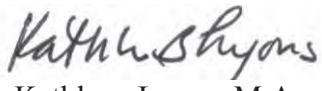
Prepared for:

Dave Joseph
Pacific Coast Hardwoods

Prepared By

Biotic Resources Group

The undersigned certifies that this report is a complete and accurate account of the findings and conclusion of a jurisdictional "waters of the U.S. and waters of the State" (including wetlands) delineation for the above-referenced project.



Kathleen Lyons, M.A.
Plant Ecologist

October 6, 2016

2551 S. Rodeo Gulch Road #12 • Soquel, California 95073 • (831) 476-4803 • brg@cruzio.com

Executive Summary

At the request of Pacific Coast Hardwoods, Biotic Resources Group (BRG) has prepared this Delineation of Jurisdictional Waters for a portion of the property located on Ranport Road near Watsonville, in an unincorporated area of Santa Cruz County, California. This delineation was based on site surveys conducted in October 2016 to document the regulatory authority of the U.S. Army Corps of Engineers (USACE) pursuant to the Federal Clean Water Act (CWA). The project area was surveyed pursuant to the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region, Version 2.0* (USACE, 2010) to identify evidence of wetland hydrology, hydrophytic vegetation, and hydric soils.

This wetland delineation was conducted to document current site conditions to fulfill requirements of an environmental review for a proposed facility on the property. The County of Santa Cruz has requested the landowner determine the potential presence of wetlands within a depression and a drainage swale in the central portion of the property (wetland study area). The property is located within the Coastal Zone. The delineation utilized the USACE criteria in determining wetlands that may be subject to the County's Riparian Corridor and Wetlands Protection Ordinance and Sensitive Habitat Protection Ordinance (County Code Chapter 16.30 and 16.32).

This delineation found that the wetland study area supports a small patch of federally-defined wetlands, located with an intermittent/perennial riparian corridor. The wetland occurs as an approximately 2.5' x 20' patch within the drainage swale. A data point (sample site #2) found in this area met all three parameters needed for federally-defined wetlands, pursuant to the current USACE manual.

The property was found to support sandy loam soils, yet despite the presence of dark soil additional required hydric soil indicators were absent at all samples except one (sample site #2). Direct observations of hydrologic features were not observed, except at sample site #2. Primary hydrologic indicators, such as soil saturation, surface water, and subsurface water, were observed at sample site #2 within one portion of the drainage swale. Secondary hydrology indicators were observed (water-stained leaves) elsewhere in the drainage swale; however, these features appear to be the result of very short duration surface water directly tied to high rainfall events.

From a review of the aerial photo record, the former depression, located northwest of the drainage swale appears to have been constructed within an otherwise upland area. An open water feature recorded in 1975 aerial photos appears to have been located within the drainage swale and is not related to the former 2013/2016 depression feature.

Table of Contents

Chapter 1. Introduction

1.1. Purpose of Delineation

This delineation was prepared for Pacific Coast Hardwoods in order to delineate the U.S. Army Corps of Engineers (USACE) jurisdictional authority for portions of APN 052-511-06 and 052-511-08 located near Watsonville, in an unincorporated area of Santa Cruz County, California. The two parcels encompass approximately 8.4 acres.

Pacific Coast Hardwoods proposes to obtain a permit from the County to construct a lumber mill, office, and two storage buildings on a portion of APN 052-511-08. The lumber mill, storage buildings, and office are proposed for an area currently used by Williams Tree Service for downed tree storage and mulching operation. Additional lumber storage will occur on APN 052-511-06; this parcel currently supports a shop/warehouse and storage buildings that will continue to be utilized by Williams Tree Service. A depression and drainage swale in the central portion of the property is the focus of the wetland delineation ("wetland study area").

In 2016, a wetland delineation was conducted for the wetland study area. The delineation was conducted pursuant to methodology as presented in 1987 USACE Manual (Environmental Laboratory, 1987), Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region, Version 2.0 (USACE, 2010). The delineation was conducted in October 2016, after a normal rainfall year that followed a four-year drought.

The findings presented in this delineation present BRG's best effort at determining the extent of wetlands based on the most current federal and State regulations and regulatory agency guidance; however, the interpretation of such regulations is the responsibility of the applicable governing body. For this project, the County of Santa Cruz is responsible for making the final determination of their jurisdiction.

1.2. Property Information

The property is located on Ranport Road, southwest of the intersection of State Highway 1 and Ranport Road, as depicted on Figure 1. The property is located within Township 11S, Range 2E (no section), Mount Diablo Meridian, within the Watsonville West USGS quadrangle. The site is reached from Ranport Road, a public street accessed from Highway 1 and Airport Boulevard.

The elevation of the study area is approximately 60 feet. The property supports one "blue-line" stream as per the USGS topographic map. Harkins Slough is a "blue-line" stream (perennial waterway) located along the eastern edge of the subject property outside the wetland study area. The County GIS also depicts a portion of this perennial creek along the eastern property line.

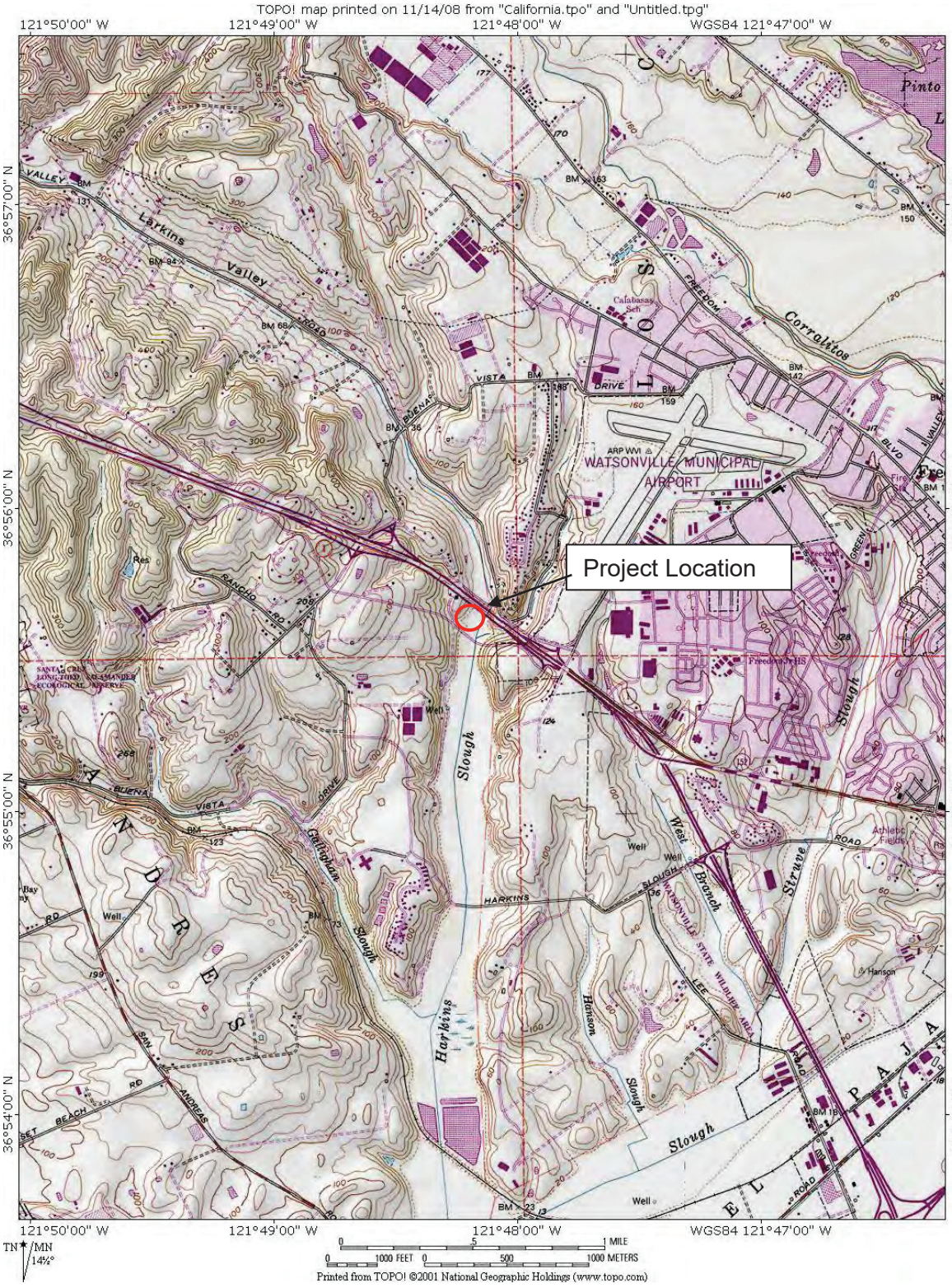


Figure 1. Project location

(USGS Watsonville West Topographic Map)

1.3. Project Description

The property currently supports office buildings, equipment storage, and storage containers associated with Williams Tree Service. The applicant (Pacific Coast Hardwoods) proposes using the southern portion of the property for timber milling, storage and office uses.

Figure 2 depicts the location of the wetland study area relative to surrounding property features. The wetland study area is located amid existing storage facilities, parking and equipment/materials storage areas. A drainage swale is located southeast of storage containers. During a survey of the property in March 2016 for a Biotic Report, a depression with open water was observed adjacent to a concrete pad and building at the base of the hillside (Pacific Coast Hardwoods Biotic Report, Biotic Resources Group, April 19, 2016). This feature was absent at the October 2016 site survey.

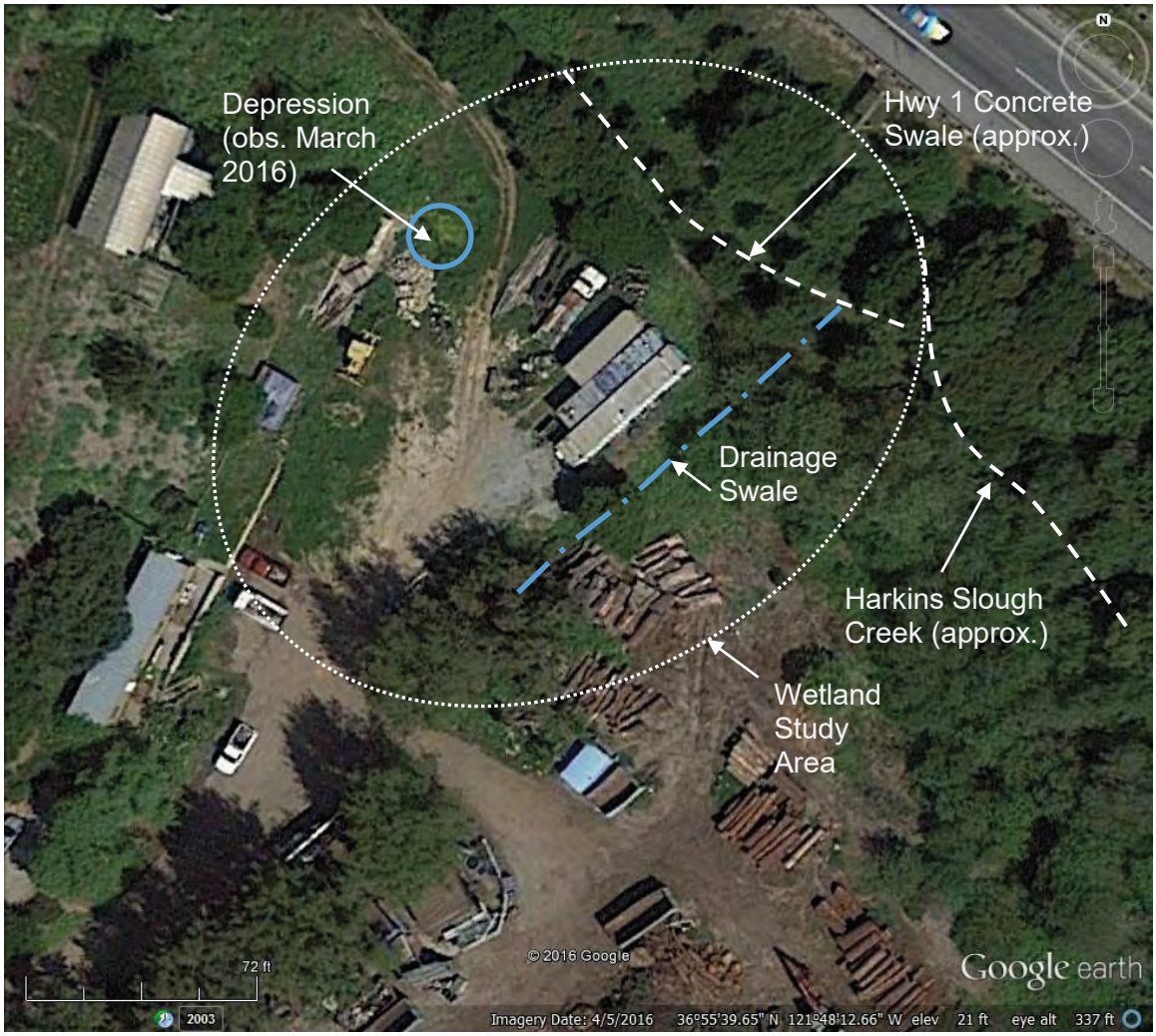


Figure 2. Wetland study area and existing site features

(Google Image, dated 2016)

Chapter 2. Summary of Regulations

2.1. United States Army Corps of Engineers (USACE)

The USACE regulates activities within waters of the United States pursuant to congressional acts: Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act (1977, as amended).

Section 10 of the Rivers and Harbors Act requires a permit for any work in, over, or under navigable waters of the United States. Examples of work include piers, docks, breakwaters, and dredging. Navigable waters are defined as those waters subject to the ebb and flow of the tide to the Mean High Water mark (tidal areas) or below the Ordinary High Water mark (freshwater areas). Navigable waters may be used currently, in the past, or in the future, to transport interstate or foreign commerce.

Section 404 of the Clean Water Act (CWA, 1977, as amended) requires a permit for discharge of dredged or fill material into Waters of the United States. Under Section 404, Waters of the United States is defined as all waters which are used currently, or were used in the past, or may be used in the future for interstate or foreign commerce, including waters subject to the ebb and flow of the tide up to the high tide line. Additionally, areas such as wetlands, rivers and streams (including intermittent streams and tributaries) are considered Waters of the U.S. Man-made ponds created by excavating dry land to collect and retain water for purposes of stock watering, irrigation or settling basins are typically not considered to be Waters of the U.S. (USACE Definitions, 2004).

The extent of wetlands is typically determined by examining the presence of hydrophytic vegetation, hydric soils and wetland hydrology. Under normal circumstances, all three of these parameters must be satisfied for an area to be considered a jurisdictional wetland under Section 404 of the Clean Water Act.

2.1.1. Isolated Waters (SWANCC Decision)

In 2001 the U.S. Supreme Court issued a decision on the scope of the USACE's Section 404 CWA permitting as it related to isolated waters. Known as the SWANCC decision, the Court found that the USACE does not have the authority over isolated, non-navigable, intrastate waters that are not tributary or adjacent to navigable waters or tributaries.

2.1.2. Intermittent and Ephemeral Streams and Wetlands (Rapanos Decision)

In 2006, the U.S. Supreme Court issued a decision that limits the definition of "wetlands" and waters of the U.S." under the CWA. In a 4-1-4 decision, four justices advocated for a narrower interpretation of the Clean Water Act, stating that waters of the U.S. should exclude intermittent or ephemeral streams and wetlands that have no continuous surface connection to navigable waters. In 2007, the USACE and the EPA issued guidance on this decision, stating that agencies will continue to assert jurisdiction over navigable waters and all wetlands adjacent to navigable waters. Jurisdiction over waters, including wetlands will be made if either of the following standards are met: 1) relatively permanent (perennial or at least seasonally) non-navigable tributaries and wetlands with a continuous surface connection with such tributaries; or 2) certain adjacent and non-navigable tributaries where there is a significant nexus to navigable waters, such as chemical, physical, or biological connection.

2.1.3. Section 7 of the Endangered Species Act

The U.S. Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration (NOAA) Marine Fisheries administer the federal Endangered Species Act (ESA). In general, NOAA is responsible for protection of ESA-listed marine species and anadromous fishes, while other fish and terrestrial species are under USFWS jurisdiction. A Proposed Project may permit the take of federally-listed species through a Section 7 Biological Opinion from USFWS or NOAA issued to another federal agency that funds or permits an action (e.g., USACOE). Under ESA, adverse impacts to protected species are avoided, minimized or mitigated for impacts to federally-listed species. This requires consultation with the USFWS and/or NOAA, which ultimately issues a Biological Opinion to USACE determining whether the federally listed species will be adversely impacted by a proposed project.

2.2 Santa Cruz County

Locally, Santa Cruz County regulates activities in and adjacent to lakes, wetlands, estuaries, lagoons, streams and rivers. According to County Code (Section 16.32), all of these features are considered sensitive habitat. The County General Plan identifies the riparian corridor along intermittent channels as extending 30 feet outward from the bank-full flow line or to the edge of riparian vegetation, whichever is greater. For perennial creeks the corridor extends 50 feet outward from the bank-full flow line or to the edge of riparian vegetation, whichever is greater. A riparian corridor also includes lands extending 100 feet from the high watermark of a lake, wetland, estuary, lagoon or natural body of standing water.

The County General Plan Glossary identifies wetlands as transitional areas between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is covered by shallow water periodically or permanently. Examples of wetlands area saltwater marshes, freshwater marshes, open or closed brackish water marshes, swamps, mudflats and fens. A pond is defined as small natural body of standing water which supports an aquatic community and riparian vegetation. A reservoir is an artificial body of standing water which supports an aquatic community and riparian vegetation.

Chapter 3. Methodology

The field and reporting methodology followed the protocol specified in the *1987 USACE Manual* (Environmental Laboratory, 1987) and *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region, Version 2.0* (USACE, 2010) to delineate the extent of federal/state waters and wetlands which may be subject to Santa Cruz County regulations. Existing reference materials relevant to the proposed project were gathered and reviewed. These materials included the following:

- Topographic Map: Watsonville West quadrangle (USGS)
- NRCS, Web Soil Survey, Santa Cruz County, California, 2016.
- Hydric Soils List; Official List of Hydric Soil Map Units for Santa Cruz County, California (SCS, 1989)
- Western Mountains, Valley, and Coast, Regional Wetland Plant List (Lichvar, Banks, Kirchner, and Melvin, 2016)
- Project Construction Plans, Topographic Map, Pacific Coast Hardwoods, 2016
- National Wetlands Inventory, USFWS, 2016
- Field Indicators of Hydric Soils in the United States, Guide for Identifying and Delineating Hydric Soils, Version 7.0, 2010. (USDA/NRCS, 2010)
- Aerial Photos, dated 1974, 1975, 1993, 2007, 2009, 2013, 2014, 2015, 2016.
- Pacific Coast Hardwoods Biotic Report, Biotic Resources Group, April 19, 2016.

Field surveys for the delineation were conducted in October 2016 in and around the former depression and drainage swale. Evidence of potential jurisdictional areas were searched by viewing the area, searching for field indicators of wetlands, such as topographic features, wetland vegetation, hydrologic features, and wetland soil conditions. Evidence of an Ordinary High Water Mark (OHWM) was searched for within the drainage swale and surrounding areas. Features of the wetland study area were photographed.

Normal circumstances were determined to occur along the drainage swale as no significant alteration or modifications to the feature has occurred recently. Under normal circumstances all three wetland parameters must be satisfied for an area to be considered a jurisdictional wetland as per the USACE guidelines. The area that formerly supported a depression (as observed in March 2016) had been recently disturbed. A depression was no longer evident. As atypical conditions were observed in this area; historical photos, maps on record, and observations of the depression from March 2016 were used for the delineation of this feature.

The March and October 2016 field surveys were conducted after a normal rainfall year, but after a 4-year period of below normal rainfall. In October 2016 four sample points were established along the drainage swale to document plant cover. One sample site was established on the edge of the former depression. Sampling pits were dug at each sample point to document the soil conditions and to examine potential wetland hydrology. The location of the sample sites was documented by GPS and their location depicted on the topographic map.

The USFWS National Wetland inventory maps were reviewed for evidence of previously mapped wetlands. The USGS map was reviewed for any water or wetland resources (e.g., blue-line streams) within the study area, as well as adjacent navigable waters.

Aerial photos between 1974 and 2016 were reviewed for evidence of water and wetland features. Swale and/or pond features were looked for based on vegetation patterns and other aerial imaging.

3.1. Waters of the U.S.

The limits of USACE's jurisdiction in non-tidal waters extend to the OHWM which is typically defined as the line on the shore established by fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, or the presence of litter and debris. Vegetation that is bent, matted down, or absent may indicate water flow and scour. The OHWM can be recorded as a line on the project base map, as an elevation and/or as a measurement above the lowest point of the channel (thalweg).

The drainage swale was viewed for evidence of riparian and/or wetland plant species, field observations of a flow line, OHWM, or bank full flow line. The October 2016 field visit was conducted at the end of a normal rainfall year, yet after a 4-year drought. During the March 2016 site visit, the depression was evaluated for open water, water sources and connectivity to adjacent waters.

3.2. Wetlands

The extent of wetlands is typically determined by examining the presence of hydrophytic vegetation, hydric soils and wetland hydrology. Under USACE guidelines, all three of these parameters must be satisfied for an area to be considered a jurisdictional wetland under Section 404 of the Clean Water Act as outlined in the *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory, 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (USACOE, May 2010).

3.1.1. Vegetation

Hydrophytic vegetation is plant life that occurs in areas where the frequency and duration of inundation or soil saturation exerts a controlling influence on the plant species present. Plant species are characterized by their tendency to occur in wetlands; the five categories are listed and described below:

- OBL: almost always is a hydrophtye, rarely in uplands
- FACW: usually is a hydrophyte but occasionally found in uplands
- FAC: commonly occurs as either a hydrophyte or non-hydrophyte
- FACU: occasionally is a hydrophyte but usually occurs in uplands
- UPL: rarely is a hydrophyte, almost always in uplands.
- NI: No Indicator, considered to be upland species.

Typically, an area is considered to meet the wetland vegetation criteria when the plant community passes the dominance test. In this test more than 50 percent of the dominant plant species across all strata are rated OBL, FACW or FAC. Species not listed on the wetland plant list are treated as upland species. A stratum (tree, sapling/shrub, herb and woody vine) is defined as having 5% or more total plant cover. For the dominance test, cover of vegetation is estimated and ranked according to dominance. Species that contribute to a cumulative total of 50% of the total dominant coverage, plus any species that comprise at least 20% of the total dominant coverage are recorded. The "50/20 rule" also states that plant species from the ranked cover list be included, in decreasing order of coverage, until cumulative cover of selected species exceeds 50%. Therefore, in these instances, plant

species providing less than 20% are included in the 50/20 rule analysis. The prevalence index is used to determine whether hydrophytic vegetation is present where indicators of hydric soil and wetland hydrology are present but the vegetation initially fails the dominance test. This test evaluates all plant species in the community and assigns weighted- numeric values to species within each indicator status categories. Hydrophytic vegetation is present if the prevalence index is 3.0 or less. This information is recorded on the Wetland Determination Data Form.

The October 2016 site visit was focused in and around the drainage swale where there were visual observations of species that are wetland indicators (OBL, FACW, or FAC-designated species). In October 2016, four sample points were established along the drainage swale. Near the former depression one patch of pre-existing vegetation was observed next to the concrete pad; a sample point was established here to document this vegetation. At each sample point, plant species and their absolute cover value was recorded onto a data sheet. The standard dominance test (indicator 2) and the prevalence index (indicator 3) were used to determine the presence of hydrophytic vegetation at each sample point.

3.1.2. Hydrology

The assessment of the hydrologic criterion is based on two groups or indicators. Primary indicators include direct observation of surface water or groundwater, evidence of recent inundation (i.e., water marks, drift deposits, sediment deposits), and evidence of recent soil saturation (i.e., presence of oxidized rhizospheres along living roots within upper 12 inches). Secondary indicators can also be used, such as shallow aquitards, drainage patterns, and the FAC-neutral test. The property is located within Land Resources Region (LRR) A and Major Land Resource Area (MLRA) 4B. In MLRA 4B, water-stained leaves are not a valid primary field indicator of wetland hydrology, but can be used as a secondary indicator. Field indicators are recorded on the Wetland Determination Data Form.

For the depression evidence of wetland hydrology was searched for and photographed in March 2016. For the drainage swale, evidence of wetland hydrology was searched for and photographed in October 2016.

3.1.3. Soils

Hydric soils are surveyed in accordance with the USACE manuals. Soil pits are excavated to a depth of 20 inches, and are typically dug laterally away from the channel/wetland features until hydric features are no longer present. At each soil pit, the soil texture and color are recorded and compared to a Munsell Soil Chart (1994) to designate hue, value and chroma. Indicators of hydric soil include organic accumulations, iron reduction, translocation and accumulation and sulfate reduction and are recorded on the Wetland Determination Data Form. Soil survey information is also used to obtain soil information in regards to soil characteristics, drainage and color. The County Hydric Soil List is also referenced for soils considered to be hydric. For this delineation soil was documented in soil pits excavated to a depth of approximately 16 inches. A restrictive layer was detected at one sample point along the drainage swale, therefore this sample was only dug to 10 inches. Soil samples were obtained in October 2016.

This delineation acknowledges that discerning redox concentrations within dark soils can be difficult and the concentrations can often be small and difficult to see. Chapters 3 and 5 of the Regional Supplement were reviewed for additional guidance. Chapter 3 contains user notes for soil indicators in dark-colored surface layers and Chapter 5 addresses difficult wetland situations.

As per the guidelines, a hand lens was used to detect small redox concentrations. Saturated soil samples were obtained at one location along the drainage swale during October 2016 and the samples were allowed to air dry to a moist condition for redox features to become more visible.

The project site is located within LLR A and MLRA 4B. Soil indicators designed for these regional categories were used to evaluate potential hydric soils as per USACE guidelines.

3.3. SWANCC Waters

The term "isolated waters" is generally applied to waters/wetlands that are not connected by surface water to a river, lake, ocean or other body of water. The depression and drainage swale were evaluated as to whether they are isolated water features. Evidence of hydrological connections to adjacent waters, such as Harkins Slough, were evaluated based on topography.

3.4. Rapanos Waters

Rapanos drainage features apply to non-navigable, ephemeral tributaries and their adjacent wetlands where there is a significant nexus to traditional navigable water (TNW). Factors considered in the significant nexus evaluation typically include volume, duration and frequency of flow, proximity to the TNW, size of the watershed, and average annual rainfall. Ecological factors can include the ability for tributaries to carry pollutants and flood waters to a TNW, ability to provide aquatic habitat that supports a TNW, the ability of the wetland to trap and filter pollutants, and the maintenance of water quality. Swales or erosion features (e.g., gullies, small washes) and ditches (including roadside ditches) excavated wholly in and draining only uplands and do not carry a relatively permanent flow of water are generally not considered federally jurisdictional waters. The depression and drainage swale were evaluated as to its flow regime and proximity to a TNW as per the Rapanos ruling.

Chapter 4. Existing Site Conditions

4.1 Vegetation Types in Wetland Study Area

The wetland study area supports five vegetation types: ruderal grassland/scrub, herbaceous and woody riparian, open water/aquatic vegetation, oak tree groves, and landscape tree groves.

4.1.1 Ruderal

Ruderal (weedy) areas occurs the study area. The areas are dominated by non-native grasses and forbs typical of previously disturbed areas. The most commonly observed plant species is poison hemlock (*Conium maculatum)* (FAC) and Italian thistle (*Carduus pycnocephalus)* (NI). Other species include wild oat (*Avena fatua)* (UPL), ripgut brome (*Bromus diandrus)* (NI), rattail fescue (*Vulpia myuros)* (FACU), Bermuda grass (*Cynodon dactylon)* (FACU), wild radish (*Raphanus sativa)* (NI), narrow-leaved clover (*Trifolium angustifolium)* (NI), bur clover (*Medicago polymorpha)* (FACU), mallow (*Malva sp.)* (NI), wild mustard (*Brassica rapa)* (FACU), and ice plant (*Carpobrotus edulis)* (NI). Native plant species are limited; deerweed (*Acmispon glaber)* (NI), bracken fern (*Pteridium aquilinum)* (FACU), coyote brush (*Baccharis pilularis)* (NI), and young coast live oak (*Quercus agrifolia)* (NI) were observed. Figure 3 shows typical ruderal vegetation on the slope above the former depression. The ruderal areas are considered upland due to a lack of hydrophytic vegetation.

Figure 3. Ruderal vegetation upslope of former depression, October 2016

4.1.2 Herbaceous and Woody Riparian

The drainage swale travels along the southeastern edge of the wetland study area and empties into a concrete-lined drainage ditch within the CalTrans Highway 1 right-of-way. This swale primarily supports herbaceous riparian vegetation. The area was considered riparian due to the linear nature of the swale feature and the presence of young willow (*Salix lasiolepis)* (FACW) in the upper section and denser willows at the downstream end of the swale. The vegetation is mostly non-native, as evidenced by Bermuda grass (FACU), rabbittsfoot grass (*Polypogon monspeliensis)* (FACW), pennyroyal (*Mentha pulegium)* (OBL), Italian thistle (NI), poison hemlock (FAC), and loosestrife (*Lythrum hyssopifolium)* (OBL). Native species include tall cyperus (*Cyperus eragrostis)* (FACW), arroyo willow (FACW), and willow herb (*Epilobium ciliatum*) (FACW). Figure 4 shows the typical condition of the herbaceous

riparian vegetation in the upper portion of the drainage swale, looking northeasterly. Figure 5 shows the dense willow at the downstream portion of the swale. The vegetation within the swale was examined as potential wetland due to a presence of hydrophytic vegetation.

Figure 4. Herbaceous riparian vegetation along upper (southwesterly) portion of swale, October 2016

Figure 5. Woody (willow) riparian along lower (northeasterly) portion of swale, October 2016

4.1.3 Open Water/Aquatic Vegetation

The depression was observed in March 2016. It was located northeast of the existing Williams Tree Service office, immediately adjacent to a concrete slab at the base of the hillside. At the March site visit, the depression measured approximately 20 feet by 20 feet and supported open water, edged with non-native wet-tolerant plant species. Rabbittsfoot grass (FACW*)*, brass buttons (*Cotula coronopifolia)* (OBL), tall cyperus (FACW) and willow lettuce (*Lactuca serriola)* (FACU) were documented. The vegetation in and around the depression exhibited hydrophytic vegetation. Upland ruderal vegetation surrounded the depression. Figures 6 and 7 show the open water and vegetation in the depression in March 2016.

Figure 6. Vegetation around man-made pond on APN 052-511-06, March 2016

Figure 7. Vegetation around man-made pond on APN 052-511-06, March 2016

4.1.4 Coast Live Oak Tree Groves

Coast live oak (NI) trees and tree groves occur on the slope above the former depression, along the northern property line (abutting CalTrans ROW), and as individual trees near the drainage swale. Non-native annual grasses and forbs dominate the understory. The tree groves were considered upland areas.

4.1.5 Landscape Trees/Tree Groves

Planted landscape trees occur in and around the existing buildings and near the drainage swale Planted trees in the wetland study include Monterey pine (*Pinus radiata)* (NI) and casuarina (*Casuarina sp.)* (NI). The landscape areas were considered upland areas.

4.2 Wetland Delineation

4.2.1 Review of Aerial Photos and Other Mapped Data

A series of aerial photos (1994 through 2015) were reviewed to detect the presence of potential wetland and/or open water features. These photos show a long history of land use on the site. The oldest image reviewed was from 1974. A dirt road traverses the wetland study area, crossing the current drainage swale. Trees on the hillside are visible. A dark photo image is present at/near the former depression; however, the characteristics of this feature are not discernable. This image is presented in Figure 8; the circle is the general location of the wetland study area.

Figure 8. Aerial photo dated 1974 (UCSC Digital Library, dated 10/14/1974)

Figure 9 depicts an aerial image from 1975. A dirt road traverses the wetland study area, similar to the 1974 image. An open water feature is evident at the site; however, this features appears to be within/adjacent to the existing drainage swale. It does not appear that the open water feature is located at the site of the 2015/16 former depression. The circle is the general location of the wetland study area.

Figure 9. Aerial photo dated 1975 (UCSC Digital Library, dated 10/14/1975)

A photo from 1993 depicts vegetation in the vicinity of the drainage swale yet no evidence of an open water feature is present. The open water feature depicted in the 1975 photo is no longer evident, and a narrower drainage swale is present, as depicted in Figure 10. The circle is the general location of the wetland study area.

Figure 10. Aerial photo dated 1993 (Google Image, dated 6/11/1993)

Figure 11 depicts the 2009 aerial. The 2009 aerial shows the presence of the upper end of the drainage swale, yet the middle section supports a road, similar to that observed in 1974. There is no definitive image of an open water feature with the drainage feature or elsewhere.

More recent photos from 2014 and 2015 show a more defined vegetated drainage swale. An open water feature is evident in the 2014 aerial, yet it is north of the feature observed in 1975 (Figures 12 and 13). The circle is the general location of the wetland study area.

Figure 11. Aerial photo dated 1993 (Google Image, dated 9/30/2009)

Figure 12. Aerial photo dated 2014 (Google Image, dated 2/23/2014)

Figure 13. Aerial photo dated 2015 (Google Image, dated 3/28/2015)

A biological report prepared in 2008 did not document an open water feature on the site. At the time of that survey the depression area was recently disturbed and the drainage swale was mapped as ruderal grassland (Biotic Resources Group, 2008), as presented in Figure 14. The circle is the general location of the wetland study area.

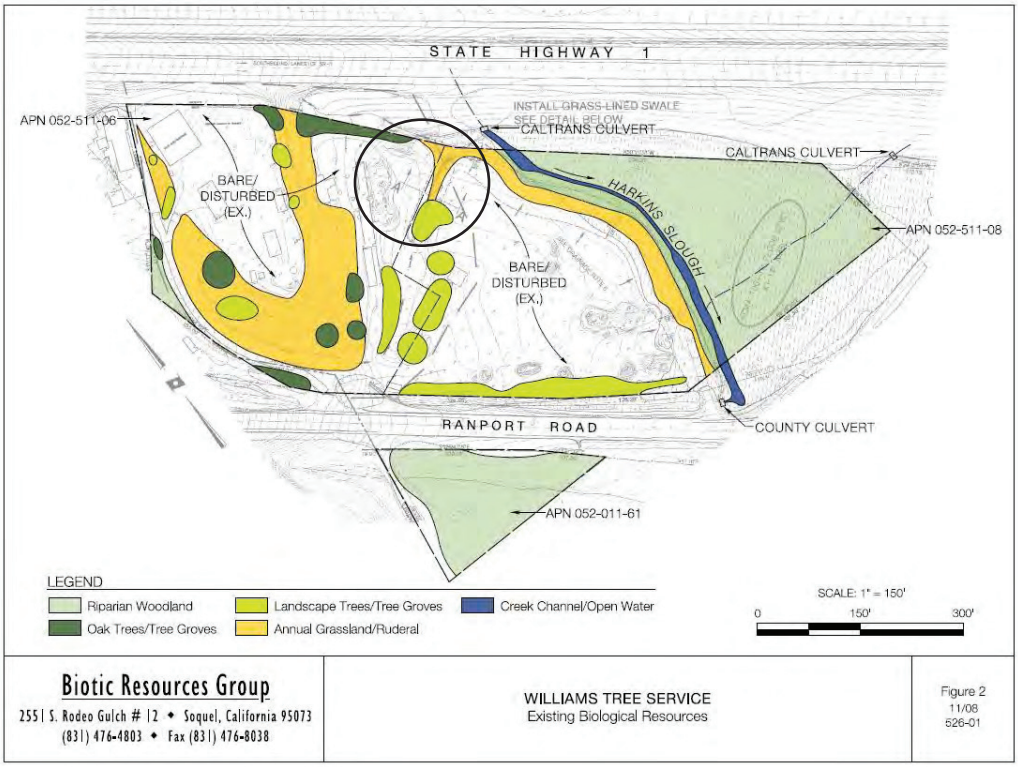


Figure 14. Habitat types mapped in 2008 (Biotic Resources Group, 2008)

The USFWS National Wetlands Inventory was also accessed. The inventory identifies wetlands associated with Harkins Slough south of Ranport Road and a wetland north of Highway 1, yet no wetlands are identified for the Ranport Road property, as depicted in Figure 15. A drainage swale is evident, yet it is not mapped. The circle is the general location of the wetland study area.

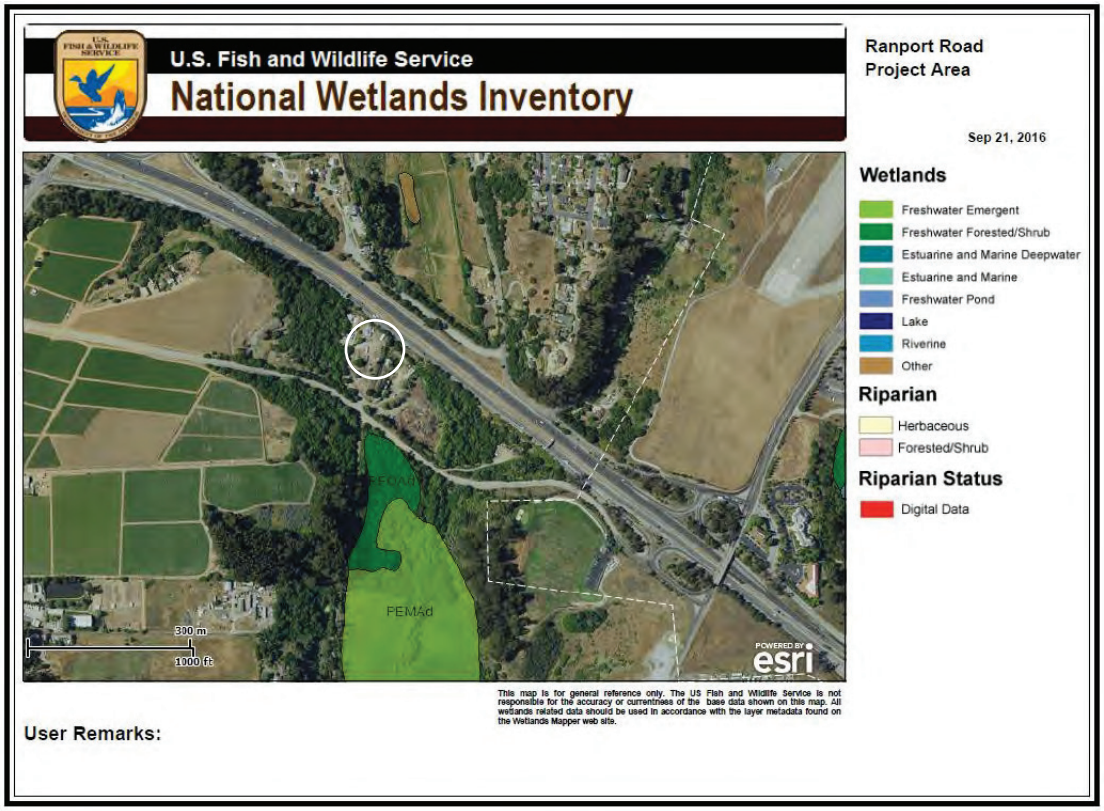


Figure 15. Habitat types identified in National Wetlands Inventory (USFWS, 2016)

The aerial photo review revealed that the site has been subject to various land activities over the last 40 years. There is photographic evidence that a drainage swale has been present in all years. In 1975, the swale appears to have extended southwesterly toward Ranport Road. Also in 1975 an open water feature is present within the downstream (northeasterly) portion of the swale. This feature is suspected of being man-made within the bottom of the swale, as it is not evident one year earlier, in the 1974 aerial photo. This open water feature is absent is all future years as the vegetation along the swale narrows and the length of the swale is reduced. A new man-made open water feature appears in the photo record in 2013. This feature is located northwest of the drainage swale and is not in the same location as the open water feature/location noted in 1975. This new feature is suspected of being man-made as it is not evident in earlier years. It appears this new feature was constructed within an otherwise upland area, with no connection to the drainage swale.

4.2.1 Vegetation

Of the four sample points established along the drainage swale, all points had dominance by hydrophytic vegetation, primarily by the dominance of rabbitsfoot grass (FACW), pennyroyal (OBL), nutsedge (FACW) and arroyo willow (FACW). The location of the sample points is depicted on Figure 16. Sample point #5 is a patch of nutsedge at the edge of the former depression; positive wetland vegetation was observed here.

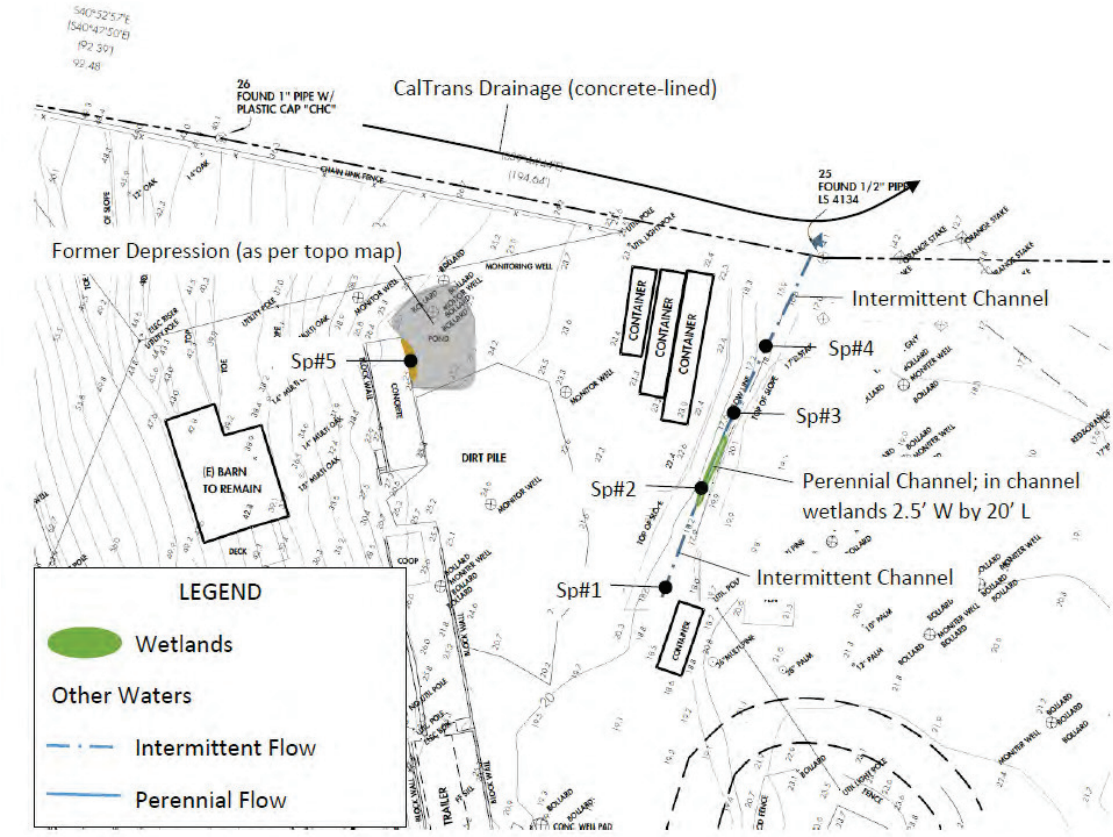


Figure 16. Results of delineation, showing location of sample points, wetlands, and other waters on topographic map, October 2016

4.2.2 Soils

According to County soil survey maps (NRCS Web Soil Survey, 2016) the soil within the wetland study area is mapped as Tierra-Watsonville complex, 15-30 % slopes (174) and Clear Lake clay, drained, 0-1%slopes (119). The web soil survey map for the project area is presented in Appendix B.

The Tierra-Watsonville complex consists of soils on alluvial and marine terraces. The complex is approximately 55% Tierra sandy loam and 30% Watsonville loam, with inclusions of other sandy loams (USDA, 1980). The soils are typically very deep, yet can range from somewhat poorly drained to well-drained. In Watsonville soil, water can be perched above clay. The typical pedon for the Tierra series is dark brown sandy clay (10YR 4/3); mottles of 10YR 6/4 may be present at 19-25 inches. The typical pedon for the Watsonville series is a dark grayish brown sandy loam or clay (10YR 4/2) with prominent yellowish brown and brownish gray mottles (10YR 5/6 and 10YR 6/2), at 12 to 26 inches. These features indicate hydric soils.

Clear Lake clay is a very deep soil found in alluvial basins. Included in this mapping area areas of Conejo loam. Permeability is slow. The typical pedon is dark gray to black clay (10YR4/1) with light yellowish brown mottles (10YR4/3). These features indicate a hydric soil.

Soil sampling within the drainage swale found the soil to be a sandy loam, yet there were inclusions of base rock and other foreign material. Soil color varied from 10YR 3/3 (moist) to 10YR 4/3 (moist), with no mottles (redox concentration) at sample sites #1, #3, and #4. These

samples did not show any positive hydric characteristics. A dark soil matrix (10YR2/1) was observed at sample site #2. The dark matrix and low chroma meet the criteria of a hydric soil. In addition, this soil had a hydrogen sulfide smell, a primary hydric soil indicator. This soil sample coincided with a dense growth of pennyroyal and surface water. In addition, a restrictive layer was noted at 10 inches. Hard bedrock gravels or other deposit was encountered in the pit, thus appearing to result in a perched water table. Data from the sample points is presented in Appendix A.

One soil sample was taken on the edge of the former depression where a patch of nutsedge was observed. The soil was a sandy loam, yet there were inclusions of base rock. Soil color was 10YR 3/3 (moist), similar to observed in the drainage swale. No hydric soil characteristics were noted.

Biotic Resources Group acknowledges that the lack of positive hydric soil features may indicate the occurrence of atypical situations. "Atypical situations" may lack indicators due to recent human activities or natural events.

4.2.3 Hydrology

Evidence of wetland hydrology was documented within the upper portion of the drainage swale. In October 2016, evidence of earlier season surface ponding was observed at SP#1 (water marks). At SP#2, surface water and soil saturation were noted. No positive hydrology indicators were noted at samples #3 or #4 except for the overall presence of a drainage pattern (a secondary indicator). These field observations were made at the end of a normal rainfall year (yet following a 4-year drought). At no samples were oxidized rhizospheres along roots detected. Water-stained leaves, a secondary wetland hydrology indicator for this region was observed at sample site #1. This indicator infers seasonal ponding. With the exception of a section of channel with a restrictive soil layer and apparent perched water table, the swale is very well-drained. There was no evidence of consistent flow/channel from the swale into the concrete-lined CalTrans channel. Figure 16 displays the portion of the swale that has intermittent flow and perennial flow.

The former depression (2013-2016) was observed to hold surface water in March 2016. The water depth was approximately 6 inches. No inlet or outlet to the depression was observed. Hillside seepage was investigated; however, no evidence of wet-tolerant plants was observed on the hillside above the depression to indicate spring inflow into the depression. There is no water connection to the CalTrans drainage channel or the nearby drainage swale. The depression appeared to be an isolated feature. Barring any other evidence for the feature, the depression appears to be a man-made feature constructed within an otherwise upland area. Typically, such features are not considered to be Waters of the U.S.

4.2.4. Wetland Data Summary

Table 2 presents a summary of the data collected at the sample points from October 2016. The location of each sample point and area meeting the criteria of wetlands and other waters of the U.S. is presented on Figure 16. Photos from the sample points are presented in Figures 17 to 21. Wetland data sheets are presented in Appendix A.

The data from the 2016 site survey indicate that a small patch of wetlands occurs in the central portion of the drainage swale. Only at SP#2 were all three wetland parameters met. The wetland occurs as an herbaceous component within a riparian corridor. Most of the corridor exhibits intermittent flow; however, the central section (in/around sample site #2) has perennial flow. The extent of the intermittent and perennial flow, as well as the wetland area is depicted on Figure 16.

The former depression supported open water and herbaceous wetland plant species when observed in March 2016. As of October 2016, only a small patch of wetland vegetation remained near the concrete slab. Although the vegetation met the wetland requirement; the other features were not discernable due to recent site activities. The review of the aerial photos suggests the depression/open water feature was constructed in/around 2013 within an otherwise upland area. It is an isolated feature with no hydrological connection to adjacent waters. The 2013-2016 depression is not the same feature depicted on the 1975 aerial photo. The open water feature evident in the 1975 aerial photo was located within the drainage swale.

Table 2. Data Collection at Sample Points within Wetland Study Area, October 2016

Sample Site	Dominant Plant Species Wetland Indicator Status Positive Hydrophytic Vegetation?	Soil Features Positive Hydric Soil?	Hydrology Features Positive Wetland Hydrology?	Meets Definition of USACE Jurisdictional Wetland?
1	*Salix lasiolepis* (FACW) *Polypogon monspeliensis* (FACW) *Carduus pycnocephalus* (NI) *Epilobium ciliatum* (FACW Yes, ≥50% of dominant species are wetland indicator species	10YR3/3, no redox concentrations within native soil No, no positive field indicators	One 1° indicators (water marks); One 2° indicator (drainage pattern) Yes, sufficient number of field indicators	No; only two of the required 3 parameters were met
2	*Polypogon monspeliensis* (FACW) *Mentha pulegium* (OBL) Yes, ≥50% of dominant species are wetland indicator species	10YR2/1 and hydrogen sulfide smell Yes, positive field indicator; restrictive layer at 10"	Three 1° indicator (surface water, high water table, saturation in 12" Yes, sufficient number of field indicators	Yes, all required 3 parameters were met
3	*Conium maculatum* (FAC) *Cyperus eragrostis* (FACW) Yes, >50% of dominant species are wetland indicator species	10YR4/3, no redox concentrations No, no positive field indicators	No 1° indicators; one 2° indicator (drainage pattern) No, insufficient number of field indicators	No; only one of the required 3 parameters were met
4	*Salix lasiolepis* (FACW) *Mentha pulegium* (OBL) *Conium maculatum* (FAC) Yes, >50% of dominant species are wetland indicator species	10YR4/3, no redox concentrations No, no positive field indicators	No 1° or 2° indicators No, insufficient number of field indicators	No; only one of the required 3 parameters were met

Table 2. Data Collection at Sample Points within Wetland Study Area, October 2016

Sample Site	Dominant Plant Species Wetland Indicator Status Positive Hydrophytic Vegetation?	Soil Features Positive Hydric Soil?	Hydrology Features Positive Wetland Hydrology?	Meets Definition of USACE Jurisdictional Wetland?
5	*Cyperus eragrostis* (FACW) Yes, >50% of dominant species are wetland indicator species	10YR4/3, no redox concentrations No, no positive field indicators; recent fill material	No 1° or 2° indicators No, insufficient number of field indicators; recently graded	No; only one of the required 3 parameters were met

Figure 17. Sample point #1 in drainage swale

Figure 18. Sample point #2 in drainage swale

Figure 19. Sample point #3 in drainage swale

Figure 20. Sample point #4 in drainage swale

Figure 21. Sample point #5, edge of former depression

Figure 22. Character of area with perennial flow and wetland vegetation in drainage swale

Figure 23. Character of former depression

4.3 Ordinary High Water Mark

The drainage swale did not show a discernable OHWM although evidence of surface water was present. This suggests that the typical volume, duration, and frequency of flow in the swale is quite low, with surface water probably limited to very large rainfall events when water is mostly related to precipitation and precipitation-related surface/subsurface runoff from the adjacent areas. The size of the area contributing to the swale is also limited; only a small portion of the parcel contributes surface/subsurface runoff to the swale. The swale's primary function is for water quality benefits, as sediments from the adjacent land uses are captured in the swale during high rainfall events before being discharged into the CalTrans drainage swale.

