

# Habitat Restoration Program Addendum

Capay Reclamation Site  
Yolo County, California

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Prepared for: Granite Construction Company

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## 1.0 INTRODUCTION

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This document is intended to serve as an addendum to the existing *Cache Creek Aggregates Habitat Restoration Program (HRP)* (Zentner and Zentner, 1995). The purpose of this addendum is to outline changes to the wetland creation and oak/riparian woodland restoration design on the Capay project site based on recent modifications to reclamation uses on the site.

The Capay project site is located in Yolo County, west of I-505, northwest from the town of Esparto. As identified in the 1995 HRP, the project site is divided into seven reclamation areas. Habitat restoration will be focused within four of these areas (Areas 2-6).

This document, in combination with the 1995 HRP, presents guidelines for the design and planting of the restored habitats on the project site and provides measures for monitoring these habitats during and post-construction.

## 2.0 MITIGATION DESIGN

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The habitat restoration design for Areas 2-6, as outlined in the 1995 HRP, will be followed for the creation of wetland habitat on the project site, with a few design modifications. The final reclamation design will follow the *Off-Channel Reclamation Plan: Capay Plant, Yolo County* (Granite Construction, 2001). The following is a general description of the changes in reclamation uses within the site.

- The proposed reclamation use for Area 2 will be changed from pastureland to wetland/open water habitat. Consequently, the final wetland design for Areas 2, 3, and 6 will be wetland/open water habitat. Cumulatively, this wetland habitat will equal 127 acres.
- The reclaimed use for Area 4 will be primarily agriculture ( $\pm$  32 acres). However, this parcel will also support a 6-acre wetland habitat/desiltation pond and a portion of the primary wetland/open water feature will be located within the parcel's southern boundary.

As outlined in the 2001 reclamation plan for the project site, a total of 127.29 acres of open water, 25.78 acres of perennial marsh, and 11.7 acres of seasonal marsh will be constructed through the implementation of this addendum plan and the 1995 HRP. Additionally, a total of 8.13 acres of riparian woodland and 25.23 acres of oak woodland habitat will be planted on the site. Under the design of the 2001 reclamation plan, 116.9 acres of row crops will be planted and 18.36 acres of stream bank will be reconstructed. A total of 199.3 acres of land will remain undisturbed within the Capay project site.

### **3.0 OAK/RIPARIAN WOODLAND PLANTING PROTOCOL**

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In addition to the measures outlined in Appendix A of the 1995 HRP, the following planting protocol shall be implemented for the Capay project site.

- Containerized stock in the form of one gallon and 5-gallon trees shall be purchased from nurseries that collect acorns from local (Yolo County and Central Valley) woodlands. All trees shall be inspected to ensure they are not root-bound, desiccated, or otherwise diseased. If possible, cuttings for willow species shall be taken from plants onsite or within the project site vicinity.
- Planting sites have been identified based on the suitability of the soil, slope, aspect, and micro-habitat. These locations shall be staked prior to planting.
- Spacing and exact locations of plantings shall be determined in the field by the Ecological Monitor (EM) based on site constraints, area available, maintenance requirements of the plantings, and number of plantings required. One-gallon plantings and five-gallon plantings shall be spaced no greater than 500/acre and 250/acre, respectively.
- Plantings shall be made in the late fall or early winter to permit plant establishment in the cool months and maximize survival of the plantings.
- Wire mesh cages or ventilated tubex shall be installed around each planting to prevent grazing from wildlife.
- Either (a) a thin layer (<2 inches) of wood chip mulch shall be placed around each planting or (b) a weed mat, made preferably of heavy weight biodegradable landscape fabric, shall be installed around each planting.
- Plantings shall be watered once directly after the planting effort.

#### **3.1 Maintenance Requirements**

The following are maintenance measures that shall be implemented, in addition to those outlined in Appendix B of the 1995 HRP, to provide conditions suitable for successful establishment of the plantings:

- It is essential that plantings be provided a reliable source of water until their root structures become established. Because the first rainfall of the year is unpredictable, temporary irrigation will be required. A proper water regime is crucial to the establishment of these plantings. Conversely, over-watering will cause damage to the trees' root structure and may cause root rot. Most plantings will require supplemental irrigation during the first three years. A temporary drip-irrigation system (or similar system), with an emitter for each planting, shall be installed per the guidelines outlined in the 1995 HRP. A watering schedule, including which tree species will require irrigation, will be determined by a landscape architect or certified arborist based on the maintenance requirements of individual plantings. The watering schedule should be prepared prior to the mitigation planting effort. The EM will monitor the watering schedule closely to ensure the plantings are not over or under watered.

- Other herbaceous and non-native species will compete with plantings (especially the liner seedlings) for nutrients, water, and light. They may also provide habitat for predators. Periodic removal of competing vegetation will be required until plantings are well established. Integrated Pest Management (IPM) removal techniques will be followed, which will typically require that removal be completed manually, unless otherwise approved by the project arborist.

#### 4.0 WETLAND/OPEN WATER HABITAT CONSTRUCTION PROTOCOL

The habitat descriptions and species recommended for planting within each habitat will follow the specification of the 1995 HRP, with the following exceptions:

- Wildlife restoration within the created open water habitat shall not include the introduction of any wildlife species. Numerous wildlife species are expected to migrate to and utilize this habitat once suitable conditions are established. The introduction of species is not recommended for this project.
- In addition to the species listed for planting along the shoreline, floating vegetation, such as duckweed (*Lemna* sp.) and azolla (*Azolla filiculoides*), is recommended for planting within the open water habitat.

## 5.0 WETLAND CONSTRUCTION MONITORING

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Construction monitoring of the restoration areas shall follow the guidelines presented in Section III-B of the 1995 HRP. The following measures shall replace the vegetation monitoring parameters (section III-C2) and performance standards (section III-D) outlined in the HRP.

### 5.1 Monitoring and Reporting

Monitoring of the constructed seasonal wetland and marsh habitat will occur for five years or until the success criteria have been met, whichever is greater. Upon attainment of the constructed wetland performance criteria, the continued success of these habitats must be demonstrated for an additional consecutive three years.

Monitoring will consist of the following actions:

- **Aerial Photography** – Aerial photographs of the areas of wetland construction will be taken twice per monitoring period. The constructed habitats will be photographed from February through June. The purpose of aerial photo monitoring is to document the extent of inundation, to provide an overview of general conditions in the mitigation area, and to identify potential problem areas (e.g. erosion, lack of inundation, etc.).
- **Site Monitoring and Floristic Data Collection** – Data on plant community composition will be collected once each monitoring period. Based on expected inundation of the constructed habitat, the optimum time for data collection will be late spring/early summer. Wildlife species associated with the wetland habitat will also be noted during field data collection.
- **Data Analysis** – Data analysis will consist of calculation of the Prevalence Index and wetland species richness and preparation of summary statistics for each constructed wetland.
- **Monitoring Reports** – Monitoring reports will be prepared annually by December 31<sup>st</sup> of each monitoring period until performance criteria are met. An additional report will be prepared upon the completion of demonstrating three consecutive years of success. The basic purpose of the monitoring reports is to present data, summary statistics, and data analysis for constructed wetlands. In addition, monitoring reports will contain reproductions of aerial photography and a discussion of constructed wetlands relative to performance standards. Any conditions detrimental to wetland function identified during monitoring will also be discussed.



## 5.2 Performance Standards

The following shall be used as performance standards for the Capay project site.

### 5.2.1 Species Richness/Wetland