Chapter 5. Delineation Findings

5.1 U.S. Army Corps of Engineers Determination

This delineation concludes that the wetland study area supports a small patch of federally-defined wetlands, located with an intermittent/perennial riparian corridor. The wetland occurs as an approximately 2.5' x 20' patch within the drainage swale. One data point found this area met all three parameters needed for federally-defined wetlands, pursuant to the current USACE manual.

The property was found to support sandy loam soils, yet despite the presence of dark soil additional required hydric soil indicators were absent at all samples except one (sample site #2). Direct observations of hydrologic features were not observed, except at sample site #2. Primary hydrologic indicators, such as soil saturation, surface water, and subsurface water, were observed at sample site #2 within one portion of the drainage swale. Secondary hydrology indicators were observed (water-stained leaves); however, these features appear to be the result of very short duration surface water directly tied to high rainfall events.

From a review of the aerial photo record, the former depression, located northwest of the drainage swale appears to have been constructed within an otherwise upland area. An open water feature recorded in 1975 aerial photos appears to have been located within the drainage swale and is not related to the former 2013/2016 depression feature.

Intended Use of this Report

The findings presented in this delineation are intended for the sole use of Pacific Coast Hardwoods and Santa Cruz County in evaluating regulatory jurisdiction for the subject wetland study area and presents BRG's best effort at determining the jurisdictional boundaries using the most current regulations, regulatory agency guidance, and professional expertise. The findings presented by BRG in this report are for information purposes only; they are not intended to represent the interpretation of any law pertaining to permitting actions within Federal jurisdictional areas or County-regulated lands. The interpretation of such laws and/or ordinances is the responsibility of the governing body.

Chapter 6. References

Baldwin (ed.), 2012. The Jepson Manual Vascular Plants of California. University of California Press.

Cowardin, L. M., V. Carter, F. C. Golet, and E. T. La Roe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. FWS/OBS 79-31. Washington: United States Fish & Wildlife Service Office of Biological Services.

Department of Defense, Department of the Army, Corps of Engineers and Environmental Protection Agency. 1993. 33 CFR Parts 323 and 328 and 40 CFR Part 110, et al. Clean Water Act Regulatory Programs; Final Rule, August 25, 1993. Federal Register 58 (163): 45008-45038.

Environmental Laboratory. 1987. Army Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1. U. S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi. 100 pp. with Appendixes.

Environmental Laboratory. 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys and Coast Region (Version 2.0). U. S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.

Kollmorgan Instruments Corporation. 1975. Munsell Soil Color Chart, revised edition (1990). Macbeth Division of Kollmorgan Instruments Corporation, Baltimore, Maryland.

Lichvar, Robert, D. banks, W. Kirchner, and N. Melvin. 2016. National Wetland Plant List for Western Mountains, Valleys, and Coasts) https://wetland_plants.usace.army.mil). U.S. Army Corps of Engineers, Engineer Research and Development Center.

National Technical Committee for Hydric Soils [NTCHS]. 1991. Hydric Soils of the United States, USDA, Soil Conservation Service Misc. Publ. 1491.

Soil Conservation Service. 1989. Field Office Official List of Hydric Soil Map Units for Santa Cruz County, California.

USDA/NRCS. 2016. Web Soil Survey for Santa Cruz County.

USDA/NRCS. 2010. Field Indicators of Hydric Soils in the United States. Guide for Indentifying and Delineating Hydric Soils, Version 7.0. In Cooperation with the National Technical Committee for Hydric Soils.

USFWS, 2016. Wetlands Mapper, National Wetlands Inventory.

USGS. 1980. Watsonville West, California 7-1/2-minute topographic quadrangle.

Appendix A Determination Data Forms

This page intentionally blank

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Ranport Rd City/County: Santa Cruz Sampling Date: 10/3/14
Applicant/Owner: Pacific Hardwoods State: CA Sampling Point: SP#1
Investigator(s): K. Lyons Section, Township, Range: T 15 R 2E, no section
Landform (hillslope, terrace, etc.): shale Local relief (concave, convex, none): concave Slope (%): ~2
Subregion (LRR): LRR A, MLRA 4B Lat: Long: Datum:
Soil Map Unit Name: Tierra/Watsonville NWI classification:
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? no Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ✓, or Hydrology ____ naturally problematic? yes (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 ____	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks:
upper end of drainage swale; transition point from UPL to wetland.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1. Salix Lasiolepis	20	Y	FACW
2.			
3.			
4.			
5.			
	20 = Total Cover		
Herb Stratum (Plot size: ____)			
1. Cynodon dactylon	10	N	FACW
2. Polygonum monspeliensis	20	Y	FACW
3. Cardnus pycnocephalus	10	N	NI
4. Epilobium ciliatum	20	Y	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	60 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 20%

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 66% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species 0	x 1 = 0
FACW species 60	x 2 = 120
FAC species 10	x 3 = 0
FACU species 10	x 4 = 40
UPL species 10	x 5 = 50
Column Totals: 80 (A)	210 (B)

Prevalence Index = B/A = 2.63

Hydrophytic Vegetation Indicators:
___ 1 - Rapid Test for Hydrophytic Vegetation
✓ 2 - Dominance Test is >50%
✓ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)
[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:
upper end of drainage swale; approx 3' wide.

US Army Corps of Engineers — Western Mountains, Valleys, and Coast – Version 2.0

SOIL Sampling Point: SP#1

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
0-10	10YR 3/3	100	none					rocky/sand/baserock

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: none

Depth (inches): ___

Hydric Soil Present? Yes ___ No ✓

Remarks:

evidence of fill material – base rock and native soil, native soil has no hydric features

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply): none

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ✓ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ✓ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Water marks on surface suggesting inundation in portions of year

US Army Corps of Engineers Western Mountains, Valleys, and Coast – Version 2.0

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Ranport Road City/County: Santa Cruz Sampling Date: 10/3/16
Applicant/Owner: Pacific Hardwoods State: CA Sampling Point: SP#2
Investigator(s): K. Lyons Section, Township, Range: T 15 R2E, no section
Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): concave Slope (%): ~2%
Subregion (LRR): LRR A, MLRA 4B Lat: Long: Datum:
Soil Map Unit Name: Tierra/Watsonville NWI classification:
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? no Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? no (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 ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks:
within bottom of drainage swale, approx 2.5' wide x 20' long

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: ____)			
1. Mentha pulegium	80	Y	OBL
2. Polypogon monspeliensis	20	Y	FACW
3. Cyperus eragrostis	5	N	FACW
4. Lythrum hyssopifolium	5	N	OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	110 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	110 = Total Cover		

% Bare Ground in Herb Stratum 10

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species 85	x 1 = 85
FACW species 25	x 2 = 50
FAC species 0	x 3 = 0
FACU species 0	x 4 = 0
UPL species 0	x 5 = 0
Column Totals: 110 (A)	135 (B)

Prevalence Index = B/A = 1.23

Hydrophytic Vegetation Indicators:
___ 1 - Rapid Test for Hydrophytic Vegetation
✓ 2 - Dominance Test is >50%
✓ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)
[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

US Army Corps of Engineers — Western Mountains, Valleys, and Coast – Version 2.0

SOIL Sampling Point: SP#2

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
0-10	10YR2/1		N/A					sandy loam, some fill
10"	2.5YR4/4							gravel bed/hard pan?

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ✓ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type: gravelly bedrock/compacted gravel
Depth (inches): 10"

Hydric Soil Present? Yes ___ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ✓ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ✓	No ___	Depth (inches): ___
Water Table Present?	Yes ✓	No ___	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ✓	No ___	Depth (inches): ___

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

US Army Corps of Engineers — Western Mountains, Valleys, and Coast – Version 2.0

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Ranport Road City/County: Santa Cruz Sampling Date: 10/3/16
Applicant/Owner: Pacific Hardwoods State: Sampling Point: SP#3
Investigator(s): K. Lyons Section, Township, Range: T15 R2E, no section
Landform (hillslope, terrace, etc.): bluff Local relief (concave, convex, none): Concave Slope (%): 22%
Subregion (LRR): LRR A, MLRA 4B Lat: Long: Datum:
Soil Map Unit Name: Tierra / Watsonville NWI classification:
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? N Are "Normal Circumstances" present? Yes ✓ No
Are Vegetation , Soil , or Hydrology naturally problematic? N (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	**Is the Sampled Area within a Wetland?** Yes No ✓
Hydric Soil Present?	Yes	No ✓	
Wetland Hydrology Present?	Yes	No ✓	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. Quercus agrifolia	40	Y	NI
2.			
3.			
4.			
	40 = Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size:)			
1. Conium maculatum	40	Y	FAC
2. Cyperus eragrostis	20	Y	FACW
3. Brassica rapa	5	N	NI
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	105 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	105 = Total Cover		

% Bare Ground in Herb Stratum 10

Remarks:
Oak leaf litter

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 66% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species 0	x 1 = 0
FACW species 20	x 2 = 40
FAC species 40	x 3 = 120
FACU species 0	x 4 = 0
UPL species 45	x 5 = 225
Column Totals: 105 (A)	385 (B)

Prevalence Index = B/A = 3.6

Hydrophytic Vegetation Indicators:
__ 1 - Rapid Test for Hydrophytic Vegetation
✓ 2 - Dominance Test is >50%
__ 3 - Prevalence Index is ≤3.0[1]
__ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
__ 5 - Wetland Non-Vascular Plants[1]
__ Problematic Hydrophytic Vegetation[1] (Explain)
[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No

US Army Corps of Engineers — Western Mountains, Valleys, and Coast – Version 2.0

SOIL Sampling Point: SP#3

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
0-10	10YR 4/3	100%	N/A					sandy loam

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- __ Histosol (A1)
- __ Histic Epipedon (A2)
- __ Black Histic (A3)
- __ Hydrogen Sulfide (A4)
- __ Depleted Below Dark Surface (A11)
- __ Thick Dark Surface (A12)
- __ Sandy Mucky Mineral (S1)
- __ Sandy Gleyed Matrix (S4)
- __ Sandy Redox (S5)
- __ Stripped Matrix (S6)
- __ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- __ Loamy Gleyed Matrix (F2)
- __ Depleted Matrix (F3)
- __ Redox Dark Surface (F6)
- __ Depleted Dark Surface (F7)
- __ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- __ 2 cm Muck (A10)
- __ Red Parent Material (TF2)
- __ Very Shallow Dark Surface (TF12)
- __ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ____ No ✓

Remarks:

pieces of gravel/base rock
dry condition; nonhydric soil

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply) none

- __ Surface Water (A1)
- __ High Water Table (A2)
- __ Saturation (A3)
- __ Water Marks (B1)
- __ Sediment Deposits (B2)
- __ Drift Deposits (B3)
- __ Algal Mat or Crust (B4)
- __ Iron Deposits (B5)
- __ Surface Soil Cracks (B6)
- __ Inundation Visible on Aerial Imagery (B7)
- __ Sparsely Vegetated Concave Surface (B8)
- __ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- __ Salt Crust (B11)
- __ Aquatic Invertebrates (B13)
- __ Hydrogen Sulfide Odor (C1)
- __ Oxidized Rhizospheres along Living Roots (C3)
- __ Presence of Reduced Iron (C4)
- __ Recent Iron Reduction in Tilled Soils (C6)
- __ Stunted or Stressed Plants (D1) (**LRR A**)
- __ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- __ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ✓ Drainage Patterns (B10)
- __ Dry-Season Water Table (C2)
- __ Saturation Visible on Aerial Imagery (C9)
- __ Geomorphic Position (D2)
- __ Shallow Aquitard (D3)
- __ FAC-Neutral Test (D5)
- __ Raised Ant Mounds (D6) (**LRR A**)
- __ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): _____

Water Table Present? Yes ____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes ____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

no water marks on surface, suggesting marginal inundation in this section of the drainage

US Army Corps of Engineers — Western Mountains, Valleys, and Coast – Version 2.0

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Ranport Road City/County: Santa Cruz Sampling Date: 10/3/16
Applicant/Owner: Pacific Hardwoods State: CA Sampling Point: SP #4
Investigator(s): K. Lyons Section, Township, Range: T1S & 2E, no Section
Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none) Concave Slope (%): < 20%
Subregion (LRR): LRR A MLRA 4B Lat: Long: Datum:
Soil Map Unit Name: Tierra/Watsonville NWI classification:
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? NO Are "Normal Circumstances" present? Yes ✓ No
Are Vegetation , Soil , or Hydrology naturally problematic? NO (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
Hydric Soil Present? Yes No ✓
Wetland Hydrology Present? Yes No ✓
Is the Sampled Area within a Wetland? Yes No ✓

Remarks:
beneath canopy & willows a patch of Mentha, in drainage swale

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix lasiolepis	90	Y	FACW
2.			
3.			
4.			
	90 = Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size:)			
1. Mentha pulegium	20	Y	OBL
2. Conium maculatum	20	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	40 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	130 = Total Cover		

% Bare Ground in Herb Stratum:

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species 20	x 1 = 20
FACW species 90	x 2 = 180
FAC species 20	x 3 = 120
FACU species 0	x 4 = 0
UPL species 0	x 5 = 0
Column Totals: 130 (A)	320 (B)

Prevalence Index = B/A = 2.46

Hydrophytic Vegetation Indicators:
__ 1 - Rapid Test for Hydrophytic Vegetation
✓ 2 - Dominance Test is >50%
✓ 3 - Prevalence Index is ≤3.0[1]
__ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
__ 5 - Wetland Non-Vascular Plants[1]
__ Problematic Hydrophytic Vegetation[1] (Explain)
[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No

Remarks:

US Army Corps of Engineers — Western Mountains, Valleys, and Coast – Version 2.0

SOIL Sampling Point: SP#4

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
0-16	10YR 4/3		N/A					

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

no hydric soil

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ✓ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): _____

Water Table Present? Yes ___ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

no water marks at surface, suggests marginal inundation in this section of drainage

US Army Corps of Engineers

Western Mountains, Valleys, and Coast – Version 2.0

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Ranport Road City/County: Santa Cruz Sampling Date: 10/3/16
Applicant/Owner: Pacific Hardwoods State: CA Sampling Point: SPHS
Investigator(s): K Lyons Section, Township, Range: T1S R2E, no section
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): <2%
Subregion (LRR): LRRA, MLRA 4B Lat: Long: Datum:
Soil Map Unit Name: Tierra/Watsonville NWI classification:
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? Yes Are "Normal Circumstances" present? Yes ____ No ✓
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? no (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 ____	Is the Sampled Area within a Wetland? Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks:
area recently graded, former depression located here; vegetation patch at edge of concrete pad

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: ____)			
1. Cyperus eragrostis	80	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	80 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	90 = Total Cover		

% Bare Ground in Herb Stratum 20

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:
____ 1 - Rapid Test for Hydrophytic Vegetation
✓ 2 - Dominance Test is >50%
____ 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ 5 - Wetland Non-Vascular Plants[1]
____ Problematic Hydrophytic Vegetation[1] (Explain)
[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:
patch of vegetation is approx. 2' wide x 10' long; artifact of former depression that held water in

US Army Corps of Engineers spring 2016

Western Mountains, Valleys, and Coast – Version 2.0

SOIL Sampling Point: #SP5

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
0-16	10YR 4/3	100%	none				sandy loam,	some base rock

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ____ No ✓

Remarks:

no hydric soil possibly placed soil from elsewhere misc

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ____ No ____ Depth (inches): _____

Water Table Present? Yes ____ No ____ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ____ No ____ Depth (inches): _____

Wetland Hydrology Present? Yes ____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

no hydrology features evident, site had been recently graded level with concrete slab.

US Army Corps of Engineers — Western Mountains, Valleys, and Coast – Version 2.0

Appendix B Web Soil Survey Map

Soil Type

174	Tierra-Watsonville complex, 15 to 30 percent slopes
119	Clear Lake clay, drained, 0 to 1 percent slopes, MLRA 14

ROCK SOLID ENGINEERING, INC.
Soil Reports • Site Assessments • Manufactured Home Foundations • Expert Witness • Real Estate Inspections

GEOTECHNICAL INVESTIGATION-DESIGN PHASE

Proposed Steel Building
1400 Ranport Road
Watsonville, Santa Cruz County, California
A.P.N.: 052-511-08

For:
David Joseph
193 Vega Road
Watsonville, California 95076

Project No. 14047
November 10, 2014

1100 Main Street, Suite A, Watsonville, CA 95076 • (831) 724-5868 • Fax: (831) 763-1578 • Email: rocksolid@cruzio.com

ROCK SOLID ENGINEERING, INC.
Soil Reports • Site Assessments • Manufactured Home Foundations • Expert Witness • Real Estate Inspections

Project No. 14047
November 10, 2014

David Joseph
193 Vega Road
Watsonville, California 95076

SUBJECT: **GEOTECHNICAL INVESTIGATION - DESIGN PHASE**
Proposed Steel Building
1400 Ranport Road, Watsonville, Santa Cruz County, California
APN 052-511-08

Dear Mr. Joseph:

In accordance with your authorization, we have completed a geotechnical investigation for the proposed steel building at 1400 Ranport Road, in Watsonville, California. This report summarizes the findings, conclusions, and recommendations from our field exploration, laboratory testing, and engineering analysis. The conclusions and recommendations included herein are based upon applicable standards at the time this report was prepared.

It is a pleasure being associated with you on this project. If you have any questions, or if we may be of further assistance, please do not hesitate to contact our office.

Sincerely,

ROCK SOLID ENGINEERING, INC.

Signed: 11/17/2014

Yvette M. Wilson, P.E.
Principal Engineer
R.C.E. 60245

Dusty Osburn
Staff Engineer

Distribution: (6) Addressee and via email

TABLE OF CONTENTS

1. INTRODUCTION

1.1 Purpose

The purpose of our investigation is to provide preliminary geotechnical design parameters and recommendations for development of the site. Conclusions and recommendations related to site grading and foundations are presented herein.

1.2 Proposed Development

a. Based on our conversations with you, it is our understanding that the project consists of the construction of a new prefabricated steel building along the southwest side of the subject site.

b. The subject site is comprised of two parcels APN 052-511-08 and 052-511-06. At your request we did a subsurface investigation on both parcels, in the event that one parcel was deemed un-buildable. The site which is intended for construction is APN 052-511-08, this site is considered suitable from a geotechnical prospective. The boring logs for the APN 052-511-06 are included in the appendix, however we will not address this site further in this report.

c. Anticipated construction consists of prefabricated steel construction supported at columns. The structure will either have earthen or concrete slab-on-grade floors. Exact wall, column, and foundation loads are unavailable, but are expected to be typical of such construction.

d. Final grading and foundation plans were unavailable at the time of this report. It is our understanding that the information obtained during our investigation will be used in the development of a finalized plan set.

1.3 Scope of Services

The scope of services provided during the course of our investigation included:

a. Review of the referenced geotechnical, geologic, and seismological reports and maps pertinent to the development of the site (available in our files).

b. Field exploration consisting of 5 borings, drilled to depths between 10 and 50 feet below existing grade in the area of the proposed development.

c. Logging and sampling of the borings by our Field Engineer, including the collection of soil samples for laboratory testing.

d. Laboratory testing of soil samples considered representative of subsurface conditions.

e. Geotechnical analyses of field and laboratory data.

f. Quantitative liquefaction analysis.

g. Preparation of a report (6 copies) presenting our findings, conclusions and recommendations.

1.4 Authorization

This investigation, as outlined in our Proposal dated August15, 2014, was performed in accordance with your written authorization on September 9, 2014.

1.5 Exclusions

Our services on this project are limited to the proposed steel building. Our services specifically exclude issues related to the overall stability of the parcel and adjacent parcels, and excludes all existing structures, foundations, retaining walls, driveways and other improvements.

2. FIELD EXPLORATION AND LABORATORY TESTING PROGRAM

Details of the field exploration and laboratory testing are presented in Appendix A.

3. SITE DESCRIPTION

3.1 Location

The subject project is located at 1400 Ranport Road, in Watsonville, Santa Cruz County, California. The location is shown on the Location Map, **Figure 1**.

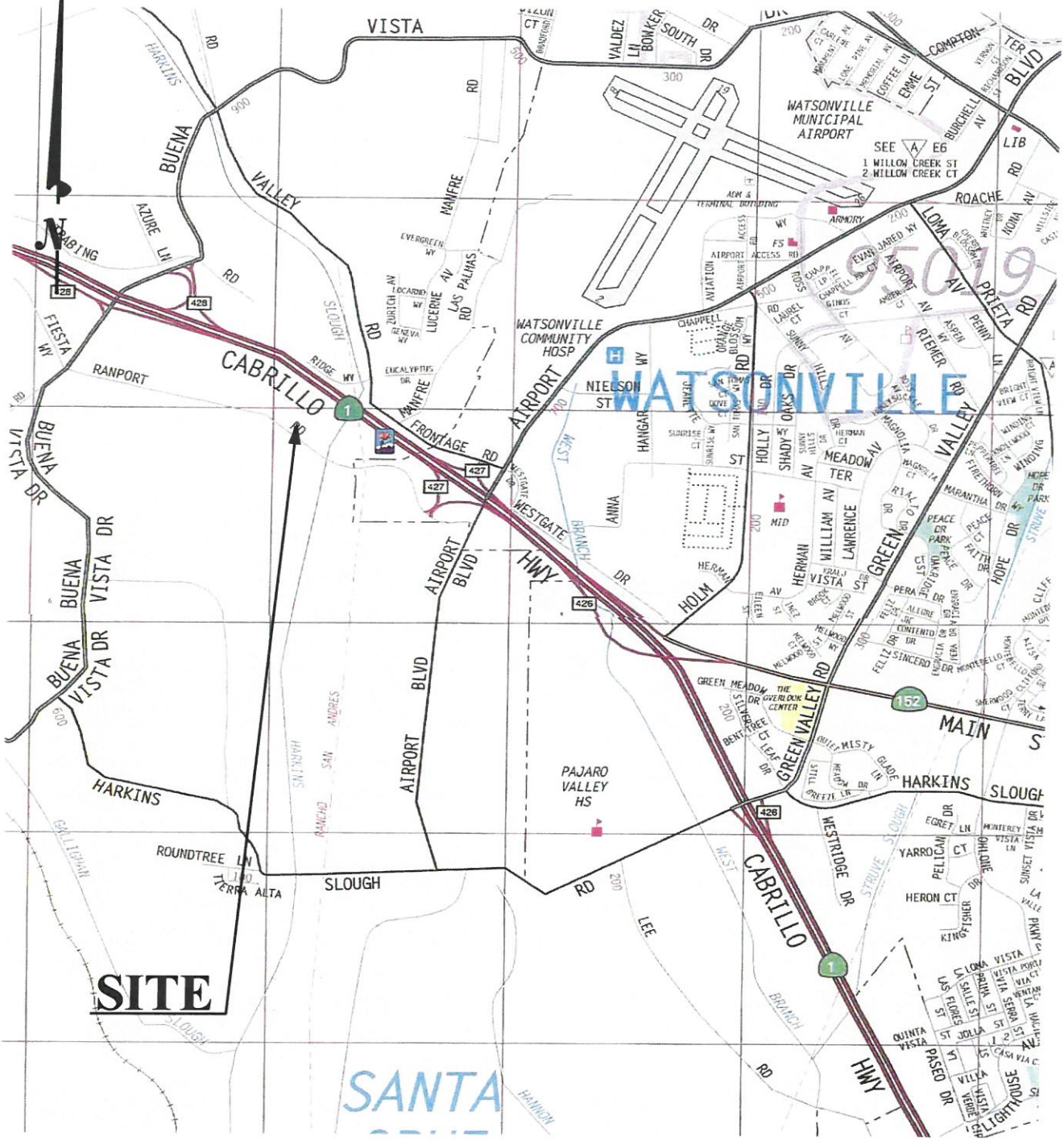
3.2 Surface Conditions

The subject site is located in a valley adjacent to Harkins Slough. The site slopes gently toward the east and toward Harkins Slough. The proposed building pad is currently used to stockpile trees and is currently not developed with any structures.

It is our understanding that the new structures will not be located in the flood zone of the Harkins Slough.

3.3 Subsurface Conditions

a. The results of our field exploration indicate that the subsurface soils present on the site are relatively consistent, however, there are variations in color, moisture content, and density.



REFERENCE: The Thomas Guide, 2004.

ROCK SOLID ENGINEERING, INC.	LOCATION MAP	FIGURE
	1400 Ranport Road, Watsonville	1

b. **Perched groundwater was encountered during the course of our field exploration at 15 and 30 feet below existing grade.**

c. The upper stratum is fill, consisting of orange brown silty to clayey sand. The fill was observed from the surface to between 1.5 and 2.5 feet below existing grade. This material is generally dry to wet, medium dense, and non-plastic.

d. Underlying the fill stratum, black and grey laminated clayey sand and sandy clay with organics is present. The laminated clay and sand was observed to between 11.5 and 12 feet below existing grade. This material is generally moist, loose to very stiff, and medium plastic. This stratum consists of mottled sand, clay and organic material which may or may not be fill.

e. Underlying the black and grey clay and sand stratum, peat is present. The peat was observed to between 17 and 20 feet below existing grade.

f. Underlying the peat stratum grey clayey sand to sand with fines is present. The clayey sand to sand with fines was observed to the extent of our boring at approximately 50 feet below existing grade. This material is generally moist to saturated, loose to very dense, and non- to medium plastic.

g. Complete soil profiles are presented on the Logs of Exploratory Borings and the boring locations are shown on the Boring Location Plan in Appendix A.

4. GEOTECHNICAL HAZARDS

4.1 General

a. Potential geotechnical hazards to man made structures include ground shaking, surface rupture, landsliding, liquefaction, lateral spreading, and differential compaction. The potential for each of these to impact the site is discussed below.

b. Ground shaking caused by earthquakes is a complex phenomenon. Structural damage can result from the transmission of earthquake vibrations from the ground into the structure. The intensity of an earthquake at any given site depends on many variables including, the proximity of the site to the hypocenter, and the characteristics of the underlying soil and/or rock. The subject site is situated at the approximate latitude of 36°59' 57" and longitude -121°59' 18". The project location (latitude and longitude) were used in conjunction with the U.S. Geologic Survey website (Reference 10) to obtain the seismic design parameters presented in **Table 1**. All proposed structures at the subject site shall be designed with the corresponding seismic design parameters in accordance with the 2013 California Building Code (Reference 2).

Table 1
2013 CBC Seismic Design Criteria

SEISMIC DESIGN CRITERIA							
Site Class	Seismic Design Category	Spectral Response Accelerations					
		Ss	S1	SMs	SM1	SDs	SD1
E	D	1.766	0.685	1.589	1.643	1.059	1.096

c. Surface rupture usually occurs along lines of previous faulting. Based on our review of the Faults and Their Potential Hazards in Santa Cruz County map (Reference 5), no faults are shown to cross the property. Therefore, the potential for surface rupture should be considered low.

d. Landslides are generally mass movements of loose rock and soil, both dry and water saturated, and usually gravity driven. Based on our review of the Preliminary Map of Landslide Deposits if Santa Cruz County (Reference 3), no landslides are mapped on the subject parcel. In addition, the building pad is relatively level, therefore, the potential for landsliding to occur across the building pad a cause damage to structures should be considered low.

e. Liquefaction, lateral spreading, and differential compaction tend to occur in loose, unconsolidated, noncohesive soils with shallow groundwater. During our field exploration relatively loose, non-cohesive soils below the groundwater level were observed and a quantitative liquefaction analysis was deemed necessary. The results of our analysis are presented in Section 4.2 of this report, and the methodology and calculations are presented in Appendix B. The end bearing foundation anchors proposed for the steel building foundation will be located at a depth sufficient to be below the potentially liquefiable material on the site. Therefore the potential for damage, due to liquefaction, to the structure should be considered low.

4.2 Liquefaction Analysis

4.2.1 General

a. The liquefaction analysis uses empirical predictions of earthquake-induced liquefaction potential and is based on the published methods used by Seed and others (Reference 9).

b. The clayey sand and sand with fines stratum encountered below the groundwater table was generally characteristic of potentially liquefiable soil. The soil is composed of poorly graded sand with varying amounts of fines. The sand was observed from approximately 17 feet to approximately 47 feet below existing grade.

c. During the course of our field investigation, perched groundwater table was located at approximately 15 and 30 feet below existing grade in the area of the proposed development. Our quantitative liquefaction analysis conservatively reflects the groundwater elevation at a depth of 10 feet to account for a rise in groundwater during the wetter winter months.

4.2.2 Results

a. The results of our quantitative liquefaction analysis indicate that the underlying clayey sand and sand with fines situated below the groundwater level to a depth of approximately 17 feet below existing grade is **susceptible** to liquefaction during the design seismic event.

b. We have calculated the resulting surface deformation due to liquefaction during the design seismic event to be approximately 2.25 inches for structures founded above the liquefiable layers. This settlement can occur beneath the entire structure, or differentially, across the least dimension of the structure. The liquefaction calculations are presented in Appendix B.

4.2.3 Discussion

a. It must be cautioned that liquefaction analysis is an inexact science and the empirical predictions of earthquake-induced liquefaction potential are based on a comparison of the subject site with areas that have experienced liquefaction. The soil configuration analyzed contains many simplifying assumptions, not the least of which are isotropy and homogeneity. Soil stratums deemed "susceptible" to liquefaction during the design seismic event will not necessarily liquefy, but the probability will be greater than a stratum deemed "not susceptible".

b. Significant variations in the proposed grades may require that our analysis and the recommendations herein be reviewed and if necessary, amended.

c. Further discussion of our liquefaction analysis, methodology, and calculations are presented in Appendix B.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 General

a. Based on the results of our investigation, it is our opinion that from the geotechnical standpoint, the subject site will be suitable for the proposed development provided the recommendations presented herein are implemented during grading and construction.

b. It is our opinion that the steel building may be supported by a **foundation system composed of helical screw piles** founded below the liquefiable stratum and peat layers. Recommendations for these foundation systems are provided in Section 5.3, Foundations.

c. It is our understanding that the proposed use of the structure as a lumber mill will allow for an earthen floor between the column supports. A significant layer of peat was encountered underlying the building pad. The peat layer may cause significant settlement of concrete slab floors. Should concrete slab-on-grade floors be required, the slab should be designed as structurally separate from the foundation system (floating) or to span all loads to the foundations (assume no soil support). Floating slabs should be expected to experience settlement and/or cracking. However, provided the slab is not structurally required then the settlement and cracking will not effect the structural integrity of the steel building. See section 5.5 Slabs-on-grade for further recommendations.

d. At the time we prepared this report, grading and foundation plans had not been finalized. We request an opportunity to review these plans during the design stages to determine if supplemental recommendations will be necessary.

e. The design recommendations of this report must be reviewed during the grading phase when subsurface conditions in the excavations become exposed.

f. **Field observation and testing must be provided by a representative of Rock Solid Engineering, Inc.**, to enable them to form an opinion regarding the adequacy of the site preparation, and the extent to which the earthwork is performed in accordance with the geotechnical conditions present, the requirements of the regulating agencies, the project specifications and the recommendations presented in this report. Any earthwork performed in connection with the subject project without the full knowledge of, and not under the direct observation of Rock Solid Engineering, Inc., the Geotechnical Consultant, will render the recommendations of this report invalid.

g. **The Geotechnical Consultant should be notified at least five (5) working days prior to any site clearing or other earthwork operations** on the subject project in order to observe the stripping and disposal of unsuitable materials and to ensure coordination with the grading contractor. During this period, a preconstruction conference should be held on the site to discuss project specifications, observation/testing requirements and responsibilities, and scheduling. This conference should include at least the Grading Contractor, the Architect, and the Geotechnical Consultant.

5.2 Grading

5.2.1 General

All grading and earthwork should be performed in accordance with the recommendations presented herein and the requirements of the regulating agencies.

5.2.2 Site Clearing

a. Prior to grading, the areas to be developed for structures, pavements and other improvements, should be stripped of any vegetation and cleared of any surface or subsurface obstructions, including any existing foundations, utility lines, basements, septic tanks, pavements, stockpiled fills, and miscellaneous debris.

b. All pipelines encountered during grading should be relocated as necessary to be completely removed from construction areas or be capped and plugged according to applicable code requirements.

c. Any wells encountered shall be capped in accordance with **Santa Cruz County** Health Department requirements. The strength of the cap shall be at least equal to the adjacent soil and shall not be located within 5 feet of any structural element.

d. Surface vegetation and organically contaminated topsoil should be removed from areas to be graded. The required depth of stripping will vary with the time of year the work is done and must be observed by the Geotechnical Consultant. It is generally anticipated that the required depth of stripping will be 6 to 12 inches.

e. Holes resulting from the removal of buried obstructions that extend below finished site grades should be backfilled with compacted engineered fill.

5.2.3 Excavating Conditions

a. We anticipate that excavation of the on-site soils may be accomplished with standard earthmoving and trenching equipment.

b. Perched groundwater was encountered during the course of our field exploration at depths of 15 and 30 feet below existing grade .

c. Although not anticipated, any excavations adjacent to existing structures should be reviewed, and recommendations obtained to prevent undermining or distress to these structures.

5.2.4 Fill Material

a. With the exception of the near surface sand (fill), the on-site soils **may not** be used as compacted fill.

b. All soils, both on-site and imported, to be used as fill, should contain less than 3% organics and be free of debris and cobbles over 6 inches in maximum dimension.

c. Any imported soil to be used as engineered fill shall meet the following requirements:

(i) free of organics, debris and other deleterious materials
(ii) be granular (sandy) in nature and have sufficient fines to allow for excavation of the foundation trenches.
(iii) free of rock and cobbles in excess of 3 inches
(iv) have an expansion potential not greater than low (EI<20)

d. Imported fill material should be approved by the Geotechnical Consultant prior to importing. The Geotechnical Consultant should be notified not less than 5 working days in advance of placing any fill or base course material proposed for import. Each proposed source of import material should be sampled, tested and approved by the Geotechnical Consultant prior to delivery of any soils imported for use on the site.

5.2.5 Fill Placement and Compaction

a. Any fill or backfill required should be placed in accordance with the recommendations presented below.

b. Material to be compacted or reworked should be moisture-conditioned or dried to achieve near-optimum conditions, and compacted to achieve the following minimum relative compaction:
   (a) All fill and compacted building subgrade: 90%
   (b) Upper 6 inches of subgrade in pavement/drive areas: 95%
   (c) Baserock and subbase: 95%.

c. The relative compaction and required moisture content shall be based on the maximum dry density and optimum moisture content obtained in accordance with ASTM D-1557.

d. The in-place dry density and moisture content of the compacted fill shall be tested in accordance with ASTM D-6780 or ASTM D-2922/ASTM D-3017.

e. The number and frequency of field tests required will be based on applicable county standards and at the discretion of the Geotechnical Consultant. As a minimum standard every 1 vertical foot of engineered fill placed within a building pad area, and every 2 vertical feet in all other areas shall be tested, unless specified otherwise by a Rock Solid Engineering, Inc. representative.

f. Fill should be compacted by mechanical means in uniform horizontal loose lifts not exceeding 8 inches in thickness.

g. All fill should be placed and all grading performed in accordance with applicable codes and the requirements of the regulating agency.

5.2.6 Preparation of On-Site Soils

a. Laboratory consolidation test results indicate that the native, near-surface soils are moderately compressible. Site preparation, consisting of over excavation and recompaction of the native subgrade will be required prior to placement of slabs-on-grade and pavements.

b. The native subgrade beneath **slabs-on-grade** should be reworked to a depth sufficient to provide a zone of compacted fill extending at least 12 inches below the bottom of the capillary break.

c. The native subgrade beneath **pavements** should be reworked to a depth sufficient to provide a zone of compacted fill extending at least 12 inches below the bottom of aggregate base coarse. The zone of compacted fill must extend a minimum of 3 feet laterally beyond all pavements.

d. A representative of our firm shall observe the bottom of the excavation once the required depth of overexcavation has been achieved to verify suitability. Prior to replacing the excavated soil, the exposed surface should be scarified to a depth of 6 to 8 inches, moisture conditioned, and compacted.

e. The depths of reworking required are subject to review by the Geotechnical Consultant during grading when subsurface conditions become exposed.

5.2.7 Groundwater Table

Perched groundwater **was** encountered during the course of our exploration between 15 and 30 feet below the existing grade.

5.2.8 Expansive Soils

Our laboratory testing shows that the expansion index of the near surface soils are equal to 14, this indicates that the expansion potential of the near surface soils should be considered **very low**.

5.2.9 Sulfate Content

The results of our laboratory testing indicate that the soluble sulfate content of the on-site soils likely to come into contact with concrete is below the 150 ppm generally considered to constitute an adverse sulfate condition. **Type II cement** is therefore considered adequate for use in concrete in contact with the on-site soils.

5.2.10 Resistivity

The results of our laboratory testing indicate that the resistivity of the on-site soils likely to come into contact with helical foundation piers is 2100 ohm-cm. Based on the literature available for Chance brand helical piers (Table 7.2, Reference 7), this resistivity corresponds to a **Moderate** corrosion potential. As these recommendations may vary by manufacturer, we recommend that the **helical foundation piers be protected from corrosion as specified by the manufacturer of the pier brand chosen for the project.**

5.2.11 Surface Drainage

a. The ground immediately adjacent to the foundation shall be slopes away from the building at slope of not less than one unit vertical in 20 units horizontal (**5 percent slope) for a distance of no less than 10 feet** measured perpendicular to the wall face.

b. If 10 horizontal feet can not be satisfied due to lot lines or physical constraints, the drainage shall be designed in accordance with the requirements of Section 1804.3 of the 2013 California Building Code.

c. Swales and impervious surfaces shall be sloped a minimum of 2 percent towards an approved drainage inlet or discharge point or as specified by the Project Civil Engineer.

d. All roof eaves should be guttered with downspouts provided. The downspouts shall discharge to either splash blocks or solid pipe to carry the storm water away from the structure to reduce the possibility of soil saturation and erosion.

e. Splash blocks may be used provided the final grade slopes away from the structures at 5 percent as required above. As the site slopes gently across the building pad, swales may be necessary to carry the runoff from the high side of the site around the structure.

f. Drainage patterns approved at the time of construction should be maintained throughout the life of the structures. The building and surface drainage facilities must not be altered nor any grading, filling, or excavation conducted in the area without prior review by the Geotechnical Consultant.

g. Irrigation activities at the site should be controlled and reasonable. Planter areas should not be sited adjacent to walls without implementing approved measures to contain irrigation water and prevent it from seeping into walls and under foundations and slabs-on-grade. Large trees should be planted a minimum distance of ½ their mature height away from the foundation.

5.2.12 Utility Trenches

a. Bedding material may consist of sand with SE not less than 20 which may then be jetted, unless local jurisdictional requirements govern.

b. Existing on-site soils may not be utilized for trench backfill, provided they are free of organic material and rocks over 6 inches in diameter.

c. If sand is used, a 3 foot concrete plug should be placed in each trench where it passes under the exterior footings.

d. Backfill of all exterior and interior trenches should be placed in thin lifts and mechanically compacted to achieve a relative compaction of not less than 95% in paved areas and 90% in other areas per ASTM D-1557. Care should be taken not to damage utility lines.

e. Utility trenches that are parallel to the sides of a building should be placed so that they do not extend below a line sloping down and away at an inclination of 2:1 (H:V) from the bottom outside edge of all footings.

f. Trenches should be capped with 1.5± feet of impermeable material. Import material must be approved by the Geotechnical Consultant prior to its use.

g. Trenches must be shored as required by the local regulatory agency, the State Of California Division of Industrial Safety Construction Safety Orders, and Federal OSHA requirements.

5.3 Foundations

5.3.1 General

a. It is our opinion that the residence may be supported by a **foundation system composed of helical screw piles** founded below the liquefiable stratum and peat layers. As an increase in the peat thickness was noted in Boring B-1 closest to Harkins Slough, we recommend the buildings be setback 100 feet from the centerline of Harkins Slough. Building closer to the slough will require more investigation and possible deeper helical piers.

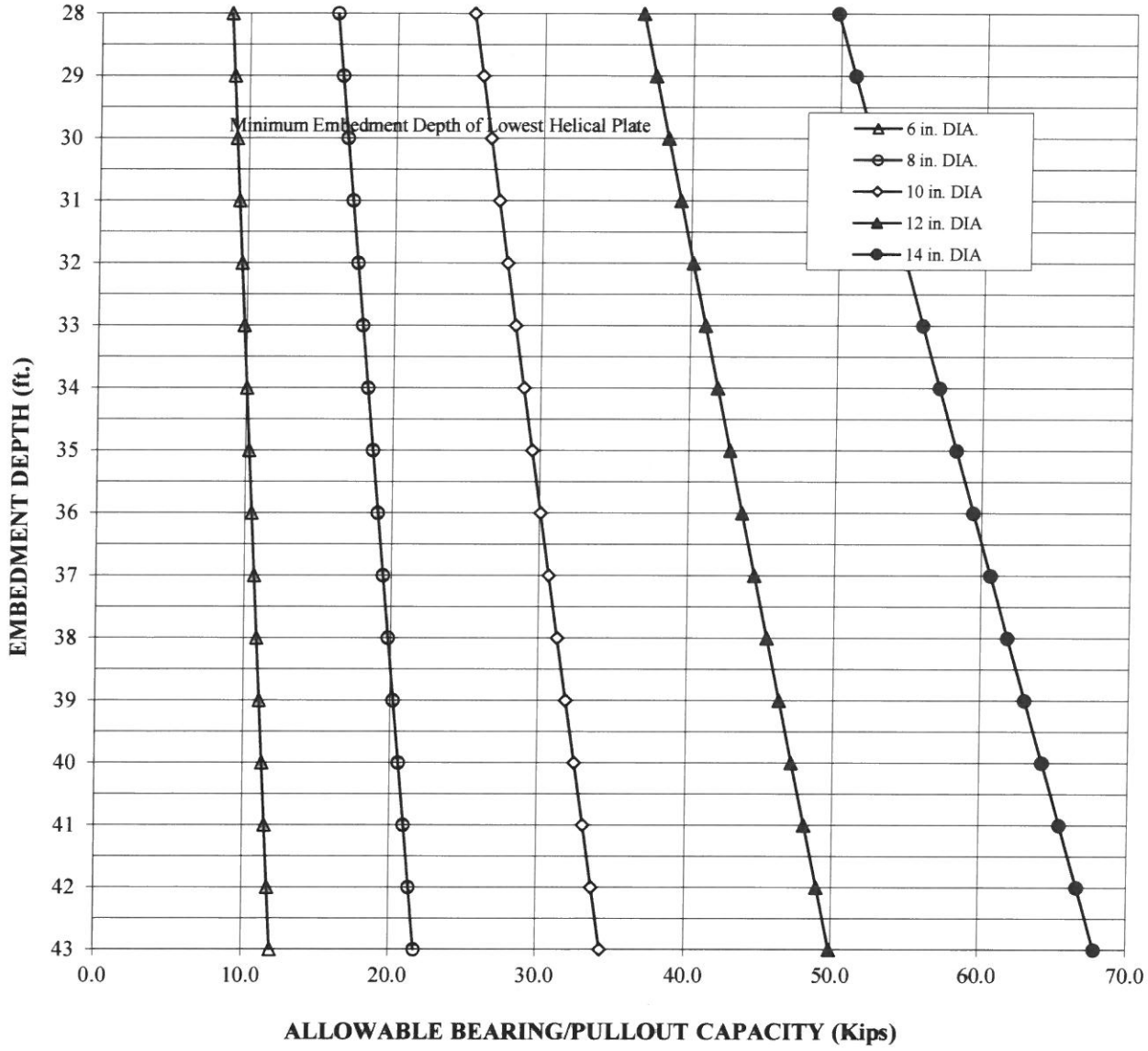
b. At the time we prepared this report, grading and foundation plans had not been finalized. We request an opportunity to review these plans during the design stages to determine if supplemental recommendations will be necessary.

5.3.2 Helical Screw Piles

a. We recommend that the proposed helical screw piles be **embedded such that the lowest helical plate has a minimum embedment of 25 feet below lowest adjacent grade**. The final depth should be below the peat layers and will be determined from monitoring the installation torque.

b. The estimated allowable bearing/pullout capacities for 6 inch, 8 inch, 10 inch, 12 inch, and 14 inch diameter, helical plates are presented in **Figure 2**. These values were computed assuming a minimum embedment depth of 30 feet.

c. If multi-plate anchors are proposed, the total allowable bearing/pull-out capacity of each anchor is calculated by summing the capacity of each helical plate on the anchor. These capacities do not include the weight of the shaft.



ROCK SOLID ENGINEERING, INC.	ALLOWABLE BEARING/PULLOUT CAPACITY for INDIVIDUAL HELICAL PLATES	FIGURE 2

d. The allowable bearing capacity values above may be increased by one-third in the case of short duration loads, such as those induced by wind or seismic forces.

e. Lateral support may be mobilized by helical piles drilled at an incline.

f. The recommended allowable bearing/pullout capacities may be higher than the design strength of the helical foundation piles or their intermediate shaft connections depending on the product chosen. These factors may effect the design capacity of the helical foundation piles and govern in the design.

g. The monitoring of installation torque during installation is recommended. Installation torque should not exceed the anchor rating. Installation torque has been empirically related to bearing/pull-out capacity. The minimum bearing/pull-out capacity to installation torque ratio generally recommended is between 9 and 10, subject to verification in the field.

h. Installation tolerances should be within 2% with regards to plumbness and to within 2 inches in location.

i. In general, installation procedures should be per the manufacturer's specifications.

j. **It is recommended that at least one helical screw pile be installed and tested prior to full scale production** in order to verify both design loads and installation torque requirements.

k. **All helical screw pile installation must be observed and approved by the Geotechnical Consultant. Any helical screw piles installed without the full knowledge and continuous observation by a representative of Rock Solid Engineering, Inc. will render the recommendations of this report invalid.**

5.4 Settlements

Total and differential settlements beneath foundation elements founded on helix anchors are expected to be within tolerable limits. Vertical movements are not expected to exceed 1 inch. Differential movements are expected to be within the normal range (½ inch) for the anticipated loads and spacings. These preliminary estimates should be reviewed by the Geotechnical Consultant when foundation plans for the proposed structures become available.

Foundation elements founded on existing grade are expected to have more than 2.25 inches of settlement across the least dimension of the structure.

5.5 Slabs-on-Grade

a. It is our understanding that the proposed use of the structure as a lumber mill will allow for an earthen floor between the column supports. A significant layer of peat was encountered underlying the building pad. The peat layer may cause significant settlement of concrete slab floors. Should concrete slab-on-grade floors be required, the slab should be designed as structurally separate from the foundation system (floating) or to span all loads to the foundations (assume no soil support). Floating slabs should be expected to experience settlement and/or cracking. However, provided the slab is not structurally required then the settlement and cracking will not effect the structural integrity of the steel building. See section 5.5 Slabs-on-grade for further recommendations.

b. Concrete floor slabs may be founded on compacted engineered fill per the recommendations in section 5.2.6. The subgrade should be proof-rolled just prior to construction to provide a firm, relatively unyielding surface, especially if the surface has been loosened by the passage of construction traffic.

c. It is important that the subgrade soils be thoroughly saturated for 24 to 48 hours prior to the time the concrete is poured. **For compacted engineered fill with a low expansion potential, the subgrade should be presoaked 4 percentage points above optimum to a depth of 1.0 feet**.

d. The slab-on-grade section should incorporate a minimum 4 inch capillary break consisting of 3/4 inch, clean, crushed rock, or approved equivalent. Class II baserock is not recommended. Structural considerations may govern the thickness of the capillary break.

e. Where moisture sensitive floor coverings are anticipated or vapor transmission may be a problem, a 10 mil waterproof membrane should be placed between the floor slab and the capillary break in order to reduce moisture condensation under the floor coverings. Place a 2-inch layer of moist sand on top of the membrane. This will help protect the membrane and will assist in equalizing the curing rate of the concrete.

f. Slab thickness, reinforcement, and doweling should be determined by the Project Structural Engineer, based on the design live and dead loads, including vehicles.

6. LIMITATIONS

a. Our investigation was performed in accordance with the usual and current standards of the profession, as they relate to this and similar localities. No other warranty, expressed or implied, is provided as to the conclusions and professional advice presented in this report.

b. The samples taken and tested, and the observations made, are considered to be representative of the site; however, soil and geologic conditions can vary significantly between sample locations.

c. As in most projects, conditions revealed during construction excavation may be at variance with preliminary findings. If this occurs, the changed conditions must be evaluated by the Project Geotechnical Consultant, and revised recommendations be provided as required.

d. This report is issued with the understanding that it is the responsibility of the Owner, or of his Representative, to ensure that the information and recommendations contained herein are brought to the attention of the Architect and Engineer for the project and incorporated into the plans, and that it is ensured that the Contractor and Subcontractors implement such recommendations in the field.

e. This firm does not practice or consult in the field of safety engineering. We do not direct the Contractor's operations, and we are not responsible for other than our own personnel on the site; therefore, the safety of others is the responsibility of the Contractor. The Contractor should notify the Owner if he considers any of the recommended actions presented herein to be unsafe.

f. The findings of this report are considered valid as of the present date. However, changes in the conditions of a site can occur with the passage of time, whether they be due to natural events or to human activities on this or adjacent sites. In addition, changes in applicable or appropriate codes and standards may occur, whether they result from legislation or the broadening of knowledge.

g. Accordingly, this report may become invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and revision as changed conditions are identified.

REFERENCES

1. Brabb, E.E., 1989, Geologic Map of Santa Cruz County, California, U.S. Geological Survey Miscellaneous Investigations Series Map I-1905, Scale: 1:62,500.

2. California Building Standards Commission, July 2013, 2013 California Building Code, California Code of Regulations, Title 24, Part 2, Effective January 1, 2014.

3. Cooper-Clark and Associates, 1975, Preliminary Map of Landslide Deposits in Santa Cruz County, California, Santa Cruz County Planning Dept., Scale: 1:62,500.

4. Dupré, W.R., 1975, Geology and Liquefaction Potential of Quaternary Deposits in Santa Cruz County, California, U.S. Geological Survey Miscellaneous Field Studies Map MF-648, Scale: 1:62,500.

5. Hall, N.T., Sarna-Wojcicki, A.M., and Dupré, W.R., 1974, Faults and their Potential Hazards in Santa Cruz County, California, U.S. Geological Survey Miscellaneous Field Studies Map MF-626, Scale: 1:62,500.

6. Hubbell Power Systems, Inc., Chance Instant Foundation Systems for Residential and Commercial Construction and Repairs, Rev. 02/03.

7. Hubbell Power Systems, Inc., Helical Screw Foundation Design Manual For New Construction, July 2003.

8. Mid Coast Engineers, Topogarphic Map, Western Farm Service, APN 052-011-58, Job No. 95109, Revision Date, 4-17-96.

9. Seed et al.(2003), Recent Advances In Soil Liquefaction Engineering: A Unified And Consistent Framework, Dated: April 30, 2003.

10. U.S. Geologic Survey, U.S. Seismic Design Maps, Site Updated June 12, 2014, Utilized November 4, 2014. http://earthquake.usgs.gov/designmaps/us/application.php

APPENDIX A

FIELD EXPLORATION AND LABORATORY TESTING PROGRAM

FIELD EXPLORATION PROCEDURES

A-1. Subsurface conditions were explored by drilling 5 borings to depths between 10 and 50 feet below existing grade. The borings were advanced with a truck mounted drill rig equipped with 8 inch hollow stem augers. The approximate locations of the borings are shown on the Boring Location Plan, **Figure A-1**. The Key to Logs, **Figure A-2**, gives definitions of the terms used in the Logs of Exploratory Borings. The Logs of Exploratory Borings are presented in **Figures A-3** through **A-7**.

A-2. Drilling of the borings was observed by our Field Engineer who logged the soils and obtained bulk and relatively undisturbed samples for classification and laboratory testing. The soils were classified, based on field observations and laboratory testing, in accordance with Unified Soil Classification System.

A-3. Relatively undisturbed soil samples were obtained by means of a drive sampler. The hammer weight and drop being 140 pounds and 30 inches, respectively. The number of "Blows/Foot"required to drive samplers are indicated on the logs.

A-4. Exploratory borings were located in the field by measuring from know landmarks. The locations, as shown, are therefore within the accuracy of such a measurement.

A-5. Perched groundwater was encountered at depths of 15 and 30 feet below existing grade during the course of our field exploration.

LABORATORY TESTING PROCEDURES

A-6. Classification

Soils were classified in accordance with the Unified Soil Classification System. Moisture content and in-situ density determinations were made from relatively undisturbed soil samples. The results are presented in the Logs of Exploratory Borings and in the Summary of Laboratory Test Results, **Figure A-8**.

A-7. Direct Shear

Direct shear strength tests were performed on representative samples of the on-site soils in accordance with laboratory test standard ASTM D 3080-98. Samples were relatively undisturbed, or remolded as specified. To simulate possible adverse field conditions, the samples were saturated prior to testing unless otherwise noted. A saturating device was used which permitted the samples to absorb moisture while preventing volume change. The direct shear test results are presented in **Figure A-9**.

A-8. Consolidation

Consolidation tests were performed on representative, relatively undisturbed samples of the underlying soils to determine compressibility characteristics. The samples were saturated during the tests to simulate possible adverse field conditions. The test results are presented in **Figure A-10**.

A-9. Expansion Index

Expansion tests were performed on representative, remolded samples of the on-site soils in accordance with laboratory test standard ASTM D 4829-95. The test results are presented in **Figure A-8**.

A-10. Amount of Materials in Soil Finer than the No. 200 Sieve

Determination of the amount of materials in the soil finer than the No. 200 sieve analyses were performed on samples considered representative of the on-site soils. The laboratory test was performed in accordance with ASTM: D 1140. The test results are presented in **Figure A-8**.

A-11. Soluble Sulfates

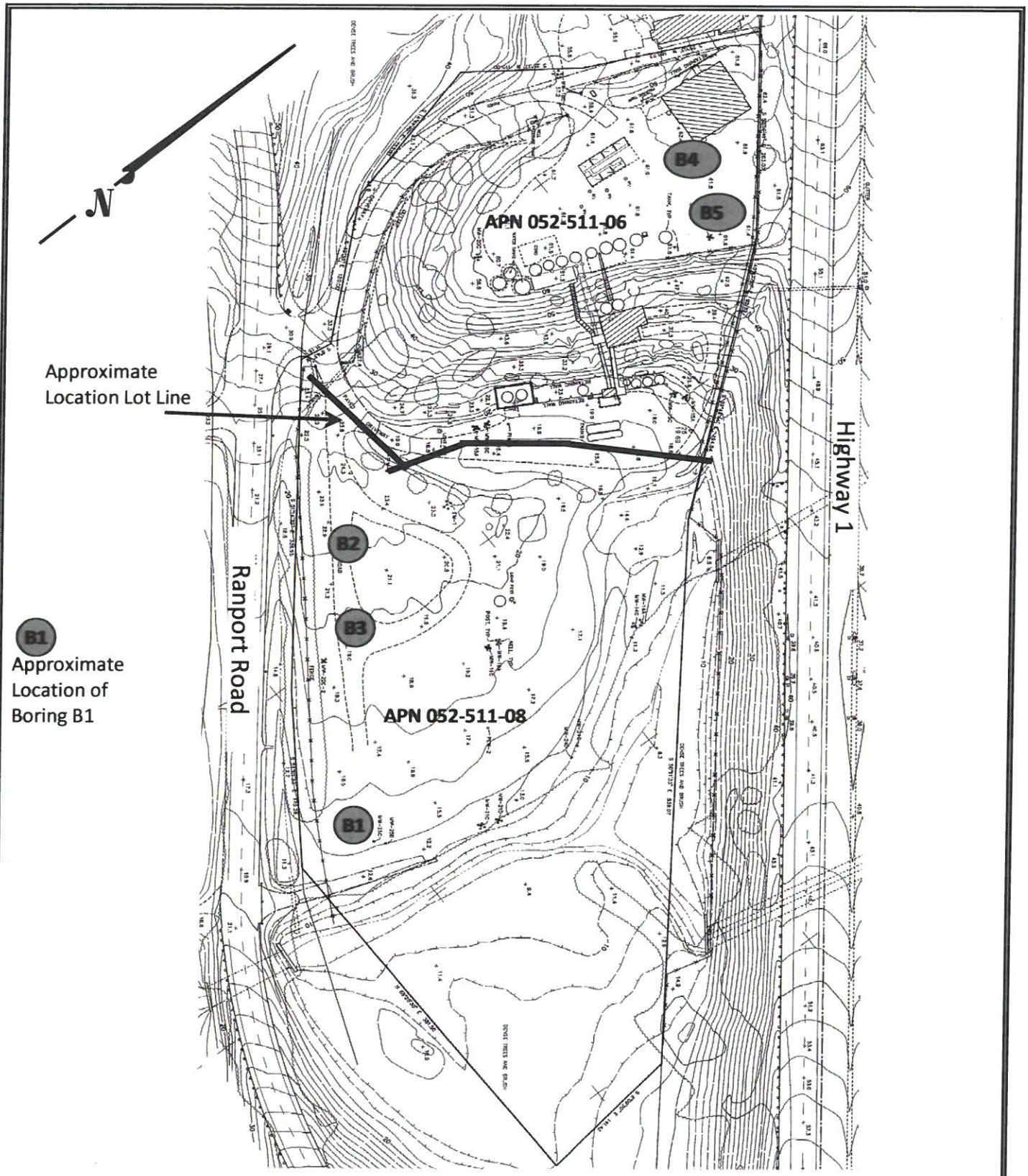
The soluble sulfate content was determined for samples considered representative of the on-soils likely to come in contact with concrete in accordance with test method California 417. The test results are presented in **Figure A-8**.

A-12. Particle Size Analysis

Particle size analyses were performed on samples considered representative of the on-site soils. The laboratory standard used was ASTM: D 422. The test results are presented in **Figures A-11 through A-13**.

A-13 Plasticity Index

The plasticity index was determined for a sample considered representative of the on-site soils in accordance with ASTM D4318. The test results are presented in **Figure A-4**.



Original Topographic Map by Mid Coast Engineers

Not to Scale

ROCK SOLID ENGINEERING, INC.	BORING LOCATION PLAN	FIGURE
	1400 Ranport Road, Watsonville	A-1

KEY TO LOGS

UNIFIED SOIL CLASSIFICATION SYSTEM				
PRIMARY DIVISIONS			GROUP SYMBOL	SECONDARY DIVISIONS
COARSE GRAINED SOILS More than half of the material is larger than the No. 200 sieve	GRAVELS More than half of the coarse fraction is larger than the No. 4 sieve	CLEAN GRAVELS (Less than 5% fines)	GW	Well graded gravels, gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels, gravel-sand mixtures, little or no fines
		GRAVEL WITH FINES	GM	Silty gravels, gravel-sand-silt mixtures, non-plastic fines
			GC	Clayey gravels, gravel-sand-clay mixtures, plastic fines
	SANDS More than half of the coarse fraction is smaller than the No. 4 sieve	CLEAN SANDS (Less than 5% fines)	SW	Well graded sands, gravelly sands, little or no fines
			SP	Poorly graded sands, gravelly sands, little or no fines
		SAND WITH FINES	SM	Silty sands, sand-silt mixtures, non-plastic fines
			SC	Clayey sands, sand-clay mixtures, plastic fines
FINE GRAINED SOILS More than half of the material is smaller than the No. 200 sieve	SILTS AND CLAYS Liquid limit less than 50		ML	Inorganic silts and very fine sands, silty or clayey fine sands or clayey silts with slight plasticity
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	Organic silts and organic silty clays of low plasticity
	SILTS AND CLAYS Liquid limit greater than 50		MH	Inorganic silts, micaceous or diatomacaceous fine sandy or silty soils, elastic silts
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS			Pt	Peat and other highly organic soils

GRAIN SIZE LIMITS							
SILT AND CLAY	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		
No. 200	No. 40	No. 10	No. 4	3/4 in.	3 in.	12 in.	

US STANDARD SIEVE SIZE

RELATIVE DENSITY	
SAND AND GRAVEL	BLOWS/FT*
VERY LOOSE	0 - 4
LOOSE	4 - 10
MEDIUM DENSE	10 - 30
DENSE	30 - 50
VERY DENSE	OVER 50

CONSISTENCY	
SILT AND CLAY	BLOWS/FT*
VERY SOFT	0 - 2
SOFT	2 - 4
FIRM	4 - 8
STIFF	8 - 16
VERY STIFF	16 - 32
HARD	OVER 32

MOISTURE CONDITION
DRY
DAMP
MOIST
WET

* Number of blows of 140 pound hammer falling 30 inches to drive a 2 inch O.D. (1 3/8 inch I.D.) split spoon (ASTM D-1586).

LOG OF EXPLORATORY BORING

Project No.:	14047	Boring:	B1
Project:	1400 Ranport Road	Location:	APN 08 South Edge of Proposed Steel Building
	Watsonville, California	Elevation:	
Date:	October 2, 2014	Method of Drilling:	Truck Mounted Drill Rig, 8in. Hollow Stem
Logged By:	DO		Auger, 140lb. Safety Hammer

2" DIA Sample | 2.5" DIA Sample | Bulk Sample | Terzaghi Split Spoon Sample | Static Water Table

Depth (ft.)	Soil Type	Undisturbed	Bulk	Description	Blows	Dry Density (pcf)	Moisture Content (%)	Wet Density (pcf)	Direct Shear c (psf)	Direct Shear φ°	Miscellaneous Laboratory Testing
	SM			**FILL**: Brown Silty SAND.							
	SC		X	Reddish Brown Clayey SAND. Dry, Medium Dense, Non-Plastic.	40	91.2	4.9	95.7			Consolidation Sulfate #200 Wash
	CL-SC			Blackish Brown with Orange Staining Sandy CLAY with Gravel. Dry, Plastic.							
			X	Blackish Brown with Orange Staining Sandy CLAY with Gravel. Dry, Stiff, Plastic. Organics Present.	12	68.3	53.5	104.8			#200 Wash
5			X	Material Consistent. Sand and Gravel Decrease with Depth. Moisture Increases with Depth.	4		58.1				
				Grey SAND. Wet, Non-Plastic.							
	CL-SC		X	Laminated Sandy CLAY and Clayey SAND with Some Organics and Gravel. Wet, Loose/Stiff, Plastic.	19						
	Pt		X	Peat. Wet.		47.9	152.3	120.8			
	CL-SC			Laminated Sandy CLAY and Clayey SAND with Some Organics and Gravel. Wet, Loose/Stiff, Plastic.	22		24.1				
10			X								
	Pt		X	Peat.	27	15.0	317.2	62.4			
15			X	Peat.	11		127.9				
			X	Peat.	12	21.6	229.5	71.1			
20				Boring Terminated @ 20 ft. Groundwater Not Encountered. Boring Backfilled With Cuttings.							
25											

ROCK SOLID ENGINEERING, INC.

FIGURE A-3

LOG OF EXPLORATORY BORING

Project No.:	14047	Boring:	B2
Project:	1400 Ranport Road	Location:	APN 08 NW Corner of Proposed Steel Building
	Watsonville, California	Elevation:	
Date:	October 2, 2014	Method of Drilling:	Truck Mounted Drill Rig, 8in. Hollow Stem
Logged By:	DO		Auger, 140lb. Safety Hammer

2" DIA Sample | 2.5" DIA Sample | Bulk Sample | Terzaghi Split Spoon Sample | Static Water Table

Depth (ft.)	Soil Type	Undisturbed	Bulk	Description	Blows	Dry Density (pcf)	Moisture Content (%)	Wet Density (pcf)	Direct Shear c (psf)	Direct Shear φ°	Miscellaneous Laboratory Testing
	SC			**FILL**: Grey to Orangish Brown Gravel and Silty SAND. Dry.							
	CL			Black with Grey Layers Organic Sandy CLAY. Moist, Very Stiff, Plastic.	25	98.0	20.1	117.7			Consolidation P.I.: 33 L.L.: 19
5	CL-SC			Black Laminated Sandy CLAY and Clayey SAND. Some Organics and Gravel. Moist, Very Stiff, Plastic.	26	115.2	12.2	129.3			#200 Wash Sulfate
				Material Consistent. Stiff.	13		20.7				
				Black CLAY.							
10	SC			Grey Clayey SAND. Moist, Loose, Non-Plastic.	18	102.6	17.0	120.0			Sulfate
15	Pt ▽			Peat with Some Silt. Wet, Non-Plastic. Perched Groundwater.	10		106.3				
20	SC			Grey Clayey SAND. Wet, Loose, Non-Plastic. Organics.	17	105.3	22.9	129.5			
25				Grey with Oxide Staining Clayey SAND. Saturated, Medium Dense, Medium Plastic.	14		23.4				Hydrometer

ROCK SOLID ENGINEERING, INC.

FIGURE A-4.1

LOG OF EXPLORATORY BORING

Project No.:	14047	Boring:	B2 Continued
Project:	1400 Ranport Road	Location:	APN 08 NW Corner of Proposed Steel Building
	Watsonville, California	Elevation:	
Date:	October 2, 2014	Method of Drilling:	Truck Mounted Drill Rig, 8in. Hollow Stem
Logged By:	DO		Auger, 140lb. Safety Hammer

2" DIA Sample | 2.5" DIA Sample | Bulk Sample | Terzaghi Split Spoon Sample | Static Water Table

Depth (ft.)	Soil Type	Undisturbed	Bulk	Description	Blows	Dry Density (pcf)	Moisture Content (%)	Wet Density (pcf)	Direct Shear c (psf)	Direct Shear φ°	Miscellaneous Laboratory Testing
30	SC			Grey Clayey SAND and Gravel. Moist, Very Stiff, Medium Plastic. Groundwater.	36	112.5	17.9	132.6			#200 Wash
35				Grey SAND with Some Fines. Saturated, Non-Plastic. Grey Clayey SAND Wet, Medium Dense, Medium Plastic. Grades to Clay.	11		23.4				Hydrometer #200 Wash
40	SP-SC			Grey Gravelly SAND with Trace Fines. Saturated, Medium Dense, Non-Plastic.	24	108.5	21.4	131.7	130	37	Hydrometer #200 Wash
45	SC			Grey Clayey SAND. Saturated, Dense, Non-Plastic.	38		24.5				#200 Wash
				Boring Terminated @ 50 ft. Perched Groundwater Was Encountered @ 15 and 30 ft. Boring Backfilled With Cuttings.							
50	SP-SC			Grey Gravelly SAND with Fines. Saturated, Very Dense, Non-Plastic.	100+		18.5				

ROCK SOLID ENGINEERING, INC.

FIGURE A-4.2

LOG OF EXPLORATORY BORING

Project No.:	14047	Boring:	B3
Project:	1400 Ranport Road	Location:	APN 08 Middle of W Side of Proposed Bldg
	Watsonville, California	Elevation:	
Date:	October 2, 2014	Method of Drilling:	Truck Mounted Drill Rig, 8in. Hollow Stem
Logged By:	DO		Auger, 140lb. Safety Hammer

2" DIA Sample | 2.5" DIA Sample | Bulk Sample | Terzaghi Split Spoon Sample | Static Water Table

Depth (ft.)	Soil Type	Undisturbed	Bulk	Description	Blows	Dry Density (pcf)	Moisture Content (%)	Wet Density (pcf)	Direct Shear c (psf)	Direct Shear φ°	Miscellaneous Laboratory Testing
	SC		X	**FILL**: Orange Brown Clayey SAND. Wet, Non-Plastic. Material Consistent.							
	SC-CL		X	Black Clay and SAND. Moist, Stiff/Loose, Plastic. Organic.	12	88.0	42.2	125.1			
			X	Black with Grey Laminated CLAY and SAND. Wet, Stiff/Loose, Plastic. Organics.	10		21.7				EI=14
5			X	Grey Brown Clayey SAND with Trace Gravel. Wet, Loose, Non-Plastic. Organics.	16	87.0	29.5	112.6			
10			X	Grey Brown CLAY and Clayey SAND. Saturated, Loose, Plastic.	10	97.8	25.9	123.2			
	Pt		X	Peat.	7		179.8				
15			X	Material Consistent.	14	15.1	309.2	61.8			
			X	Black CLAY with Sand. Saturated, Firm, Plastic. Organic.	5		67.3				
	CL		X	Black CLAY with Sand. Saturated, Firm, Plastic.	14		22.9				
20				Boring Terminated @ 19.5 ft. Groundwater Not Encountered. Boring Backfilled With Cuttings.							
25											

ROCK SOLID ENGINEERING, INC.

FIGURE A-5

LOG OF EXPLORATORY BORING

Project No.:	14047	Boring:	B4
Project:	1400 Ranport Road	Location:	APN 06 NE Croner of Prop. Near (E) Structure
	Watsonville, California	Elevation:	
Date:	October 2, 2014	Method of Drilling:	Truck Mounted Drill Rig, 8in. Hollow Stem
Logged By:	DO		Auger, 140lb. Safety Hammer

2" DIA Sample | 2.5" DIA Sample | Bulk Sample | Terzaghi Split Spoon Sample | Static Water Table

Depth (ft.)	Soil Type	Undisturbed	Bulk	Description	Blows	Dry Density (pcf)	Moisture Content (%)	Wet Density (pcf)	Direct Shear c (psf)	Direct Shear ϕ °	Miscellaneous Laboratory Testing
	SC			**FILL**: Brown and Grey Gravel Over Orange Clayey SAND. Moist, Non-Plastic.							
	CL			**NATIVE**: Brown CLAY with Sand. Moist, Stiff, Medium Plastic.	20	114.8	14.1	131.0			#200 Wash
				Material Consistent.	11		16.3				Sulfate
5	SM-ML			Light Orangish Brown Silty SAND/Sandy SILT. Dry, Loose, Non-Plastic.	14	107.3	14.4	122.8			#200 Wash Sulfate
10				Mottled Brown and Orangish Brown Sandy SILT. Moist, Very Stiff, Medium Plastic.	31	114.0	16.7	133.0			
15	CL			Brown with Oxide Staining Sandy CLAY. Moist, Very Stiff, Medium Plastic.	15		17.2				
	SC			Light Brown Clayey SAND. Moist, Non-Plastic.	17		20.7				
20	CL			Grey CLAY. Moist, Very Stiff, Plastic.							
				Boring Terminated @ 20 ft. Groundwater Not Encountered. Boring Backfilled With Cuttings.							
25											

ROCK SOLID ENGINEERING, INC.

FIGURE A-6

LOG OF EXPLORATORY BORING

Project No.:	14047	Boring:	B5
Project:	1400 Ranport Road	Location:	NE Corner of Site S Corner of Bldng Pad
	Watsonville, California	Elevation:	
Date:	October 2, 2014	Method of Drilling:	Truck Mounted Drill Rig, 8in. Hollow Stem
Logged By:	DO		Auger, 140lb. Safety Hammer

2" DIA Sample | 2.5" DIA Sample | Bulk Sample | Terzaghi Split Spoon Sample | Static Water Table

Depth (ft.)	Soil Type	Undisturbed	Bulk	Description	Blows	Dry Density (pcf)	Moisture Content (%)	Wet Density (pcf)	Direct Shear c (psf)	Direct Shear φ°	Miscellaneous Laboratory Testing
	SC			**FILL**: Orange Brown Clayey Gravelly SAND.							
				Orangish Brown SAND. Moist, Medium Dense, Non-Plastic.	37	118.6	6.3	126.1			Sulfate
				Material Consistent. Thin Brown Sandy CLAY Layer in Center of Sample.	9		16.8				
5	CL			**NATIVE**: Brown Sandy CLAY. Wet, Stiff, Plastic.	12	104.9	20.4	126.2			
				Orangish Brown Sandy CLAY. Moist, Very Stiff, Plastic.	18		18.6				
10				Boring Terminated @ 10 ft. Groundwater Not Encountered. Boring Backfilled With Cuttings.							
15											
20											
25											

ROCK SOLID ENGINEERING, INC.

FIGURE A-7

SUMMARY OF LABORATORY TEST RESULTS

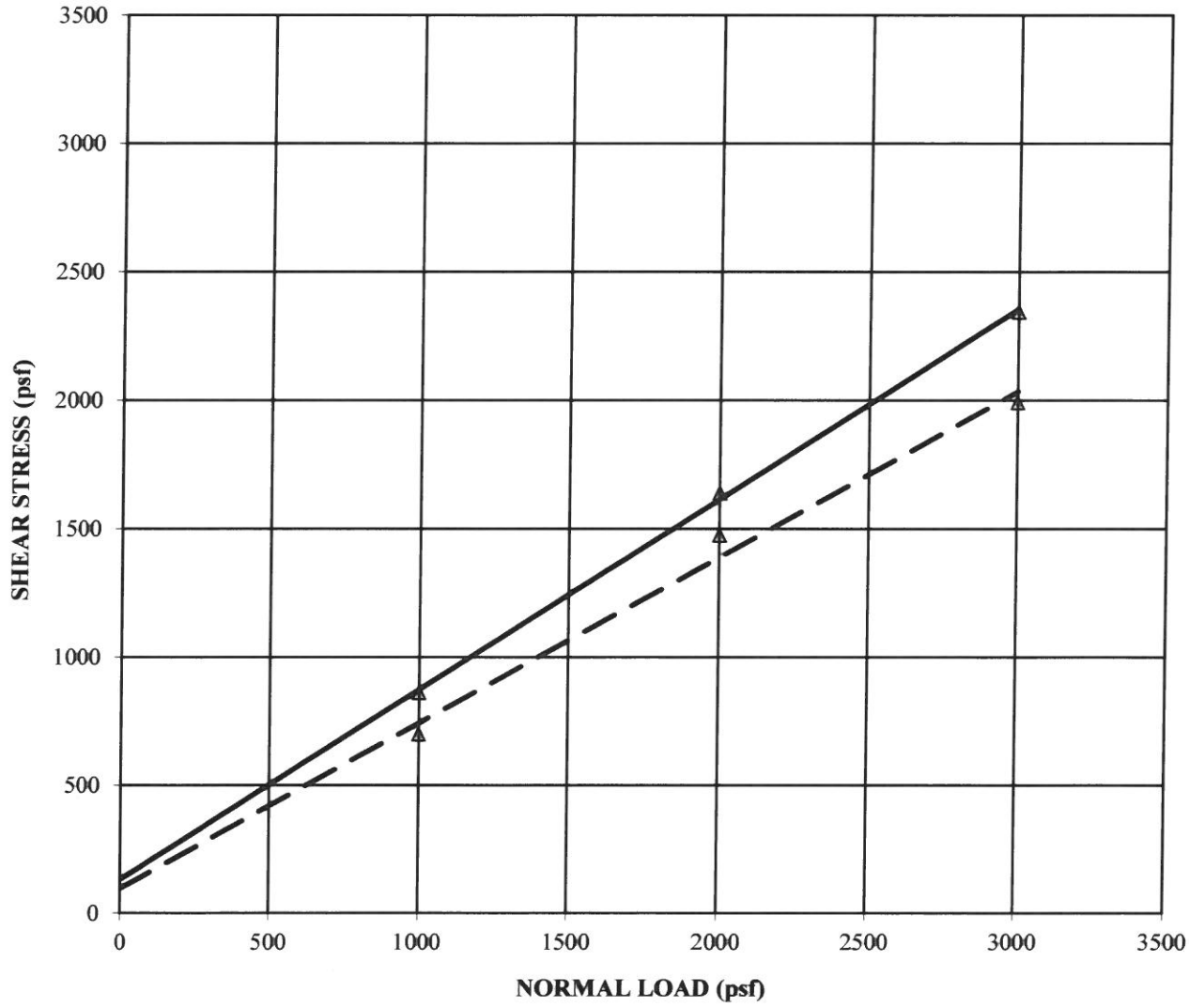
BORING	DEPTH	SOIL TYPE	IN-SITU			DIRECT SHEAR		GRAIN SIZE (%)				EXPANSION INDEX	SOLUBLE SULFATES (ppm)
			DRY DENSITY (pcf)	MOISTURE CONTENT (%)	WET DENSITY (pcf)	COHESION (psf) (PEAK)	FRICTION ANGLE (PEAK)	GRAVEL	SAND	SILT	CLAY		
B1	1.0	SC	91.2	4.9	95.7								29
B1	3.5	CL-SC	68.3	53.5	104.8					50			
B1	5.0	CL-SC		58.1						24			
B1	7.0	Pt	47.9	152.3	120.8								
B1	8.5	CL-SC		24.1									
B1	13.5	Pt	15.0	317.2	62.4								
B1	15.0	Pt		127.9									
B1	18.5	Pt	21.6	229.5	71.1								
B2	1.0	CL	98.0	20.1	117.7								
B2	3.5	CL-SC	115.2	12.2	129.3					31			59
B2	5.0	CL-SC		20.7									
B2	8.5	SC	102.6	17.0	120.0								26
B2	13.5	Pt		106.3									
B2	18.5	SC	105.3	22.9	129.5								40
B2	23.5	SC		23.4									
B2	28.5	SC	112.5	17.9	132.6					30			
B2	33.5	SC		23.4						36			
B2	38.5	SP-SC	108.5	21.4	131.7	130	37	6	87	7			
B2	43.5	SC		24.5						42			
B2	48.5	SP-SC		18.5				16	78	6			
B3	1.0	SC-CL	88.0	42.2	125.1								

SUMMARY OF LABORATORY TEST RESULTS

BORING	DEPTH	SOIL TYPE	IN-SITU			DIRECT SHEAR		GRAIN SIZE (%)				EXPANSION INDEX	SOLUBLE SULFATES (ppm)
			DRY DENSITY (pcf)	MOISTURE CONTENT (%)	WET DENSITY (pcf)	COHESION (psf) (PEAK)	FRICTION ANGLE (PEAK)	GRAVEL	SAND	SILT	CLAY		
B3	2.5	SC-CL		21.7								14	
B3	5.0	SC-CL	87.0	29.5	112.6								
B3	10.0	SC-CL	97.8	25.9	123.2								
B3	11.5	Pt		179.8									
B3	15.0	Pt	15.1	309.2	61.8								
B3	16.5	Pt		67.3									
B3	18.0	CL		22.9									
B4	1.0	CL	114.8	14.1	131.0					52			
B4	2.5	CL		16.3									17
B4	5.0	SM-ML	107.3	14.4	122.8					50			12
B4	10.0	SM-ML	114.0	16.7	133.0								
B4	15.0	CL		17.2									
B4	18.5	SC		20.7									
B5	1.0	SC	118.6	6.3	126.1								200
B5	2.5	SC		16.8									
B5	5.0	CL	104.9	20.4	126.2								
B5	8.5	CL		18.6									

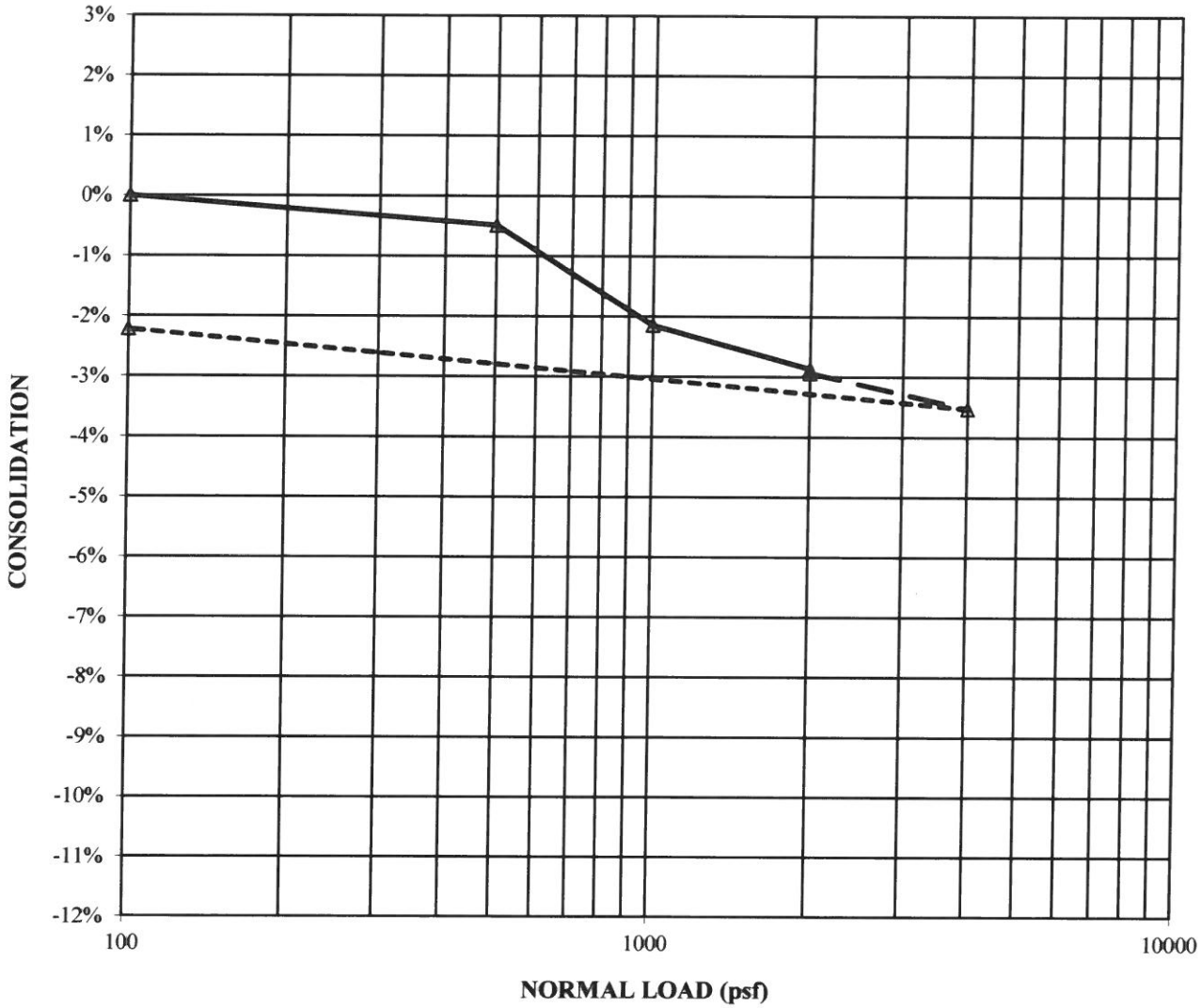
BORING:	B2		COHESION	FRICTION
DEPTH (ft):	38.5		(psf)	ANGLE
SOIL TYPE (USCS):	SP-SC	PEAK	130	37
		RESIDUAL	90	33

TEST SAMPLE TYPE:	FIELD MOISTURE:	21.4%
IN-SITU (SATURATED)	SATURATED MOIST:	23.3%



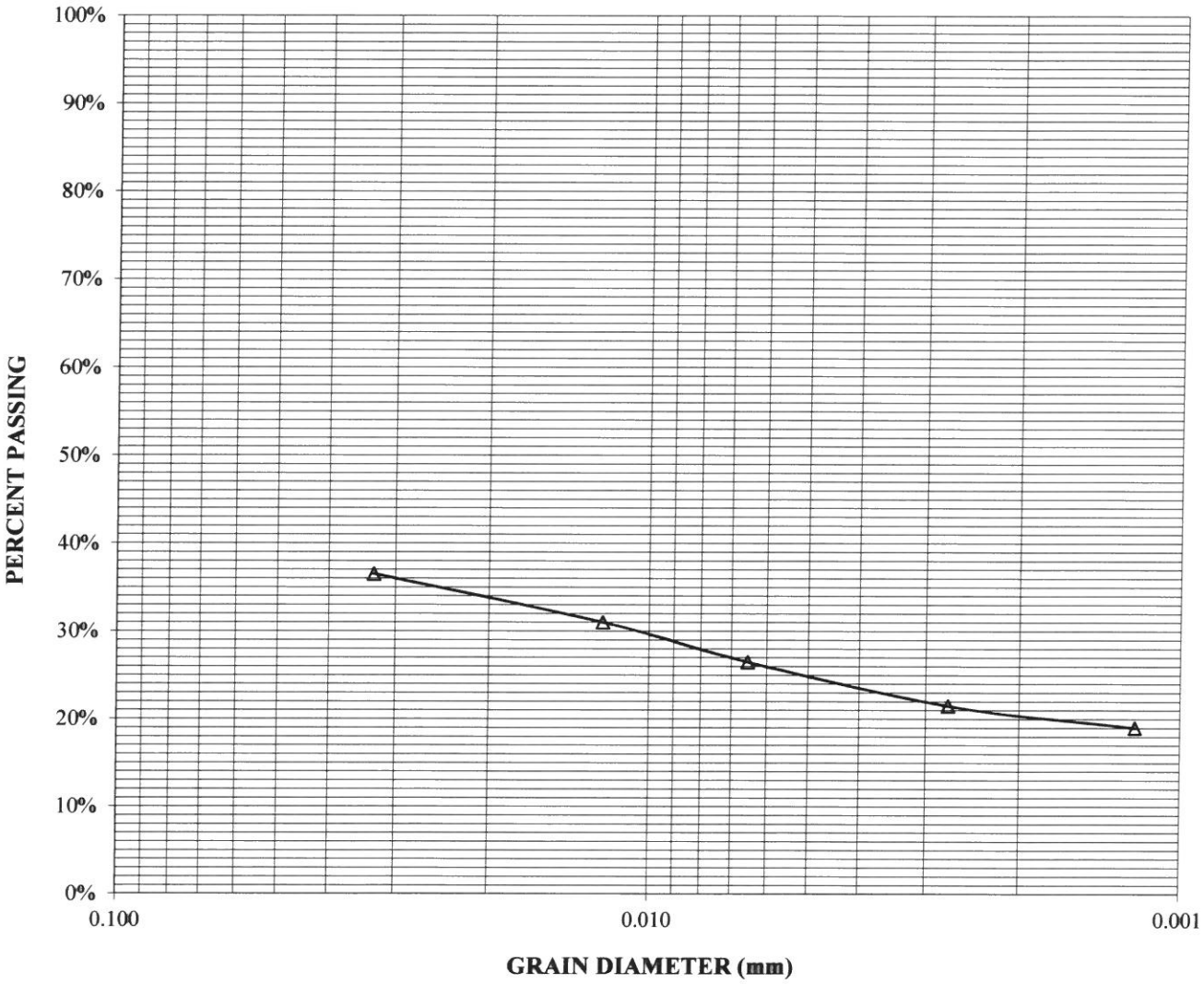
ROCK SOLID ENGINEERING, INC.	DIRECT SHEAR TEST RESULTS	FIGURE
	1400 Ranport Road, Watsonville	A-9

BORING:	B2	FIELD MOISTURE	
DEPTH (ft):	1.0	SATURATED	
SOIL TYPE (USCS):	CL	REBOUND	
SEATING WEIGHT:	220 psf	FIELD MOISTURE:	20.1%
		SATURATED MOIST:	24.0%



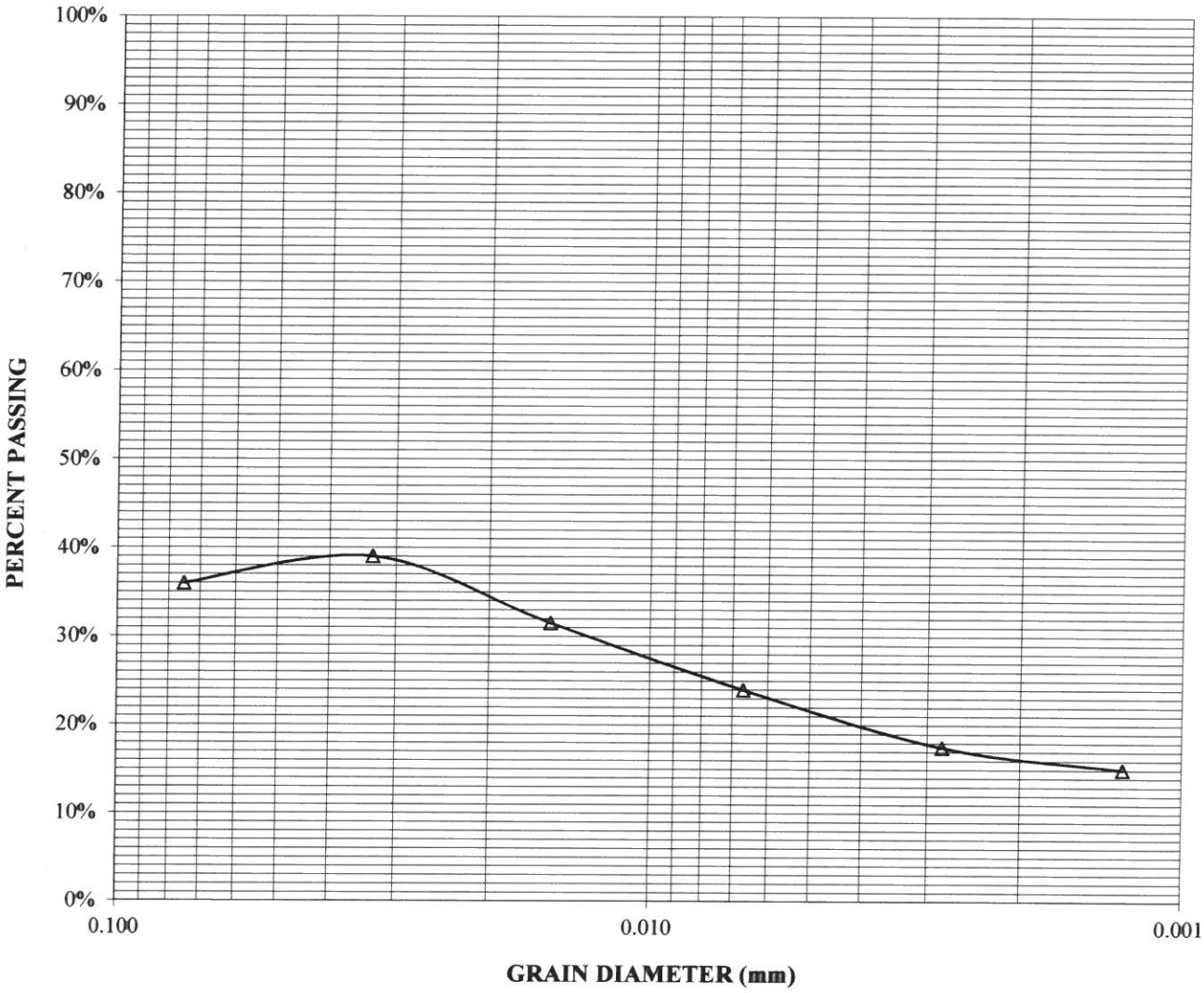
ROCK SOLID ENGINEERING, INC.	**CONSOLIDATION TEST RESULTS**	FIGURE
	1400 Ranport Road, Watsonville	A-10

BORING:	B2	PERCENT	PERCENT
DEPTH (ft):	23.5	PASSING No. 200	CLAY FRACTION <.002mm
SOIL TYPE (USCS):	SC		20%



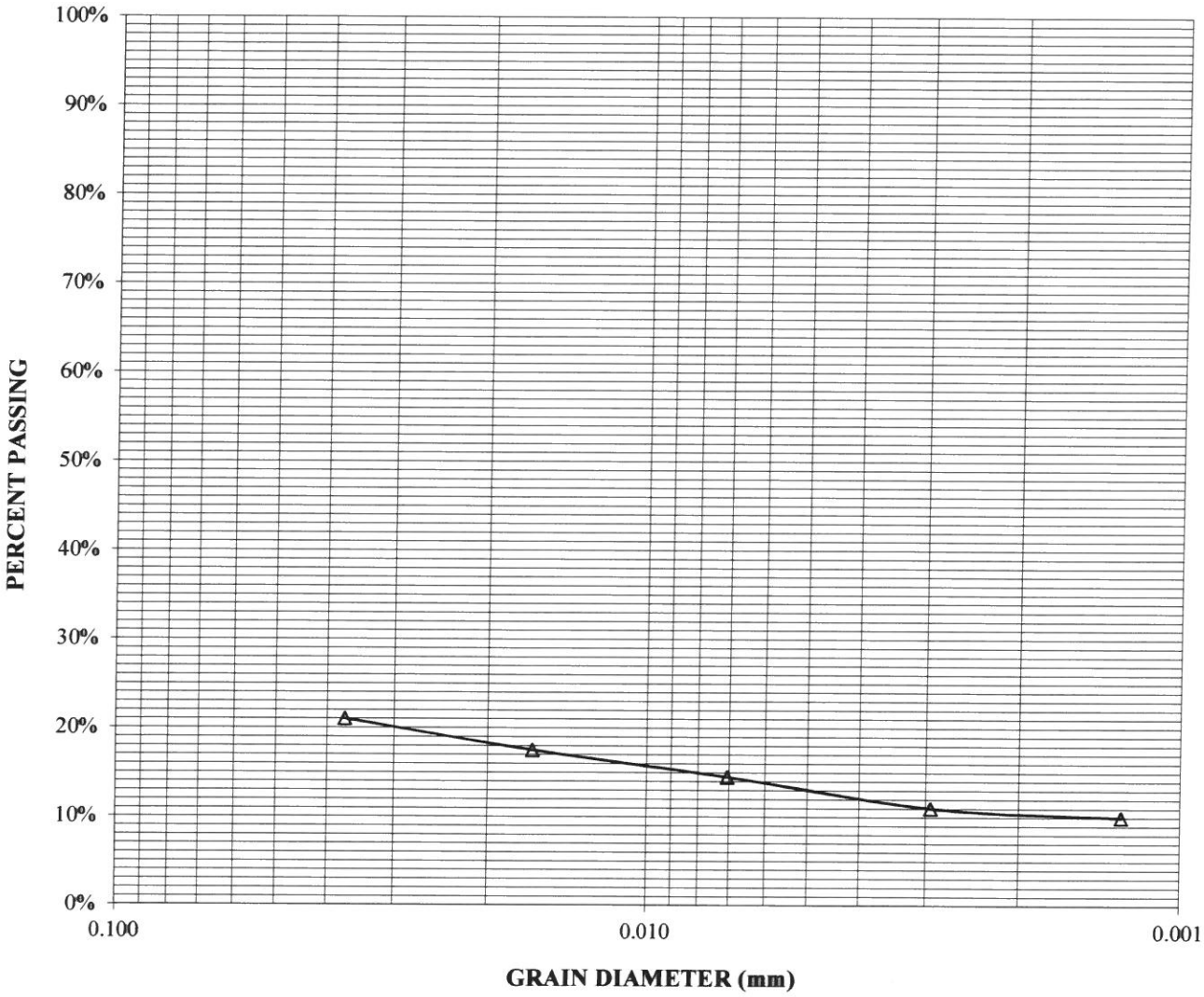
ROCK SOLID ENGINEERING, INC.	GRAIN SIZE DISTRIBUTION	FIGURE
	1400 Ranport Road, Watsonville	A-11

BORING:	B2	PERCENT	PERCENT
DEPTH (ft):	33.5	PASSING No. 200	CLAY FRACTION <.002mm
SOIL TYPE (USCS):	SC	36%	16%



ROCK SOLID ENGINEERING, INC.	GRAIN SIZE DISTRIBUTION	FIGURE
	1400 Ranport Road, Watsonville	A-12

BORING:	B2	PERCENT	PERCENT
DEPTH (ft):	38.5	PASSING No. 4	CLAY FRACTION<.002mm
SOIL TYPE (USCS):	SP-SC	87.0%	10%



ROCK SOLID ENGINEERING, INC.	GRAIN SIZE DISTRIBUTION	FIGURE
	1400 Ranport Road, Watsonville	A-13

APPENDIX B

LIQUEFACTION ANALYSIS

METHODOLOGY

B-1. Our quantitative liquefaction analysis was performed on the observed soil configuration which is considered representative of the conditions at the subject site.

B-2. The analysis uses empirical predictions of earthquake-induced liquefaction potential and is based on the published methods used by Seed and others (Reference 9). This analysis is based on a comparison of the in-situ cyclic stress ration (CSR) with the CSR from historical data collected in areas which experienced liquefaction for a given magnitude earthquake and soil configuration.

B-3. The design seismic event was assumed to occur along the San Andreas Fault with a corresponding magnitude of M=7.9. Our analysis was performed assuming a peak ground acceleration (PGA_M) of 0.67g in accordance with ASCE 7-10, Section 11.8.3.

B-4. Grain size distribution, in-situ water content, and density were determined for samples considered representative of the potentially liquefiable soils encountered. The results of our laboratory testing are presented in Appendix A.

B-5. Material properties chosen for our analysis are conservatively based on laboratory test results and our experience in the vicinity.

B-6. Our calculations of the analyzed soil configuration are presented in tabular form in 1 foot increments below.

LIQUEFACTION ANALYSIS

Project No.:	14047
Project:	1400 Ranport Road, Watsonville, CA
Date:	October 24, 2014
Run By:	YW

Drilling Information	
Boring Diameter (in.):	8.0
C_E Value Based on Hammer Type:	0.6
Sampler Type:	Non-Standard SPT w/Liners Removed

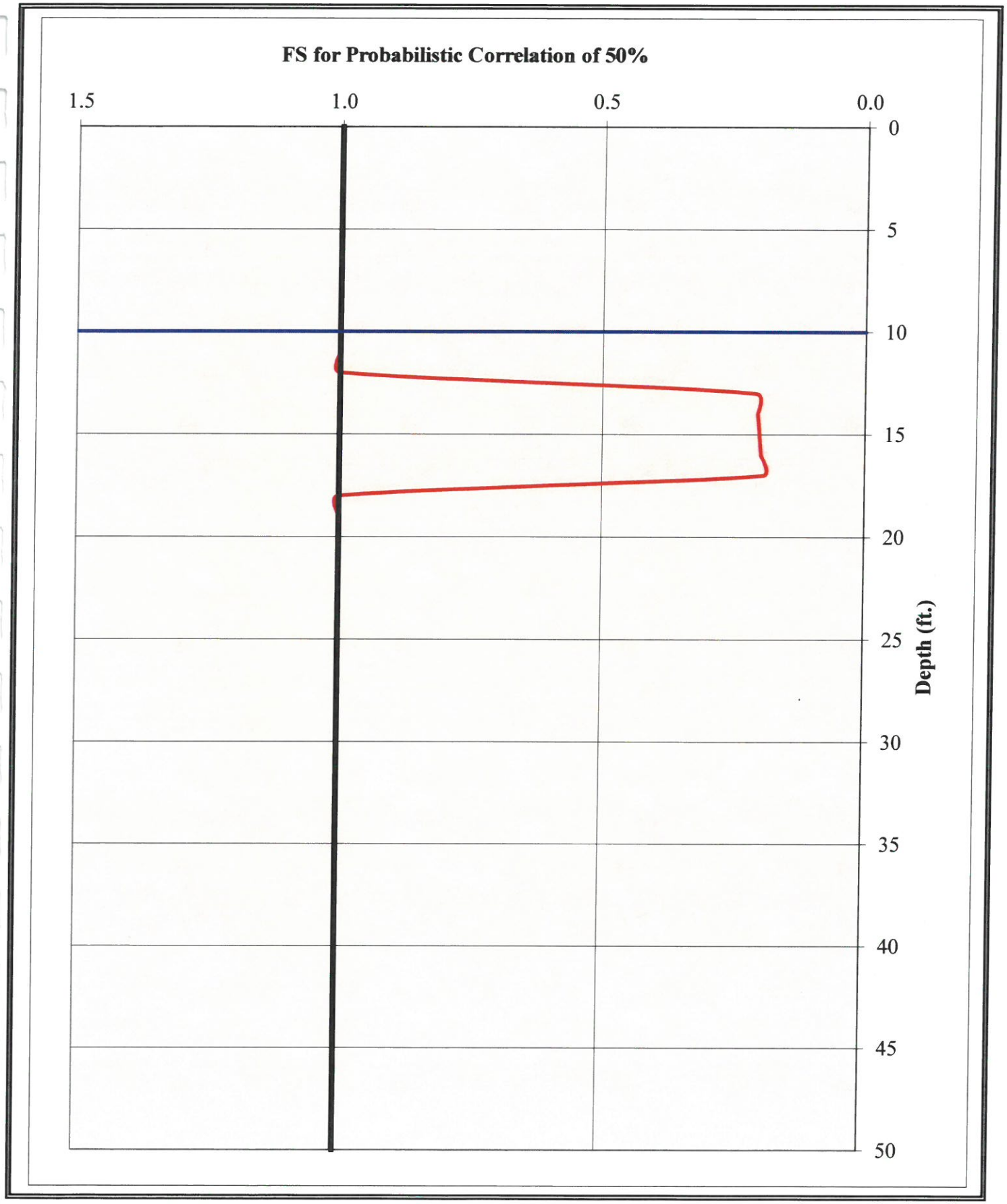
Site Information	
Design Fault:	San Andreas
Design Magnitude:	7.9
Latitude:	N36.9744
Longitude:	W121.95444
Design Pga (g):	0.67
Average Shear Wave Velocity (fps):	1000
Design Groundwater Depth (ft.)	10.0

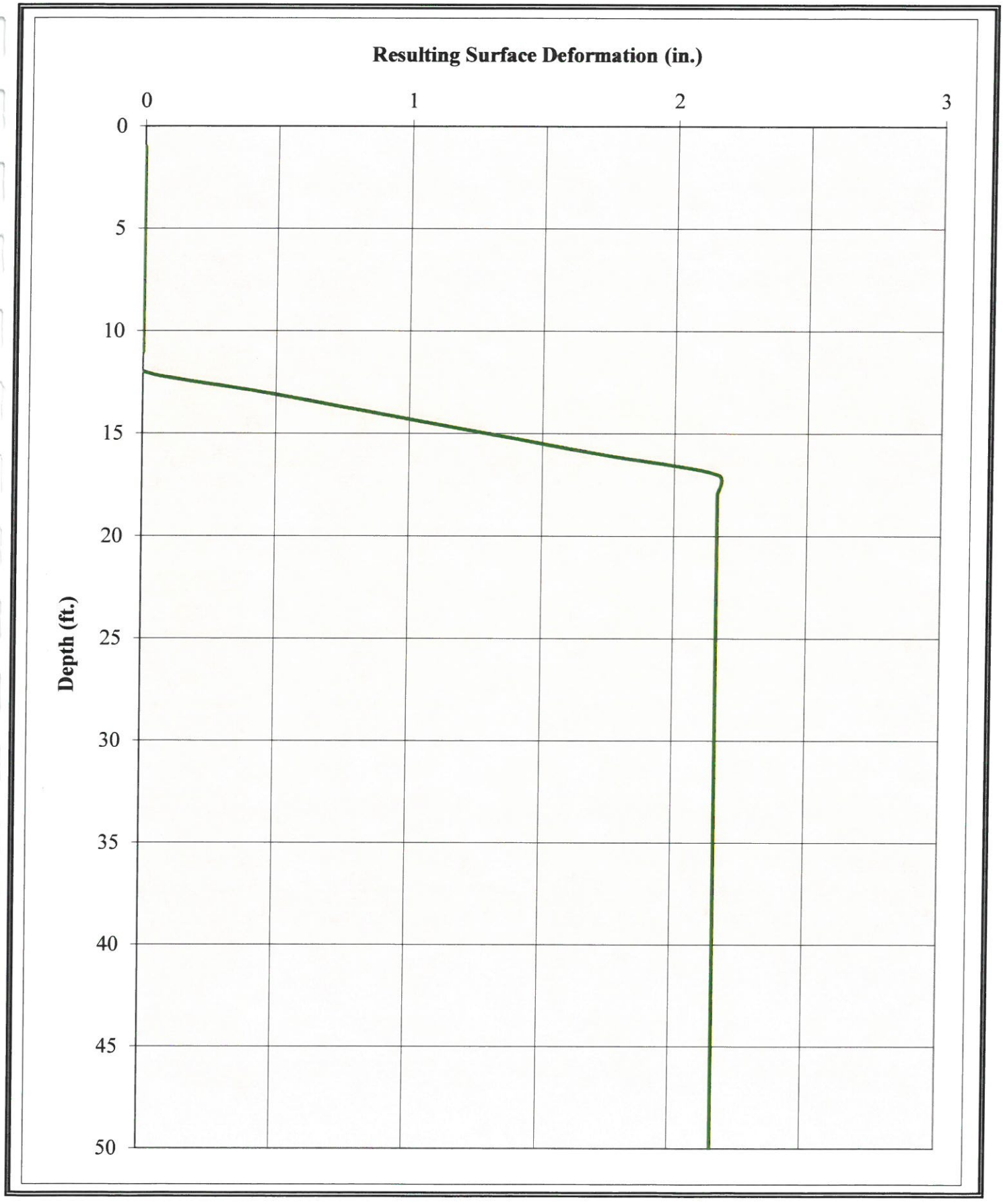
Calculations

DEPTH (ft.)	SOIL TYPE	TOTAL STRESS (psf)	EFFECTIVE STRESS (psf)	$(N_1)_{60CS}$	CSR*	SUSCEPTIBLE	CSR* NEEDED FOR LIQUEFACTION	FACTOR OF SAFETY	CUMULATIVE RECONSOLIDATION (in.)
1	CL	118	118	14.4	0.30	NO	N/A	N/A	N/A
2	CL	235	235	10.6	0.31	NO	N/A	N/A	N/A
3	CL	353	353	9.0	0.32	NO	N/A	N/A	N/A
4	CL	471	471	8.1	0.33	NO	N/A	N/A	N/A
5	CL	589	589	7.4	0.34	NO	N/A	N/A	N/A
6	CL	706	706	7.0	0.35	NO	N/A	N/A	N/A
7	CL	824	824	6.6	0.36	NO	N/A	N/A	N/A
8	CL	942	942	6.4	0.37	NO	N/A	N/A	N/A
9	CL	1059	1059	6.2	0.38	NO	N/A	N/A	N/A
10	SC	1179	1179	32.8	0.39	NO	N/A	N/A	N/A
11	SC	1299	1237	32.8	0.41	NO	N/A	N/A	N/A
12	SC	1419	1295	32.4	0.43	NO	N/A	N/A	N/A
13	OL	1482	1295	11.0	0.45	YES	0.09	0.21	0.45
14	OL	1544	1295	11.2	0.46	YES	0.09	0.21	0.87
15	OL	1607	1295	11.3	0.47	YES	0.10	0.20	1.29

Calculations (continued)

DEPTH (ft.)	SOIL TYPE	TOTAL STRESS (psf)	EFFECTIVE STRESS (psf)	$(N_1)_{60CS}$	CSR*	SUSCEPTIBLE	CSR* NEEDED FOR LIQUEFACTION	FACTOR OF SAFETY	CUMULATIVE RECONSOLIDATION (in.)
16	OL	1669	1295	11.4	0.49	YES	0.10	0.20	1.71
17	OL	1731	1295	11.6	0.50	YES	0.10	0.19	2.16
18	SC	1861	1362	15.6	0.52	NO	N/A	N/A	N/A
19	SC	1990	1429	15.4	0.53	NO	N/A	N/A	N/A
20	SC	2120	1496	15.2	0.54	NO	N/A	N/A	N/A
21	SC	2249	1563	15.1	0.54	NO	N/A	N/A	N/A
22	SC	2379	1630	14.8	0.55	NO	N/A	N/A	N/A
23	SC	2508	1697	14.6	0.56	NO	N/A	N/A	N/A
24	SC	2638	1764	14.5	0.56	NO	N/A	N/A	N/A
25	SC	2767	1831	14.3	0.56	NO	N/A	N/A	N/A
26	SC	2897	1898	14.1	0.56	NO	N/A	N/A	N/A
27	SC	3026	1966	13.9	0.56	NO	N/A	N/A	N/A
28	SP	3159	2036	19.1	0.56	NO	N/A	N/A	N/A
29	SP	3292	2106	18.9	0.56	NO	N/A	N/A	N/A
30	SP	3424	2176	18.6	0.56	NO	N/A	N/A	N/A
31	SP	3557	2246	18.3	0.56	NO	N/A	N/A	N/A
32	SP	3689	2317	18.1	0.55	NO	N/A	N/A	N/A
33	SP	3822	2387	17.8	0.55	NO	N/A	N/A	N/A
34	SP	3955	2457	17.6	0.55	NO	N/A	N/A	N/A
35	SP	4087	2527	17.3	0.55	NO	N/A	N/A	N/A
36	SP	4220	2597	17.1	0.55	NO	N/A	N/A	N/A
37	SP	4352	2668	16.9	0.55	NO	N/A	N/A	N/A
38	SP	4484	2737	10.0	0.55	NO	N/A	N/A	N/A
39	SP	4616	2806	9.9	0.55	NO	N/A	N/A	N/A
40	SP	4747	2875	9.8	0.54	NO	N/A	N/A	N/A
41	SP	4879	2945	9.7	0.55	NO	N/A	N/A	N/A
42	SP	5011	3014	9.6	0.55	NO	N/A	N/A	N/A
43	SP	5143	3083	8.6	0.54	NO	N/A	N/A	N/A
44	SP	5274	3153	8.6	0.54	NO	N/A	N/A	N/A
45	SP	5406	3222	8.5	0.54	NO	N/A	N/A	N/A
46	SP	5538	3291	8.4	0.54	NO	N/A	N/A	N/A
47	SP	5669	3361	8.3	0.54	NO	N/A	N/A	N/A
48	SP	5801	3430	8.2	0.54	NO	N/A	N/A	N/A
49	SP	5933	3499	8.2	0.54	NO	N/A	N/A	N/A
50	SP	6064	3568	8.1	0.53	NO	N/A	N/A	N/A


FS for Probabilistic Correlation of 50%
1.5
1.0
0.5
0.0
0
5
10
15
20
25
30
35
40
45
50
Depth (ft.)


Resulting Surface Deformation (in.)
0
1
2
3
Depth (ft.)
0
5
10
15
20
25
30
35
40
45
50

COUNTY OF SANTA CRUZ

PLANNING DEPARTMENT
701 OCEAN STREET, 4TH FLOOR, SANTA CRUZ, CA 95060
(831) 454-2580 FAX: (831) 454-2131 TDD: (831) 454-2123
KATHLEEN MOLLOY PREVISICH, PLANNING DIRECTOR

August 15, 2016

Brian Spector
54-C Penny Ln.
Watsonville, CA 95076

Subject: Review of Geotechnical Investigation by Rock Solid Engineering, Inc. Dated November 10, 2014, Project No. 14047
APN 052-511-08, Application No. REV161004

Dear Mr. Spector,

The purpose of this letter is to inform you that the Planning Department has accepted the subject report and the following items shall be required:

1. All construction shall comply with the recommendations of the report.

2. Final plans shall reference the report and include a statement that the project shall conform to the report's recommendations.

3. Prior to the discretionary application being deemed "complete", please submit a signed and stamped *Soils (Geotechnical) Engineer Plan Review Form* to Environmental Planning. *Please note that the plan review form must reference the final plan set by last revision date.* Any updates to report recommendations necessary to address conflicts between the report and plans must be provided via a separate addendum to the soils report.

   The author of the report shall sign and stamp the completed form. An electronic copy of this form may be found on our website: www.sccoplanning.com, under "Environmental", "Geology & Soils", "Assistance & Forms", "Soils Engineer Plan Review Form".

4. Please submit two original, wet-signed copies of the soils report with the building permit application.

5. Please submit a detailed grading and drainage plan prepared by a licensed Civil Engineer with the building permit application.

6. Due to the presence of liquefiable soils beneath the proposed structured and a mapped flood plain on the parcel, a Notice of Geologic Hazards, Acceptance of Risk, and Liability Release must be signed and recorded on the parcel prior to issuance of the building

permit. A copy of this document will be provided to you by Environmental Planning staff upon their review of the building permit application.

7. As noted in Recommendation 5.3.1(a), all proposed buildings must be set back a minimum of 100 feet from the centerline of Harkins Slough. Additional geotechnical investigation of the site will be required if buildings are proposed closer than 100 feet from the centerline of the slough.

After building permit issuance the soils engineer *must remain involved with the project* during construction. Please review the *Notice to Permits Holders* (attached). Please note: Electronic copies of all forms required to be completed by the Geotechnical Engineer may be found on our website: www.sccoplanning.com, under "Environmental", "Geology & Soils", "Assistance & Forms".

Our acceptance of the report is limited to its technical content. Other project issues such as zoning, fire safety, septic or sewer approval, etc. may require resolution by other agencies.

Please note that this determination may be appealed within 14 calendar days of the date of service. Additional information regarding the appeals process may be found online at: http://www.sccoplanning.com/html/devrev/plnappeal_bldg.htm

Please call the undersigned at (831) 454-5121 if we can be of any further assistance.

Sincerely,

Carolyn Burke
Senior Civil Engineer

Cc: Antonella Gentile, Environmental Planning
Rock Solid Engineering, Inc.
Dennis Williams, Owner

NOTICE TO PERMIT HOLDERS WHEN A SOILS REPORT HAS BEEN PREPARED, REVIEWED AND ACCEPTED FOR THE PROJECT

After issuance of the building permit, the County requires your soils engineer to be involved during construction. Several letters or reports are required to be submitted to the County at various times during construction. They are as follows:

1. **When a project has engineered fills and / or grading**, a letter from your soils engineer must be submitted to the Environmental Planning section of the Planning Department prior to foundations being excavated. This letter must state that the grading has been completed in conformance with the recommendations of the soils report. Compaction reports or a summary thereof must be submitted.

2. **Prior to placing concrete for foundations**, a letter from the soils engineer must be submitted to the building inspector and to Environmental Planning stating that the soils engineer has observed the foundation excavation and that it meets the recommendations of the soils report.

3. **At the completion of construction,** a *Soils (Geotechnical) Engineer Final Inspection Form* from your soils engineer is required to be submitted to Environmental Planning that includes copies of all observations and the tests the soils engineer has made during construction and is stamped and signed, certifying that the project was constructed in conformance with the recommendations of the soils report.

   If the *Final Inspection Form* identifies any portions of the project that were not observed by the soils engineer, you may be required to perform destructive testing in order for your permit to obtain a final inspection. The soils engineer then must complete and initial an *Exceptions Addendum Form* that certifies that the features not observed will not pose a life safety risk to occupants

County of Santa Cruz

HEALTH SERVICES AGENCY

701 OCEAN STREET, ROOM 312, SANTA CRUZ, CA 95060-4073

(831) 454-2022 FAX: (831) 454-3128

http://www.co.santa-cruz.ca.us/

ENVIRONMENTAL HEALTH

February 23, 2021

Ms. Annette Olson
Principal Planner
County of Santa Cruz Planning Department
701 Ocean Street, Suite 400
Santa Cruz, CA 95060
EMAIL: Annette.Olson@santacruzcounty.us

SUBJECT: Response to Site Redevelopment Building Permit/Plans, Former Western Farm Service, Inc. – Green Gro Facility (Record ID# RO0000060; GeoTracker Global ID# SL203221260); 1485 Ranport Road, Watsonville, California

Dear Ms. Olson:

This email provides a summary of the historical Site uses that caused the current contamination in soil, soil gas, and groundwater at the Site, historical cleanups that have been conducted, historical institutional controls that were implemented (i.e., deed restriction), and additional work that is required of the responsible party (Shell) prior to case closure. Approval of the proposed Site redevelopment building plans is not contingent on Shell updating their Human Health and Ecological Risk Assessment (HHERA). However, a condition of the permit approval must be that the office trailer located on the lower Site terrace be removal or relocated (further detailed below) prior to issuance of the building permit.

Site History

The former Western Farm Service, Inc. (WFS) Green Gro facility is located at 1485 Ranport Road in Watsonville, California, which includes approximately 8.4 acres of land on two APNs (052-511-06 and 052-511-08). Current structures at the Site include an office trailer, a water above ground storage tank, and various structures used for storage including the former Office/Maintenance Building, the former Mixing Room, three open-walled shelters, three cargo containers, and a shed.

The Site has housed various operations since the 1960s. The Site was purchased in 1978 by WFS, a Shell Chemical subsidiary, and was used to store and distribute pesticides and fertilizers for use on area farms, including the liquid pesticide fumigants dichloropropane-dichloropropene (D-D®) and Telone II. D-D® consisted entirely of various chlorinated hydrocarbons, including 1,2-dichloropropane (1,2-DCP) and 1,3-dichloropropene and the composition of Telone II was 97.5% 1,3-dichloropropene. The fertilizer formerly stored and distributed at the facility is assumed to be a nitrogen fertilizer due to the nitrate as nitrogen presence in the subsurface. Shell Chemical sold the Site to Herman Wilson, dba Western Farmco, Inc., in 1988. Pesticide and fertilizer storage and distribution operations were terminated in 1996. Western Farmco, Inc. merged with two other companies into WFS in 1997 and WFS sold the property to Forrest Moore in 2001. The property was conveyed from Forrest Moore to Dennis Williams

in 2003 and from Dennis Williams to Richard Henry in 2019. Williams Tree Service, a commercial tree-cutting service, is currently a tenant. Dave Joseph is the beneficiary of a Deed of Trust for the property.

Historical sampling results indicate the presence of fertilizer and pesticide components, including 1,2-DCP in soil, groundwater, and soil vapor and nitrate in groundwater. Polychlorinated biphenyls (PCBs) and organochlorine pesticides in soil are present in a localized area near the former fertilizer storage tanks in the north central portion of the Site. Site remedial activities began in the early 1980s and included subsurface investigation and over-excavation of an unlined disposal pit and rinse water pond. Additional investigations and remediation have included soil sampling, monitoring well installation, in-situ denitrification and soil flushing pilot testing, installation and operation of a groundwater injection/treatment system, and soil vapor sampling. Semiannual groundwater monitoring took place from 2003 to 2008, with an additional shallow well groundwater sampling event in 2016 and a shallow and deep well groundwater sampling event in 2019 to investigate concentrations of 1,2-DCP, nitrate as nitrogen, PCB congeners, benzene, and 1,4-dioxane.

Deed Restriction

A deed restriction was recorded on the property on September 28, 2001, which restricts the Site use as follows: (1) an environmental restriction prohibits the property from being used for residential purposes and (2) a use restriction prohibits use of the property as a distribution center for agricultural chemicals and fertilizer products. Currently, an amended deed restriction is planned for the property that will restrict the use of shallow groundwater and will require adherence to a May 20, 2020, *Subsurface Media Management Plan*.

Future Risks to PCB and Dieldrin Contamination in Soil Near Former Fertilizer Storage Tank Area

Historical PCB and pesticide (dieldrin) impacted soil remail under portions of the Site near the former fertilizer storage tank area (i.e., soil boring SB-23) between 1.5 feet below grade (fbg) and 9.5 fbg, but do not pose a risk for the current Site use and configuration. Risks to human health and the environment during the proposed Site redevelopment were evaluated. Three risk assumptions were evaluated for the known PCB and pesticide soil contamination: (1) the above-mentioned impacted soil area; (2) the future benthic community exposures in future surface sediment (0 to 1 fbg) in the vicinity of a planned emergent wetland; and (3) ecological risk to upland organisms in soil from below 2 fbg and above 9.5 fbg due to the potential for construction-related redistribution of contamination to the surface.

It was determined that soils in the former fertilizer storage tank area have elevated concentrations of PCBs and dieldrin and must be mitigated if soils are brought to the surface. Unacceptable risks to commercial and construction workers are present if soils from between 2 and 9.5 fbg are brought to the surface and left accessible for 250 days per year for construction workers or for 25 years for commercial workers. If soils from below 1.5 fbg are brought to the surface for extended periods of time, there are potential hazards to ecological receptors. Additionally, if these soils from 2 to 9.5 fbg are brought to the surface, there are potential future ecological risks associated with exposure to the proposed soil/wetland sediment. Potential impacts associated with the proposed Site redevelopment project must be mitigated through the adherence to the approved *Subsurface Media Management Plan*, dated May 20, 2020.

Additional Required Environmental Work for Shell

Groundwater: In 2020, the Central Coast Regional Water Quality Control Board (CCRWQCB) requested three additional quarterly groundwater monitoring events be conducted at the Site. The purpose of this investigation is to further evaluate current trends of the contaminant concentrations of

1,2-DCP; 1,2,3-trichloropropane (TCP); and nitrate as nitrogen. TCP has not been evaluated at the Site and its groundwater MCL, adopted in 2017, of 5 parts per trillion (0.005 µg/L) is very low. TCP is an impurity/manufacturing by-product resulting from the production of the soil fumigants formerly stored at the Site, D-D® and Telone II. TCP is considered a persistent pollutant in groundwater and has been classified by the US EPA as "likely to be a carcinogenic to humans." Two of the three quarterly groundwater sampling events have occurred. After the three quarterly groundwater sampling events have been conducted, Shell's environmental consultant will make conclusions and recommendations for the CCRWQCB to consider.

Human Health Risk Assessment and Vapor Intrusion

Former Office/Maintenance Building (Upper Terrace Location): Relatively recently, in 2020, Shell discovered that the former Office/Maintenance Building, located on the upper terrace on the northwestern portion of the Site, is currently occupied by a Site worker(s) for up to one hour per day. This is new knowledge and was not incorporated into the HHERA for the Site. This building is located within 100 lateral feet of the soil gas plume associated with 1,2-DCP, benzene, and 1,3-butadiene. Therefore, Shell is required to evaluate the Site and this building with current applicable soil gas and indoor air screening levels. At this time, Shell has not conducted their re-evaluation of the potential indoor air inhalation pathway risks for the Office/Maintenance Building. However, if potential indoor air risks are found, Shell could recommend further soil gas and/or indoor air investigation(s), remediation, and/or mitigation controls at the Office/Maintenance Building.

Office Trailer (Lower Terrace Location): It should be noted that the office trailer located in the lower terrace is within 100 lateral feet of the 1,2-DCP and benzene soil gas plume. The indoor air for this office trailer building has not been evaluated for vapor intrusion human health risks. Shell does not plan to further evaluate this building because of its temporary construction (i.e., the building is a trailer) and the planned redevelopment includes the construction of a new office building on the lower terrace area. However, vapor intrusion inhalation risks may still be present in the office trailer at its current location. Therefore, the office trailer located on the lower terrace must be removed from the Site or moved to a location that is greater than 100 lateral feet from the Site soil gas plumes and not above contaminated soil prior to issuance of the redevelopment building permit.

If you have any comments or questions regarding this letter, you may contact me by email address at John.Gerbrandt@santacruzcounty.us or at (831) 454-2731, 8:00 a.m. to 9:30 a.m., Monday through Friday.

Sincerely,

John B. Gerbrandt, P.G., R.E.H.S.
Professional Geologist
County of Santa Cruz Health Services Agency
Environmental Health Division
Site Mitigation Program
701 Ocean Street, Suite 312
Santa Cruz, CA 95060

AECOM
9 Jonathan Bourne Drive
Unit 1
Pocasset, MA 02559
www.aecom.com

508 833 6950 tel
508 833 6951 fax

May 27, 2021

Mr. John Gerbrandt, P.G., R.E.H.S.
Hazardous Materials Program
Environmental Health Division
County of Santa Cruz Health Services Agency
701 Ocean Street, Room 312
Santa Cruz, California 95060

Ms. Amber Sellinger, P.G., C.Hg
Central Coast Regional Water Quality Control Board
895 Aerovista Place, Suite 101
San Luis Obispo, CA 93401

Subject: Revised Subsurface Media Management Plan
Former Western Farm Service, Inc. Green Gro Facility
1485 Ranport Road
Watsonville, California
Global ID SL203221260

Dear Mr. Gerbrandt and Ms. Sellinger:

On behalf of Shell Oil Products US, AECOM Technical Services, Inc. revised the enclosed plan for the above-referenced site.

Should you have any questions, please do not hesitate to contact me at debra.stiffel@aecom.com or 508.833.6968.

Sincerely,

AECOM Technical Services, Inc.

Debra R.P. Stiffel, CPG
Project Manager

Thomas Pender, PG
Senior Geologist

Enclosure

cc: Mr. Dave Joseph (electronic)
Mr. Richard Henry (electronic)
Ms. Toni DeMayo, Shell Oil Products US (electronic)

AECOM

REVISED SUBSURFACE MEDIA MANAGEMENT PLAN

FORMER WESTERN FARM SERVICE, INC. GREEN GRO FACILITY
1485 RANPORT ROAD
WATSONVILLE, CALIFORNIA
GLOBAL ID SL203221260

Prepared for:

Shell Oil Products US
20945 S. Wilmington Ave.
Carson, CA 90810

Prepared by:

AECOM Technical Services, Inc.
9 Jonathan Bourne Drive
Pocasset, MA 02559

May 27, 2021

CONTENTS

ACRONYMS AND ABBREVIATIONS

%	percent
AECOM	AECOM Technical Services, Inc.
bgs	below ground surface
COPEC	constituent of potential ecological concern
CSCEHD	County of Santa Cruz Environmental Health Division
1,2-DCP	1,2-dichloropropane
DDT	4,4'-dichloro-diphenyl-trichloroethane
DTSC	Department of Toxic Substances Control (California)
HHERA	Human Health and Ecological Risk Assessment
HSP	Health and Safety Plan
mg/kg	milligram per kilogram
mg/L	milligram per liter
PCB	polychlorinated biphenyl
PVWMA	Pajaro Valley Water Management Agency
RWQCB	Regional Water Quality Control Board
Shell	Shell Oil Products US
Site	former WFS Green Gro facility, 1485 Ranport Road, Watsonville, California
UCL	upper confidence limit
U.S. EPA	United States Environmental Protection Agency
USGS	United States Geological Survey
WFS	Western Farm Service, Inc.

1.0 INTRODUCTION

The former Western Farm Service, Inc. (WFS) Green Gro facility is located at 1485 Ranport Road in Watsonville, California (Site) (Figure 1). Current structures at the Site include an office trailer, the former Office/Maintenance Building, an aboveground water storage tank, and various structures used for storage including the former Mixing Room, three open-walled shelters, three cargo containers, and a shed (Figure 2). This plan is based on the results of the May 2021 Revised Final Human Health and Ecological Risk Assessment (HHERA) (AECOM Technical Services, Inc. [AECOM] 2021), which includes the updated risk assessment that evaluated results from the July 2019 soil and groundwater investigation (AECOM 2020).

1.1 BACKGROUND

The Site has housed various operations since the 1960s. The Site was purchased in 1978 by WFS, a Shell Chemical subsidiary, and was used to store and distribute pesticides and fertilizers. Shell Chemical sold the Site to Herman Wilson, dba Western Farmco, Inc., in 1988. Pesticide and fertilizer storage and distribution operations were terminated in 1996. Western Farmco, Inc. merged with two other companies into WFS in 1997 and WFS sold the property to Forrest Moore in 2001. The property was conveyed from Forrest Moore to Dennis Williams in 2003 and from Dennis Williams to Richard Henry in 2019. Williams Tree Service, a commercial tree-cutting service, is currently a tenant. Dave Joseph is the beneficiary of a Deed of Trust for the property.

Historical sampling results indicate the presence of fertilizer and pesticide components in soil, groundwater, and soil vapor. Polychlorinated biphenyls (PCBs) and organochlorine pesticides in soil are present in a localized area near the former fertilizer storage tanks in the north central portion of the Site. Site remedial activities began in the early 1980s and included subsurface investigation and over-excavation of an unlined disposal pit and rinse water pond. Additional investigations and remediation have included soil sampling, monitoring well installation, in-situ denitrification and soil flushing pilot testing, installation and operation of a groundwater injection/treatment system, and soil vapor sampling. Semiannual groundwater monitoring took place from 2003 to 2008, with an additional shallow well groundwater sampling event in 2016 and a shallow and deep well groundwater sampling event in 2019 through 2021.

1.2 OBJECTIVES OF THE SUBSURFACE MEDIA MANAGEMENT PLAN

Historical PCB and pesticide impacts in soil remain under portions of the Site that pose no risk to current Site operations. This Subsurface Media Management Plan has been prepared to address possible future activities and mitigate the potential for:

- Commercial/industrial workers and construction workers to be exposed to PCBs and dieldrin in soil from below 1.5 feet and above 9.5 feet below ground surface (bgs) in the vicinity of the former fertilizer storage tank area (Table 1, Figure 3).
- The future benthic community to be exposed to PCBs and pesticides in future surface sediment (0 to 1 foot bgs) in the vicinity of the planned emergent wetland (Tables 2 and 3, Figure 3).
- Ecological risk to upland organisms related to PCBs and/or pesticides in soil in the vicinity of the former fertilizer storage tank area from below 2 feet and above 9.5 feet bgs due to the potential for construction-related redistribution of contamination to the surface (Tables 2 and 3, Figure 3).

Delineation east of exceedances at location SB-23R-E4 is achieved by the SB-12 sample at 1.5 feet bgs since the depths are comparable due to the change in topography in the swale.

This Subsurface Media Management Plan has been revised in response to comments from the County of Santa Cruz Environmental Health Division (CSCEHD) and the Central Coast Regional Water Quality Control Board (RWQCB) (CSCEHD 2020a and 2020b, RWQCB 2020). In addition, updates required

as a result of the Revised Final HHERA have been incorporated. In the event a significant change in land use not covered in the above scenarios is proposed for the Site, a revised Plan will be prepared to address hazard mitigation.

2.0 ENVIRONMENTAL SETTING

The Site has been assigned Assessor's Parcel Numbers 052-511-06 and 052-511-08 and consists of approximately 8.4 acres of land (Santa Cruz Planning Department 2018). Land usage around the facility is primarily agricultural or undeveloped. The Site is bounded to the north by California State Route 1 and to the south by Ranport Road. The Site is bounded to the west by a small residential compound and undeveloped woodland. Harkins Slough runs through the eastern portion of the Site, and its associated riparian corridor functions as the eastern boundary for ongoing Site activities. Beyond Harkins Slough to the east lies a staging area for County maintenance vehicles, additional undeveloped woodlands, and California State Route 1.

The following subsections describe the Site's environmental setting.

2.1 CLIMATE

The climate at the Site is warm and temperate with rain falling mostly in winter and relatively little rain falling in the summer. Average minimum and maximum daily temperatures in Watsonville range from 45.9 to 67.1 degrees Fahrenheit. The average annual rainfall is 22.43 inches (Western Regional Climate Center 2005).

2.2 TOPOGRAPHY

According to the United States Geological Survey (USGS) 7.5-minute Watsonville, California quadrangle, the Site's topography is divided into two regions: an Upper Terrace in the northwest region and a Lower Terrace in the southeast region, which slopes gently to the southeast from 18 to 14 feet mean sea level. The upper terrace is at an approximate elevation of 60 feet mean sea level, and the lower terrace is at an approximate elevation of 20 feet mean sea level (USGS 2015). Both regions are unpaved; however, the upper terrace has two large concrete pads of approximately 1,300 square feet that served as foundations for former aboveground storage tanks.

2.3 GEOLOGY AND HYDROGEOLOGY

The Site is located in the Pajaro Valley Groundwater basin, which is bounded to the west by Monterey Bay, to the north by geologic contact with the Purisima Formation, to the east by the San Andreas Fault, and to the south by a drainage divide in the Carneros Hills. The Pajaro Valley Basin is underlain by discontinuous low-permeability clays and sandy clays that promote perched aquifer conditions. Beneath these deposits lies the Aromas Sand Formation, which is a laterally continuous regional aquifer (California Department of Water Resources 2006).

Soil types at the Site vary between the Upper Terrace, Lower Terrace, and riparian corridor. Soils at the Site are generally classified as Clear Lake clay and Tierra-Watsonville complex (United States [U.S.] Department of Agriculture 2019). Clear Lake clay is a basin alluvium derived from igneous, metamorphic, and sedimentary rock that is poorly drained. The Tierra-Watsonville complex consists of sandy loam, clay, clay loam, and sandy clay alluvium derived from sedimentary rock that is moderately well drained.

The nearest surface water body in the downgradient direction is Harkins Slough, which passes through the Site and comprises the eastern boundary of the Site's operational area (Figure 2). Harkins Slough is a man-made riverine habitat (i.e., contained within a channel that periodically or continuously contains moving water or connects two bodies of standing water) with a low gradient and water covering the substrate throughout the year (U.S. Fish and Wildlife Service 2019). A riparian corridor associated with the slough has management practices specified to maintain riparian functions and values.

The Site is within the Pajaro River Watershed (Pajaro Valley Water Management Agency [PVWMA] 2014a). The Site's subsurface contains an Upper Saturated Unit and a Lower Saturated Unit separated by a leaky aquitard ranging from 25 to 40 feet thick. The Upper Saturated Unit is unconfined and is characterized by clay, sandy clays, and peat with water occurring at depths ranging from 4 to 20 feet bgs. The Aromas Sand Formation constitutes the laterally extensive Lower Saturated Unit and is encountered at depths ranging from 25 to 90 feet bgs and extends to approximately 400 feet bgs.

Groundwater flow direction varies seasonally and trends to the southeast towards Harkins Slough in the eastern portion of the Site. Harkins Slough is considered hydrologically disconnected from the Lower Saturated Unit and connected to the Upper Saturated Unit periodically during the wet season when shallow groundwater levels are higher and the slough receives some of its base flow from perched water in the Upper Saturated Unit (Terra Technologies 1996).

2.4 WATER SUPPLY WELLS

The Site contains one groundwater supply well in the northwestern corner of the property that is screened in the Lower Saturated Unit from 160 to 210 feet bgs and supplies water not designated for use as drinking water. The groundwater is used for the Site's fire and restroom facilities (Figure 2).

Records available in 2010 indicated 22 wells are located within 0.5 mile of the Site. The depths of these wells range from 130 feet bgs to 545 feet bgs, with most wells completed between 200 and 250 feet bgs within the Aromas Sand Formation. In addition to the on-Site well described above, four wells were identified within 1,000 feet of the Site. These wells are for domestic/private use and are cross-gradient relative to historical on-Site groundwater gradients (URS Corporation [URS] 2010).

Groundwater is the predominant source for drinking water in the Pajaro River Watershed where the Site is located. Elevated nitrate in groundwater is a regional problem within the watershed. The Pajaro River and Watsonville Creek both contain elevated concentrations of nitrate that contribute to their water quality impairment preventing their beneficial use and inclusion as a Clean Water Act Section 303(d) Listed Water Body (PVWMA 2014a and 2014b).

2.5 CURRENT AND FUTURE LAND USE

The property is zoned as Agricultural and Watsonville Utility Prohibition Combining District (Santa Cruz Planning Department 2018) and is therefore restricted to agricultural use and prohibits the provision of urban services to undeveloped/rural areas so as to discourage urban development in the farmlands, wetlands, and other environmentally sensitive areas in the coastal zone west of Watsonville.

Future land use is expected to remain non-residential and there are plans to develop facilities for lumber mill operations. The proposed facilities include an office building, saw mill building, and two storage warehouses (Spector Corbett Architects Inc. 2017). Landscaping is planned in various areas as part of the development project, including plantings along a swale at the north-central portion of the Site and plantings in the riparian buffer along the east portion of the Site (Gregory Lewis Landscape Architect 2018).

2.6 USE RESTRICTIONS

The following use restrictions are currently in place through the Grant Deed recorded as Instrument 2001-0061081 on September 28, 2001 by Official Records, County of Santa Cruz (Appendix A) (WFS and Forrest Moore 2001):

- An environmental restriction prohibits the property from being used for residential purposes.
- A use restriction prohibits use of the property as a distribution center for agricultural chemicals and fertilizer products.

A Land Use Covenant is currently in preparation that will restrict the use of shallow groundwater and will require adherence to this Subsurface Media Management Plan.

2.7 SUMMARY OF RISK FINDINGS AND MANAGEMENT AREAS

Human health and ecological risks related to the presence of potential contaminants of concern were evaluated and are briefly summarized in the following subsections (AECOM 2021). A more detailed discussion is presented in Appendix B.

2.7.1 Human Health

PCB concentrations in soil above relevant commercial/industrial worker and/or construction worker screening levels are present in multiple locations (Table 1). In addition, a single dieldrin location (SB-23 at 5 feet bgs) also exceeded the commercial/industrial worker screening levels. There are no unacceptable risks to commercial and construction workers related to these PCB and dieldrin soil concentrations under current conditions and current use of the property. If soils from between 2 and 9.5 feet bgs are brought to the surface and left accessible for 250 days per year for construction workers or for 25 years for commercial workers, potential risks associated with exposure to the soil should be mitigated. To be conservative, the areas in the planting area where no data are available were included in the management area. Figure 3 shows the area to be managed if soils below 1.5 feet are brought to the surface; subsurface activities in this area must be performed in accordance with this Subsurface Media Management Plan.

Under current use of the property, no complete exposure pathways were identified for groundwater by ingestion or direct contact because impacted groundwater at the property is not used for potable water purposes and the non-potable supply well draws from outside of the impacted groundwater area. The Land Use Covenant currently in preparation will formally document restriction of the use of shallow groundwater (Section 2.6); the Land Use Covenant will ensure any future groundwater wells will draw from outside of the impacted groundwater area.

Vapor intrusion-related risks are not a concern under current use of the property (AECOM 2021). Current land use and lumber yard operations consist primarily of outdoor operations and indoor activities are limited to two buildings: the office trailer and the former Office/Maintenance Building. The office trailer is a raised portable with free space and air flow between the bottom of the trailer and the ground surface. The former Office/Maintenance Building is reportedly currently occupied by Site workers for up to one hour per day. Based on a risk screening followed by Site-specific evaluation of vapor intrusion risk, portions of the Site exceed screening levels. In the future near areas that exceed screening levels (Figure 3), potential vapor intrusion risks should be evaluated and mitigated (e.g. soil vapor sampling, elevating structures to create free air space, vapor barrier), if warranted based on the evaluation, under scenarios such as:

- Current use of existing conventional slab-on-grade structures changes (e.g., the former Office/Maintenance Building occupied for more than one hour per day)
- Open-walled structures were to be enclosed and occupied (e.g., the former Mixing Room).
- Conventional slab-on-grade enclosed structures are proposed to be constructed.

2.7.2 Ecological

Several guidance documents were used as resources for ecological screening levels (AECOM 2021).

Terrestrial Receptors

Few screening levels were available for plants and the one plant screening level that was applied was not exceeded.

For birds, the 95 percent (%) upper confidence limits (UCLs) calculated from the Site surface soil concentrations, which are more representative of exposure for mobile species like birds, were below screening levels. These results, coupled with the low quality habitat, indicate that current use of the property poses little risk to terrestrial birds.

The majority of potential foraging areas at the Site are characterized by barren and ornamental habitats, which provide limited resource value. Continued commercial activity will not result in improvements to foraging conditions. The presence of burrowing mammal habitat will continue to be hindered by compaction, as well as frequent disturbance during commercial activities across the majority of the Site.

For burrowing mammals exposed to 0 to 6 feet bgs soils, maximum soil concentrations were above some screening levels. An evaluation of the 95% UCLs was performed. There are currently no unacceptable risks to terrestrial ecological receptors related to concentrations of PCBs and chlorinated pesticides in soil under current use of the property based on the comparison of the 95% UCL concentrations to screening levels and other lines of evidence related to Site conditions and habitat quality.

Potential future ecological risks associated with PCBs and pesticides in subsurface soils in the vicinity of the former fertilizer storage tank area may exist if these deeper soils are brought to the surface. If deeper soils from these are brought to the surface and left accessible for extended time periods, potential risks associated with exposure to the soil should be mitigated. Figure 3 shows the areas of potential hazards to ecological receptors if soils below 1.5 feet are brought to the surface. Subsurface activities in these areas must be performed in accordance with this Subsurface Media Management Plan.

Future Wetland Receptors

In light of the proposed land use change in the area of the swale at the north-central portion of the Site, a focused ecological risk screening was conducted on data collected within the proposed freshwater wetland footprint to assess the potential for risk to benthic and aquatic organisms that could populate this wetland in the future (AECOM 2021).

Potential future ecological risks to the benthic community should be mitigated if the proposed land use change encouraging establishment of an emergent freshwater wetland is implemented. The proposed wetland will be small and seasonal in nature (water levels are expected to be higher in approximately December to February) and the upper six inches of soil (future sediment) will comprise the bioactive zone where the majority of ecological activity occurs. Most of the benthic organisms are expected to reside at the surface and would be exposed to chemicals within the first couple of inches, with infaunal invertebrates (burrowers) potentially contacting soils down to a maximum of six inches. Therefore, prior to installing plantings to promote establishment of the wetland, the upper six inches of soil (i.e., the bioactive zone) within the vicinity of SB-3R and SB-24 in the planting area shown on Figure 3 should be removed and replaced with clean backfill. This action may also benefit terrestrial receptors, particularly burrowing mammals, which may be present in the proposed wetland area during the dry season. Most burrowing activity occurs within the top three feet of soil. The 0 to 3 ft depth interval in the proposed wetland area may provide better habitat for terrestrial receptors at the surface, and no exceedances of the burrowing mammal soil screening level for PCBs occur in this area between 0.5 and 2.5 feet bgs; exceedances occur for some OCPs at this depth interval but are expected to represent a substantial overestimate of exposure and risk by including dietary/bioaccumulation pathways that are typically limited to the bioactive zone.

As stated above, perched groundwater occurs in the proposed emergent freshwater wetland area. The soil contaminants have been in place since the 1980s and subject to leaching from downward migration of perched groundwater. After removal of impacted soil from the former pesticide disposal pit, analytical testing of extensive suites of agricultural chemicals indicated groundwater impacts were limited to 1,2-DCP and nitrate (Woodward Clyde Consultants 1990 and 1991). No changes to the hydrology will occur from removing and replacing the top six inches of soil in the area, so leaching

conditions are not expected to change; thus, the potential for an increase in chemical concentrations in groundwater is very low.

The results for subsurface soil data collected from 2 to 9.5 feet bgs within the footprint of the proposed wetland indicate concentrations of PCBs and pesticides greater than the sediment screening levels, but are beyond the bounds (i.e., too deep) of likely ecological exposures as long as they remain buried at depth. Therefore, if these deeper soils are brought to the surface, potential future ecological risks associated with exposure to the soil/wetland sediment should be mitigated. Figure 3 shows the areas of potential hazards to ecological receptors if deeper soils are brought to the surface. Subsurface activities in these areas must be performed in accordance with this Subsurface Media Management Plan.

3.0 MANAGEMENT FOR FUTURE SITE ACTIVITIES IN IMPACTED AREAS

The guidelines provided in this section outline requirements for managing soil disturbance activities below 1.5 feet and groundwater in areas where screening levels were exceeded (Figure 3). These management activities do not apply to soil disturbance shallower than 1.5 feet. These guidelines do not address requirements pertaining to right-of-entry permits, access agreements, utility clearances, or local permits that need to be obtained prior to the beginning of activities. These general requirements remain the responsibility of the party performing subsurface activities at the Site.

A qualified environmental professional with sufficient experience in environmental data collection and evaluation activities should lead and/or review the tasks described in the following subsections. These guidelines are not intended to be comprehensive or cover every possible situation. As it is not feasible to provide detailed summaries of all the available environmental data, parties and their respective environmental professionals are required to review appropriate prior reports prepared for the Site.

3.1 PRE-EXCAVATION EVALUATIONS

Parties should consult available reports to obtain relevant information on soil or groundwater in the area to be excavated.

Parties should obtain information for any existing or planned remediation equipment, groundwater monitoring wells, or engineering controls that may be affected by proposed development, construction, or property use. Potential effects on these features (e.g., destruction, impairment, reduced effectiveness) should be evaluated. To the extent reasonable, new construction should avoid the need to modify, repair, or replace groundwater wells or engineering controls. In the event modifications, repairs, or replacements are required, these should be minimized to the extent practical.

3.2 CONSULTATION WITH REGULATORY AGENCY

Parties are required to comply with applicable laws. Parties should communicate with the CSCEHD and the Central Coast RWQCB to obtain any necessary approvals for any characterization and construction work involving the management of subsurface soils that have exceeded screening levels.

3.3 HEALTH AND SAFETY

Field activities should be coordinated in a manner that will protect human health and the environment; prevent damage to property, utilities, materials, supplies, and equipment; and avoid work interruptions.

Project-specific Health and Safety Plans (HSPs) should be prepared prior to commencing field activities. The HSPs should be prepared in accordance with federal, state and local health and safety regulations.

3.4 SOIL EXCAVATION AND STOCKPILING

Free water present in the soil should be drained into the excavation prior to stockpiling and only the minimum amount of soil necessary to complete the construction project should be excavated.

Soil being excavated and loaded for transport and stockpiled soil are subject to wind (generating fugitive dust concerns) and could come into contact with storm water, thus potentially impacting the storm water that could drain into nearby surface water bodies, such as Harkins Slough. To prevent this from occurring, the following activities should be performed:

- Dust generation should be monitored during excavation, during high wind conditions, and while stockpiles are loaded into trucks to be hauled off site for disposal. Should any visible dust be observed during excavation, high wind conditions, or loading, work will be stopped until additional dust suppression measures can be enacted, such as additional wetting of work area until fugitive dust is no longer visible.
- All soil stockpiles should be placed in lined containers or on plastic sheeting with the sheeting bermed at the edges, thus preventing contact with storm water runoff.
- Excavated soil should be kept moist in order to minimize the potential for fugitive dust emissions.
- At the end of each day, or in the event of a storm, all soil stockpiles should be covered with plastic sheeting, thus preventing contact with direct precipitation.
- All soil stockpiles should be inspected each day to ensure the plastic sheeting is intact and that burrowing mammals or other fauna do not have access to the covered soil.
- Containers of soil should be covered before being transported off Site.

3.5 DEWATERING

Given the shallow nature of groundwater at the Site, dewatering may be required during excavation and construction activities depending on the depth of excavation and construction. If dewatering is required, ensure compliance with agencies rules for permitting, discharging, treating and/or disposing off Site, if necessary. A separate work plan provided by the contractor selected for the work will include information on the mechanism for dewatering, anticipated volume of water to be removed, storage of water, and a sampling and analysis plan supporting proper disposal.

3.6 SOIL OFF-SITE DISPOSAL

Excavated soils should be sampled to ensure compliance with reuse and/or disposal options.

The samples may need to be analyzed for Site contaminants, non-hazardous/hazardous waste determination analytes (CA Title 22 metals, ignitability), landfill-specific analytes, or treatment facility-specific analytes; information regarding the chemical analysis and the disposal process should be obtained from the appropriately licensed candidate landfill or treatment facility. Parties are responsible to accurately profile waste materials disposed in a landfill or treatment facility and verify any required manifests or bills of lading are completed properly and signed by the appropriate party performing the work.

The non-hazardous/hazardous waste determination for soil removed from the Site will be made during the waste profiling stage. Soil with PCBs above hazardous waste criteria (i.e., 50 mg/kg or greater) are located in the vicinity of SB-23, SB-23R-N2, and SB-23R-S2 (Figure 3). Soils with total DDT, endrin, and heptachlor epoxide potentially above the TCLP hazardous waste criteria (i.e., 0.1, 0.02, and 0.008 mg/L, respectively) are located in the vicinity of SB-23.

PCB-impacted soils should be handled in accordance with the most recent DTSC *Recommendations for Evaluating PCBs at Contaminated Sites in California* guidance. Per the Toxic Substances Control

Act regulations, all PCB waste should be transported off Site within one year of generation. All containers should be secured, marked, and labeled in accordance with U.S. Department of Transportation shipping regulations. PCB waste should be disposed in accordance with 40 Code of Federal Regulations Part 761.62.

3.7 DECONTAMINATION WATER

Reusable equipment should be decontaminated after use in impacted areas. Care should be taken to avoid contact between clean and contaminated equipment.

Decontamination water should be containerized in 55-gallon drums, totes, or similar pending sampling, waste profiling, and disposal in accordance with State, Federal, and local requirements. All waste containers should be labeled with appropriate waste labels. Decontamination water should be sampled to ensure compliance with disposal options; samples should be analyzed as described in Section 3.6.

3.8 REPORTING AND RECORD KEEPING

Upon completion of any excavation and dewatering activities, a summary report should be submitted to the CSCEHD and the Central Coast RWQCB. The report should outline the activities performed as indicated in this Subsurface Media Management Plan. The summary report should include soil excavation and disposal activities, dewatering and disposal activities (if needed), and documentation of material disposed off Site.

Field notes should be recorded and maintained for monitoring and sampling activities conducted during subsurface activities.

4.0 LIMITATIONS

The scope of services performed during this task may not be appropriate to satisfy the needs of other users, and any use or re-use of this document or of the findings, conclusions, or recommendations presented herein is at the sole risk of said user.

Background information and other data have been furnished to AECOM by Shell and/or third parties, which AECOM has used in preparing this document. AECOM has relied on this information as furnished, and is neither responsible for, nor has confirmed, the accuracy of this information.

Opinions presented herein apply to the existing and reasonably foreseeable Site conditions at the time of our assessment. They cannot apply to Site changes of which AECOM is unaware and has not had the opportunity to review. Changes in the condition of this property may occur with time due to natural processes or works of man at the Site or on adjacent properties. Changes in applicable standards may also occur as a result of legislation or the broadening of knowledge. Accordingly, the findings of this document may be invalidated, wholly or in part, by changes beyond our control.

5.0 REFERENCES

AECOM Technical Services, Inc. 2021. Revised Final Human Health and Ecological Assessment, Former Western Farm Service, Inc. Green Gro Facility, 1485 Ranport Road, Watsonville, California, Global ID SL203221260. May 3.

———. 2020. Additional Soil and Groundwater Investigation Report, Former Western Farm Service, Inc. Green Gro Facility, 1485 Ranport Road, Watsonville, California, Global ID SL203221260. May 20.

California Department of Toxic Substances Control. 1998. Depth of Burrows for Burrowing Mammals. California Department of Toxic Substances Control Human and Ecological Risk Division (HERD) ERA Note Number: 1 (EcoNOTEs #1).

California Department of Water Resources. 2006. Pajaro Valley Groundwater Basin. Bulletin 118.

Central Coast Regional Water Quality Control Board. 2020. Email Correspondence "Re: WFS Green Gro project Call Agenda," received by Debra Stiffel. April 8.

County of Santa Cruz Environmental Health Division. 2020a. Email correspondence “1485 Ranport Rd – Huntley Review Comments,” received by Debra Stiffel. April 7.

———. 2020b. Email correspondence “RE: 1485 Ranport Rd – Cumulative Risk,” received by Debra Stiffel. April 21.

Gregory Lewis Landscape Architect. 2018. Planting Plan, Pacific Coast Hardwoods, 1400 Ranport Road, Watsonville, CA. August 18.

Pajaro Valley Water Management Agency. 2014a. Pajaro River Watershed Integrated Regional Water Management Plan. August.

———. 2014b. Basin Management Plan Update. February.

San Francisco Regional Water Quality Control Board. 2019. Direct Exposure Soil Screening Levels, Commercial/Industrial Worker Exposure Scenario, Table S-1. January 24.

Santa Cruz Planning Department. 2018. Public GIS Application, http://gis.co.santa-cruz.ca.us/PublicGISWeb/. December.

Spector Corbett Architects Inc. 2017. Pacific Coast Hardwoods – Proposed Mill Facilities, 1400 Ranport Road, Watsonville, CA 95076. June 16.

Terra Technologies. 1996. Environmental Site Assessment Site Characterization Report. January 8.

United States Department of Agriculture. 2019. Web Soil Survey. http://websoilsurvey.nrcs.usda.gov.

United States Environmental Protection Agency. 2005. Guidance for Developing Ecological Soil Screening Levels. Office of Emergency and Remedial Response Washington D.C., November 2003, Revised February 2005, Latest Update April 2007 (Attachment 4-1). Includes interim final chemical documents 2003 through 2008.

———. 2014. National Functional Guidelines for Superfund Organic Methods Data Review, EPA-540-R-014-002. August.

———. 2018. Regional Screening Levels – Generic Tables. November.

United States Fish and Wildlife Service. 2019. Wetlands Mapper. https://www.fws.gov/wetlands/data/mapper.html.

United States Geological Survey. 2015. Watsonville Quadrangle, California-Santa Cruz County, 7.5-Minute Series, Scale 1:24,000.

URS Corporation. 2010. Risk-Based Site Closure Report, Western Farm Service, Inc., Green Gro Facility, Watsonville, California. April 23.

Western Regional Climate Center. 2005. Watsonville Waterworks, California (049473), Period of Record Monthly Climate Summary. https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?cawats+nca.

Western Farm Service and Forrest Moore. 2001. Grant Deed, Instrument 2001-0061081. Recorded September 28.

Woodward Clyde Consultants. 1990. Volume I Groundwater and Soil Investigation at Green-Gro Facility, Watsonville, California. August 3.

———. 1991. Phase II Groundwater and Soil Investigation at Green-Gro Facility, Watsonville, California. July 18.

Tables

Table 1: Summary of Soil Analytical Results and Human Health Screening Levels - Polychlorinated Biphenyls and Organochlorine Pesticides

Analyte			PCBs (8082) [1]			Organochlorine Pesticides (8081A) [2]
			Aroclor 1254	Aroclor 1260	Total PCBs [3]	Dieldrin
U.S. EPA Soil Commercial/Industrial RSL [4]			0.97	0.99	--	0.14
SF Bay RWQCB Soil Commercial/Industrial ESL [5]			--	--	0.94	0.16
SF Bay RWQCB Soil Construction ESL [5]			--	--	5.5	1.1
DTSC HERO Note 3 Soil Commercial/Industrial SL [6]			0.59	0.60	0.58	0.093
Sample Location	Depth (ft bgs)	Sample Date				
SB-1	1.5	6/10/14	<0.0095	<0.0095	<0.019	<0.005
	7.5	6/10/14	<0.0096	0.077	0.144	0.0081 J
SB-2	1.5	6/10/14	<0.0095	<0.0095	<0.019	<0.0051
	7.5	6/10/14	<0.0095	0.057	0.124	<0.0017
SB-3	1.5	6/10/14	<0.067	0.71	1.18	<0.017
	7.5	6/10/14	<0.0095	0.025	0.092	<0.0017
SB-3R	0.5	7/23/19	<0.060	<0.060	<0.060	<0.0024
	1.5	7/23/19	<0.068	0.22	0.29	0.0099
	2.5	7/23/19	<0.061 UJ	0.32 J	0.38	0.025
	5.0	7/23/19	<0.082	0.22	0.30	0.052
	8.0	7/23/19	<0.064	<0.064	<0.064	0.014
	10.0	7/23/19	<0.06	<0.06	<0.06	<0.0024
	10.0	7/23/19	<0.048	<0.048	<0.048	<0.0049
SB-4	1.5	6/10/14	0.13	0.11	0.30	0.0039
	7.5	6/10/14	0.37	0.12	0.55	0.0049 J
SB-5	1.5	6/10/14	<0.0096	<0.0096	<0.019	<0.0017
	7.5	6/10/14	<0.0095	<0.0095	<0.019	<0.0017
SB-6	1.5	6/10/14	<0.0095	<0.0095	<0.019	<0.0017
	1.5	6/10/14	<0.0096	<0.0096	<0.019	<0.0017
	7.5	6/10/14	<0.0096	0.21	0.28	0.0082 J
SB-11	1.5	6/9/14	--	--	--	0.0042
	7.5	6/11/14	--	--	--	<0.0017
	7.5	6/11/14	<0.0097	<0.0097	<0.019	<0.0017
SB-12	1.5	6/12/14	<0.0096	0.28	0.35	0.02
	7.5	6/10/14	<0.0096	<0.0096	<0.019	0.0079 J
	7.5	6/10/14	<0.0096	<0.0096	<0.019	0.0087 J
SB-12R	0.5	7/23/19	<0.063	<0.063	<0.063	<0.0025
	1.5	7/23/19	<0.066 UJ	<0.066 UJ	<0.066	0.0045
	2.5	7/23/19	<0.055	<0.055	<0.055	<0.0022
	2.5	7/23/19	<0.12	<0.12	<0.12	<0.0046
	5.0	7/23/19	<0.062	<0.062	<0.062	<0.0025
	8.0	7/23/19	0.5	<0.064	0.56	<0.0026
	10.0	7/23/19	0.25 J	<0.06	0.31	0.011
SB-14	1.5	6/10/14	<0.0095	<0.0095	<0.019	<0.0017
	7.5	6/10/14	<0.0095	0.28	0.35	0.033 J
SB-15	1.5	6/10/14	<0.0096	0.056	0.123	0.049
	7.5	6/10/14	<0.0095	<0.0095	<0.019	<0.024 UJ
SB-16	1.5	6/12/14	--	--	--	<0.0017
	7.5	6/12/14	--	--	--	<0.0017
SB-17	1.5	6/12/14	0.14	0.14	0.34	0.0064
	7.5	6/10/14	0.41	0.29	0.76	0.036 J
SB-18	1.5	6/12/14	--	--	--	0.0049 J
	7.5	6/13/14	--	--	--	<0.0017

Table 1: Summary of Soil Analytical Results and Human Health Screening Levels - Polychlorinated Biphenyls and Organochlorine Pesticides

Analyte			PCBs (8082) [1]			Organochlorine Pesticides (8081A) [2]
			Aroclor 1254	Aroclor 1260	Total PCBs [3]	Dieldrin
U.S. EPA Soil Commercial/Industrial RSL [4]			0.97	0.99	--	0.14
SF Bay RWQCB Soil Commercial/Industrial ESL [5]			--	--	0.94	0.16
SF Bay RWQCB Soil Construction ESL [5]			--	--	5.5	1.1
DTSC HERO Note 3 Soil Commercial/Industrial SL [6]			0.59	0.60	0.58	0.093
Sample Location	Depth (ft bgs)	Sample Date				
SB-19	1.5	6/9/14	--	--	--	<0.0017
	7.5	6/9/14	--	--	--	<0.0017
SB-20	1.5	6/11/14	--	--	--	0.016
	7.5	6/11/14	--	--	--	<0.002
SB-21	1.5	6/10/14	<0.0097	<0.0097	<0.019	<0.0018
	1.5	6/10/14	<0.0095	<0.0095	<0.019	<0.0018
	7.5	6/10/14	<0.0095	<0.0095	<0.019	<0.0019
SB-22	1.5	6/12/14	--	--	--	0.0024
	7.5	6/12/14	--	--	--	<0.0021
SB-23	1.5	6/10/14	<0.013 UJ	<0.013 UJ	<0.025	<0.084
	5	6/10/14	**26** J	**36** J	69	**0.94 J**
	5	6/10/14	**13**	**8.7**	30	**0.57 J**
SB-23R	0-0.25	3/1/16	<0.0426	<0.0426	<0.0426	--
	0.25-1.0	3/1/16	<0.0419	<0.0419	<0.0419	--
	1.5-2.0	3/1/16	<0.0454	<0.0454	<0.0454	--
	1.5-2.0	3/1/16	<0.0405	<0.0405	<0.0405	--
	4.5-5.0	5/23/16	**2.44** J	<0.406 UJ	4.88	--
	4.5-5.0	5/23/16	<0.393 UJ	**2.13** J	4.49	--
	7.5-8.0	5/27/16	<0.0382	<0.0382	<0.0382	--
	9.5-10.0	5/27/16	<0.0433	<0.0433	<0.0433	--
SB-23R-N1	0-0.25	5/24/16	<0.0369	<0.0369	<0.0369	--
	0.25-1.0	5/24/16	<0.0387	<0.0387	<0.0387	--
	1.5-2.0	5/24/16	<0.0397	<0.0397	<0.0397	--
	4.5-5.0	5/24/16	**2.54**	<0.394	4.90	--
	7.5-8.0	5/27/16	<0.0407	<0.0407	<0.0407	--
	9.5-10.0	5/27/16	<0.042	<0.042	<0.042	--
SB-23R-N2	0-0.25	5/24/16	<0.0371	<0.0371	<0.0371	--
	0.25-1.0	5/24/16	<0.0364	<0.0364	<0.0364	--
	1.5-2.0	5/24/16	<0.039	<0.039	<0.039	--
	4.5-5.0	5/24/16	*<8.01* UJ	**21.9** J	70.0	--
	7.5-8.0	5/27/16	<0.0393	<0.0393 UJ	<0.0393	--
	7.5-8.0	5/27/16	<0.226	**1.19** J	2.55	--
	9.5-10.0	5/27/16	<0.0411	<0.0411	<0.0411	--
SB-23R-N3	0-1.0	5/31/17	<0.12	<0.12 UJ	<0.12	--
	1.5-2.0	5/31/17	<0.12	<0.12	<0.12	--
	4.5-5.0	5/31/17	<0.12	<0.12	<0.12	--
	4.5-5.0	5/31/17	<0.12	<0.12	<0.12	--
	7.5-8.0	6/1/17	<0.12	<0.12	<0.12	--
	9.5-10.0	6/1/17	<0.12	<0.12	<0.12	--

Table 1: Summary of Soil Analytical Results and Human Health Screening Levels - Polychlorinated Biphenyls and Organochlorine Pesticides

Analyte			PCBs (8082) [1]			Organochlorine Pesticides (8081A) [2]
			Aroclor 1254	Aroclor 1260	Total PCBs [3]	Dieldrin
U.S. EPA Soil Commercial/Industrial RSL [4]			0.97	0.99	--	0.14
SF Bay RWQCB Soil Commercial/Industrial ESL [5]			--	--	0.94	0.16
SF Bay RWQCB Soil Construction ESL [5]			--	--	5.5	1.1
DTSC HERO Note 3 Soil Commercial/Industrial SL [6]			0.59	0.60	0.58	0.093
Sample Location	Depth (ft bgs)	Sample Date				
SB-23R-E1	0-0.25	5/23/16	<0.0342	<0.0342	<0.0342	--
	0.25-1.0	5/23/16	<0.0368	<0.0368	<0.0368	--
	1.5-2.0	5/23/16	<0.0387	<0.0387	<0.0387	--
	4.5-5.0	5/23/16	**5.4** J	*<1.98* UJ	17.3	--
	7.5-8.0	5/27/16	*<0.856* UJ	**3.71** J	8.85	--
	9.5-10.0	5/27/16	<0.0391	<0.0391	<0.0391	--
SB-23R-E2	0-0.25	5/23/16	<0.0347	0.121	0.329	--
	0.25-1.0	5/23/16	<0.0405	<0.0405	<0.0405	--
	1.5-2.0	5/23/16	<0.0356	0.111	0.325	--
	4.5-5.0	5/23/16	*<1.99* UJ	**8.25** J	20.19	--
	7.5-8.0	5/27/16	<0.393	<0.393	<0.393	--
	9.5-10.0	5/27/16	<0.0413	<0.0413	<0.0413	--
SB-23R-E3	0-1.0	5/31/17	<0.052	<0.052	<0.052	--
	1.5-2.0	5/31/17	<0.11	<0.11	<0.11	--
	4.5-5.0	5/31/17	0.17	0.09	0.55	--
	7.5-8.0	6/1/17	**1.1**	0.93	2.6	--
	9.5-10.0	6/1/17	<0.12 UJ	<0.12 UJ	<0.12	--
SB-23R-E4	0.5	7/23/19	<0.052	<0.052	<0.052	--
	1.5	7/23/19	<0.057	<0.057	<0.057	--
	2.5	7/23/19	<0.056	<0.056	<0.056	--
	5.0	7/23/19	**2.3**	*<1.2*	3.5	--
	8.0	7/23/19	<0.054	0.19	0.24	--
	10.0	7/23/19	<0.063	0.08	0.14	--
SB-23R-S1	0-0.25	3/1/16	<0.0404	<0.0404	<0.0404	--
	0.25-1.0	3/1/16	<0.0362	<0.0362	<0.0362	--
	0.25-1.0	3/1/16	<0.0359	<0.0359	<0.0359	--
	1.5-2.0	3/1/16	<0.0428	<0.0428	<0.0428	--
	2.5-3.0	3/1/16	<0.0392	<0.0392	<0.0392	--
	4.5-5.0	5/23/16	*<2.0* UJ	**7.83** J	19.83	--
	7.5-8.0	5/27/16	<0.2	0.867	2.067	--
	9.5-10.0	5/27/16	<0.0388	<0.0388	<0.0388	--
SB-23R-S2	2.5-3.0	3/1/16	<0.0429	<0.0429	<0.0429	--
	4.5-5.0	5/23/16	*<7.76*	**16**	63	--
	7.5-8.0	5/27/16	<0.0404	0.0435	0.2859	--
	9.5-10.0	5/27/16	<0.0394	<0.0394	<0.0394	--
SB-23R-S3	0-1.0	5/31/17	<0.059	<0.059	<0.059	--
	1.5-2.0	5/31/17	<0.12	<0.12	<0.12	--
	4.5-5.0	5/31/17	**12**	**7.8**	23	--
	7.5-8.0	6/1/17	<0.12	0.54	1.26	--
	9.5-10.0	6/1/17	<0.16	<0.16	<0.16	--

Table 1: Summary of Soil Analytical Results and Human Health Screening Levels - Polychlorinated Biphenyls and Organochlorine Pesticides

Analyte			PCBs (8082) [1]			Organochlorine Pesticides (8081A) [2]
			Aroclor 1254	Aroclor 1260	Total PCBs [3]	Dieldrin
U.S. EPA Soil Commercial/Industrial RSL [4]			0.97	0.99	--	0.14
SF Bay RWQCB Soil Commercial/Industrial ESL [5]			--	--	0.94	0.16
SF Bay RWQCB Soil Construction ESL [5]			--	--	5.5	1.1
DTSC HERO Note 3 Soil Commercial/Industrial SL [6]			0.59	0.60	0.58	0.093
Sample Location	Depth (ft bgs)	Sample Date				
SB-23R-S4	0-1.0	5/31/17	<0.11	<0.11	<0.11	--
	1.5-2.0	5/31/17	<0.11	<0.11	<0.11	--
	4.5-5.0	5/31/17	**5.3**	**3.0**	9.0	--
	7.5-8.0	6/1/17	**5.0**	**1.9**	7.5	--
	9.5-10.0	6/1/17	0.46 J	0.26 J	1.37	--
SB-23R-S5	1.0	7/22/19	<0.055	0.089	0.144	--
	2.0	7/22/19	<0.061	0.29	0.35	--
	5.0	7/22/19	**1.6** J	*<1.2* UJ	2.8	--
	8.0	7/22/19	0.48	<0.12	0.60	--
	10.0	7/22/19	0.15	<0.11	0.26	--
SB-23R-S6	1.0	7/22/19	<0.054	<0.054	<0.054	--
	2.0	7/22/19	<0.057	0.20	0.26	--
	5.0	7/22/19	<0.059	0.11	0.17	--
	5.0	7/22/19	0.73	<0.11	0.84	--
	8.0	7/22/19	<0.058	<0.058	<0.058	--
	10.0	7/22/19	<0.058	<0.058	<0.058	--
	15.0	7/22/19	<0.49	<0.49	<0.49	--
SB-23R-W1	0-0.25	5/23/16	<0.0353	0.0368	0.2486	--
	0.25-1.0	5/23/16	<0.0365	<0.0365	<0.0365	--
	1.5-2.0	5/23/16	<0.0427	<0.0427	<0.0427	--
	4.5-5.0	5/23/16	**4.03** J	*<0.81* UJ	8.89	--
	4.5-5.0	5/23/16	*<2.01* UJ	**5.37** J	17.43	--
	7.5-8.0	5/27/16	<0.039	0.249	0.483	--
	9.5-10.0	5/27/16	<0.0388	<0.0388	<0.0388	--
SB-23R-W2	0-0.25	5/23/16	<0.194	<0.194	<0.194	--
	0.25-1.0	5/23/16	<0.036	<0.036	<0.036	--
	1.5-2.0	5/23/16	<0.0363	<0.0363	<0.0363	--
	4.5-5.0	5/23/16	<0.079	0.0894	0.0894	--
	7.5-8.0	5/27/16	<0.0393	<0.0393	<0.0393	--
	9.5-10.0	5/27/16	<0.0402	<0.0402	<0.0402	--
SB-23R-W3	1.0	7/22/19	<0.053	<0.053	<0.053	--
	1.0	7/22/19	<0.05	<0.05	<0.05	--
	2.0	7/22/19	<0.053	<0.053	<0.053	--
	5.0	7/22/19	<0.062	0.1	0.2	--
	8.0	7/22/19	<0.16	<0.16	<0.16	--
	10.0	7/22/19	<0.077	<0.077	<0.077	--
SB-24	0.5	7/23/19	<0.31 UJ	0.60 J	0.91	--
	1.5	7/23/19	<0.062 UJ	0.34 J	0.40	--
	2.5	7/23/19	<0.06	0.25	0.31	--
	5.0	7/23/19	<0.062	<0.062	<0.062	--
	8.0	7/23/19	<0.081	<0.081	<0.081	--
	10.0	7/23/19	<0.059	<0.059	<0.059	--

Table 1: Summary of Soil Analytical Results and Human Health Screening Levels - Polychlorinated Biphenyls and Organochlorine Pesticides

Analyte			PCBs (8082) [1]			Organochlorine Pesticides (8081A) [2]
			Aroclor 1254	Aroclor 1260	Total PCBs [3]	Dieldrin
U.S. EPA Soil Commercial/Industrial RSL [4]			0.97	0.99	--	0.14
SF Bay RWQCB Soil Commercial/Industrial ESL [5]			--	--	0.94	0.16
SF Bay RWQCB Soil Construction ESL [5]			--	--	5.5	1.1
DTSC HERO Note 3 Soil Commercial/Industrial SL [6]			0.59	0.60	0.58	0.093
Sample Location	**Depth (ft bgs)**	**Sample Date**				
SB-25	0.5	7/23/19	<0.09	0.25	0.34	--
	1.5	7/23/19	<0.059	0.27	0.33	--
	2.5	7/23/19	<0.059	0.18	0.24	--
	5.0	7/23/19	<0.12	0.44	0.56	--
	8.0	7/23/19	<0.063	<0.063	<0.063	--
	10.0	7/23/19	<0.062	<0.062	<0.063	--

All results are in milligrams per kilogram

-- = not applicable or not analyzed

< = constituent not detected at concentration exceeding laboratory detection limit.

Italics = non detect with detection limit above a screening criteria

Bold = detection above U.S. EPA Soil Commercial/Industrial RSL

= detection above SF Bay RWQCB Soil Commercial/Industrial ESL

blue font = detection above SF Bay RWQCB Soil Construction ESL

= detection above DTSC HERO Note 3 Soil Commercial Industrial SL

bgs - below ground surface

ESL = Environmental Screening Level

ft = feet

J = the detected concentration is estimated

[1] Individual Aroclor data was also available for 1016, 1221, 1232, 1248 for all 2017, 2016 and all 2014 samples except SB-11 (two samples), SB-16, SB-18, SB-19, SB-20 and SB-22. Because there were no detections, these four Aroclors are not included in this table and were not analyzed in 2019.

[2] Dieldrin was the only organochlorine pesticide that exceeded human health screening criteria.

[3] Total PCBs calculation:

- All Aroclors detected, Total PCBs = sum of detections
- One or more Aroclors detected, Total PCBs = sum of detection(s) and reporting limit of non detect result(s)
- No Aroclors detected, Total PCBs = highest reporting limit

[4] U.S. EPA. 2019. Regional Screening Levels, Target Hazard Quotient of 1.0, https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables. May.

[5] San Francisco Bay Regional Water Quality Control Board (SF Bay RWQCB). 2019. Direct Exposure Human Health Risk Levels (Table S-1). July, Rev 2.

[6] California Department of Toxic Substance Control (DTSC). 2019. Human and Ecological Risk Office (HERO) Note 3, DTSC-modified Screening Levels (commercial/industrial soil). April.

Table 2: Summary of Soil Analytical Results and Ecological Screening Levels - Polychlorinated Biphenyls

Analyte			PCBs (8082)							
			Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Total PCBs [1]
Soil Ecological SL - Surface [2]			--	--	--	--	--	--	--	0.371
Soil Ecological SL - Subsurface [3]			--	--	--	--	--	--	--	4.0
Sediment Ecological TEC (lower bound) [4]			--	--	--	--	--	--	--	0.0598
Sediment Ecological PEC (upper bound) [4]			--	--	--	--	--	--	--	0.676
Sample Location	Depth (ft bgs)	Sample Date								
PCB delineation - Soil Ecological SLs										
SB-1	1.5	6/10/14	<0.0095	<0.019	<0.0095	<0.0095	<0.0095	<0.0095	<0.0095	<0.019
	7.5	6/10/14	<0.0096	<0.019	<0.0096	<0.0096	<0.0096	<0.0096	0.077	0.144
SB-2	1.5	6/10/14	<0.0095	<0.019	<0.0095	<0.0095	<0.0095	<0.0095	<0.0095	<0.019
	7.5	6/10/14	<0.0095	<0.019	<0.0095	<0.0095	<0.0095	<0.0095	0.057	0.124
SB-3	1.5	6/10/14	<0.067	<0.13	<0.067	<0.067	<0.067	<0.067	0.71	**1.18**
	7.5	6/10/14	<0.0095	<0.019	<0.0095	<0.0095	<0.0095	<0.0095	0.025	0.092
SB-4	1.5	6/10/14	<0.0096	<0.019	<0.0096	<0.0096	<0.0096	0.13	0.11	0.30
	7.5	6/10/14	<0.0096	<0.019	<0.0096	<0.0096	<0.0096	0.37	0.12	0.55
SB-5	1.5	6/10/14	<0.0096	<0.019	<0.0096	<0.0096	<0.0096	<0.0096	<0.0096	<0.019
	7.5	6/10/14	<0.0095	<0.019	<0.0095	<0.0095	<0.0095	<0.0095	<0.0095	<0.019
SB-6	1.5	6/10/14	<0.0095	<0.019	<0.0095	<0.0095	<0.0095	<0.0095	<0.0095	<0.019
	1.5	6/10/14	<0.0096	<0.019	<0.0096	<0.0096	<0.0096	<0.0096	<0.0096	<0.019
	7.5	6/10/14	<0.0096	<0.019	<0.0096	<0.0096	<0.0096	<0.0096	0.21	0.28
SB-11	7.5	6/10/14	<0.0097	<0.019	<0.0097	<0.0097	<0.0097	<0.0097	<0.0097	<0.019
SB-14	1.5	6/10/14	<0.0095	<0.019	<0.0095	<0.0095	<0.0095	<0.0095	<0.0095	<0.019
	7.5	6/10/14	<0.0095	<0.019	<0.0095	<0.0095	<0.0095	<0.0095	0.28	0.35
SB-15	1.5	6/10/14	<0.0096	<0.019	<0.0096	<0.0096	<0.0096	<0.0096	0.056	0.123
	7.5	6/10/14	<0.0095	<0.019	<0.0095	<0.0095	<0.0095	<0.0095	<0.0095	<0.019
SB-17	1.5	6/12/14	<0.0096	<0.019	<0.0096	<0.0096	<0.0096	0.14	0.14	0.34
	7.5	6/10/14	<0.0097	<0.019	<0.0097	<0.0097	<0.0097	0.41	0.29	0.76
SB-21	1.5	6/10/14	<0.0097	<0.019	<0.0097	<0.0097	<0.0097	<0.0097	<0.0097	<0.019
	1.5	6/10/14	<0.0095	<0.019	<0.0095	<0.0095	<0.0095	<0.0095	<0.0095	<0.019
	7.5	6/10/14	<0.0095	<0.019	<0.0095	<0.0095	<0.0095	<0.0095	<0.0095	<0.019
SB-23	1.5	6/10/14	<0.013 UJ	<0.025 UJ	<0.013 UJ	<0.013 UJ	<0.013 UJ	<0.013 UJ	<0.013 UJ	<0.025
	5	6/10/14	<1.2 UJ	<2.3 UJ	<1.2 UJ	<1.2 UJ	<1.2 UJ	26 J	36 J	69
	5	6/10/14	<1.3	<2.7	<1.3	<1.3	<1.3	13	8.7	30

Table 2: Summary of Soil Analytical Results and Ecological Screening Levels - Polychlorinated Biphenyls

Analyte			PCBs (8082)							
			Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Total PCBs [1]
Soil Ecological SL - Surface [2]			--	--	--	--	--	--	--	0.371
Soil Ecological SL - Subsurface [3]			--	--	--	--	--	--	--	4.0
Sediment Ecological TEC (lower bound) [4]			--	--	--	--	--	--	--	0.0598
Sediment Ecological PEC (upper bound) [4]			--	--	--	--	--	--	--	0.676
Sample Location	Depth (ft bgs)	Sample Date								
SB-23R	0-0.25	3/1/16	<0.0426	<0.0426	<0.0426	<0.0426	<0.0426	<0.0426	<0.0426	<0.0426
	0.25-1.0	3/1/16	<0.0419	<0.0419	<0.0419	<0.0419	<0.0419	<0.0419	<0.0419	<0.0419
	1.5-2.0	3/1/16	<0.0454	<0.0454	<0.0454	<0.0454	<0.0454	<0.0454	<0.0454	<0.0454
	1.5-2.0	3/1/16	<0.0405	<0.0405	<0.0405	<0.0405	<0.0405	<0.0405	<0.0405	<0.0405
	4.5-5.0	5/23/16	<0.406	<0.406	<0.406	<0.406	<0.406	2.44 J	<0.406 UJ	4.88
	4.5-5.0	5/23/16	<0.393	<0.393	<0.393	<0.393	<0.393	<0.393 UJ	2.13 J	4.49
	7.5-8.0	5/27/16	<0.0382	<0.0382	<0.0382	<0.0382	<0.0382	<0.0382	<0.0382	<0.0382
	9.5-10.0	5/27/16	<0.0433	<0.0433	<0.0433	<0.0433	<0.0433	<0.0433	<0.0433	<0.0433
SB-23R-N1	0-0.25	5/24/16	<0.0369	<0.0369	<0.0369	<0.0369	<0.0369	<0.0369	<0.0369	<0.0369
	0.25-1.0	5/24/16	<0.0387	<0.0387	<0.0387	<0.0387	<0.0387	<0.0387	<0.0387	<0.0387
	1.5-2.0	5/24/16	<0.0397	<0.0397	<0.0397	<0.0397	<0.0397	<0.0397	<0.0397	<0.0397
	4.5-5.0	5/24/16	<0.394	<0.394	<0.394	<0.394	<0.394	2.54	<0.394	4.90
	7.5-8.0	5/27/16	<0.0407	<0.0407	<0.0407	<0.0407	<0.0407	<0.0407	<0.0407	<0.0407
	9.5-10.0	5/27/16	<0.042	<0.042	<0.042	<0.042	<0.042	<0.042	<0.042	<0.042
SB-23R-N2	0-0.25	5/24/16	<0.0371	<0.0371	<0.0371	<0.0371	<0.0371	<0.0371	<0.0371	<0.0371
	0.25-1.0	5/24/16	<0.0364	<0.0364	<0.0364	<0.0364	<0.0364	<0.0364	<0.0364	<0.0364
	1.5-2.0	5/24/16	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039
	4.5-5.0	5/24/16	<8.01 UJ	<8.01 UJ	<8.01 UJ	<8.01 UJ	<8.01 UJ	<8.01 UJ	21.9 J	70.0
	7.5-8.0	5/27/16	<0.226	<0.226	<0.226	<0.226	<0.226	<0.226	1.19 J	2.55
	9.5-10.0	5/27/16	<0.0411	<0.0411	<0.0411	<0.0411	<0.0411	<0.0411	<0.0411	<0.0411
SB-23R-N3	0-1.0	5/31/17	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12 UJ	<0.12
	1.5-2.0	5/31/17	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12
	4.5-5.0	5/31/17	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12
	4.5-5.0	5/31/17	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12
	7.5-8.0	6/1/17	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12
	9.5-10.0	6/1/17	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12
SB-23R-E1	0-0.25	5/23/16	<0.0342	<0.0342	<0.0342	<0.0342	<0.0342	<0.0342	<0.0342	<0.0342
	0.25-1.0	5/23/16	<0.0368	<0.0368	<0.0368	<0.0368	<0.0368	<0.0368	<0.0368	<0.0368
	1.5-2.0	5/23/16	<0.0387	<0.0387	<0.0387	<0.0387	<0.0387	<0.0387	<0.0387	<0.0387
	4.5-5.0	5/23/16	<1.98 UJ	<1.98 UJ	<1.98 UJ	<1.98 UJ	<1.98 UJ	5.4 J	<1.98 UJ	17.3
	7.5-8.0	5/27/16	<0.856 UJ	*<0.856* UJ	*<0.856* UJ	*<0.856* UJ	*<0.856* UJ	*<0.856* UJ	3.71 J	8.85
	9.5-10.0	5/27/16	<0.0391	<0.0391	<0.0391	<0.0391	<0.0391	<0.0391	<0.0391	<0.0391

Table 2: Summary of Soil Analytical Results and Ecological Screening Levels - Polychlorinated Biphenyls

Analyte			PCBs (8082)							
			Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Total PCBs [1]
Soil Ecological SL - Surface [2]			--	--	--	--	--	--	--	0.371
Soil Ecological SL - Subsurface [3]			--	--	--	--	--	--	--	4.0
Sediment Ecological TEC (lower bound) [4]			--	--	--	--	--	--	--	0.0598
Sediment Ecological PEC (upper bound) [4]			--	--	--	--	--	--	--	0.676
Sample Location	Depth (ft bgs)	Sample Date								
SB-23R-E2	0-0.25	5/23/16	<0.0347	<0.0347	<0.0347	<0.0347	<0.0347	<0.0347	0.121	0.329
	0.25-1.0	5/23/16	<0.0405	<0.0405	<0.0405	<0.0405	<0.0405	<0.0405	<0.0405	<0.0405
	1.5-2.0	5/23/16	<0.0356	<0.0356	<0.0356	<0.0356	<0.0356	<0.0356	0.111	0.325
	4.5-5.0	5/23/16	<1.99 UJ	<1.99 UJ	<1.99 UJ	<1.99 UJ	<1.99 UJ	<1.99 UJ	8.25 J	20.19
	7.5-8.0	5/27/16	<0.393	<0.393	<0.393	<0.393	<0.393	<0.393	<0.393	<0.393
	9.5-10.0	5/27/16	<0.0413	<0.0413	<0.0413	<0.0413	<0.0413	<0.0413	<0.0413	<0.0413
SB-23R-S1	0-0.25	3/1/16	<0.0404	<0.0404	<0.0404	<0.0404	<0.0404	<0.0404	<0.0404	<0.0404
	0.25-1.0	3/1/16	<0.0362	<0.0362	<0.0362	<0.0362	<0.0362	<0.0362	<0.0362	<0.0362
	0.25-1.0	3/1/16	<0.0359	<0.0359	<0.0359	<0.0359	<0.0359	<0.0359	<0.0359	<0.0359
	1.5-2.0	3/1/16	<0.0428	<0.0428	<0.0428	<0.0428	<0.0428	<0.0428	<0.0428	<0.0428
	2.5-3.0	3/1/16	<0.0392	<0.0392	<0.0392	<0.0392	<0.0392	<0.0392	<0.0392	<0.0392
	4.5-5.0	5/23/16	<2.0 UJ	<2.0 UJ	<2.0 UJ	<2.0 UJ	<2.0 UJ	<2.0 UJ	7.83 J	19.83
	7.5-8.0	5/27/16	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.867	2.067
	9.5-10.0	5/27/16	<0.0388	<0.0388	<0.0388	<0.0388	<0.0388	<0.0388	<0.0388	<0.0388
SB-23R-S2	2.5-3.0	3/1/16	<0.0429	<0.0429	<0.0429	<0.0429	<0.0429	<0.0429	<0.0429	<0.0429
	4.5-5.0	5/23/16	<7.76	<7.76	<7.76	<7.76	<7.76	<7.76	16	63
	7.5-8.0	5/27/16	<0.0404	<0.0404	<0.0404	<0.0404	<0.0404	<0.0404	0.0435	0.2859
	9.5-10.0	5/27/16	<0.0394	<0.0394	<0.0394	<0.0394	<0.0394	<0.0394	<0.0394	<0.0394
SB-23R-S4	0-1.0	5/31/17	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11
	1.5-2.0	5/31/17	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11
	4.5-5.0	5/31/17	<0.13	<0.13	<0.13	<0.13	<0.13	5.3	3.0	9.0
	7.5-8.0	6/1/17	<0.12	<0.12	<0.12	<0.12	<0.12	5	1.9	7.5
	9.5-10.0	6/1/17	<0.13 UJ	<0.13 UJ	<0.13 UJ	<0.13 UJ	<0.13 UJ	0.46 J	0.26 J	1.37
SB-23R-S5	1.0	7/22/19	--	--	--	--	--	<0.055	0.089	0.144
	2.0	7/22/19	--	--	--	--	--	<0.061	0.29	0.35
	5.0	7/22/19	--	--	--	--	--	1.6 J	<1.2 UJ	2.8
	8.0	7/22/19	--	--	--	--	--	0.48	<0.12	0.60
SB-23R-S6	1.0	7/22/19	--	--	--	--	--	<0.054	<0.054	<0.054
	2.0	7/22/19	--	--	--	--	--	<0.057	0.20	0.26
	5.0	7/22/19	--	--	--	--	--	<0.059	0.11	0.17
	5.0	7/22/19	--	--	--	--	--	0.73	<0.11	0.84
	8.0	7/22/19	--	--	--	--	--	<0.058	<0.058	<0.058

Table 2: Summary of Soil Analytical Results and Ecological Screening Levels - Polychlorinated Biphenyls

Analyte			PCBs (8082)							
			Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Total PCBs [1]
Soil Ecological SL - Surface [2]			--	--	--	--	--	--	--	0.371
Soil Ecological SL - Subsurface [3]			--	--	--	--	--	--	--	4.0
Sediment Ecological TEC (lower bound) [4]			--	--	--	--	--	--	--	0.0598
Sediment Ecological PEC (upper bound) [4]			--	--	--	--	--	--	--	0.676
Sample Location	**Depth (ft bgs)**	**Sample Date**								
SB-23R-W1	0-0.25	5/23/16	<0.0353	<0.0353	<0.0353	<0.0353	<0.0353	<0.0353	0.0368	0.2486
	0.25-1.0	5/23/16	<0.0365	<0.0365	<0.0365	<0.0365	<0.0365	<0.0365	<0.0365	<0.0365
	1.5-2.0	5/23/16	<0.0427	<0.0427	<0.0427	<0.0427	<0.0427	<0.0427	<0.0427	<0.0427
	4.5-5.0	5/23/16	<0.81	<0.81	<0.81	<0.81	<0.81	4.03 J	<0.81 UJ	8.89
	4.5-5.0	5/23/16	<2.01 UJ	<2.01 UJ	<2.01 UJ	<2.01 UJ	<2.01 UJ	<2.01 UJ	5.37 J	17.43
	7.5-8.0	5/27/16	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039	0.249	0.483
	9.5-10.0	5/27/16	<0.0388	<0.0388	<0.0388	<0.0388	<0.0388	<0.0388	<0.0388	<0.0388
SB-23R-W2	0-0.25	5/23/16	<0.194	<0.194	<0.194	<0.194	<0.194	<0.194	<0.194	<0.194
	0.25-1.0	5/23/16	<0.036	<0.036	<0.036	<0.036	<0.036	<0.036	<0.036	<0.036
	1.5-2.0	5/23/16	<0.0363	<0.0363	<0.0363	<0.0363	<0.0363	<0.0363	<0.0363	<0.0363
	4.5-5.0	5/23/16	<0.079	<0.079	<0.079	<0.079	<0.079	<0.079	0.0894	0.0894
	7.5-8.0	5/27/16	<0.0393	<0.0393	<0.0393	<0.0393	<0.0393	<0.0393	<0.0393	<0.0393
	9.5-10.0	5/27/16	<0.0402	<0.0402	<0.0402	<0.0402	<0.0402	<0.0402	<0.0402	<0.0402
SB-23R-W3	1.0	7/22/19	--	--	--	--	--	<0.053	<0.053	<0.053
	1.0	7/22/19	--	--	--	--	--	<0.05	<0.05	<0.05
	2.0	7/22/19	--	--	--	--	--	<0.053	<0.053	<0.053
	5.0	7/22/19	--	--	--	--	--	<0.062	0.1	0.2
	8.0	7/22/19	--	--	--	--	--	<0.16	<0.16	<0.16
PCB delineation - Soil Ecological SLs and Sediment Ecological TEC/PEC										
SB-3R	0.5	7/23/19	--	--	--	--	--	<0.060	<0.060	*<0.060*
	1.5	7/23/19	--	--	--	--	--	<0.068	0.22	0.29
	2.5	7/23/19	--	--	--	--	--	<0.061 UJ	0.32 J	0.38
	5.0	7/23/19	--	--	--	--	--	<0.082	0.22	0.30
	8.0	7/23/19	--	--	--	--	--	<0.064	<0.064	<0.064
SB-12	1.5	6/12/14	<0.0096	<0.019	<0.0096	<0.0096	<0.0096	<0.0096	0.28	0.35
	7.5	6/10/14	<0.0096	<0.019	<0.0096	<0.0096	<0.0096	<0.0096	<0.0096	<0.019
	7.5	6/10/14	<0.0096	<0.019	<0.0096	<0.0096	<0.0096	<0.0096	<0.0096	<0.019

Table 2: Summary of Soil Analytical Results and Ecological Screening Levels - Polychlorinated Biphenyls

Analyte			PCBs (8082)							
			Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Total PCBs [1]
Soil Ecological SL - Surface [2]			--	--	--	--	--	--	--	0.371
Soil Ecological SL - Subsurface [3]			--	--	--	--	--	--	--	4.0
Sediment Ecological TEC (lower bound) [4]			--	--	--	--	--	--	--	0.0598
Sediment Ecological PEC (upper bound) [4]			--	--	--	--	--	--	--	0.676
Sample Location	**Depth (ft bgs)**	**Sample Date**								
SB-12R	0.5	7/23/19	--	--	--	--	--	<0.063	<0.063	*<0.063*
	1.5	7/23/19	--	--	--	--	--	<0.066 UJ	<0.066 UJ	*<0.066*
	2.5	7/23/19	--	--	--	--	--	<0.055	<0.055	<0.055
	2.5	7/23/19	--	--	--	--	--	<0.12	<0.12	*<0.12*
	5.0	7/23/19	--	--	--	--	--	<0.062	<0.062	<0.062
	8.0	7/23/19	--	--	--	--	--	0.5	<0.064	0.56
SB-23R-E3	0-1.0	5/31/17	<0.052	<0.052	<0.052	<0.052	<0.052	<0.052	<0.052	<0.052
	1.5-2.0	5/31/17	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	*<0.11*
	4.5-5.0	5/31/17	<0.058	<0.058	<0.058	<0.058	<0.058	0.17	0.09	0.55
	7.5-8.0	6/1/17	<0.12	<0.12	<0.12	<0.12	<0.12	1.1	0.93	2.6
	9.5-10.0	6/1/17	<0.12 UJ	<0.12 UJ	<0.12 UJ	<0.12 UJ	<0.12 UJ	<0.12 UJ	<0.12 UJ	<0.12
SB-23R-E4	0.5	7/23/19	--	--	--	--	--	<0.052	<0.052	<0.052
	1.5	7/23/19	--	--	--	--	--	<0.057	<0.057	<0.057
	2.5	7/23/19	--	--	--	--	--	<0.056	<0.056	<0.056
	5.0	7/23/19	--	--	--	--	--	2.3	<1.2	3.5
	8.0	7/23/19	--	--	--	--	--	<0.054	0.19	0.24
SB-23R-S3	0-1.0	5/31/17	<0.059	<0.059	<0.059	<0.059	<0.059	<0.059	<0.059	<0.059
	1.5-2.0	5/31/17	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	*<0.12*
	4.5-5.0	5/31/17	<0.12	<0.12	<0.12	<0.12	<2.4	12	7.8	23
	7.5-8.0	6/1/17	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	0.54	1.26
	9.5-10.0	6/1/17	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16
SB-24	0.5	7/23/19	--	--	--	--	--	<0.31 UJ	0.60 J	**0.91**
	1.5	7/23/19	--	--	--	--	--	<0.062 UJ	0.34 J	**0.40**
	2.5	7/23/19	--	--	--	--	--	<0.06	0.25	0.31
	5.0	7/23/19	--	--	--	--	--	<0.062	<0.062	<0.062
	8.0	7/23/19	--	--	--	--	--	<0.081	<0.081	<0.081

Table 2: Summary of Soil Analytical Results and Ecological Screening Levels - Polychlorinated Biphenyls

Analyte			PCBs (8082)							
			Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Total PCBs [1]
Soil Ecological SL - Surface [2]			--	--	--	--	--	--	--	0.371
Soil Ecological SL - Subsurface [3]			--	--	--	--	--	--	--	4.0
Sediment Ecological TEC (lower bound) [4]			--	--	--	--	--	--	--	0.0598
Sediment Ecological PEC (upper bound) [4]			--	--	--	--	--	--	--	0.676
Sample Location	**Depth (ft bgs)**	**Sample Date**								
SB-25	0.5	7/23/19	--	--	--	--	--	<0.09	0.25	0.34
	1.5	7/23/19	--	--	--	--	--	<0.059	0.27	0.33
	2.5	7/23/19	--	--	--	--	--	<0.059	0.18	0.24
	5.0	7/23/19	--	--	--	--	--	<0.12	0.44	0.56
	8.0	7/23/19	--	--	--	--	--	<0.063	<0.063	<0.063

All results are in milligrams per kilogram
-- = not applicable or not analyzed
< = constituent not detected at concentration exceeding laboratory detection limit.
Italics = non detect with detection limit above a screening criteria
Bold = detection above Soil Ecological SL - Surface (samples between 0 to 2 feet bgs)
= detection above Soil Ecological SL - Subsurface (samples between 2 to 6 feet bgs)
blue font = detection above Sediment Ecological TEC (samples from 0 to 2.5 feet bgs)
= detection above Sediment Ecological PEC (samples from 0 to 2.5 feet bgs)
= Soil Ecological SL - Surface exceedance if subsurface soil below 2 feet bgs and above 9.5 feet bgs brought to surface

bgs - below ground surface
SL = Screening Level
J = the detected concentration is estimated
TEC = threshold effects concentration (lower bound)
PEC = probable effects concentration (upper bound)
UJ = the detection limit is estimated

[1] Total PCBs calculation:
- All Aroclors detected, Total PCBs = sum of detections
- One or more Aroclors detected, Total PCBs = sum of detection(s) and reporting limit of non detect result(s)
- No Aroclors detected, Total PCBs = highest reporting limit

[2] Efroymson et al. 1997. Oak Ridge National Laboratory, Preliminary Remediation Goals for Ecological Endpoints.

[3] Oregon Department of Environmental Quality. 2001. Level II Ecological Screening Level Values.

[4] Sediment screening levels protective of a freshwater benthic community, with the consensus-based TECs and PECs as the primary source (MacDonald et al. 2000), supplemented by screening levels presented in the National Oceanic and Atmospheric Administration Screening Quick Reference Tables (Buchman 2008).

Table 3: Summary of Soil Analytical Results and Ecological Screening Levels - Organochlorine Pesticides

			Organochlorine Pesticides (8081A)																		
Analyte			DDD	DDE	DDT	Total DDTs [1]	Aldrin	alpha-BHC	beta-BHC	delta-BHC	Gamma-BHC (Lindane)	Chlordane	cis-Chlordane	trans-Chlordane	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan sulfate	Endrin	Endrin aldehyde	Endrin Ketone
Soil Ecological SL - Surface [2]			0.021	0.021	0.021	0.021	0.0049	1,000	1,000	8	8	9	9	9	0.0049	20	20	20	0.04	0.04	0.04
Soil Ecological SL - Subsurface [3]			0.021	0.021	0.021	0.021	0.0049	1,000	1,000	1,000	1,000	250	250	250	0.0049	20	20	20	5	5	5
Sediment Ecological TEC (lower bound) [4]			0.00488	0.00316	0.00416	0.00528	0.002	0.006	0.005	0.00324	0.00237	0.00324	0.00324	0.00324	0.0019	--	--	--	0.00222	0.00222	--
Sediment Ecological PEC (upper bound) [4]			0.028	0.0313	0.0629	0.572	0.08	0.1	0.21	0.0176	0.00499	0.0176	0.0176	0.0176	0.0618	--	--	--	0.207	0.207	--
Sample Location	Depth (ft bgs)	Sample Date																			
Organochlorine pesticides delineation - Soil Ecological SLs																					
SB-1	1.5	6/10/14	<0.0098	<0.0098	<0.0098	<0.0098	*<0.005*	<0.005	<0.005	<0.005	<0.005	--	<0.005	<0.005	<0.005	<0.005	<0.0098	<0.0098	<0.0098	<0.0098	--
	7.5	6/10/14	0.023	0.05	<0.0033	0.08	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	--	<0.0017	<0.0017	0.0081 J	<0.0017	<0.0033	<0.0033	0.0033	<0.0033	--
SB-2	1.5	6/10/14	<0.0098	<0.0098	<0.0098	<0.0098	*<0.0051*	<0.0051	<0.0051	<0.0051	<0.0051	--	<0.0051	<0.0051	<0.0051	<0.0051	<0.0098	<0.0098	0.0098	<0.0098	--
	7.5	6/10/14	0.025	0.0083	<0.0033	0.037	0.0027 J	<0.0017	<0.0017	<0.0017	<0.0017	--	<0.0017	<0.0017	<0.0017	<0.0017	<0.0033	<0.0033	0.0033	<0.0033	--
SB-3	1.5	6/10/14	<0.033	<0.033	0.11	0.18	*<0.017*	<0.017	<0.017	<0.017	<0.017	--	<0.017	<0.017	<0.017	<0.017	<0.033	0.077 J	<0.033	<0.033	--
	7.5	6/10/14	<0.0033	<0.0033	<0.0033	<0.0033	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	--	<0.0017	<0.0017	<0.0017	<0.0017	<0.0033	<0.0033	0.0033	<0.0033	--
SB-4	1.5	6/10/14	0.0084	0.0046	<0.0033	0.0163	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	--	0.0026	0.0027	0.0039	<0.0017	0.0098 J	<0.0033	<0.0033	0.0033	--
	7.5	6/10/14	0.03 J	0.0074	0.0034 J	0.04	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	--	0.0021	<0.0017	0.0049 J	<0.0017	<0.0033	<0.0033	0.0074 J	<0.0033	--
SB-5	1.5	6/10/14	<0.0033	<0.0033	<0.0033	<0.0033	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	--	0.0022 J	<0.0017	<0.0017	<0.0017	<0.0033	<0.0033	<0.0033	<0.0033	--
	7.5	6/10/14	<0.0033	<0.0033	<0.0033	<0.0033	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	--	<0.0017	<0.0017	<0.0017	<0.0017	<0.0033	<0.0033	<0.0033	<0.0033	--
SB-6	1.5	6/10/14	<0.0033	0.005	<0.0033	0.012	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	--	<0.0017	<0.0017	<0.0017	<0.0017	<0.0033	<0.0033	<0.0033	<0.0033	--
	1.5	6/10/14	<0.0033	0.005	<0.0033	0.012	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	--	<0.0017	<0.0017	<0.0017	<0.0017	<0.0033	<0.0033	<0.0033	<0.0033	--
	7.5	6/10/14	0.022 J	0.054	0.039 J	0.115	<0.0017	<0.0017	<0.0017	0.02 J	<0.0017	--	0.0054 J	<0.0017	0.0082 J	0.018	0.059 J	<0.0033	0.021 J	<0.0033	--
SB-10	1.5	6/9/14	<0.0033	<0.0033	<0.0033	<0.0033	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	--	<0.0017	<0.0017	<0.0017	<0.0017	<0.0033	<0.0033	0.0033	<0.0033	--
	7.5	6/9/14	<0.0033	<0.0033	<0.0033	<0.0033	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	--	<0.0017	<0.0017	<0.0017	<0.0017	<0.0033	<0.0033	0.0033	<0.0033	--
SB-11	1.5	6/9/14	<0.0033	<0.0033	0.0056	0.0122	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	--	<0.0017	<0.0017	0.0042	<0.0017	<0.0033	<0.0033	<0.0033	<0.0033	--
	7.5	6/11/14	<0.0033	<0.0033	<0.0033	<0.0033	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	--	<0.0017	<0.0017	<0.0017	<0.0017	<0.0033	<0.0033	<0.0033	<0.0033	--
	7.5	6/11/14	<0.0033	<0.0033	<0.0033	<0.0033	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	--	<0.0017	<0.0017	<0.0017	<0.0017	<0.0033	<0.0033	<0.0033	<0.0033	--
SB-14	1.5	6/11/14	<0.0033	<0.0033	<0.0033	<0.0033	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	--	<0.0017	<0.0017	<0.0017	<0.0017	<0.0033	<0.0033	<0.0033	<0.0033	--
	7.5	6/11/14	0.035	0.045	0.0048 J	0.085	0.0045	<0.0017	<0.0017	<0.0017	<0.0017	--	<0.0017	0.0021	0.033 J	<0.0017	<0.0033	0.0034 J	0.016 J	<0.0033	--
SB-15	1.5	6/12/14	**0.066 J**	**0.03 J**	0.0058 J	**0.10**	<0.0017	<0.0017	<0.0017	0.0063	<0.0017	--	0.029 J	0.032	0.049	0.015	0.044 J	0.017 J	0.0061 J	0.01	--
	7.5	6/12/14	1.4 J	0.25 J	0.28 J	1.9	<0.024 UJ	<0.024 UJ	<0.024 UJ	<0.024 UJ	<0.024 UJ	--	<0.024 UJ	0.052 J	<0.024 UJ	0.14 J	0.097 J	<0.046 UJ	<0.046 UJ	<0.046 UJ	--
SB-16	1.5	6/12/14	<0.0033	<0.0033	<0.0033	<0.0033	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	--	<0.0017	<0.0017	<0.0017	<0.0017	<0.0033	<0.0033	0.0033	<0.0033	--
	7.5	6/12/14	<0.0033	<0.0033	<0.0033	<0.0033	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	--	<0.0017	<0.0017	<0.0017	<0.0017	<0.0033	<0.0033	0.0033	<0.0033	--
SB-17	1.5	6/9/14	0.016	0.013	**0.039**	**0.068**	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	--	0.0049 J	<0.0022	0.0064	0.0038	<0.0043	0.02 J	0.009 J	<0.0043	--
	7.5	6/9/14	0.05 J	0.041 J	0.025 J	0.12	0.005	<0.0023	<0.0023	<0.0023	<0.0023	--	<0.0023	0.034	0.036 J	<0.0023	<0.0045	<0.0045	0.041 J	0.011 J	--
SB-18	1.5	6/12/14	<0.0033	0.0036 J	0.0079	0.0148	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	--	<0.0017	<0.0017	0.0049 J	<0.0017	<0.0033	<0.0033	0.0042 J	<0.0033	--
	7.5	6/13/14	<0.0033	<0.0033	<0.0033	<0.0033	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	--	<0.0017	<0.0017	<0.0017	<0.0017	<0.0033	<0.0033	0.0033	<0.0033	--
SB-19	1.5	6/9/14	<0.0033	<0.0033	0.0042	0.0108	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	--	0.0042 J	<0.0017	<0.0017	<0.0017	<0.0033	<0.0033	<0.0033	<0.0033	--
	7.5	6/9/14	<0.0033	<0.0033	<0.0033	<0.0033	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	--	<0.0017	<0.0017	<0.0017	<0.0017	<0.0033	<0.0033	<0.0033	<0.0033	--
SB-20	1.5	6/11/14	<0.0038	<0.0038	0.016	**0.0236**	<0.002	<0.002	<0.002	<0.002	<0.002	--	<0.002	<0.002	0.016	<0.002	<0.0038	<0.0038	<0.0038	<0.0038	--
	7.5	6/11/14	<0.0038	<0.0038	<0.0038	<0.0038	<0.002	<0.002	<0.002	<0.002	<0.002	--	<0.002	<0.002	<0.002	<0.002	<0.0038	<0.0038	<0.0038	<0.0038	--
SB-21	1.5	6/12/14	<0.0035	<0.0035	<0.0035	<0.0035	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	--	<0.0018	<0.0018	<0.0018	<0.0018	<0.0035	<0.0035	<0.0035	<0.0035	--
	1.5	6/12/14	<0.0034	<0.0034	<0.0034	<0.0034	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	--	<0.0018	<0.0018	<0.0018	<0.0018	<0.0034	<0.0034	<0.0034	<0.0034	--
	7.5	6/12/14	<0.0038	<0.0038	<0.0038	<0.0038	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	--	<0.0019	<0.0019	<0.0019	<0.0019	<0.0038	<0.0038	<0.0038	<0.0038	--
SB-22	1.5	6/12/14	0.012 J	0.016	**0.067**	**0.095**	<0.0021	<0.0021	<0.0021	<0.0021	0.014	--	<0.0021	<0.0021	0.0024	<0.0021	<0.004	0.0073 J	0.0058 J	0.004	--
	7.5	6/12/14	<0.0041	<0.0041	<0.0041	<0.0041	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	--	<0.0021	<0.0021	<0.0021	<0.0021	<0.0041	<0.0041	<0.0041	<0.0041	--
SB-23	1.5	6/12/14	<0.16	<0.16	<0.16	<0.16	*<0.084*	<0.084	<0.084	<0.084	<0.084	--	<0.084	<0.084	<0.084	<0.084	<0.16	<0.16	*<0.16*	*<0.16*	--
	5.0	6/13/14	1.7 J	1.4 J	3.4 J	6.5	*<0.43 UJ*	<0.43 UJ	<0.43 UJ	<0.43 UJ	<0.43 UJ	--	<0.43 UJ	<0.43 UJ	0.94 J	<0.43 UJ	<0.83 UJ	0.99 J	*<1.2 UJ*	*<1.2 UJ*	--
	5.0	6/13/14	1.4 J	0.64 J	2.1 J	4.1	*<0.041 UJ*	<0.041 UJ	<0.041 UJ	<0.041 UJ	<0.041 UJ	--	<0.041 UJ	<0.041 UJ	0.57 J	<0.041 UJ	0.31 J	<0.08 UJ	**0.78 J**	**0.15 J**	--

Table 3: Summary of Soil Analytical Results and Ecological Screening Levels - Organochlorine Pesticides

Analyte			Organochlorine Pesticides (8081A)			
			Heptachlor	Heptachlor epoxide	Methoxychlor	Toxaphene
Soil Ecological SL - Surface [2]			15	15	500	1,000
Soil Ecological SL - Subsurface [3]			15	15	500	1,000
Sediment Ecological TEC (lower bound) [4]			0.00247	0.00247	--	0.0001
Sediment Ecological PEC (upper bound) [4]			0.016	0.016	--	0.001
Sample Location	Depth (ft bgs)	Sample Date				
Organochlorine pesticides delineation - Soil Ecological SLs						
SB-1	1.5	6/10/14	<0.005	<0.005	<0.05	<0.18
	7.5	6/10/14	0.0026 J	0.0023 J	<0.017	<0.06
SB-2	1.5	6/10/14	<0.0051	<0.0051	<0.051	<0.18
	7.5	6/10/14	<0.0017	<0.0017	<0.017	<0.06
SB-3	1.5	6/10/14	<0.017	0.019 J	<0.17	<0.6
	7.5	6/10/14	<0.0017	<0.0017	<0.017	<0.06
SB-4	1.5	6/10/14	<0.0017	0.0026	<0.017	<0.06
	7.5	6/10/14	<0.0017	<0.0017	<0.017	<0.06
SB-5	1.5	6/10/14	<0.0017	<0.0017	<0.017	<0.06
	7.5	6/10/14	<0.0017	<0.0017	<0.017	<0.06
SB-6	1.5	6/10/14	<0.0017	<0.0017	<0.017	<0.059
	1.5	6/10/14	<0.0017	<0.0017	<0.017	<0.06
	7.5	6/10/14	<0.0017	0.01 J	<0.017	<0.06
SB-10	1.5	6/9/14	<0.0017	<0.0017	<0.017	<0.059
	7.5	6/9/14	<0.0017	<0.0017	<0.017	<0.06
SB-11	1.5	6/9/14	<0.0017	<0.0017	<0.017	<0.06
	7.5	6/11/14	<0.0017	<0.0017	<0.017	<0.059
	7.5	6/11/14	<0.0017	<0.0017	<0.017	<0.061
SB-14	1.5	6/11/14	<0.0017	<0.0017	<0.017	<0.059
	7.5	6/11/14	<0.0017	<0.0017	<0.017	<0.06
SB-15	1.5	6/12/14	0.0081	0.02 J	<0.017	<0.06
	7.5	6/12/14	<0.024 UJ	0.071 J	<0.24 UJ	<0.84 UJ
SB-16	1.5	6/12/14	<0.0017	<0.0017	<0.017	<0.059
	7.5	6/12/14	<0.0017	<0.0017	<0.017	<0.06
SB-17	1.5	6/9/14	<0.0022	<0.0022	<0.022	<0.078
	7.5	6/9/14	<0.0023	0.016 J	<0.023	<0.082
SB-18	1.5	6/12/14	0.0017	<0.0017	<0.017	<0.06
	7.5	6/13/14	<0.0017	<0.0017	<0.017	<0.06
SB-19	1.5	6/9/14	<0.0017	<0.0017	0.047	<0.06
	7.5	6/9/14	<0.0017	<0.0017	<0.017	<0.059
SB-20	1.5	6/11/14	<0.002	<0.002	<0.02	<0.069
	7.5	6/11/14	<0.002	<0.002	<0.02	<0.07
SB-21	1.5	6/12/14	<0.0018	<0.0018	<0.018	<0.064
	1.5	6/12/14	<0.0018	<0.0018	<0.018	<0.062
	7.5	6/12/14	<0.0019	<0.0019	<0.019	<0.068
SB-22	1.5	6/12/14	<0.0021	<0.0021	<0.021	<0.073
	7.5	6/12/14	<0.0021	<0.0021	<0.021	<0.074
SB-23	1.5	6/12/14	<0.084	<0.084	<0.84	<3.0
	5.0	6/13/14	<0.43 UJ	0.49 J	<4.3 UJ	<15 UJ
	5.0	6/13/14	<0.041 UJ	<0.041 UJ	<0.41 UJ	<1.5 UJ

Table 3: Summary of Soil Analytical Results and Ecological Screening Levels - Organochlorine Pesticides

			Organochlorine Pesticides (8081A)																		
Analyte			DDD	DDE	DDT	Total DDTs [1]	Aldrin	alpha-BHC	beta-BHC	delta-BHC	Gamma-BHC (Lindane)	Chlordane	cis-Chlordane	trans-Chlordane	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan sulfate	Endrin	Endrin aldehyde	Endrin Ketone
Soil Ecological SL - Surface [2]			0.021	0.021	0.021	0.021	0.0049	1,000	1,000	8	8	9	9	9	0.0049	20	20	20	0.04	0.04	0.04
Soil Ecological SL - Subsurface [3]			0.021	0.021	0.021	0.021	0.0049	1,000	1,000	1,000	1,000	250	250	250	0.0049	20	20	20	5	5	5
Sediment Ecological TEC (lower bound) [4]			0.00488	0.00316	0.00416	0.00528	0.002	0.006	0.005	0.00324	0.00237	0.00324	0.00324	0.00324	0.0019	--	--	--	0.00222	0.00222	--
Sediment Ecological PEC (upper bound) [4]			0.028	0.0313	0.0629	0.572	0.08	0.1	0.21	0.0176	0.00499	0.0176	0.0176	0.0176	0.0618	--	--	--	0.207	0.207	--
Sample Location	Depth (ft bgs)	Sample Date																			
Organochlorine pesticides delineation - Soil Ecological SLs and Sediment Ecological TEC/PEC																					
SB-3R	0.5	7/23/19	<0.0024	<0.0024	0.0025	0.0073	*<0.0024*	<0.0024	<0.0024	<0.0024	*<0.0024*	0.053	0.0042 J	0.0041	*<0.0024*	<0.0024	<0.0024	<0.0024	*<0.0024*	*<0.0024*	<0.0024
	1.5	7/23/19	0.013	0.017	0.014 J	**0.044**	*<0.0027*	<0.0027	<0.0027	<0.0027	*<0.0027*	*<0.055*	<0.0027	<0.0027	**0.0099**	<0.0027	0.0068	0.012	*<0.0027*	*<0.0027*	<0.0027
	2.5	7/23/19	0.0088 J	0.024	0.17	0.203	*<0.0025*	<0.0025	<0.0025	<0.0025	*<0.0025*	*<0.049*	<0.0025	<0.0025	0.025	<0.0025	0.049	0.20	*<0.0025*	*<0.0025*	<0.0025
	5.0	7/23/19	0.045	0.041	0.54	0.626	0.0049	<0.0033	<0.0033	<0.0033	<0.0033	<0.066	<0.0033	<0.0033	0.052	<0.0033	0.024	0.0093 J	<0.0033	<0.0033	<0.0033
	8.0	7/23/19	0.051	0.012	0.01 J	0.0730	<0.0026	<0.0026	<0.0026	<0.0026	<0.0026	<0.052	<0.0026	<0.0026	0.014	<0.0026	<0.0026	<0.0026	<0.0026	<0.0026	<0.0026
SB-12	1.5	6/12/14	**0.046**	0.019	**0.025 J**	**0.090**	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	--	0.0022	0.0019	**0.02**	<0.0017	0.018 J	0.037	0.018 J	0.004 J	--
	7.5	6/12/14	0.037	0.0092	0.057 J	0.103	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	--	0.0019	0.0019	0.0079 J	0.016 J	0.025 J	0.0084 J	<0.0033	<0.0033	--
	7.5	6/12/14	0.041 J	0.008	0.036 J	0.085	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	--	<0.0017	<0.0017	0.0087 J	0.012 J	0.014 J	0.0063 J	<0.0033	<0.0033	--
SB-12R	0.5	7/23/19	<0.0025	<0.0025	<0.0025	<0.0025	*<0.0025*	--	--	--	--	--	--	--	*<0.0025*	--	--	--	*<0.0025*	*<0.0025*	--
	1.5	7/23/19	0.003	<0.0027	0.0028 J	0.009	*<0.0027*	--	--	--	--	--	--	--	0.0045	--	--	--	*<0.0027*	*<0.0027*	--
	2.5	7/23/19	<0.0022	<0.0022	<0.0022	<0.0022	*<0.0022*	--	--	--	--	--	--	--	*<0.0022*	--	--	--	<0.0022	<0.0022	--
	2.5	7/23/19	<0.0046	*<0.0046*	*<0.0046*	<0.0046	*<0.0046*	--	--	--	--	--	--	--	*<0.0046*	--	--	--	*<0.0046*	*<0.0046*	--
	5.0	7/23/19	0.056	0.018 J	0.033	0.107	<0.0025	--	--	--	--	--	--	--	<0.0025	--	--	--	<0.0025	<0.0025	--
	8.0	7/23/19	0.032 J	0.013 J	<0.0026	0.048	<0.0026	--	--	--	--	--	--	--	<0.0026	--	--	--	<0.0026	<0.0026	--

Table 3: Summary of Soil Analytical Results and Ecological Screening Levels - Organochlorine Pesticides

Analyte			Organochlorine Pesticides (8081A)			
			Heptachlor	Heptachlor epoxide	Methoxychlor	Toxaphene
Soil Ecological SL - Surface [2]			15	15	500	1,000
Soil Ecological SL - Subsurface [3]			15	15	500	1,000
Sediment Ecological TEC (lower bound) [4]			0.00247	0.00247	--	0.0001
Sediment Ecological PEC (upper bound) [4]			0.016	0.016	--	0.001
Sample Location	**Depth (ft bgs)**	**Sample Date**				
Organochlorine pesticides delineation - Soil Ecological SLs and Sediment Ecological TEC/PEC						
SB-3R	0.5	7/23/19	<0.0024	<0.0024	<0.0024	*<0.048*
	1.5	7/23/19	*<0.0027*	*<0.0027*	<0.0027	*<0.055*
	2.5	7/23/19	*<0.0025*	0.0029	<0.0025	0.66
	5.0	7/23/19	<0.0033	<0.0033	<0.0033	<0.066
	8.0	7/23/19	<0.0026	<0.0026	<0.0026	<0.052
SB-12	1.5	6/12/14	<0.0017	0.0019	<0.017	*<0.06*
	7.5	6/12/14	<0.0017	<0.0017	<0.017	<0.06
	7.5	6/12/14	<0.0017	<0.0017	<0.017	<0.06
SB-12R	0.5	7/23/19	--	--	--	--
	1.5	7/23/19	--	--	--	--
	2.5	7/23/19	--	--	--	--
	2.5	7/23/19	--	--	--	--
	5.0	7/23/19	--	--	--	--
	8.0	7/23/19	--	--	--	--

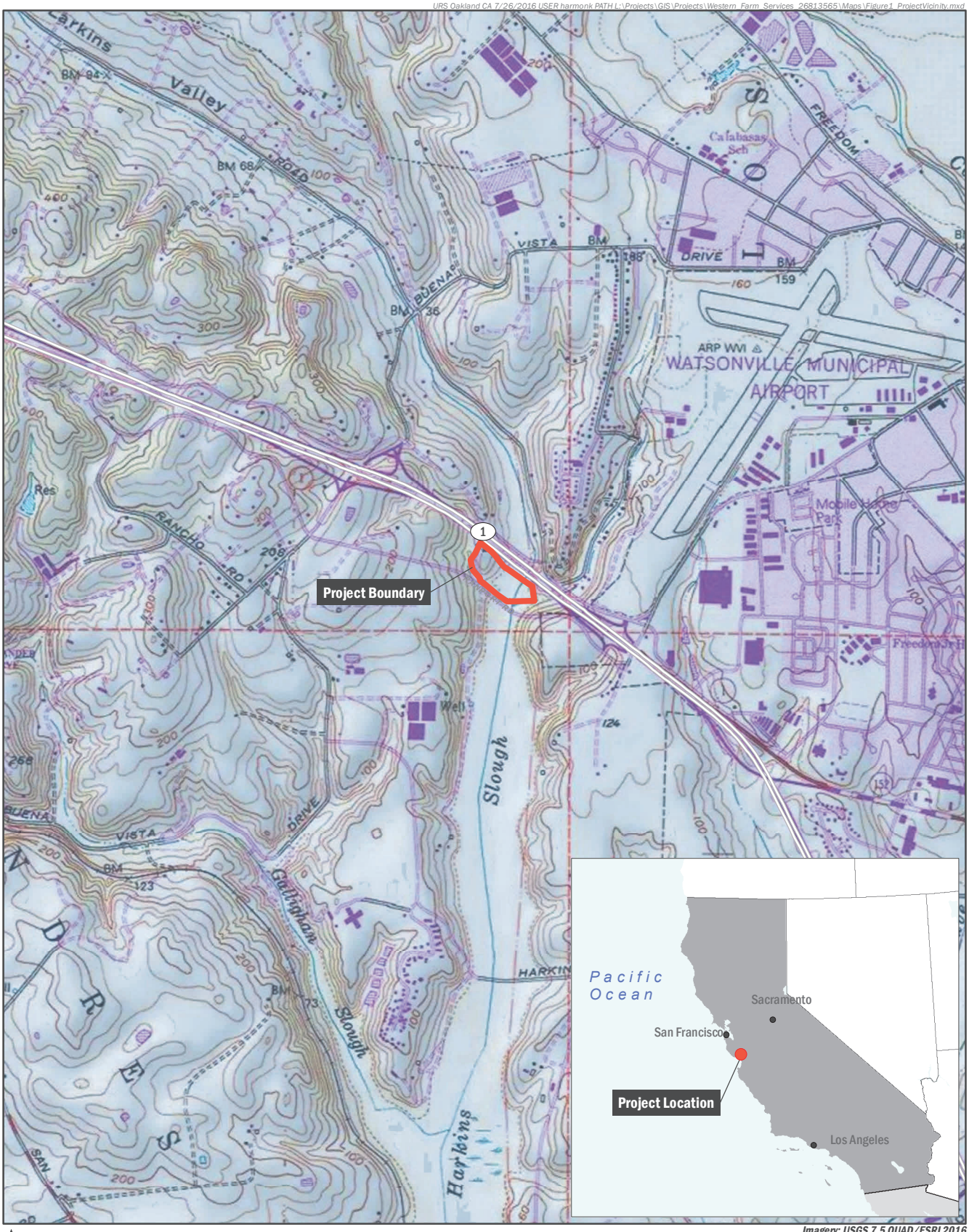
All results are in milligrams per kilogram
-- = not applicable or not analyzed
< = constituent not detected at concentration exceeding laboratory detection limit.
Italics = non detect with detection limit above a screening criteria
Bold = detection above Soil Ecological SL - Surface (samples between 0 to 2 feet bgs)
= detection above Soil Ecological SL - Subsurface (samples between 2 to 6 feet bgs)
blue font = detection above Sediment Ecological TEC (samples from 0 to 2.5 feet bgs)
= detection above Sediment Ecological PEC (samples from 0 to 2.5 feet bgs)
= Soil Ecological SL - Surface exceedance if subsurface soil below 2 feet bgs and above 9.5 feet bgs brought to surface

bgs - below ground surface
BHC = benzene hexachloride
DDD = 4,4'-dichloro-diphenyl-dichloroethane
DDE = 4,4'-dichloro-diphenyl-dichloroethylene
DDT = 4,4'-dichloro-diphenyl-trichloroethane
ft = feet
J = the detected concentration is estimated
PEC = probable effects concentration (upper bound)
SL = Screening Level
TEC = threshold effects concentration (lower bound)

[1] Total DDTs calculation:
- All three isomers (DDD, DDE, DDT) detected, Total DDTs = sum of detections
- One or two isomers detected, Total DDTs = sum of detection(s) and reporting limit of non detect result(s)
- All three isomers non detect, Total DDTs = highest reporting limit

[2] Efroymson et al. 1997. Oak Ridge National Laboratory, Preliminary Remediation Goals for Ecological Endpoints.
[3] Oregon Department of Environmental Quality. 2001. Level II Ecological Screening Level Values.
[4] Sediment screening levels protective of a freshwater benthic community, with the consensus-based TECs and PECs as the primary source (MacDonald et al. 2000), supplemented by screening levels presented in the National Oceanic and Atmospheric Administration Screening Quick Reference Tables (Buchman 2008).

Figures



AECOM

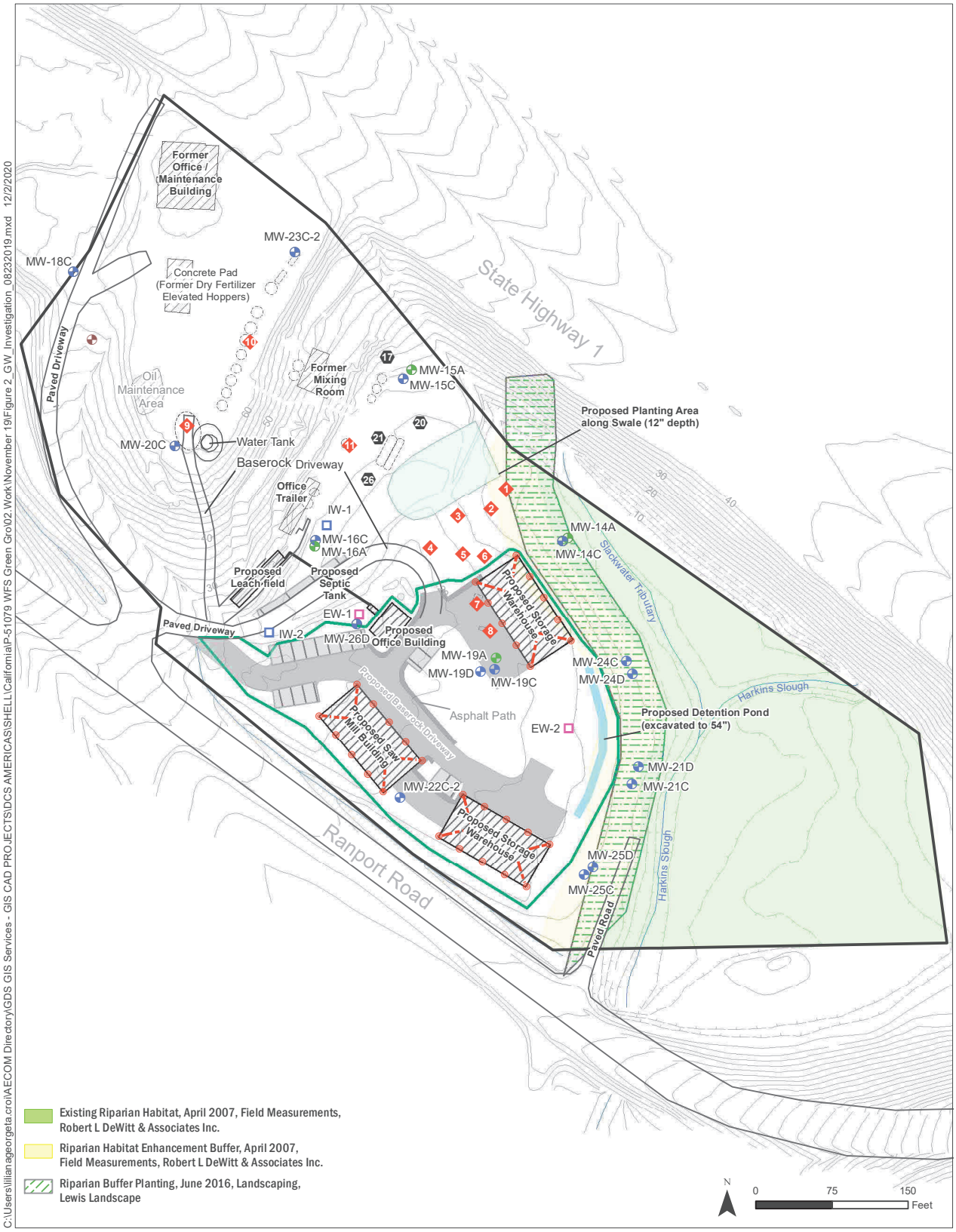
Western Farm Services, Inc.

Former Green Gro Facility

PROJECT NUMBER 60593206

FIGURE 1

Project Vicinity

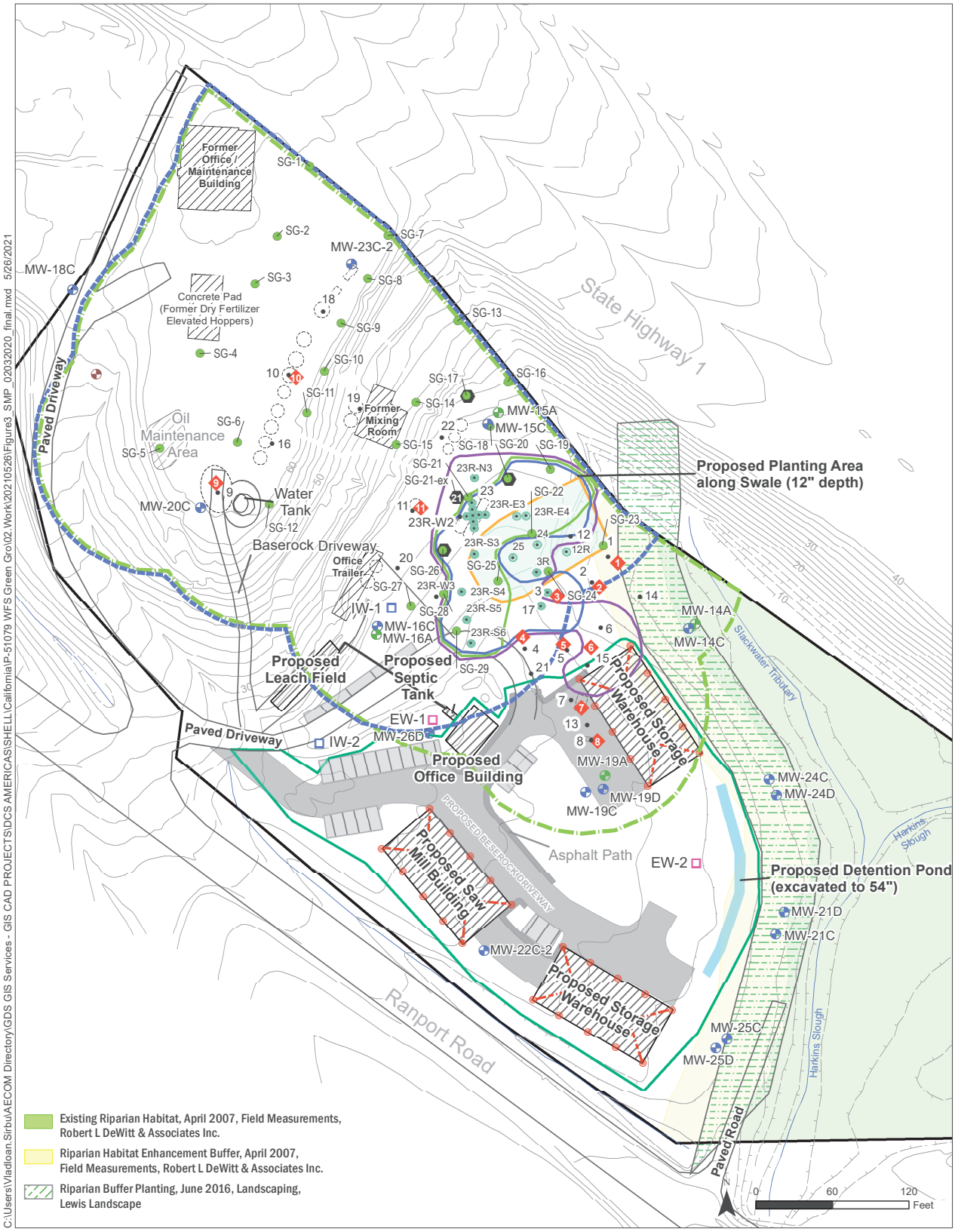


Topographic Contours: Mid Coast Engineers 01/23/1996

- Site Boundary
- Limit of proposed grading
- Former Agricultural Chemical or Petroleum Storage Tank
- Topographic Contours (feet above mean sea level)
- Roads and driveways
- Proposed Helical piers (29' depth)
- Monitoring Well, shallow well
- Monitoring Well, deep well
- Approximate Location of Non-Potable Water Supply Well
- Extraction Well (inactive)
- Injection Well (inactive)
- Soil Vapor Well Location (SVW-#) (Wells SVW-1, SVW-2, SVW-9, SVW-10 and SVW-11 are nested soil vapor wells)
- Soil Vapor Well Location (SVW-SG-#) (Repeat sample locations from 2009)

Western Farm Service, Inc.
Former Green Gro Facility
PROJECT NUMBER: 60593206

FIGURE 2
Site Plan



Topographic Contours: Mid Coast Engineers 01/23/1996

- Site Boundary
- Limit of proposed grading
- Former Agricultural Chemical or Petroleum Storage Tank
- Topographic Contours (feet above mean sea level)
- Roads and driveways
- Proposed Helical piers (29' depth)
- 2009 Soil Vapor Sample Location
- Soil Boring Location (SB-#)
- Soil result > human health and/or ecological criteria
- Soil Vapor Well Location (SVW-#). (Wells SVW-1, SVW-2, SVW-9, SVW-10 and SVW-11 are nested soil vapor wells)
- Soil Vapor Well Location (SVW-SG-#). (Repeat sample locations from 2009)
- Monitoring Well, shallow well
- Monitoring Well, deep well
- Approximate Location of Non-Potable Water Supply Well
- Extraction Well (inactive)
- Injection Well (inactive)
- Approximate area to be managed if plants are installed to promote an emergent freshwater wetland; PCBs and pesticides exceed ecological screening levels. The upper 6 inches of soil should be removed and replaced with clean backfill.
- Approximate area to be managed if subsurface soils from below 1.5 feet are brought to the surface; PCBs exceed ecological screening levels.
- Approximate area to be managed if subsurface soils from below 1.5 feet are brought to the surface; pesticides exceed ecological screening levels
- Approximate area of soil to be managed for soil disturbance below 1.5 feet; PCBs exceed commercial and construction worker screening levels
- Approximate area with soil vapor exceedances (attenuation factor 0.005) to be evaluated and managed prior to slab-on-grade building occupancy
- Approximate area with soil vapor exceedances (attenuation factor 0.03) to be evaluated and managed prior to slab-on-grade building occupancy

Western Farm Service, Inc.
Former Green Gro Facility
PROJECT NUMBER: 60593206

FIGURE 3

Screening Level Exceedance Management Areas

Appendix A
Grant Deed, Instrument 2001-0061081

RECORDING REQUESTED BY

CHICAGO TITLE COMPANY

AND WHEN RECORDED MAIL THIS DEED AND, UNLESS OTHERWISE SHOWN BELOW, MAIL TAX STATEMENT TO:

Name Forrest P. Moore

Street Address P.O. Box 1480

City & State Zip Freedom, Ca. 95019

Title Order No. 5586329-SCF Escrow No. 9472478 JHM

Santa Cruz Title Co.

2001-0061081

Recorded Official Records County Of SANTA CRUZ RICHARD W. BEDAL Recorder

08:00AM 28-Sep-2001

REC FEE	25.00
TAX	181.50
SURVEY	10.00
BLS	
Page 1 of 7	

SPACE ABOVE THIS LINE FOR RECORDER'S USE

T 355 Legal (2-94)

Grant Deed

THE UNDERSIGNED GRANTOR(s) DECLARE(s)

DOCUMENTARY TRANSFER TAX IS $ 181.50

☒ _____ unincorporated area ☐ City of _____

Parcel No. 052-511-06 & 08 & 052-011-61

☒ computed on full value of interest or property conveyed, or

☐ computed on full value less value of liens or encumbrances remaining at time of sale, and

FOR A VALUABLE CONSIDERATION, receipt of which is hereby acknowledged, WESTERN FARM SERVICE, INC., a Delaware Corporation

hereby GRANT(S) to FORREST P. MOORE, a single man

the following described real property in the county of Santa Cruz, state of California:

SEE EXHIBIT "A" ATTACHED HERETO AND BY THIS REFERENCE MADE PART HEREOF

SUBJECT TO THE ENVIRONMENTAL RESTRICTION AND USE RESTRICTION AS SET FORTH IN EXHIBIT "C" ATTACHED HERETO AND BY THIS REFERENCE MADE PART HEREOF.

Dated September 17, 2001

WESTERN FARM SERVICE, INC.,
a Delaware Corporation
BY: Gordon Miller
Gordon Miller
ITS Vice President
Vice President

STATE OF CALIFORNIA
COUNTY OF Fresno } S.S.

On September 24, 2001 before me,

Denell Cline

a Notary Public in and for said County and State, personally appeared

Gordon Miller

personally known to me (or proved to me on the basis of satisfactory evidence) to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

WITNESS my hand and official seal.

Signature Denell Cline

DENELL CLINE
Commission # 1249292
Notary Public - California
Fresno County
My Comm. Expires Feb 9, 2004

(This area for official notarial seal)

MAIL TAX STATEMENTS TO PARTY SHOWN ON FOLLOWING LINE; IF NO PARTY SHOWN, MAIL AS DIRECTED ABOVE

Name | Street Address | City & State

NOTARY SEAL CLARIFICATION PAGE

I certify under penalty of perjury that the "Notary Seal" on the document to which this statement is attached reads as follows:

Name of Notary: Denell Cline

Commission #: 1249292

Date commission expires: FEb. 9, 2004

Place of execution: Fresno, Ca.

Date: 9/26/01 Chicago Title Company

SIGNATURE (FIRM NAME IF ANY)

(Govt. Code, Sec. 27361.7)

EXHIBIT "A"

PARCEL ONE:

Being a portion of Lot 10, as the same is shown upon that certain map entitled, "Map No. 2 of Harkins Ranch, as partitioned by the referees W.R. Radcliff, John Kennaugh and James B. Holohan, and surveyed by C.B. Lewis, 1907, situated in Santa Cruz County, California", filed for record in the office of the County Recorder of Santa Cruz County in Volume 16 of Maps, Page 8, Santa Cruz County Records, and more particularly described as follows:

Beginning at a driven iron pipe at the Southeast corner of the abovementioned Lot No. 10; thence from said point of beginning along the South boundary of said Lot No. 10 South 88° 28'30" West shown on said map as South 87° 43' West 831.12 feet to a driven iron pipe at the Southwest corner of lands conveyed to Leslie S. Fauskee et ux, by Deed recorded in Volume 831, page 51 of Official Records of said County; thence along the East boundary of said lands of Fauskee, now or formerly and of lands conveyed to Silvio Sciutto, et ux by Deed recorded in Volume 931 Page 613, Official Records of said county, North 8° 43' East 350.00 feet to a point; thence North 42° 30' West 150.00 feet to a point; thence North 14° 44' 40" West 153.00 feet to a point; thence North 35° 37' East 115.00 feet to a point; thence North 25° 03' East 169.23 feet to a 1/2" X 30" iron pipe marked "1.s.4134" on the Southwest side of California State Highway 1, from which a 1" iron pipe with plastic tag "C.H.C." bears N 52° 10' 41" W 21.86 feet distant, thence along said side of said highway South 52° 10' 41" East 203.03 feet; thence South 40° 47' 50" East 92.39 feet; thence South 39° 44' 44" East 194.64 feet; thence South 50° 11' 33" East 539.07 feet to a point on the East line of aforementioned Lot No. 10; thence leaving aforementioned lands of the State and along the East Boundary of aforementioned Lot No. 10, South 8° 09' 20" West, called on said map 141.43 feet to the point of beginning.

Excepting therefrom Parcel 2 of the lands conveyd to the State of California by W.C. Deny et al by Deed recorded June 3, 1971 in Vol. 2100, page 222, Official Records of Said County called "Rampart Road".

PARCEL TWO:

An easement, appurtenant to Parcel One, for driveway purposes over and across that certain property described as follows:

Being a portion of that parcel of land described in the State of California director's Deed to Silvio Sciutto, et al, recorded June 4, 1973, in Volume 2317, Page 453, Official Records of Santa Cruz County, said portion being more particularly described as follows:

Commencing at the Southeasterly terminus of a course described as "S. 44° 41' 31" E., 206.79 feet" in said parcel (2317 or 453); thence along said course North 44° 41' 31" West, 17.99 feet; thence from a tangent that bears North 28° 35' 26" East, along a curve to the left with a radius of 25.00 feet, through an angle of 68° 49' 12", an arc length of 30.03 feet; thence North 40° 13' 46" West 49.67 feet; thence along a tangent curve to the right with a radius of 208.00 feet, through an angle of 13° 29' 43", an arc length of 48.99 feet to the line common to the land, now or formerly, of Silvio Sciutto, et al., and W.C. Denny, et al,;

thence along said common property line, South 42° 07′ 56" East, 139.81 feet and South 09° 05′ 04" West, 28.13 feet to the Southwesterly line of said parcel (2317 or 453); thence along last said line North 51° 14′ 15" West, 18.96 feet to the point of commencement, as granted in the Deed from Christina Solari, et al., to Walter W. Love, et al., recorded March 21, 1979, in Volume 3034, Page 490, Official Records of Santa Cruz County.

BENIFITTED PROPERTY AS SET OUT IN EXHIBIT "C"

EXHIBIT "B"

SITUATE in the City of Watsonville, County of Santa Cruz, State of California.

PARCEL ONE:

BEING a part of the lands conveyed by Earl G. Callender, et al., to Monterey Bay Investments, Inc., by Deed dated March 28, 1958, recorded April 2, 1958 in Volume 1178, Page 476, Official Records of Santa Cruz County, and being more particularly described as follows:

BEGINNING on the Southerly side of Wall Street, sometimes called 3rd Street, at the Northeast corner of lands conveyed by Loma Prieta Lumber Company to Walter J. Foster, by Deed recorded April 13, 1928 in Volume 128, Page 286, Official Records of Santa Cruz County, which point is South 64° 28' West 288.67 feet from the intersection of the Southerly side of Wall Street with the Westerly side of Pine Street; thence from said place of beginning along the Southerly side of Wall Street, North 64° 28' East 100 feet to a point which is 188.67 feet from said intersection; thence parallel with the East line of said lands of Foster, (now Stolich, et al.), South 23° 20' East to the North line of Watson Street; thence along the North line of Watson Street, South 48° 5' West to the Southwest corner of said lands conveyed to Monterey Bay Investments, Inc.; thence leaving the North side of Watson Street and along the West line of said lands of Monterey Bay Investments, Inc., North 23° 34' West 196.92 feet, more or less, to a stake at the Southwest corner of said lands of Foster; and thence along the line of said lands, North 64° 28' East parallel with 3rd Street, 66.50 feet to a stake at the Southeast corner of said lands; thence North 23° 20' West 200.00 feet to the place of beginning.

PARCEL TWO:

BEGINNING at a 3/4-inch pipe on the Northwesterly boundary of Watson Street at the South corner of land of Edward A. Bakich, et ux., from which a 3/4-inch pipe at the intersection of the Southwesterly side of Pine Street with the said Northwesterly side of Watson Street is North 48° 04' East 292.19 feet distant and a 2-inch pipe bears South 48° 04' West 47.61 feet distant; thence along the Southwest boundary line of said lands of Bakich North 23° 30' West at 114.70 feet a 3/4-inch iron pipe, 148.70 feet to the West corner of lands conveyed by Monterey Bay Investments, Inc., to Edward A. Bakich, et ux., by Deed dated April 26, 1963, recorded May 13, 1963 in Volume 1540, Page 554, Official Records of Santa Cruz County; thence along the Northerly boundary of said lands, Northeasterly 60 feet; thence leaving said boundary, South 23° 30' East 132 feet, more or less, to the North side of Watson Street and thence along the North side of Watson Street, South 48° 04' West 63 feet, more or less, to the place of beginning.

EXHIBIT "C"

Environmental Restriction: For the purpose of protecting human health and safety from possible hazardous materials, the Grantee of the property described on Exhibit "A" attached to this Grant Deed (the "Real Property"), hereby covenants that the Real Property shall never be permitted to be used for residential purposes. The Parties to this Grant Deed hereby specifically agree that this covenant shall be binding on all successors and assigns of the Grantee.

Use Restriction: The Grantee of the Real Property hereby covenants for the benefit of the real property described on Exhibit "B" attached to this Grant Deed (the "Benefitted Property"), that the Real Property shall never be permitted to be used as a distribution center for any agricultural chemicals and fertilizer products. The parties to this Grant Deed hereby specifically agree that this restrictive use covenant shall be binding upon the successors and assigns of the Grantee and all successive owners of the Real Property, and enforceable by the successors and assigns of the Grantor and all successive owners of the Benefitted Property.

The foregoing restrictions are hereby read and approved by the undersigned grantee and grantee hereby accepts this deed containing foregoing restrictions.

Forrest P. Moore

Forrest P. Moore

STATE OF CALIFORNIA,

COUNTY OF SANTA CRUZ

On SEPTEMBER 25, 2001, before me, THE UNDERSIGNED, a Notary Public in and for said County and State, personally appeared FORREST P. MOORE

personally known to me (or proved to me on the basis of satisfactory evidence) to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

WITNESS my hand and official seal.

Signature Joyce E Avila

FOR NOTARY SEAL OR STAMP

JOYCE E. AVILA
COMM. # 1202585
NOTARY PUBLIC-CALIFORNIA
SANTA CRUZ COUNTY
COMM. EXP. NOV. 21, 2002

I CERTIFY UNDER PENALTY OF PERJURY THAT THE "NOTARY SEAL" ON THE DOCUMENT TO WHICH THIS STATEMENT IS ATTACHED READS AS FOLLOWS:

COMMISSION #_____

NAME OF NOTARY_____

DATE COMMISSION EXPIRES_____

PLACE OF EXECUTION_____ DATE_____

Govt. Code, Sec. 27261.7) _____
Signature (Firm Name If Any)

Appendix B
Summary of Risk Findings and Management Areas

B-1.0 SUMMARY OF RISK FINDINGS AND MANAGEMENT AREAS

Human health and ecological risks related to the presence of potential contaminants of concern were evaluated and are summarized in the following subsections (AECOM 2020 and 2021). This Subsurface Media Management Plan has been prepared to mitigate the potential:

- For commercial/industrial workers and construction workers to be exposed to PCBs in soil from below 1.5 feet and above 9.5 feet below ground surface (bgs) in the vicinity of sample locations SB-3, SB-17, SB-23, SB-23R, SB-23R-N1, SB-23R-N2, SB-23R-E1, SB-23R-E2, SB-23R-E3, SB-23R-E4, SB-23R-S1, SB-23R-S2, SB-23R-S3, SB-23R-S4, SB-23R-S5, SB-23R-S6, and SB-23R-W1 near the former fertilizer storage tank area (Table 1, Figure 3).
- For commercial/industrial workers and construction workers to be exposed to dieldrin in soil at 5 feet bgs at sample location SB-23 (Table 1, Figure 3).
- For the future benthic community to be exposed to future surface sediment (0 to 1 foot bgs) impacted with PCBs in the vicinity of sample location SB-24 and pesticides in the vicinity of sample location SB-3R (Tables 2 and 3, Figure 3).
- For ecological risk to upland organisms related to PCBs and/or pesticides in soil in the vicinity of sample locations SB-3R, SB-6, SB-12, SB-15, SB-17, SB-23, SB-23R, SB-23R-N1, SB-23R-N2, SB-23R-E1, SB-23R-E2, SB-23R-E3, SB-23R-E4, SB-23R-S1, SB-23R-S2, SB-23R-S3, SB-23R-S4, SB-23R-S5, SB-23R-S6, and SB-23R-W1 from below 2 feet and above 9.5 feet bgs due to the potential for construction-related redistribution of contamination to the surface (Tables 2 and 3, Figure 3).

Delineation east of exceedances at location SB-23R-E4 is achieved by the SB-12 sample at 1.5 feet bgs since the depths are comparable due to the change in topography in the swale.

B-1.1 Human Health

In the 2017 HHERA using Site-averaged concentrations, excess cancer risks and noncancer hazards related to direct contact with soil are at acceptable levels for the current commercial workers both for 0 to 3 feet bgs depth intervals and for 0 to 10 feet bgs depth intervals, although there are some exceedances of screening levels at some individual locations. Risks and hazards are also acceptable on a Site-wide basis for future construction workers on the basis of available data[1]. These risks were estimated from soil data collected throughout the site, including sampling locations in the vicinity of the proposed office building and the northern proposed storage warehouse. There is no known use or history of potential sources or releases in in the area of the proposed saw mill building and proposed storage warehouse in the southern portion of the Site; therefore, soil management planning would be unnecessary in those areas. An updated HHERA method was used in the final HHERA (AECOM 2021) such that exposure depths for commercial and constructions workers were defined as 0 to 10 feet bgs and all depths (0 to 15 feet bgs), respectively.

Exceedances of commercial worker and construction worker screening levels[2], noted at some individual subsurface soil locations, are defined in this SMMP. PCB concentrations in soil above relevant commercial/industrial worker screening criteria are present below 2 feet bgs at locations SB-17, SB-23, SB-23R, SB-23R-N1, SB-23R-N2, SB-23R-E1, SB-23R-E2, SB-23R-E3, SB-23R-E4, SB-23R-S1, SB-23R-S2, SB-23R-S3, SB-23R-S4, SB-23R-S5, SB-23R-S6, and SB-23R-W1 (Table 1). PCB concentrations in soil above the construction worker screening criteria are present below 2 feet bgs at locations SB-23, SB-23R-N2, SB-23R-E1, SB-23R-E2, SB-23R-S1, SB-23R-S2, SB-23R-S3,

[1] The excess cancer risks were either less than or only marginally above a level of 1 x 10^{-6}, and the noncancer hazards were well below a value of 1.0.

[2] Corresponding to a cancer risk level of 1 x 10^{-6} and noncancer hazard of 1.0.

SB-23R-S4, and SB-23R-W1. In addition, a single dieldrin location (SB-23 at 5 feet bgs) also exceeded the commercial/industrial worker screening levels (Table 1). There are no unacceptable risks to commercial and construction workers related to these PCB and single dieldrin soil concentrations under current conditions and current use of the property. If soils from between 2 and 9.5 feet bgs are brought to the surface and left accessible for extended time periods, potential risks associated with exposure to the soil should be mitigated. To be conservative, the areas in the planting area where no data are available were included in the management area. Figure 3 shows the area of commercial and construction workers screening criteria exceedances to be managed if deeper soils are brought to the surface; subsurface activities in this area must be performed in accordance with this Subsurface Media Management Plan.

Under current use of the property, no complete exposure pathways were identified for groundwater by ingestion or direct contact because impacted groundwater at the property is not used for potable water purposes and the non-potable supply well draws from outside of the impacted groundwater area. The Land Use Covenant currently in preparation will formally document restriction of the use of shallow groundwater (Section 2.6); the Land Use Covenant will ensure any future groundwater wells will draw from outside of the impacted groundwater area.

Vapor intrusion-related risks are not a concern under current use of the property (AECOM 2021). Current land use and lumber yard operations consist primarily of outdoor operations and indoor activities are limited to two buildings: the office trailer and the former Office/Maintenance Building. The office trailer is a raised portable with free space and air flow between the bottom of the trailer and the ground surface. The former Office/Maintenance Building is reportedly currently occupied by Site workers for up to one hour per day. Figure 3 shows the approximate areas requiring soil vapor risk management under the assumption of an AF of 0.03 and the California-specific commercial AF of 0.005 and considering all depths of soil vapor data. In the future near areas that exceed screening levels (Figure 3), potential vapor intrusion risks should be evaluated and mitigated (e.g. soil vapor sampling, elevating structures to create free air space, vapor barrier), if warranted based on the evaluation, under scenarios such as:

- Current use of existing conventional slab-on-grade structures changes (e.g., the former Office/Maintenance Building occupied for more than one hour per day)
- Open-walled structures were to be enclosed and occupied (e.g., the former Mixing Room).
- Conventional slab-on-grade enclosed structures are proposed to be constructed.

B-1.2 Ecological

Several guidance documents were used as resources for ecological screening levels (AECOM 2021).

B-1.2.1 Terrestrial Receptors

Few screening levels were available for plants and the one plant screening level that was applied (for total PCBs) was not exceeded.

For birds, the maximum soil concentrations of total 4,4'-dichloro-diphenyl-trichloroethane (DDT), total PCBs, and dieldrin within 0 to 2 feet bgs exceeded the screening levels. However, the 95 percent (%) upper confidence limits (UCLs), which are more representative of exposure for mobile species like birds, were below the screening levels. These results, coupled with the low quality habitat, indicate that current use of the property poses little risk to terrestrial birds.

The majority of potential foraging areas at the Site are characterized by barren and ornamental habitats, which provide limited resource value. Continued commercial activity will not result in improvements to foraging conditions. The presence of burrowing mammal habitat will continue to be hindered by compaction, as well as frequent disturbance during commercial activities across the majority of the Site.

For burrowing mammals exposed to 0 to 6 feet bgs soils, maximum soil concentrations of total DDT, total PCBs, and dieldrin were above the screening levels. For soils within 0 to 2 feet bgs, the 95% UCLs for total DDT and dieldrin were higher than the screening levels and the 95% UCL for total PCBs was less than the screening level. Because the maximum concentrations of PCBs and these chlorinated pesticides were detected at SB-23 at 4.5 to 5 feet bgs, and these detections were markedly higher than other detections of these constituents of potential ecological concern (COPECs), the 95% UCLs for 0 to 6 feet bgs soils were calculated without the data from SB-23. The 95% UCLs for 0 to 6 feet bgs soils for total DDT, total PCBs, and dieldrin were higher than the screening levels when these deep SB-23 data were excluded.

The risk posed by these exceedances is overestimated because the highest concentrations of these COPECs occur in soil between 4.5 to 5 feet bgs, which is deeper than most burrowing rodent activity would be expected to occur. Most burrowing rodents remain within the first 2 to 3 feet of soil (California Department of Toxic Substances Control [DTSC] 1998). In addition, food consumption is typically the primary pathway of exposure for mammals (U.S. EPA 2005), and prey such as insects and other invertebrates would not be expected to contact COPECs in soils deeper than the first few feet (e.g., bioactive zone). The Site generally lacks a soil invertebrate community (especially earthworms) in the barren areas where contamination is present at the surface and subsurface, and animals at the Site are likely to be exposed to lower doses of chemicals than predicted in this conservative screening assessment. There are currently no unacceptable risks to terrestrial ecological receptors related to concentrations of PCBs and chlorinated pesticides in soil under current use of the property.

Potential future ecological risks associated with PCBs in subsurface soils in the vicinity of location SB-23, including locations SB-23R, SB-23R-N1, SB-23R-N2, SB-23R-E1, SB-23R-E2, SB-23R-S1, SB-23R-S2, SB-23R-S3, SB-23R-S4, and SB-23R-W1 may exist if these deeper soils are brought to the surface. At these locations, PCB detections exceed the ecological screening level for subsurface soils of 4 mg/kg in addition to the lower screening level for surface soil of 0.371 mg/kg (Table 2, Figure 3). Other locations in the vicinity of SB-23 have subsurface PCB detections that exceed the surface soil screening level, but not the subsurface screening level (SB-23R-E3, SB-23R-E4, SB-23R-S5, SB-23R-S6). Total PCB concentrations in subsurface soils from the remaining locations, which are not affiliated with SB-23, i.e., SB-4-7.5', SB-17-7.5', SB-3R-2.5', SB-12R-8.0', and SB-25-5.0', are only slightly higher than the surface soil screening level (≤ 2 times higher); therefore, measures to address potential future subsurface soil exposures by ecological receptors is not warranted.

In addition, pesticides in subsurface soil in the vicinity of sample locations SB-3R, SB-6, SB-15, SB-17, and SB-23 may pose a concern due to exceedances of the surface soil screening levels (Table 3, Figure 3). Subsurface soil concentrations of pesticides in exceedance of the surface soil screening levels at the remaining locations (SB-1-7.5', SB-2-7.5', SB-4-7.5', SB-14-7.5', SB-3R-8.0', SB-12-7.5', SB-12R-5.0', and SB-12R-8.0') are considered low (≤ 5 times higher) in recognition of the conservative nature of the surface soil screening levels and are not expected to pose an ecological risk if brought to the surface.

If deeper soils from these areas discussed above are brought to the surface and left accessible for extended time periods, potential risks associated with exposure to the soil should be mitigated. Figure 3 shows the areas of potential hazards to ecological receptors if deeper soils are brought to the surface. Subsurface activities in these areas must be performed in accordance with this Subsurface Media Management Plan.

As stated above, no further assessment of PCBs and pesticides in surface soil under current use of the property is warranted because the 95% UCL is below the lowest ecological screening level for PCBs, and the 95% UCLs for total DDTs and dieldrin are only slightly higher than the soil SLs.

B-1.2.2 Future Wetland Receptors

In light of the proposed land use change in the area of the swale at the north-central portion of the Site, a focused ecological risk screening was conducted on data collected within the proposed

freshwater wetland footprint to assess the potential for risk to benthic and aquatic organisms that could populate this wetland in the future (AECOM 2021).

The near surface soil depths (0 to 1.0 foot bgs) at seven locations were selected because they most closely correspond to the likely depth of the bioactive zone of a future wetland use in the vicinity (bottom of Tables 2 and 3). PCBs were detected in surface soil from SB-24 above both lower and upper-bound screening levels, while at SB-25 only the lower-bound sediment screening level was exceeded (Table 2). Total DDTs, chlordane, and cis- and trans-chlordane were detected in surface soil from SB-3R at concentrations greater than the lower-bound sediment screening level, and the chlordane detection was also above the upper-bound sediment screening level (Table 3).

Potential future ecological risks to the benthic community should be mitigated if the proposed land use change encouraging establishment of an emergent freshwater wetland is implemented. The proposed wetland will be small and seasonal in nature (water levels are expected to be higher in approximately December to February) and the upper six inches of soil (future sediment) will comprise the bioactive zone where the majority of ecological activity occurs. Most of the benthic organisms are expected to reside at the surface and would be exposed to chemicals within the first couple of inches, with infaunal invertebrates (burrowers) potentially contacting soils down to a maximum of six inches. Therefore, prior to installing plantings to promote establishment of the wetland, the upper six inches of soil (i.e., the bioactive zone) within the vicinity of SB-3R and SB-24 in the planting area shown on Figure 3 should be removed and replaced with clean backfill. The locations of the proposed mitigation were identified by evaluating surface soil exceedances of the upper-bound (probable effects concentration) screening values shown on Tables 2 and 3 (i.e., chlordane at SB-3R and PCBs at SB-24). Locations with multiple lower-bound (threshold effects concentration) screening value exceedances in surface soil (more than one COPEC) were also considered for the proposed mitigation (i.e., Total DDTs and chlordane at SB-3R). Although there are multiple sampling points within the proposed planting area, chlordane data are available at only location SB-3R; therefore, the entire area of the proposed wetland area is conservatively included in the mitigation plan. This action may also benefit terrestrial receptors, particularly burrowing mammals, which may be present in the proposed wetland area during the dry season. Most burrowing activity occurs within the top three feet of soil. The 0 to 3 ft depth interval in the proposed wetland area may provide better habitat for terrestrial receptors at the surface, and no exceedances of the burrowing mammal soil screening level for PCBs occur in this area between 0.5 and 2.5 feet bgs; exceedances occur for some OCPs at this depth interval but are expected to represent a substantial overestimate of exposure and risk by including dietary/bioaccumulation pathways that are typically limited to the bioactive zone.

Perched groundwater occurs in the proposed emergent freshwater wetland area. The soil contaminants have been in place since the 1980s and subject to leaching from downward migration of perched groundwater. After removal of impacted soil from the former pesticide disposal pit, analytical testing of extensive suites of agricultural chemicals indicated groundwater impacts were limited to 1,2-DCP and nitrate (Woodward Clyde Consultants 1990 and 1991). No changes to the hydrology will occur from removing and replacing the top six inches of soil in the area, so leaching conditions are not expected to change; thus, the potential for an increase in chemical concentrations in groundwater is very low.

The results for subsurface soil data collected from 2 to 9.5 feet bgs within the footprint of the proposed wetland indicate concentrations of PCBs and pesticides greater than the sediment screening levels, but are beyond the bounds (too deep) of likely ecological exposures as long as they remain buried at depth. SB-23R-E3 (7.5-8 feet bgs), SB-23R-E4 (5 feet bgs), and SB-23R-S3 (4.5-5 feet bgs and 7.5-8 feet bgs) are the locations within the wetland footprint with PCB concentrations in subsurface soils at levels of potential concern to benthic or aquatic organisms (>10 times higher than lower-bound sediment screening level). In addition, concentrations of dieldrin and total DDTs (>10 times higher than lower-bound sediment screening levels) and toxaphene (> upper-bound sediment screening level) at SB-3R-2.5', and dieldrin and total DDTs at SB-12-1.5' (>10 times higher than lower-bound sediment screening level) are present in subsurface soils at levels of potential concern to benthic or aquatic organisms. Therefore, if these deeper soils are brought to the surface, potential future ecological risks

associated with exposure to the soil/wetland sediment should be mitigated. Figure 3 shows the areas of potential hazards to ecological receptors if deeper soils are brought to the surface. Subsurface activities in these areas must be performed in accordance with this Subsurface Media Management Plan.

About AECOM
AECOM (NYSE: ACM) is a global provider of professional technical and management support services to a broad range of markets, including transportation, facilities, environmental and energy. With more than 50,000 employees around the world, AECOM is a leader in all of the key markets that it serves. AECOM provides a blend of global reach, local knowledge, innovation, and technical excellence in delivering solutions that enhance and sustain the world's built, natural, and social environments.

AECOM Technical Services, Inc.
9 Jonathan Bourne Drive, Unit 1
Pocasset, MA 02559
T 508.833.6950
F 508.833.6951
www.aecom.com

Roper Engineering
Civil Engineering & Land Surveying
64 Penny Lane, Suite A - Watsonville, CA 95076-6021
(831) 724-5300 phone
(831) 724-5509 fax
jeff@roperengineering.com e-mail

Jeff A. Roper
Civil Engineer & Land Surveyor
RCE 41081
PLS 5180

STORMWATER MANAGEMENT REPORT

For

PACIFIC COAST HARDWOODS

Attn: Dave Joseph
250 Ocean View Avenue
Santa Cruz, CA 95062

New Saw Mill at
1400 Ranport Road
Watsonville, Santa Cruz County
APN 052-511-06
Job No. 15027
July 2016
Rev: February 2017

Existing Site Drainage

The existing parcel is bounded by Highway One to the north, Ranport Road to the south, the headwaters of Harkins Slough to the east and commercial property to the west. The site consists of 2 relatively level bench pads, the west pad being approximately 40 feet higher in elevation that the east pad.

The area surrounding the pads slope away from the level areas in all directions. There are drainage ditches along Ranport Road and Highway One that drain to Harkins Slough. Harkins Slough has a 100 year flood level of 17.0 feet as shown on the civil plans.

The west pad is currently being used by a tree pruning company and will continue to utilize this location. The east pad will be developed for the saw mill as shown on the preliminary civil and architectural plans.

Proposed Drainage

The project development will be split into four phases. Our preliminary civil plans assume full build out of all phases. Four new buildings are proposed, two 5000 sf warehouses, one 5000 sf saw mill building and one 864 sf office building along with asphalt paths and baserock driveways. We propose to collect all the runoff from the roof downspouts and direct them to the bioretention/detention pond. This pond will be sized to mitigate the 2 to 10 year storm levels.

The Infiltration Report by Rock Solid Engineering gave infiltration rates of 0.08 to 0.3 inches per hour. Due to the low percolation rates of the onsite soils, we propose to provide bioretention at the rate of 4% of the new impervious area.

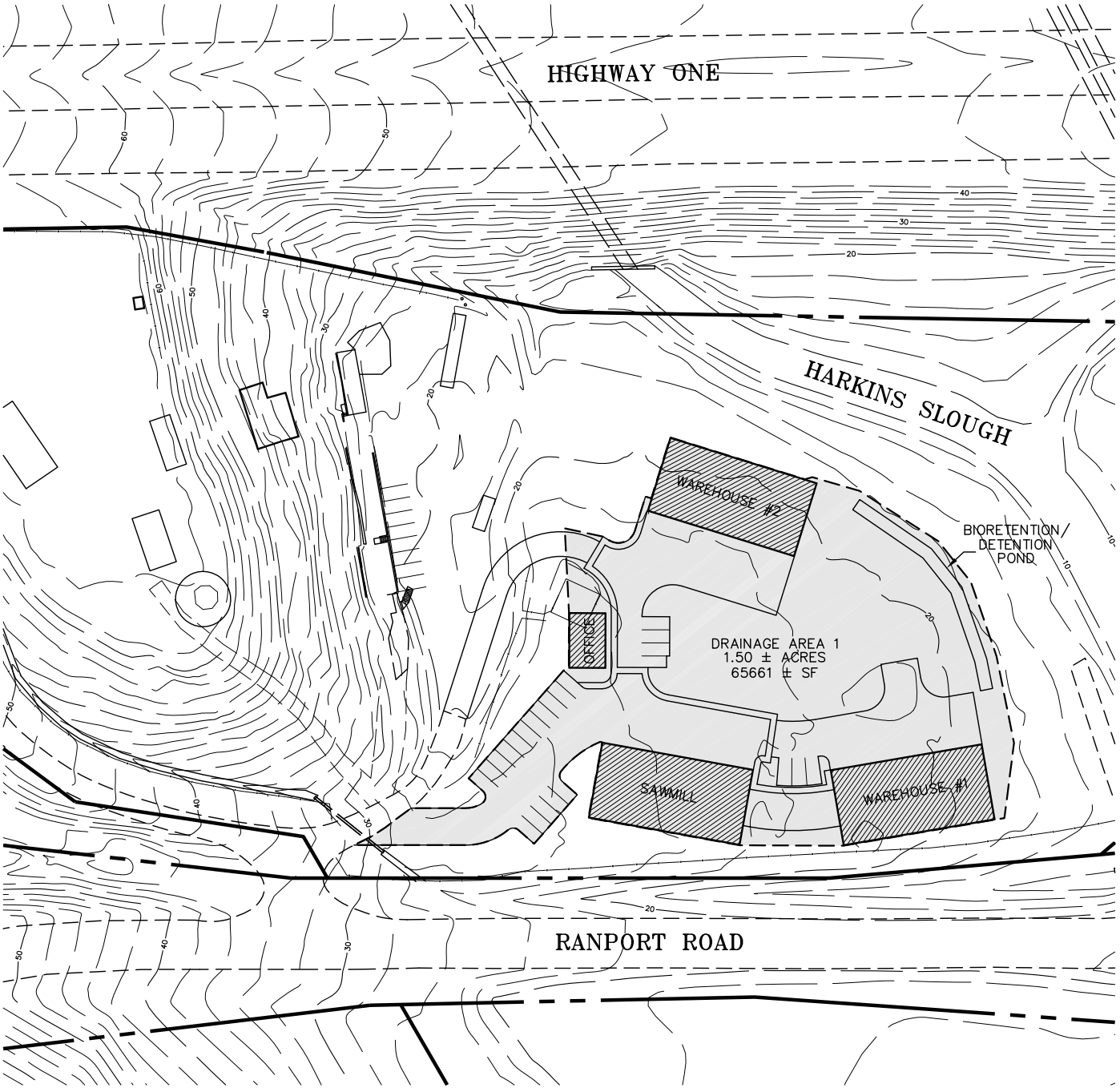
A three foot high berm will be constructed outside the 50’ riparian setback and the 100 year flood level to direct all runoff from the new impervious surfaces through the bioretention/detention pond. This berm will surround the lower bench between warehouses #1 & #2 along Harkin Slough.

Runoff from the lower bench will be intercepted by the new bioretention/detention pond (see attached Drainage Area sketch). This pond will be designed to treat the 2 year storm from the new buildings, baserock and asphalt pavement areas. An Industrial SWPPP will be required for this operation which will describe how the bioretention/detention ponds will be maintained and protected from debris.

Clean overflow runoff water will be allowed to drain through the berm to the Harkins Slough drainage channel. Samples of this runoff will be taken during rain events as specified in the Industrial SWPPP.

Attached is a storm water detention calculation sheet. We utilized a runoff coefficient of 0.5 for the baserock areas. We used half of the new baserock surface areas in determining the new impervious surfaces for bioretention due to the semi-pervious nature of baserock.

CLIENT: PACIFIC COAST HARDWOODS	**ROPER ENGINEERING** CIVIL ENGINEERING & LAND SURVEYING 64 PENNY LANE, SUITE A WATSONVILLE, CA 95076 (831) 724-5300	**JOB NO.:** 15027
LOCATION: 1400 RANPORT ROAD		**DATE:** FEB. 17, 2016
DRAINAGE CALCULATIONS		**SHEET:** 1 OF 1



DRAINAGE AREAS

SCALE: 1"=100'

0 50 100 200
FEET

CONTOURS ON THIS SHEET ARE BASED UPON AERIAL MAPPING BY THE CITY OF WATSONVILLE DATED 2007 NAVD 1988 DATUM, 2 FOOT CONTOUR INTERVAL

PROJECT: Pacific Coast Hardwoods- APN: 052-511-06 Application: 161014 **Calc by:** JR **Date:** 2/16/2017

RUNOFF DETENTION BY THE MODIFIED RATIONAL METHOD

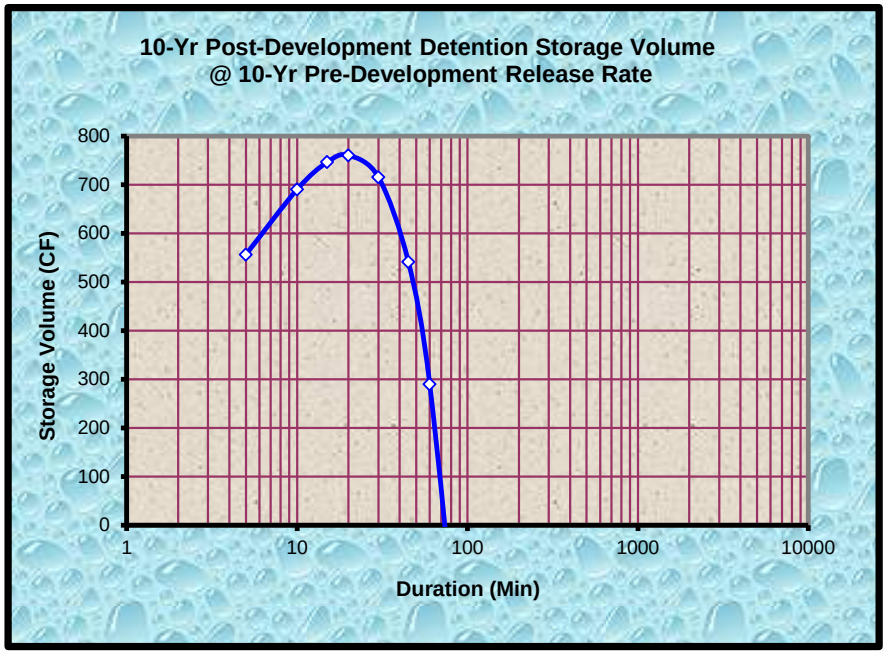
Data Entry: PRESS TAB & ENTER DESIGN VALUES SS Ver: 1.0

Site Location P60 Isopleth:	1.30		Fig. SWM-2 in County Design Criteria
Rational Coefficients Cpre:	0.25		See note # 2
Cpost:	0.51		See note # 2
Impervious Area:	67963	ft^2	See note # 2 and # 4

STRUCTURE DIMENSIONS FOR DETENTION

761	ft^3 storage volume calculated			
100	% void space assumed			
761	ft^3 excavated volume needed			
Structure	Length	Width*	Depth*	*For pipe, use the square
Ratios	95.00	8.00	1.00	root of the sectional area
Dimen. (ft)	**95.02**	**8.00**	**1.00**	

10 - YEAR DESIGN STORM				DETENTION @ 15 MIN.	
Storm Duration (min)	10 - Year Intensity (in/hr)	10 - Yr. Release Qpre (cfs)	10 - Year Qpost (cfs)	Detention Rate To Storage (cfs)	Specified Storage Volume (cf)
1440	0.21	0.084	0.171	-0.467	-50444
1200	0.23	0.091	0.185	-0.453	-40738
960	0.25	0.100	0.205	-0.433	-31199
720	0.29	0.114	0.232	-0.405	-21891
480	0.35	0.136	0.278	-0.359	-12940
360	0.39	0.155	0.316	-0.321	-8678
240	0.47	0.186	0.379	-0.259	-4660
180	0.54	0.211	0.431	-0.207	-2796
120	0.64	0.253	0.516	-0.122	-1098
90	0.73	0.287	0.586	-0.052	-348
60	0.88	0.344	0.702	0.064	290
45	0.99	0.391	0.798	0.160	541
30	1.19	0.469	0.956	0.318	716
20	1.43	0.561	1.145	0.507	**761**
15	1.62	**0.638**	1.301	0.663	746
10	1.94	0.764	1.558	0.921	690
5	2.64	1.040	**2.121**	1.484	556



Notes & Limitations on Use:

1) The modified rational method, and therefore the standard calculations are applicable in watersheds up to 20 acres in size.
2) Required detention volume determinations shall be based on all net new impervious area both on and off-site, resulting from the proposed project. Pervious areas shall not be included in detention volume sizing; an exception may be made for incidental pervious areas less than 10% of the total area.
3) Gravel packed detention chambers shall specify on the plans, aggregate that is washed, angular, and uniformly graded (of single size), assuring void space not less than 35%.
4) A map showing boundaries of both regulated impervious areas and actual drainage areas routed to the hydraulic control structure of the detention facility is to be provided, clearly distinguishing between the two areas, and noting the square footage.
5) The EPA defines a class V injection well as any bored, drilled, or driven shaft, or dug hole that is deeper than its widest surface dimension, or an improved sinkhole, or a subsurface fluid distribution system. Such storm water drainage wells are "authorized by rule". For more information on these rules, contact the EPA. A web site link is provided from the County DPW Stormwater Management web page.
6) Refer to the County of Santa Cruz Design Criteria, for complete method criteria.

ROCK SOLID ENGINEERING, INC.
Soil Reports • Site Assessments • Manufactured Home Foundations • Expert Witness • Real Estate Inspections

Project No. 14047
January 5, 2017

David Joseph
193 Vega Road
Watsonville, California 9507

SUBJECT: **ADDENDUM TO GEOTECHNICAL INVESTIGATION REPORT**
Proposed Steel Buildings and Office Building
1400 Ranport Road, Watsonville, California
Portion of APN: 052-511-08

REFERENCES: See Attached

Dear Mr. Joseph:

Based on our review of the current plans for the site prepared by Roper Engineering (Reference 3), it is our understanding that you are planning on extending the footprint of Storage Warehouse #1. The new footprint will extend beyond the setback of 100 feet from the centerline of Harkins Slough which was recommended in the referenced Geotechnical Investigation report (Reference 2). Additionally, a new office building and another warehouse building are now proposed.

As a result of the changes to the proposed development, we advanced 3 borings in the areas of the new development. The locations of the borings are shown on **Figure A-1.**

Details of the field exploration and laboratory testing are presented in Appendix A.

The conclusions and recommendations based on our field exploration are presented herein.

New Storage Warehouse #1 and #2

a. Boring B-6 was advanced in the area of the footprint of Storage Warehouse #1, where it is located in the setback of 100 feet from the centerline of Harkins Slough. Boring B-7 was advanced in the area of Storage Warehouse #2. The soil stratums encountered were generally consistent with the initial borings advanced at the site.

b. It is our opinion that the warehouse structures may be supported by a **foundation system composed of helical screw piles** founded below the liquefiable stratum and peat layers, in accordance with our original report (Reference 2). Recommendations for these foundation systems are provided in Section 5.3, Foundations.

New Office Building

a. Boring B-8 was advanced in the area of the proposed office building. The soil stratums encountered were fairly consistent with the initial borings advanced at the site.

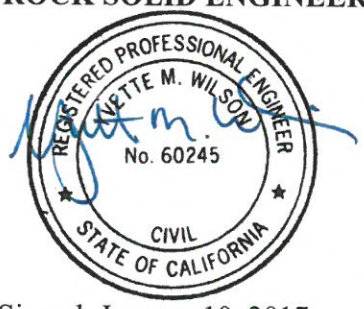
b. It is our opinion that the proposed office building may be supported by a **foundation system composed of helical screw piles** founded below the liquefiable stratum and peat layers, in accordance with our original Geotechnical Investigation report (Reference 2). Recommendations for these foundation systems are provided in Section 5.3, Foundations.

c. A significant layer of peat was encountered underlying the building pad. The peat layer may cause significant settlement of concrete slab floors. Based on the potential for settlement of the building site, we recommend that the new office building be designed with raised wood floors supported by the helical anchors. Should the office building be designed with slab-on-grade floors the slab shall be designed to span all loads to the helical anchors. For further recommendations see Section 5.5 of our original Geotechnical Investigation report (Reference 2), Slabs-on-Grade.

The remaining portions of the Geotechnical Investigation report generally continue to apply. If you have any questions, or if we may be of further assistance, please do not hesitate to contact our office.

Sincerely,

ROCK SOLID ENGINEERING, INC.



Signed: January 10, 2017

Yvette M. Wilson, P.E.
Principal Engineer
R.C.E. 60245

Attachments: References
Appendix A: Field Exploration and Laboratory Testing Program

Distribution: (4) Addressee and via email

REFERENCES

1. Mid Coast Engineers, Topographic Map, Western Farm Service, APN 052-011-58, Job No. 95109, Revision Date, 4-17-96.

2. Rock Solid Engineering, Inc., Geotechnical Investigation-Design Phase, Proposed Steel Building, 1400 Ranport Road, Watsonville, Santa Cruz County, California, APN: 052-511-08, Job No. 14047, Dated November 10, 2014.

3. Roper Engineering, New Processing Mill for Pacific Coast Hardwoods, 1400 Ranport Road, APN 052-511-06 & 058, Job No. 15027, Sheet C2, Dated July 11, 2016.

APPENDIX A

FIELD EXPLORATION AND LABORATORY TESTING PROGRAM

FIELD EXPLORATION PROCEDURES

A-1. Subsurface conditions were explored by drilling 3 borings to depths between 25 and 40 feet below existing grade. The borings were advanced with a truck mounted drill rig equipped with 8 inch hollow stem augers. The approximate locations of the borings are shown on the Boring Location Plan, **Figure A-1**. The Key to Logs, **Figure A-2**, gives definitions of the terms used in the Logs of Exploratory Borings. The Logs of Exploratory Borings are presented in **Figures A-3** through **A-5**.

A-2. Drilling of the borings was observed by our Field Engineer who logged the soils and obtained bulk and relatively undisturbed samples for classification and laboratory testing. The soils were classified, based on field observations and laboratory testing, in accordance with Unified Soil Classification System.

A-3. Relatively undisturbed soil samples were obtained by means of a drive sampler. The hammer weight and drop being 140 pounds and 30 inches, respectively. The number of "Blows/Foot"required to drive samplers are indicated on the logs.

A-4. Exploratory borings were located in the field by measuring from know landmarks. The locations, as shown, are therefore within the accuracy of such a measurement.

A-5. Groundwater was encountered at depths between 13.5 and 28 feet below existing grade during the course of our field exploration.

LABORATORY TESTING PROCEDURES

A-6. Classification

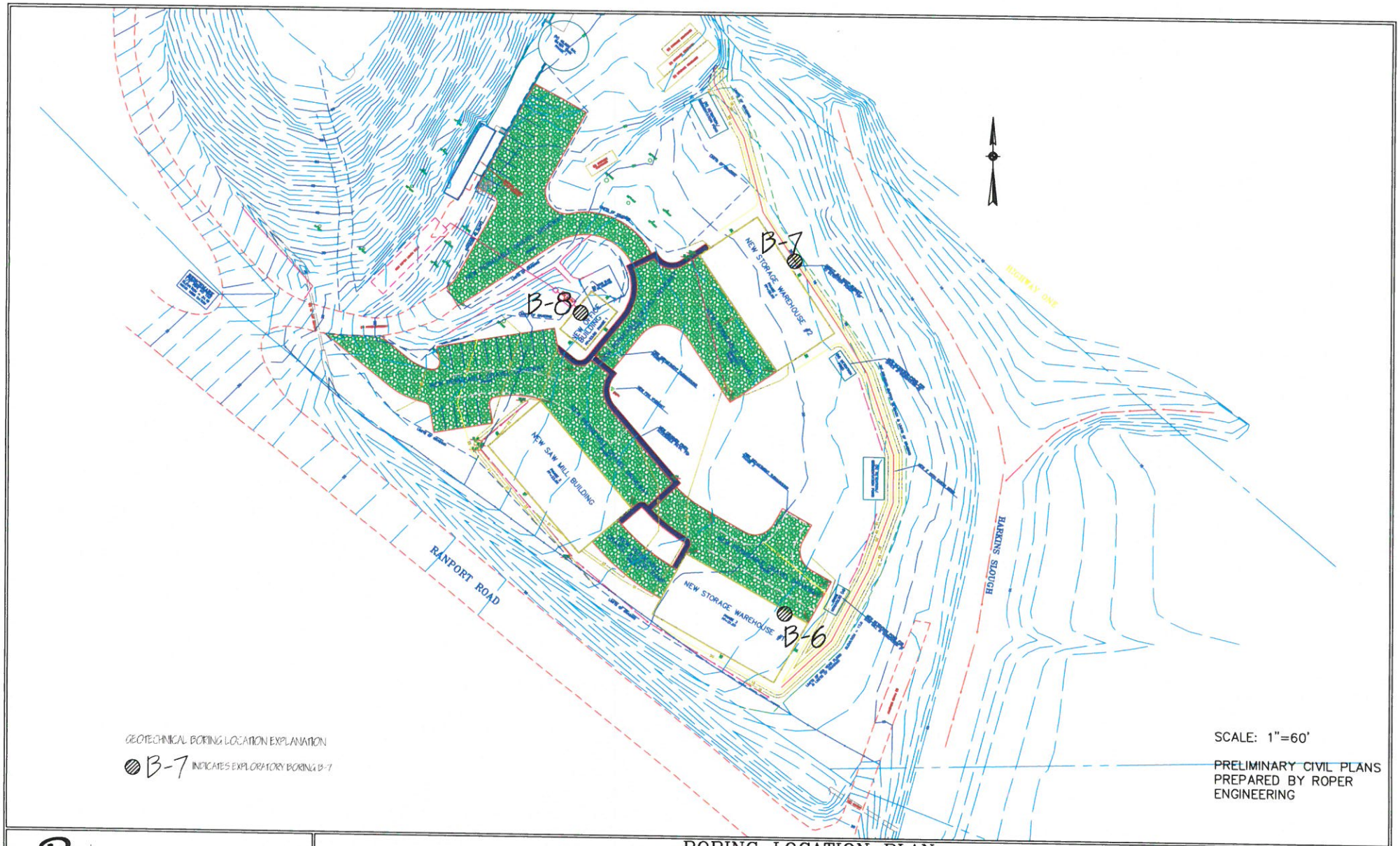
Soils were classified in accordance with the Unified Soil Classification System. Moisture content and in-situ density determinations were made from relatively undisturbed soil samples. The results are presented in the Logs of Exploratory Borings and in the Summary of Laboratory Test Results, **Figure A-6**.

A-7. Consolidation

Consolidation tests were performed on representative, relatively undisturbed samples of the underlying soils to determine compressibility characteristics. The samples were saturated during the tests to simulate possible adverse field conditions. The test results are presented in **Figures A-7 and A-8**.

A-8. Soluble Sulfates

The soluble sulfate content was determined for samples considered representative of the on-soils likely to come in contact with concrete in accordance with test method California 417. The test results are presented in **Figure A-6**.



ROCK SOLID ENGINEERING, INC.

BORING LOCATION PLAN

1400 RANPORT ROAD
WATSONVILLE, CALIFORNIA

FIGURE A-1

KEY TO LOGS

UNIFIED SOIL CLASSIFICATION SYSTEM

PRIMARY DIVISIONS			GROUP SYMBOL	SECONDARY DIVISIONS
COARSE GRAINED SOILS More than half of the material is larger than the No. 200 sieve	GRAVELS More than half of the coarse fraction is larger than the No. 4 sieve	CLEAN GRAVELS (Less than 5% fines)	GW	Well graded gravels, gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels, gravel-sand mixtures, little or no fines
		GRAVEL WITH FINES	GM	Silty gravels, gravel-sand-silt mixtures, non-plastic fines
			GC	Clayey gravels, gravel-sand-clay mixtures, plastic fines
	SANDS More than half of the coarse fraction is smaller than the No. 4 sieve	CLEAN SANDS (Less than 5% fines)	SW	Well graded sands, gravelly sands, little or no fines
			SP	Poorly graded sands, gravelly sands, little or no fines
		SAND WITH FINES	SM	Silty sands, sand-silt mixtures, non-plastic fines
			SC	Clayey sands, sand-clay mixtures, plastic fines
FINE GRAINED SOILS More than half of the material is smaller than the No. 200 sieve	SILTS AND CLAYS Liquid limit less than 50		ML	Inorganic silts and very fine sands, silty or clayey fine sands or clayey silts with slight plasticity
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	Organic silts and organic silty clays of low plasticity
	SILTS AND CLAYS Liquid limit greater than 50		MH	Inorganic silts, micaceous or diatomacaceous fine sandy or silty soils, elastic silts
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS			Pt	Peat and other highly organic soils

GRAIN SIZE LIMITS

SILT AND CLAY	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		
No. 200	No. 40	No. 10	No. 4	3/4 in.	3 in.	12 in.	

US STANDARD SIEVE SIZE

RELATIVE DENSITY	
SAND AND GRAVEL	BLOWS/FT*
VERY LOOSE	0 - 4
LOOSE	4 - 10
MEDIUM DENSE	10 - 30
DENSE	30 - 50
VERY DENSE	OVER 50

CONSISTENCY	
SILT AND CLAY	BLOWS/FT*
VERY SOFT	0 - 2
SOFT	2 - 4
FIRM	4 - 8
STIFF	8 - 16
VERY STIFF	16 - 32
HARD	OVER 32

MOISTURE CONDITION
DRY
DAMP
MOIST
WET

* Number of blows of 140 pound hammer falling 30 inches to drive a 2 inch O.D. (1 3/8 inch I.D.) split spoon (ASTM D-1586).

LOG OF EXPLORATORY BORING

Project No.:	14047	Boring:	B6
Project:	1400 Ranport Road	Location:	Storage Warehouse #1
	Watsonville, California	Elevation:	
Date:	September 28, 2016	Method of Drilling:	Truck Mounted Drill Rig, 8in. Hollow Stem
Logged By:	YW/CF		Auger, 140lb. Safety Hammer

2" DIA Sample | 2.5" DIA Sample w/ Liners | Bulk Sample | Terzaghi Split Spoon Sample | 2.5" DIA Sample w/out Liners | Static Water Table

Depth (ft.)	Soil Type	Undisturbed	Bulk	Description	Blows	Dry Density (pcf)	Moisture Content (%)	Wet Density (pcf)	Direct Shear c (psf)	Direct Shear ϕ°	Miscellaneous Laboratory Testing
	SP			Brown SAND with Trace Fines. Dry to Moist, Non-Plastic. (Possible Fill)							
5	CL		X	Blue Grey CLAY. Moist to Wet, Firm, Plastic. (Native). Black Silty CLAY. Moist to Wet, Firm, Plastic.	6						
10	CL		X	Black Silty CLAY. Wet, Firm, Plastic.	7						
	Pt		X	Dark Brown Peat.							
	CL		X	Black Silty CLAY. Wet, Stiff, Plastic. Wood at Bottom of Sample.	15						
15	Pt		X	Dark Brown Peat.							
	CL		X	Black Silty CLAY with Organics. Wet to Saturated, Firm, Plastic.	7		59.0				
20				Material Consistent.							
	CL		X	Blue Grey Clayey SAND. Wet, Loose, Medium Plastic. Trace Gravels. No Organics.	8		19.1				
25											

ROCK SOLID ENGINEERING, INC.

FIGURE A-3.1

LOG OF EXPLORATORY BORING

Project No.:	14047	Boring:	B6 Continued
Project:	1400 Ranport Road	Location:	Storage Warehouse #1
	Watsonville, California	Elevation:	
Date:	September 28, 2016	Method of Drilling:	Truck Mounted Drill Rig, 8in. Hollow Stem Auger, 140lb. Safety Hammer
Logged By:	YW/CF		

2" DIA Sample | 2.5" DIA Sample | Bulk Sample | Terzaghi Split Spoon Sample | Static Water Table

Depth (ft.)	Soil Type	Undisturbed	Bulk	Description	Blows	Dry Density (pcf)	Moisture Content (%)	Wet Density (pcf)	Direct Shear c (psf)	Direct Shear ϕ°	Miscellaneous Laboratory Testing
	CL		X	Material Consistent. Clay Content Varies. Some Sandstone Clasts.	12		18.0				
	▽			Groundwater.							
	SC		X	Greyish Brown Clayey SAND with Gravels. Saturated, Loose, Non-Plastic.	14						
30				Boring Terminated @ 30 ft. Groundwater Encountered @ 28 ft. Boring Backfilled with Cuttings.							
35											
40											
45											
50											

ROCK SOLID ENGINEERING, INC.

FIGURE A-3.2

LOG OF EXPLORATORY BORING

Project No.:	14047	Boring:	B7
Project:	1400 Ranport Road	Location:	Storage Warehouse #2
	Watsonville, California	Elevation:	
Date:	September 28, 2016	Method of Drilling:	Truck Mounted Drill Rig, 8in. Hollow Stem
Logged By:	YW/CF		Auger, 140lb. Safety Hammer

2" DIA Sample | 2.5" DIA Sample | Bulk Sample | Terzaghi Split Spoon Sample | Static Water Table

Depth (ft.)	Soil Type	Undisturbed	Bulk	Description	Blows	Dry Density (pcf)	Moisture Content (%)	Wet Density (pcf)	Direct Shear c (psf)	Direct Shear φ°	Miscellaneous Laboratory Testing
				FILL: Brown Silty SAND. Dry, Non-Plastic.							
	SM	X	X	Brown Silty SAND. Dry, Loose, Non-Plastic. Organics, Wood Chips, Some Gravels.	9	100.2	15.0	115.2			Consolidation
	ML			Dark Gray to Black Clayey SILT. Moist, Plastic. No Recovery	7						
5				Layer of Wood and Roots							
	CL			**NATIVE:** Dark Gray to Black Silty CLAY. Wet, Very Soft, Plastic.	3						
	SC			Gray Clayey SAND. Wet to Saturated, Non-Plastic. Some Organics.							
	Pt		X	Dark Brown Clayey SILT. Wet. Highly Organic. Material Consistent.	8						
10	SC			Dark Gray Clayey SAND. Wet, Loose.							
	CL			Blue Gray Silty CLAY. Wet, Firm, Plastic. Some Organics.	6						
			X	Dark Gray CLAY. Moist to Wet, Plastic. No Organics.							
	CL		X	Blue Gray Silty CLAY. Wet, Stiff, Plastic. Some Organics.	16						
15	Pt			Peat.							
			X	Peat.	6						
			X	Peat.	7		233.7				
20				Peat.							
	CL		X	Dark Gray to Black Silty CLAY. Wet, Firm, Plastic. No Organics.	6		32.5				
			X	Dark Gray to Black Sandy CLAY. Wet, Stiff, Medium Plastic. No Organics.	12		20.0				
25											

ROCK SOLID ENGINEERING, INC.

FIGURE A-4.1

LOG OF EXPLORATORY BORING

Project No.:	14047	Boring:	B7 Continued
Project:	1400 Ranport Road	Location:	Storage Warehouse #2
	Watsonville, California	Elevation:	
Date:	September 28, 2016	Method of Drilling:	Truck Mounted Drill Rig, 8in. Hollow Stem
Logged By:	YW/CF		Auger, 140lb. Safety Hammer

2" DIA Sample | 2.5" DIA Sample | Bulk Sample | Terzaghi Split Spoon Sample | Static Water Table

Depth (ft.)	Soil Type	Undisturbed	Bulk	Description	Blows	Dry Density (pcf)	Moisture Content (%)	Wet Density (pcf)	Direct Shear c (psf)	Direct Shear φ °	Miscellaneous Laboratory Testing
	CL			Dark Gray to Black Sandy CLAY. Wet, Stiff, Medium Plastic. Sandier with Depth							
			X	Dark Gray Clayey SAND.	12		17.7				
	SC		X	Gray Clayey SAND. Wet to Saturated, Loose, Medium Plastic	12						
30				Material Consistent.							
	CL		X	Gray Sandy CLAY. Wet, Stiff, Medium Plastic. Trace Gravels.	11						
	▽ SC			Groundwater. Blue Gray Clayey SAND. Saturated, Loose, Medium Plastic. Clay Content Varies.	7						
35											
	SP-SC			Blue Gray SAND. Saturated, Dense, Non-Plastic. Some Gravels.	58						
40				Boring Terminated @ 40 ft. Groundwater Encountered @ 33.5 ft. Groundwater Measured After Drilling @ 20 ft. 5 in. Boring Backfilled with Cuttings.							
45											
50											

ROCK SOLID ENGINEERING, INC.

FIGURE A-4.2

LOG OF EXPLORATORY BORING

Project No.:	14047	Boring:	B8
Project:	1400 Ranport Road	Location:	Proposed Office
	Watsonville, California	Elevation:	
Date:	September 28, 2016	Method of Drilling:	Truck Mounted Drill Rig, 8in. Hollow Stem
Logged By:	YW/CF		Auger, 140lb. Safety Hammer

2" DIA Sample | 2.5" DIA Sample | Bulk Sample | Terzaghi Split Spoon Sample | Static Water Table

Depth (ft.)	Soil Type	Undisturbed	Bulk	Description	Blows	Dry Density (pcf)	Moisture Content (%)	Wet Density (pcf)	Direct Shear c (psf)	Direct Shear φ °	Miscellaneous Laboratory Testing
				FILL: Light Brown Silty SAND. Dry, Non-Plastic.							
	SM			Light Brown Silty SAND. Dry, Medium Dense, Non-Plastic.							
	SC		X	Dark Brown Clayey SAND.	31	105.4	15.4	121.6			Consolidation Sulfate
			X	Material Consistent. Loose. Trace Gravels.	8						
5			X	Material Consistent. Small Roots and Orange Staining.	11						
	CL			Dark Brown Sandy CLAY with Orange Staining. Moist, Soft, Medium Plastic. Trace Organics.							
10			X	Dark Gray Silty CLAY. Wet, Soft, Plastic. No Organics.	4						
				Groundwater.							
	SC			Gray Clayey SAND. Saturated, Loose, Non-Plastic.							
	CL		X	Gray Silty CLAY. Saturated, Firm, Plastic.	9						
15	Pt			Peat.							
	CL			Black Silty CLAY with Organics. Firm, Wet.							
	Pt		X	Peat.	5						
	Pt			Peat.							
20	CL			Black Silty CLAY. Wet, Soft, Plastic. Organics Present.	4						
				Boring Terminated @ 25 ft. Groundwater Encountered @ 13.5 ft. Boring Backfilled with Cuttings.							
25	SC		X	Gray Clayey SAND. Wet, Stiff, Medium Plastic.	10		21.0				

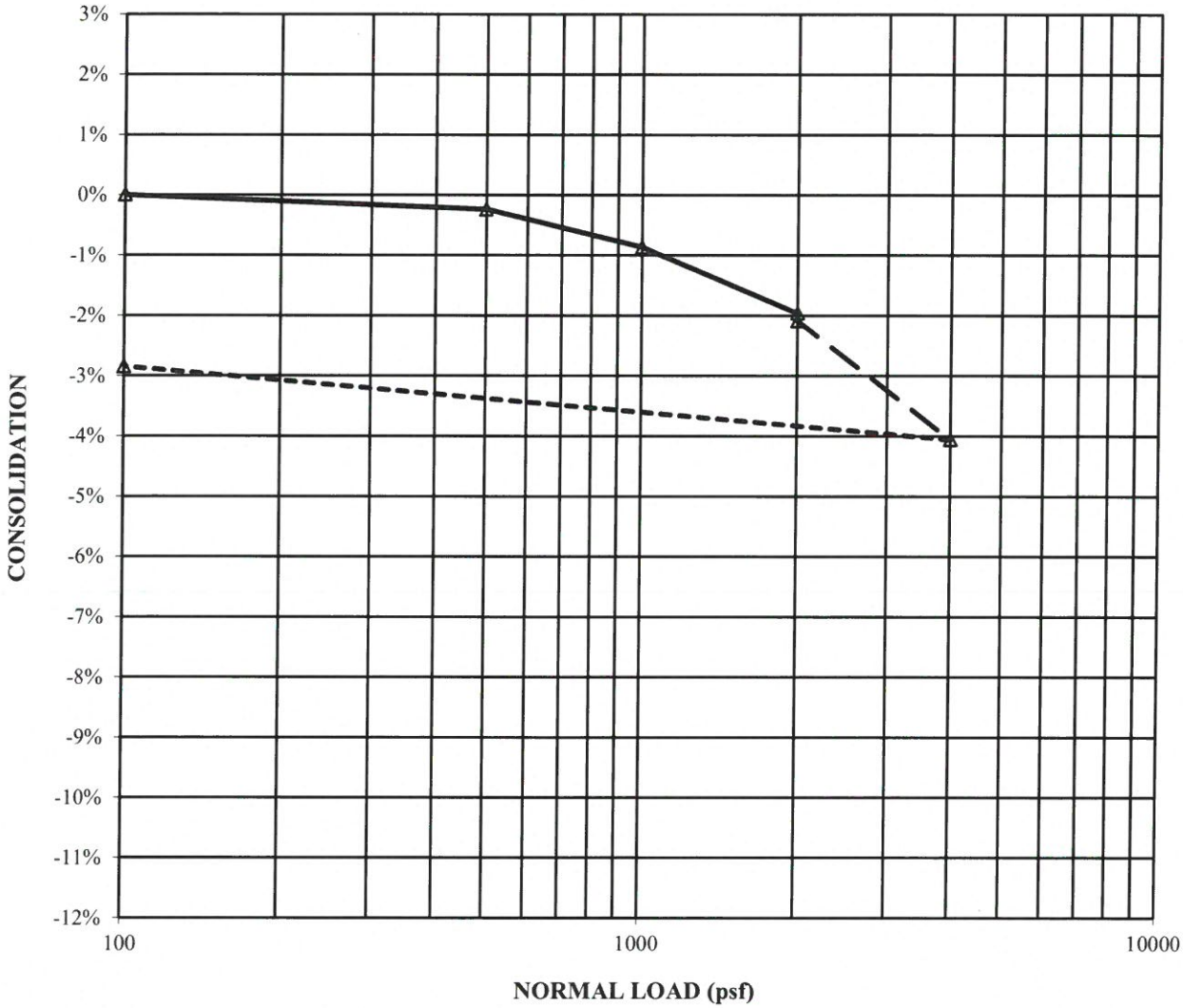
ROCK SOLID ENGINEERING, INC.

FIGURE A-5

SUMMARY OF LABORATORY TEST RESULTS

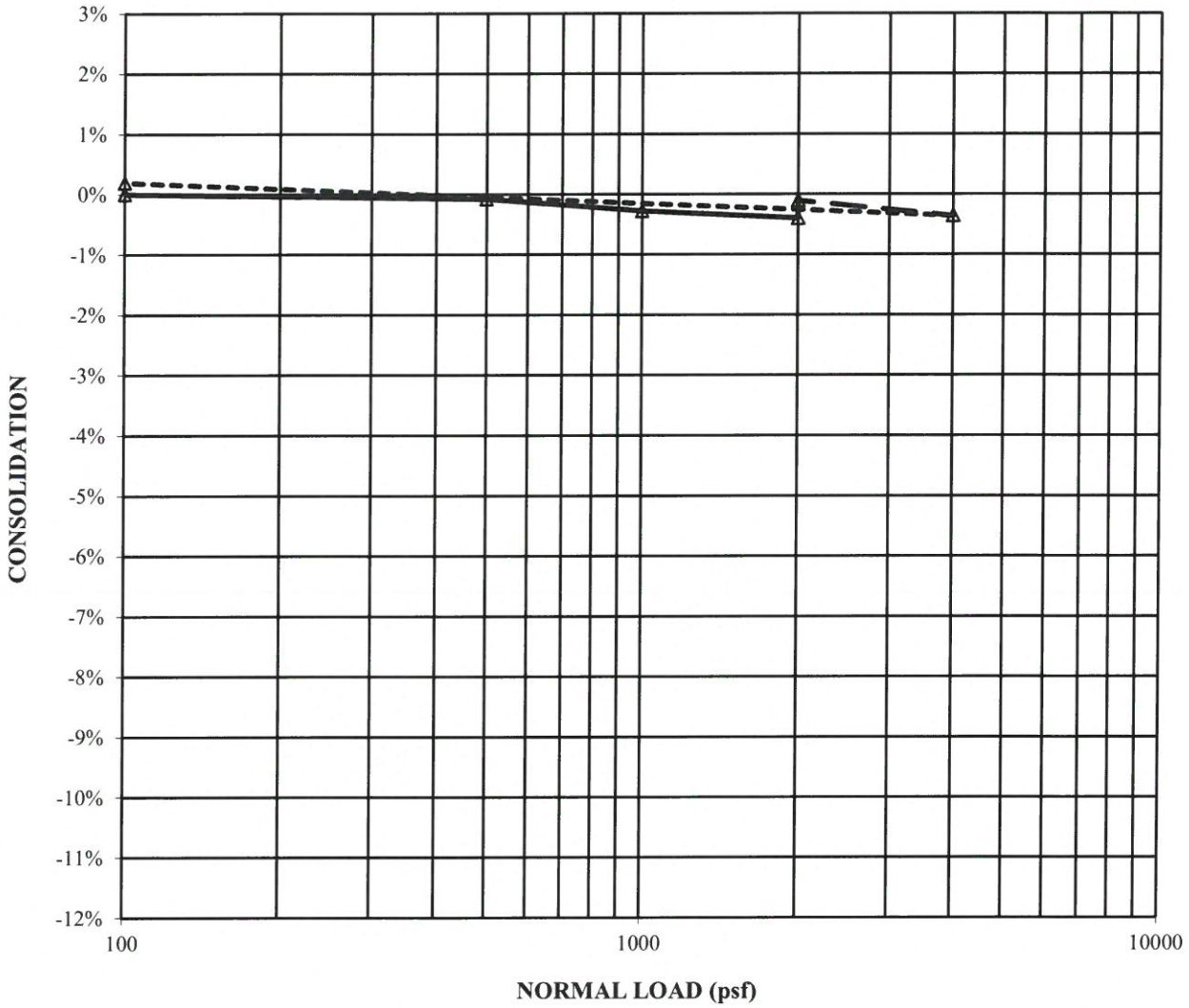
BORING	DEPTH	SOIL TYPE	IN-SITU			DIRECT SHEAR		GRAIN SIZE (%)				EXPANSION INDEX	SOLUBLE SULFATES (ppm)
			DRY DENSITY (pcf)	MOISTURE CONTENT (%)	WET DENSITY (pcf)	COHESION (psf) (PEAK)	FRICTION ANGLE (PEAK)	GRAVEL	SAND	SILT	CLAY		
B6	18.5B	CL		59.0									
B6	23.5	CL		19.1									
B6	25.0	CL		18.0									
B7	2.0	SM	100.2	15.0	115.2								
B7	18.5	Pt		233.7									
B7	20.0	CL		32.5									
B7	23.5	CL		20.0									
B7	25.0	SC		17.7									
B8	1.0	SC	105.4	15.4	121.6								130
B8	23.5	SC		21.0									

BORING:	B7	FIELD MOISTURE	
DEPTH (ft):	2.0	SATURATED	
SOIL TYPE (USCS):	SM	REBOUND	
SEATING WEIGHT:	220 psf	FIELD MOISTURE:	15.0%
		SATURATED MOIST:	24.8%



ROCK SOLID ENGINEERING, INC.	**CONSOLIDATION TEST RESULTS**	FIGURE
	1400 Ranport Road, Watsonville	A-7

BORING:	B8	FIELD MOISTURE	
DEPTH (ft):	1.0	SATURATED	
SOIL TYPE (USCS):	SC	REBOUND	
SEATING WEIGHT:	250 psf	FIELD MOISTURE:	15.4%
		SATURATED MOIST:	21.0%



ROCK SOLID ENGINEERING, INC.	**CONSOLIDATION TEST RESULTS**	FIGURE
	1400 Ranport Road, Watsonville	A-8

Business Operations Description

Intended use

Small business scale lumber operations specializing in salvage of local trees brought down for purposes other than lumber harvest such as housing development, trees endangering structures, orchard replanting, and storm damage. We will bring in ecologically sound, commercially harvested timber if salvage sources are not sufficient to fill capacity and demand. The business is targeted at wholesale and online sales. As such, we do not intend to conduct retail sales on site.

Hours of operation

8 am to 6 pm; Monday through Saturday

Number of employees

Current operations are run with 2 employees but as operations grow there could be as many as 10. There will be ½ to 3 office employees as operations grow with balance working in the manufacturing operations. The existing Williams tree service operation may have up to 3 office employees with other employees working primarily at customer locations.

Deliveries

There is no preset schedule for incoming log deliveries or outgoing lumber deliveries. Initially we will have most deliveries made in box containers less than 22 feet in length. We have taken deliveries on a 40 ft log trailer twice in our 2 year operating history. Initially we will take approximately 1 delivery a week. As business grows we may take 1 delivery per day. This includes but may not be limited to the commercial harvested timber referenced in the intended use statement. Outgoing deliveries will be made on flatbed trucks or trailers of approximately 20 feet in length. Outgoing deliveries will be 1 or 2 per week initially and may grow to 1 or 2 per day. Deliveries will be made to construction sites, cabinet shops, and lumber yards. Most deliveries will be made within Santa Cruz County but some will be made within the greater San Francisco and Monterey Bay areas.

Hazardous materials and waste products

We intend to store small volumes of diesel fuel for use in our equipment. We do not have definite plans at this time but any such storage would utilize code compliant storage and handling methods. Deposal will be done by licensed pick up or delivery to appropriate waste disposal sites such as the Buena Vista Landfill. The only other waste products are “mill ends” (the initial cuts on a log which includes the outer portions of the log and bark) and lumber trimmings. These are all clean wood waste which will be ground and then used for landscaping purposes, or will be incinerated in a mobile Air Burner PG Firebox which Air Quality and Cal Fire compliant.

Initial equipment list

- Self built electric mill

- Weinig U17A molder
- Whitney planer
- Diehl straightline rip saw
- Hyster forklift

Williams operations

The Williams Tree Service will share the property. Their operations will consist of

- employee parking within the designated parking locations
- a brush pile area also indicated on the site plan; this brush pile will be ground periodically and the chips sold for landscaping purposes
- parking of equipment when not in use at customer locations; the parking location is also shown on the plan
- future details of their operation are included in their use permit application

Development phasing

Phase 1

- Remove existing trailer. Move existing containers
- Metal 45,000 galleon water tank and fire infrastructure per fire district requirements
- Baserock access road, required parking, accessible path of travel, and fire dept turnaround. Refer to civil plan for more precise phasing.
- Septic system: vault, pump, leach field, and expansion area
- (E) driveway closure: remove asphalt between the gate and Ranport Rd. Add planting.
- “Slow trucks” signs (W51 (CA)) for each direction of travel
- 4’ high split rail fence and 3’ earth berm at the edge of the riparian buffer setback above 17’ contour line to be permanently maintained.
- Bathroom building
- Provide separate portable containers with covered receptacles for trash and depositing, storage, and collection of non-hazardous materials for recycling

Phase 2

- 1-story, 500 SF, 50’x100’ storage building 1

Phase 3

- 1-story, 500 SF, 50’x100’ storage building 2

Phase 4

- 1-story, 500 SF, 50’x100’ mill manufacturing building

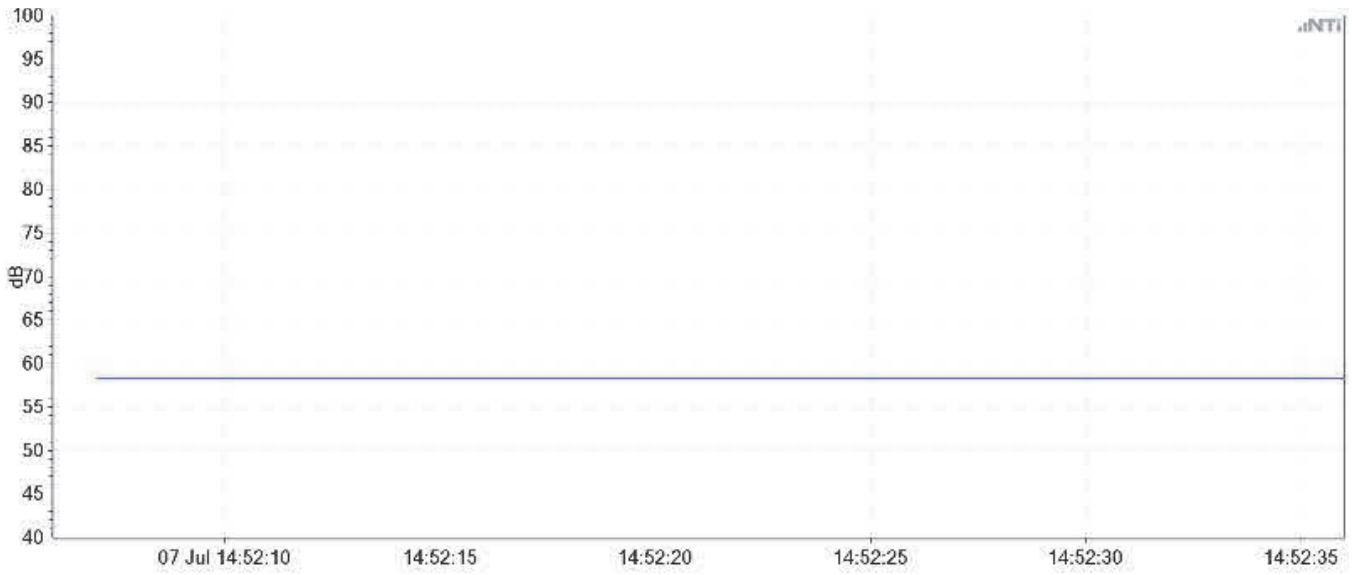
Phase 5

- Remove bathroom building
- 2-story 1,600 sq ft, 24’x36’ yard operations building.
-

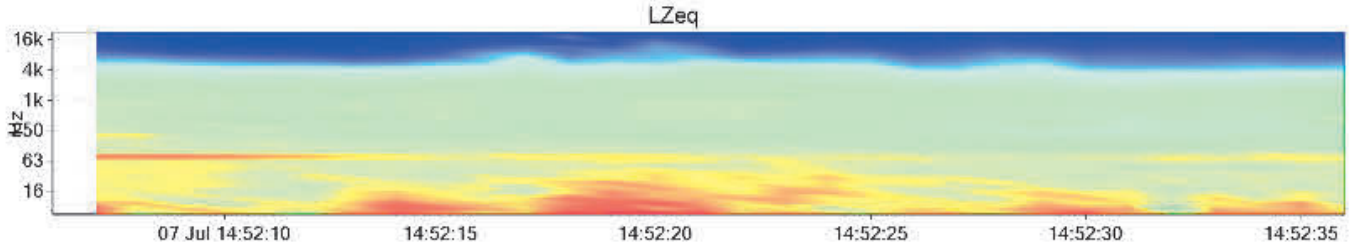
Ambient Onsite no Equipment Operating ID24

Start: 2021-07-07 14:52:06

End: 2021-07-07 14:52:36



LASmax



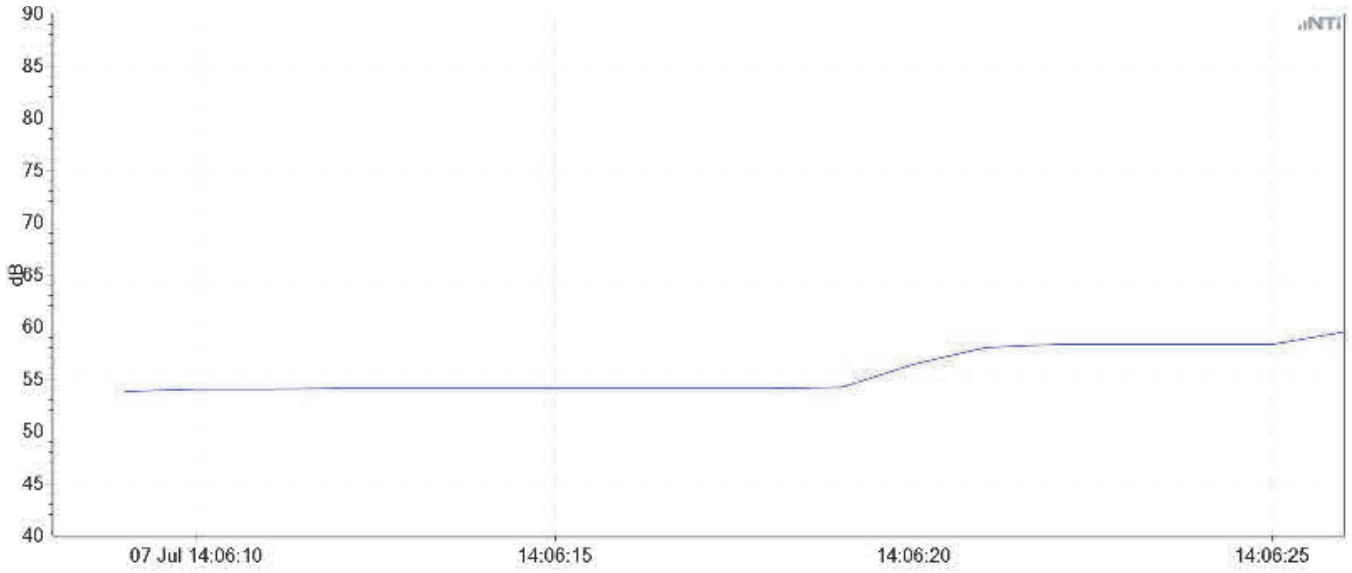
Results

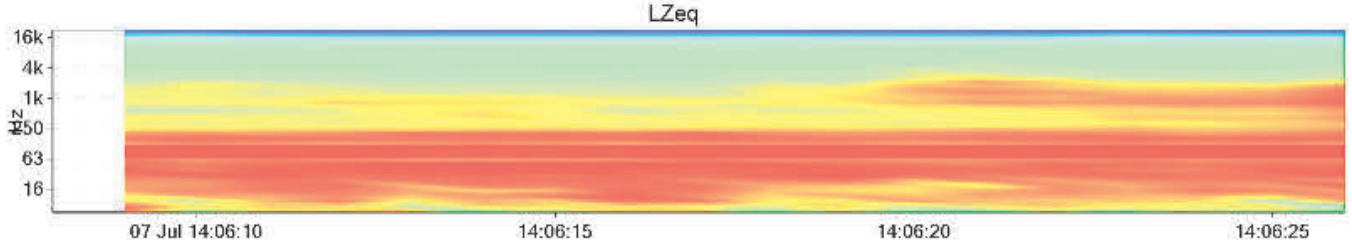
Type	Start	Duration	LASmax [dB]
Recorded	**2021-07-07 14:52:06**	**00:00:30**	**58.3**
Project Result		**00:00:30**	**58.3**

Ambient @ Rampart Rd w/ Moulder & Generator Running ID012

Start: 2021-07-07 14:06:08

End: 2021-07-07 14:06:26





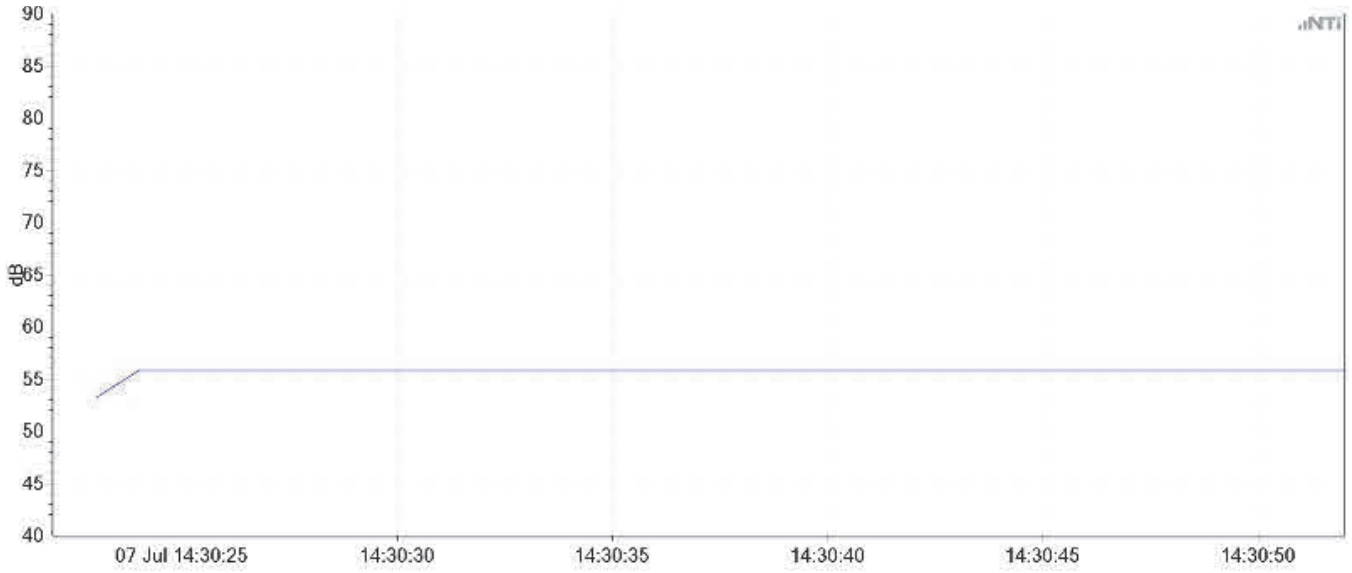
Results

Type	Start	Duration	LASmax [dB]
Recorded	**2021-07-07 14:06:08**	**00:00:18**	**59.5**
Project Result		**00:00:18**	**59.5**

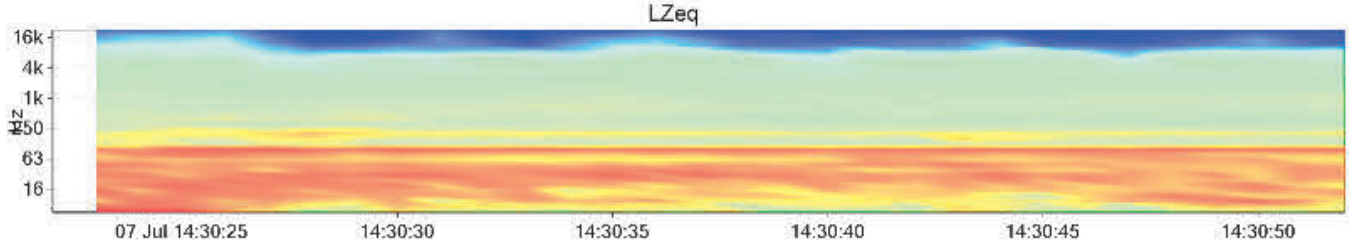
Ambient @ Rampart Rd Traffic Noise ID018

Start: 2021-07-07 14:30:22

End: 2021-07-07 14:30:52



LASmax



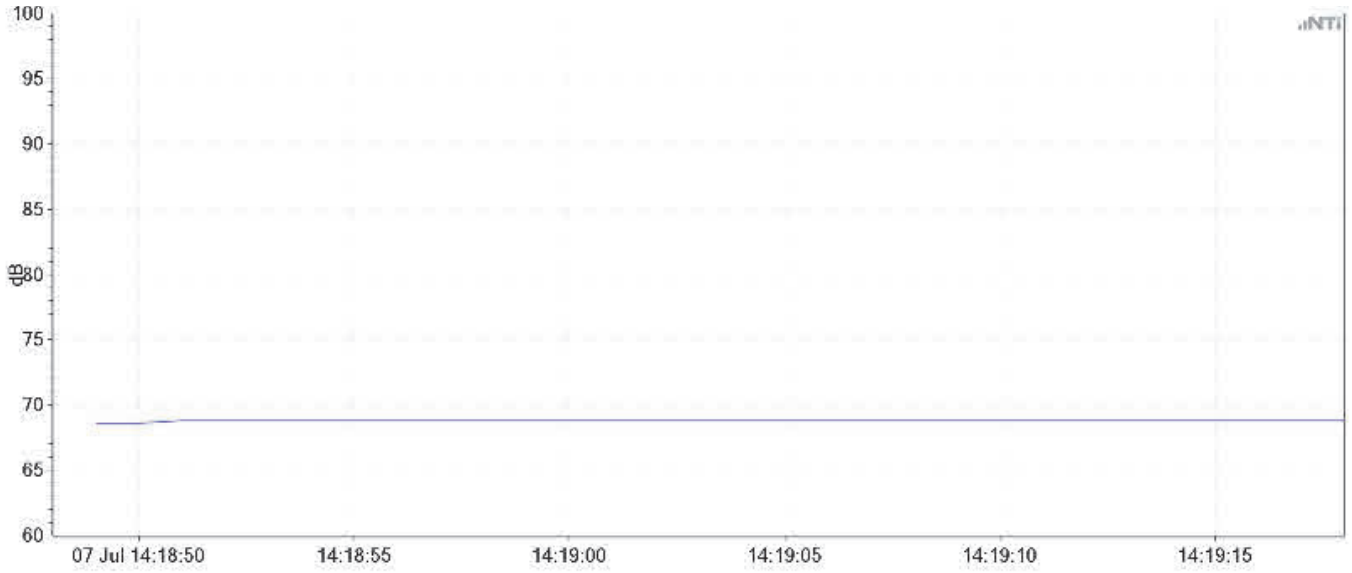
Results

Type	Start	Duration	LASmax [dB]
Recorded	**2021-07-07 14:30:22**	**00:00:30**	**55.8**
Project Result		**00:00:30**	**55.8**

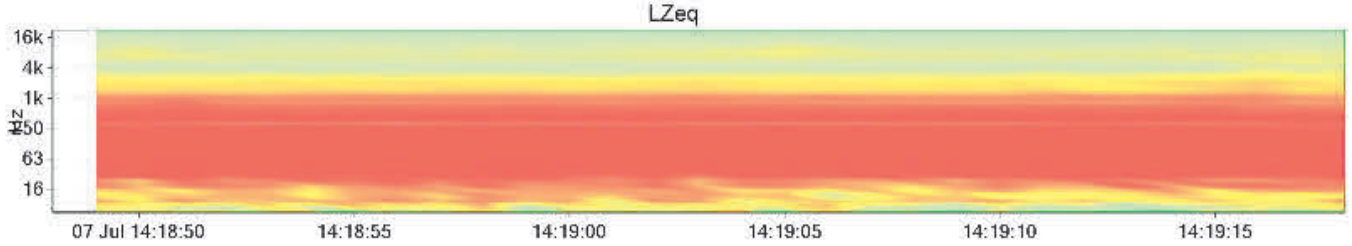
Dust Collector SPL - Free Field 11'(3.5m) ID016

Start: 2021-07-07 14:18:48

End: 2021-07-07 14:19:18



LASmax



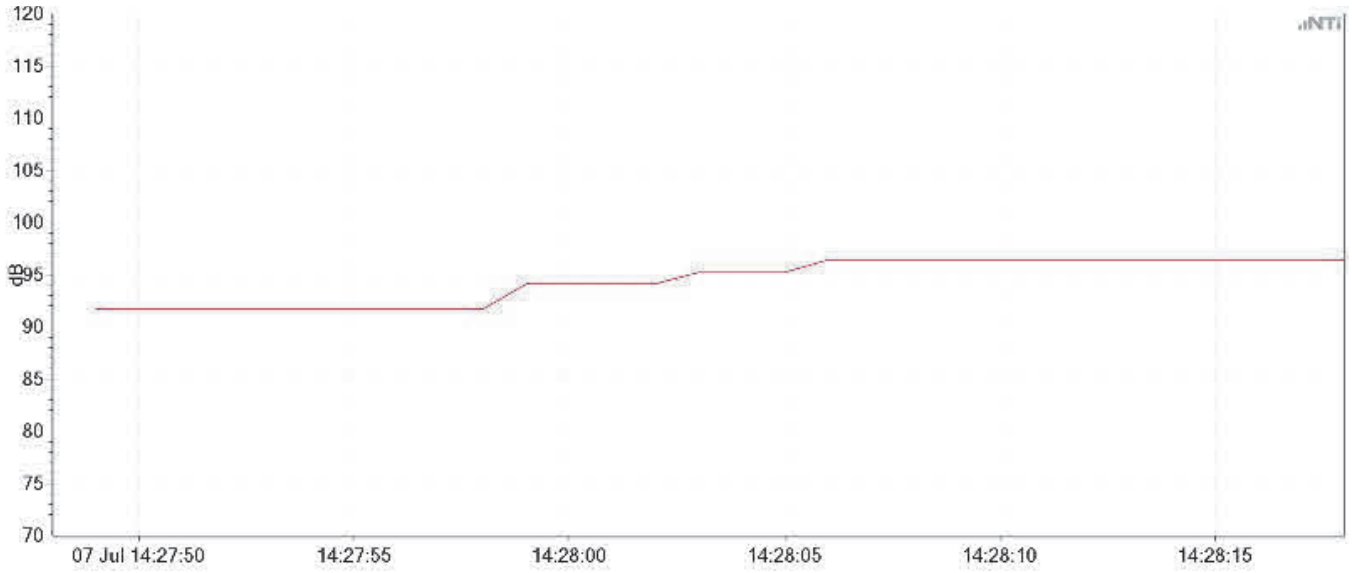
Results

Type	Start	Duration	LASmax [dB]
Recorded	**2021-07-07 14:18:48**	**00:00:30**	**68.8**
Project Result		**00:00:30**	**68.8**

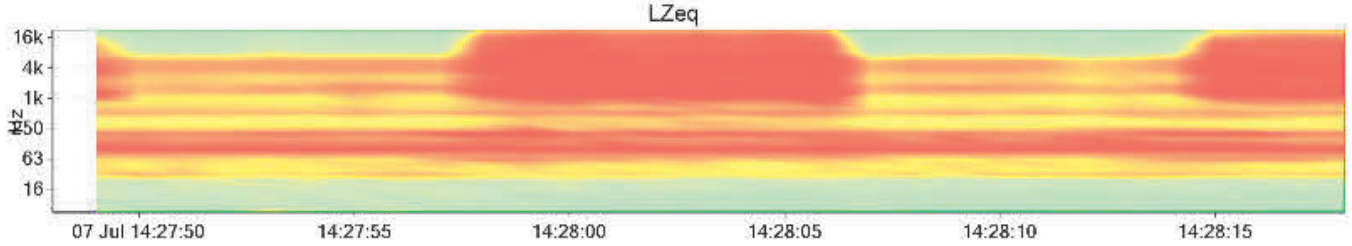
Gang Rip Saw - Free Field @ 11'(3.5m) ID017

Start: 2021-07-07 14:27:48

End: 2021-07-07 14:28:18



LAFmax



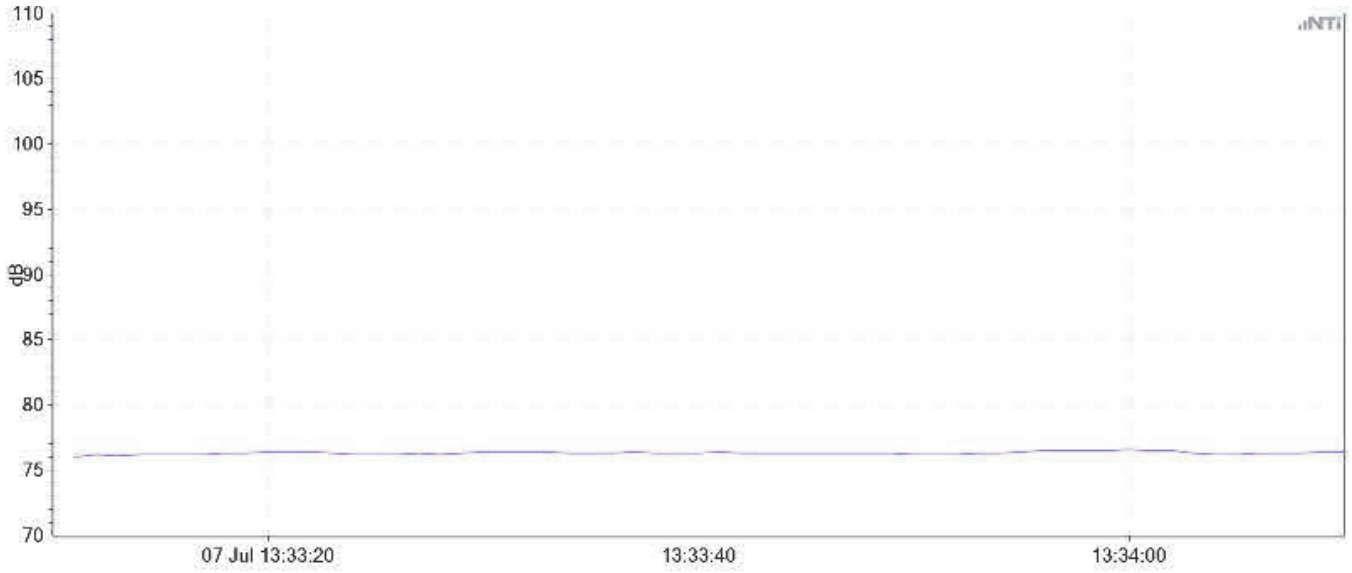
Results

Type	Start	Duration	LAFmax [dB]
Recorded	**2021-07-07 14:27:48**	**00:00:30**	**96.4**
Project Result		**00:00:30**	**96.4**

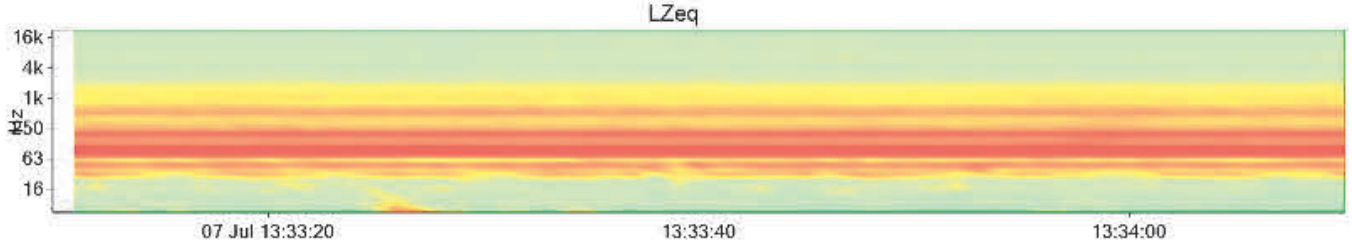
Generator - Free Field @ 11'(3.5m) ID000

Start: 2021-07-07 13:33:10

End: 2021-07-07 13:34:10



LASmax_dt



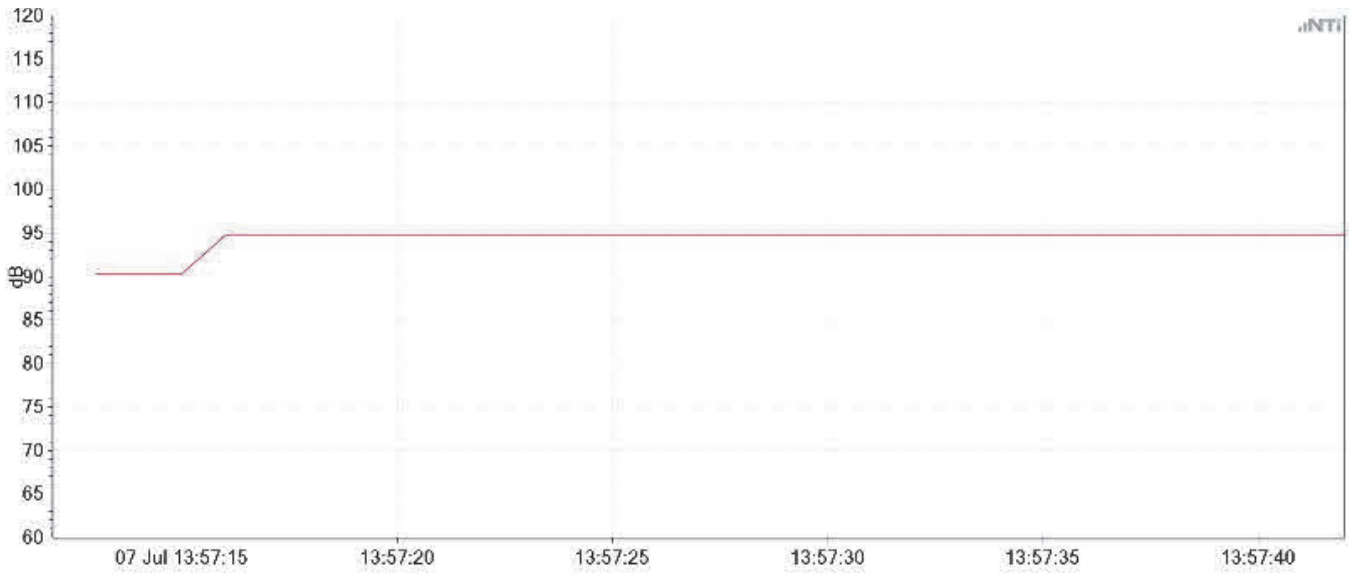
Results

Type	Start	Duration	LASmax [dB]
Recorded	**2021-07-07 13:33:10**	**00:01:00**	**76.6**
Project Result		**00:01:00**	**76.6**

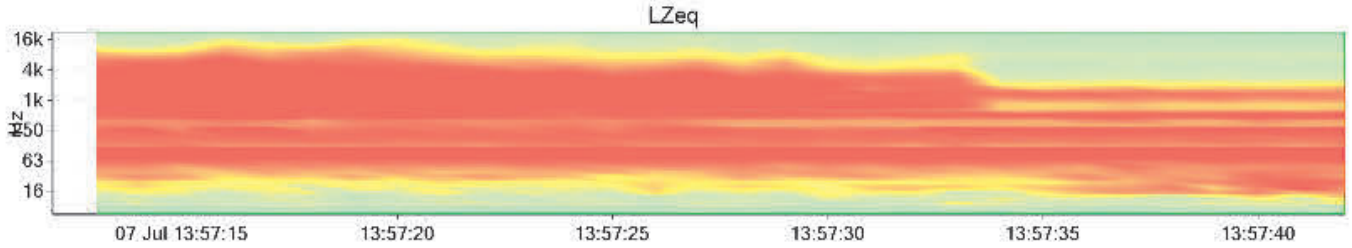
Planer / Jointer - Free Field @ 11'(3.5m) ID006

Start: 2021-07-07 13:57:12

End: 2021-07-07 13:57:42



LAFmax



Results

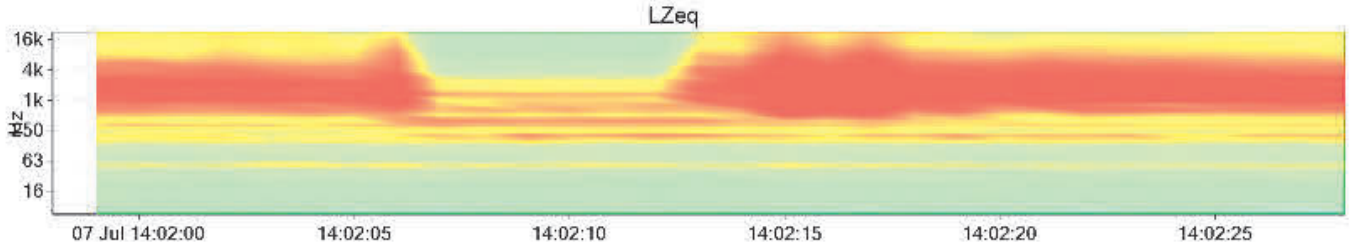
Type	Start	Duration	LAFmax [dB]
Recorded	**2021-07-07 13:57:12**	**00:00:30**	**94.7**
Project Result		**00:00:30**	**94.7**

Planer / Moulder - Free Field @ 11'(3.5m) ID010

Start: 2021-07-07 14:01:58

End: 2021-07-07 14:02:28

LAFmax



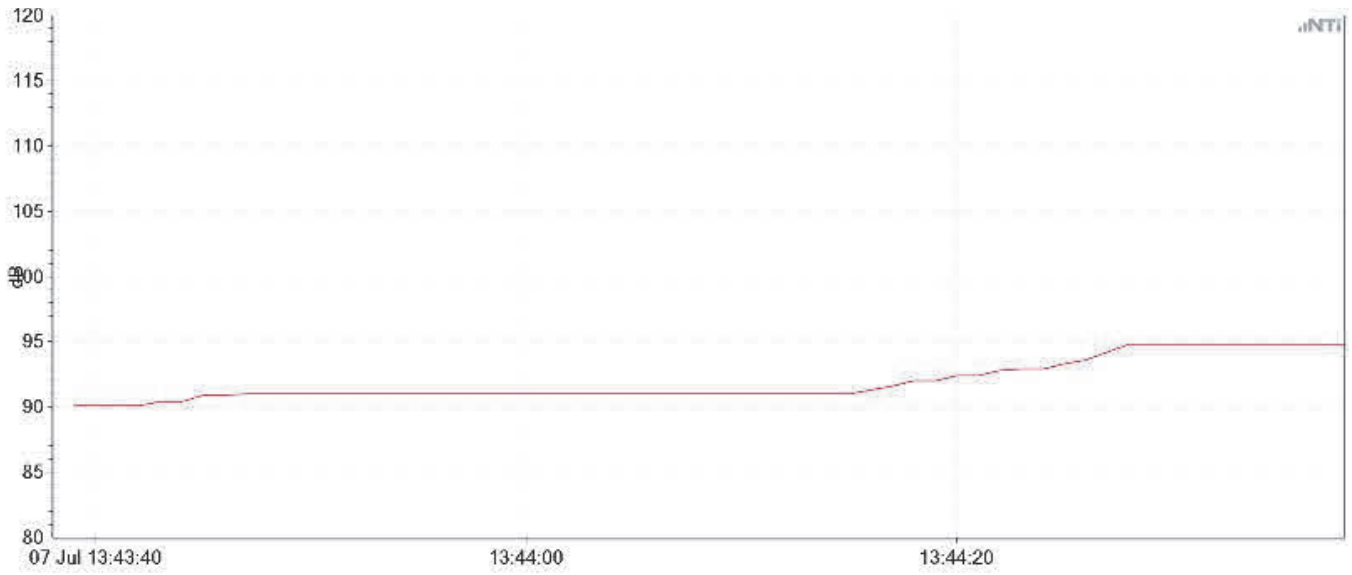
Results

Type	Start	Duration	LAFmax [dB]
Recorded	**2021-07-07 14:01:58**	**00:00:30**	**111.2**
Project Result		**00:00:30**	**111.2**

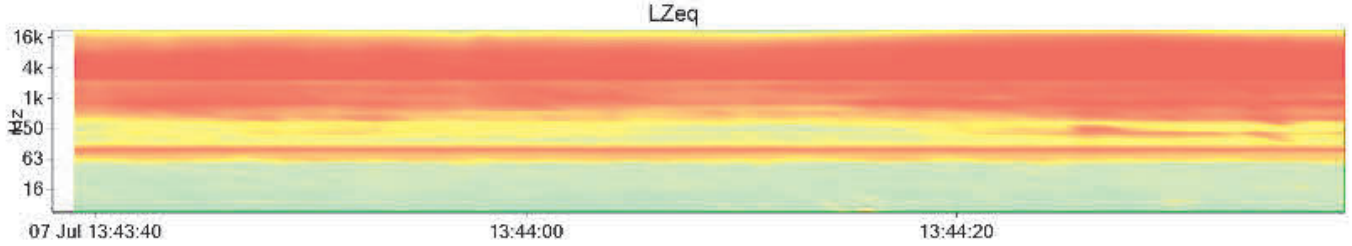
Slab Mill - Free Field @ 11'(3.5m) ID003

Start: 2021-07-07 13:43:38

End: 2021-07-07 13:44:38



LAFmax



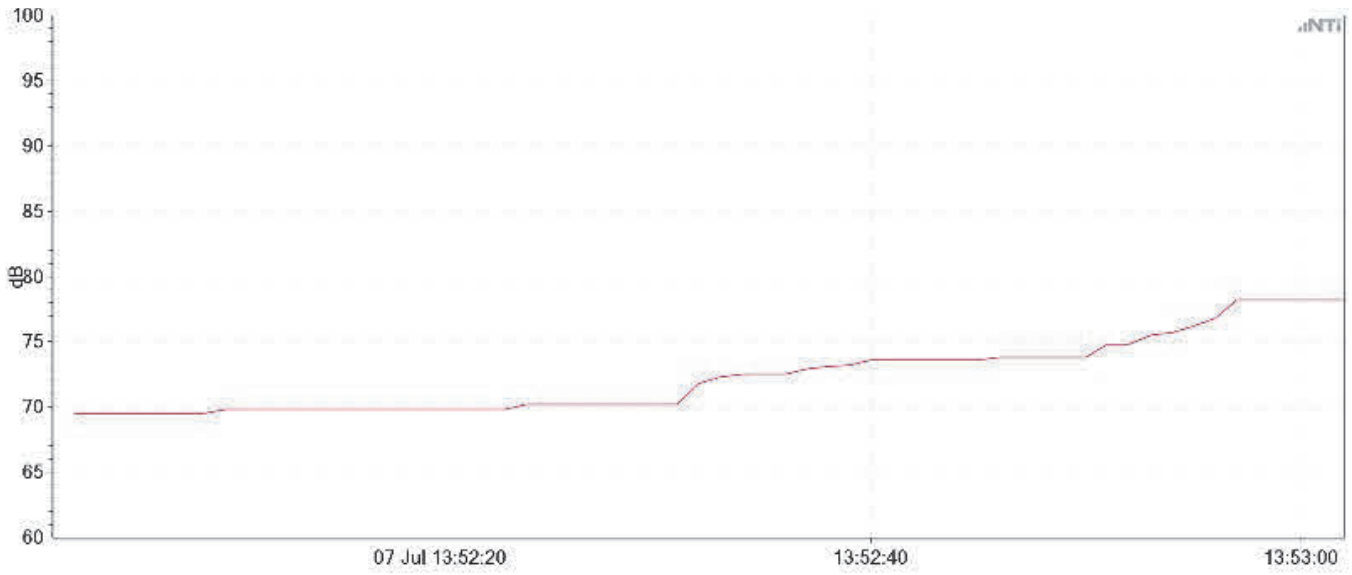
Results

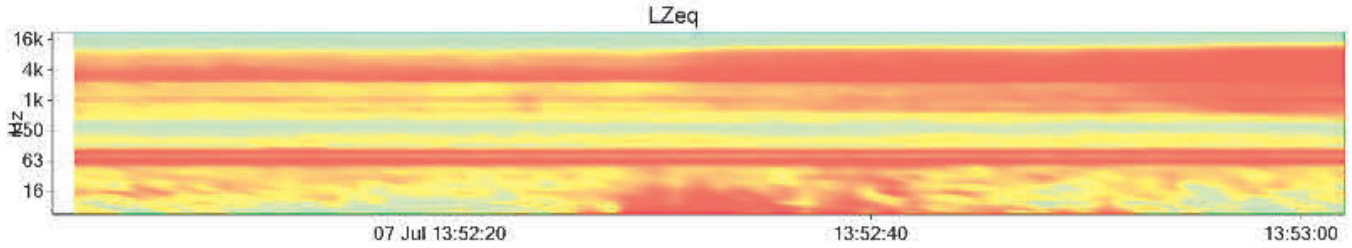
Type	Start	Duration	LAFmax [dB]
Recorded	**2021-07-07 13:43:38**	**00:01:00**	**94.8**
Project Result		**00:01:00**	**94.8**

Straight Line Rip Saw - Free Field @ 11'(3.5m) ID005

Start: 2021-07-07 13:52:02

End: 2021-07-07 13:53:02





Results

Type	Start	Duration	LAFmax [dB]
Recorded	**2021-07-07 13:52:02**	**00:01:00**	**78.2**
Project Result		**00:01:00**	**78.2**

North American Office
Acoustiblok Inc.
6900 Interbay Boulevard
Tampa, FL 33616 USA
Phone: 813-980-1400
Fax: 813-549-2653
www.thermablok.com
www.acoustiblok.com
sales@acoustiblok.com

MADE IN USA

100% Recyclable

Acoustifence Information

- Lab tested STC value of 28 represents over an 80% reduction in sound to the human ear.
- Works extraordinarily well blocking sound.
- Far less sound reflected than solid walls.
- Installed or removed in less than one hour.
- UV tolerant and does not support mold.
- Virtually indestructible, very resilient material.
- 100% recyclable
- Comprised of over 64% recycled materials.
- Will accept most paint finishes.
- To store, Acoustifence easily rolls up like a carpet.

Material Specifications

Acoustical Rating	STC 28 / OITC 22
Size	6 ft. (1.83m) x 30 ft. (9.14m) x 0.125 in (3mm) 180 ft² (16.72m²)
Weight	185 lbs. (84Kg)
Fastening	Brass Grommets every 6 in (152mm) along top edge with four grommets spaced along the bottom edge. Commonly installed horizontally.
Color	Black

Acoustifence™ Installation

Number of people: 2
Time required: 10 – 15 mins.
Items: Utility Knife, Pliers, 70 lb. Wire ties (included with purchase), Hand Truck / Dolly (optional)

1. Cut and remove the plastic wrap around the roll.
2. Tilt the roll so it is leaning against the fence. Line up the top of the roll to the top of the fence or at the desired height.
3. Begin unrolling the Acoustifence material along the fence. Have one person slowly unroll the material while the second person inserts the ties in each grommet and attaches to the fence. Insure that the material is kept taut as you install the wire ties to prevent it from sagging.
4. Remove the tape and roll core.
5. Tighten each tie so that the Acoustifence is properly lined up at the desired height. Material will relax and straighten when warmed by the sun.

Middle East Office
Kingdom Tower, Riyadh, Kingdom of Saudi Arabia
Phone: + 966-1-211-8193

Acoustifence™ Acoustical Test Results ATI Report # 65299.01

ASTM E90 Sound Transmission Loss Measurements

ATI # : 65299.01B **Date:** 05/25/2006

Specimen: Acoustifence Sound Barrier Material

Specimen Area: 6.0 Sq. Ft.

Filler Area: 134.0 Sq. Ft.

Operator: Benjamin W. Green

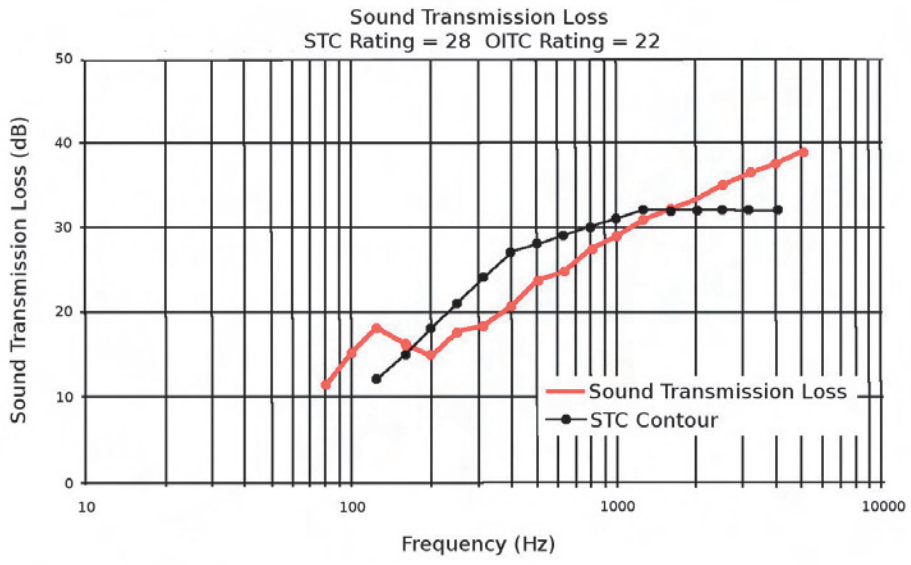
	Bkgrd	Absorp	Source	Receive	Filler	Specimen
Temp F	73.9	74.0	73.1	73.9	73.1	73.7
R. H. %	65.7	65.7	63.3	65.7	61.4	65.1

Freq (Hz)	Bkgrd SPL (dB)	Absorp (Sabines / Sq. Ft.)	Source SPL (dB)	Receive SPL (dB)	Filler TL (dB)	Specimen TL (dB)	95% Conf Limit	No. of Deficiencies	Trans Coef Diff
80	43.0	52.5	84.2	63.7	36.3	11	2.54	0	11.7
100	39.2	59.1	87.7	62.9	40.3	15	3.77	0	12.0
125	47.4	55.9	91.5	63.7	47.5	18	2.02	0	15.9
160	43.4	50.4	94.2	68.8	46.2	16	1.06	0	16.5
200	43.0	54.9	97.9	73.5	49.6	15	0.80	3	21.3
250	35.8	53.0	99.3	72.2	51.0	18	1.12	3	19.8
315	33.7	57.2	95.7	67.5	54.0	18	0.53	6	22.1
400	33.3	56.0	95.0	64.6	58.4	21	0.78	6	24.3
500	31.6	56.3	98.8	65.4	60.5	24	0.30	4	23.4
630	25.1	57.7	101.5	66.9	65.2	25	0.53	4	26.9
800	25.2	59.9	101.3	63.8	67.4	27	0.54	3	26.4
1000	23.2	62.6	101.0	61.9	72.2	29	0.49	2	29.8
1250	23.8	69.4	105.1	63.7	78.0	31	0.28	1	33.8
1600	20.1	70.2	111.4	68.6	81.8	32	0.22	0	36.3
2000	15.0	76.3	107.4	63.2	79.9	33	0.22	0	33.2
2500	7.5	86.9	105.9	59.3	74.8	35	0.23	0	26.3
3150	8.4	102.0	106.6	58.0	77.8	36	0.33	0	28.0
4000	7.7	124.9	105.6	55.0	81.1	37	0.33	0	30.2
5000	8.1	162.8	104.1	51.0	81.0	39	0.36	0	28.7

STC Rating = 28 (Sound Transmission Class)

Deficiencies = 32 (Number of deficiencies versus contour curve)

OITC Rating = 22 (Outdoor / Indoor Transmission Class)



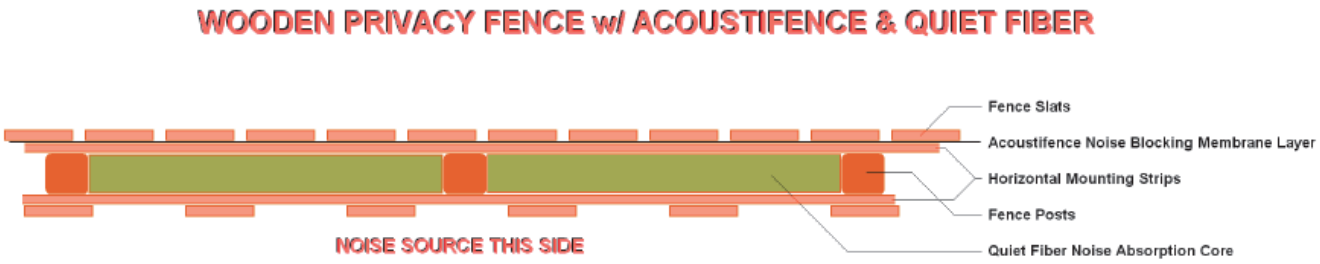
Middle East Office
Kingdom Tower, Riyadh, Kingdom of Saudi Arabia
Phone: + 966-1-211-8193

Acoustifence

Acoustifence is a limp mass, line of sight outdoor acoustical barrier designed to hang on an existing chain link fence or be incorporated into a wooden fence to dramatically increase the STC (Sound Transmission Class) of the barrier. STC is a rating of how much sound transmits through a barrier. Acoustifence attenuates more sound than the same thickness of lead and is very easy to install. It is UV resistant, will not mold or mildew and is paintable.

Creating an absorption barrier

Acoustifence & Quietfiber – You can create an absorption barrier by incorporating Acoustifence and Quietfiber into a wooden fence. Absorption barriers are needed around residential noise sources such as AC Units, Heat Pumps, Generators, compressors etc.



Creating a reflective acoustical barrier

Acoustifence – Adding Acoustifence to a wooden fence will dramatically increase the sound transmission loss through the fence and create a reflective barrier.

Shadowbox fence with Acoustifence added – reflective barrier.

SONICS

July 27, 2021

Mr. Dave Joseph, Owner
Central Coast Lumber LLC
1400 Rampart Road
Watsonville, CA 95076

Re: Equipment Noise Testing Program and Report for County Noise Assessment

Dear Mr. Joseph,

A site observation visit and noise testing program was conducted on Wednesday July 7, 2021, on the proposed site of the Central Coast Lumber Mill, 1400 Rampart Road, Watsonville, California. The purpose of this site visit was to measure the noise levels of the mill equipment in-situ and to determine the potential noise impact to adjacent areas of the site.

Measurement Program

An instrumented measurement program was conducted on various lumber milling equipment employed in the operations of the mill facility. Individual noise testing was performed adjacent the various pieces of the operating milling equipment in the manner it would normally be used and at perimeter locations around the site. Each piece of operational equipment was tested separately while performing its finishing or cutting operation and recorded for later analysis. Additionally, ambient noise measurements, traffic noise and overhead aircraft operations from the Watsonville Airport (KWVI) were measured and recorded. The only continuously operating piece of mechanical equipment during the testing was the site generator which was being employed since a local grid connection was not available. Separate proximity measurements were made of the generator operating with its contribution excluded from the site ambient measurements.

The following pieces of milling equipment were employed for the testing program; Slab Mill, Planer, Straight Line Rip Saw, Planer/Moulder and a Gang Rip Saw and Dust Collector. All tests were conducted 3.5 meters (11.5 feet) from the operating equipment.

Site Location and Stage of Development

The 8.4-acre mill site is located directly adjacent Rampart Road, situated between Rampart Road and Highway 1 and slightly West of Airport Road (see picture 1 below). The current site is undergoing planned development; the various pieces of equipment were made operational for the noise testing. The proposed mill building, support and office buildings do not currently exist.

Picture 1 - Site of Central Coast Lumber Proposed Development

Noise Testing and Potential Mitigation Program

For the purposes of this report, all milling, and support equipment noise levels were recorded in a free field condition. A noise level is considered to be free field if it is at a distance greater than 3.5 meters from any reflecting surfaces, other than the ground and between 1 and 3.5 meters from the façade of a building or other reflective structure. Currently no vertical reflecting surfaces of buildings exist so free field measurements shall apply. A noise mitigation program has not been developed and is beyond the scope of this report at this time. However, if elected, it will consist of the construction means and methods for the proposed mill building and other structures noted in the Planning Permit Application.

Site and Equipment Noise Measurements

The measurements were taken using certified, laboratory grade, Class 1, computerized, automatic recording sound analysis equipment. All tests were monitored in real-time. Level calibration was performed before and after testing using an NIST traceable calibration standard.

Measurement Equipment

The following equipment was employed in the Central Coast Lumber Mill equipment testing program.

NTi Audio Acoustical Analyzer XL2, s/n A2A-18776-E0

(Certified, Class 1 Instrument)
M2230 microphone preamplifier, s/n 09633
GRAS Free Field Microphone, Type MC2230A, s/n A2329
Calibration Certificate, US-21-018
Extended Acoustic Pack module, s/n 4951
Sound Insulation module, s/n 1437
Vibration Measurement module, s/n 1380
Data Explorer module, license, s/n 9145
Remote Measurement module, s/n 9003
Lenovo, Think Pad Computer, Type 20MF-000DUS, s/n R9-0S4A1,
Windows 10 Pro 64-bit OS
Shear Accelerometer, JTLD352C33, s/n 356488
48V-ICP adapter, 600 010 223
Larson Davis Laboratories, CAL-250, Precision Acoustic Calibrator, S/N 5643.

Applicable Standards

ANSI S1-13 *"American National Standards Methods for Measurement of Sound Pressure Level in Air",* ANSI S1-43 *"American National Standards Specification For Integrating-Averaging Sound Level Meters"*

Noise Standard Metrics

For purposes of this report, Ldn or CNEL levels were not computed and only dBA Fast and Slow maximum levels were employed since the mill operation will only operate during daytime hours. CNEL, *Community Noise Equivalent Level,* and Ldn, Level Day/Night are time weighted 24-hour dBA averages.

Measurement Tests

Real time, dBA Fast and dBA Slow weighting as well as one-third octave spectrum measurements from 6.3 Hz to 20 KHz are shown as colored spectrograms on the detailed reports. Spectrograms display energy by frequency as a function of color; red depicts low frequencies, yellow and green mid-band frequencies and blue as high frequency energy. Full bandwidth audio recordings were also made for each piece of equipment for later analysis and to identify what noise mitigation control measures may be applied where needed.

Noise Descriptors and Measurement Protocol

The descriptor dB is a measurement of sound level. dBA is the A-weighted decibel scale, an index of loudness that gives more "weight" to certain frequencies to approximate the way the human ear responds to sound levels. For the purposes of this report, the maximum dBA Sound Pressure Levels (SPL) were measured and recorded employing fast and slow time weighting. Fast time

weighting is typically used for common sound level measurements that can vary in level; its time constant is 1/8 of a second. Slow time weighting employs a 1 second time constant and is an exponential function of time, which defines how changes of the instantaneous sound pressure level are averaged for useful sound level results. The LAFmax weighted level display would take approximately 0.6 seconds to reach the new level, while the LASmax weighted level display would reach the new level only after approximately 5 seconds. Slow time weighting is typically employed for noise energy that is relatively constant without large variations in level such as the generator and dust collector. dBA Fast or the descriptor LAFmax is more useful for sawing and milling machinery noise where the level varies and rises to a maximum level during operation.

Measurement Results

These measurements are noted below and in more detail in the accompanying attached individual reports. Their values are as follows:

Noise Measurements – Proposed Mill Site	**LAFmax**	**LASmax**
Site Ambient Level with **No** Equipment Operating	N/A	58.3 dBA
Site Ambient at Rampart Road - Planer/Moulder and Generator Operating	N/A	59.5 dBA
Slab Mill @ 3.5 m	94.8 dBA	N/A
Planer @ 3.5 m	94.7 dBA	N/A
Straight Line Rip Saw @ 3.5 m	78.8 dBA	N/A
Planer/Moulder @ 3.5 m	111.2 dBA	N/A
Gang Rip Saw @ 3.5 m	96.4 dBA	N/A
Dust Collector @ 3.5 m	N/A	68.8 dBA
Generator @ 3.5 m	N/A	76.6 dBA
Rampart Road Traffic Noise @ Property Line	N/A	55.8 dBA

Land Use, Santa Cruz County

Santa Cruz County land use compatibility for Community Noise Requirements standards, Section 6.9.1 of the General Plan, classifies the Mill as *Industrial, Manufacturing, Utilities and Agriculture* usage. This requires a detailed analysis of the noise and noise reduction requirements for a **Conditionally Acceptable** classification. This level (measured at the property line) is typically, 70 dBA

maximum with a Slow time weighting (LASmax) for continuous noise and 65 dB maximum with a Fast time weighting (LAFmax) for impulsive noise which the Mill operations would come under. See Figure 6-2 below, Santa Cruz County Maximum Noise Exposure for Stationary Noise Sources (Copyright 2021).

Figure 6-2
Maximum Allowable Noise Exposure
Stationary Noise Sources [1]

	Daytime [5] (7AM to 10PM)	Nighttime [2,5] (10PM to 7AM)
Hourly Leq – average hourly noise level, dB [3]	50	45
Maximum level, dB [3]	70	65
Maximum Level dB – Impulsive Noise [4]	65	60

dB = decibel

(1) As determined at the property line of the receiving land use. When determining the effectiveness of noise mitigation measures, the standards may be applied on the receptor side of noise barriers or other property line noise mitigation measures.

(2) Applies only where the receiving land use operates or is occupied during nighttime hours.

(3) Sound level measurements shall be made with "slow" meter response.

(4) Sound level measurements shall be made with "fast" meter response.

(5) Sound level measurements shall be raised to the ambient noise levels where the ambient levels exceed the allowable levels. Allowable levels shall be reduced 5dB if the ambient hourly Leq is at least 10 dB lower than the allowable level.

Santa Cruz County 2021, General Plan, Noise Maximums

Caveat

Noise levels add logarithmically with multiple machines and operations occurring at the same time, plus noise levels also increase when placed near vertical surfaces or partitions. This must be taken into account when predicting the maximum property line noise level.

Site Influencing Factors

Site influencing factors of the vehicle noise from Highway 1, Rampart Road traffic and operations and overflights from the Watsonville Airport contribute to the overall site noise. These will be considered by the County when evaluating the results of this report for the Central Coast Lumber site.

Conclusion

A final property line noise model cannot be accurately predicted until the Mill Building plans, adjacent structures and equipment locations are finalized. Based on the proposed structures noted in the Planning Permit drawings, the current in-situ equipment measurements (Free Field) and the relative distances involved,

the equipment noise levels should be sufficiently attenuated to meet the County's maximum levels with or without the proposed buildings. While beyond the scope of this report at this time, should additional equipment not yet in operation or changes in the site layout occur that potentially raise the site noise levels, unless excessive, these increases may be managed effectively with a Mass Loaded Vinyl (MLV) noise barrier membrane added to the perimeter fencing at the property line adjacent the proposed equipment. A suitable MLV barrier manufacturers data sheet is attached as part of this report.

The information contained in this site observation and testing report is believed to be correct and accurate. All measured results employed in this study are included as part of this report. If you have any questions regarding the information contained in this report, please feel free to contact this office for clarification.

Sincerely,

Mr. Jim Barath, Ph.D., INCE
Principal

Enclosures: Printed graphs with frequency distribution and computed results
Acoustifence, Manufacturers Data Sheet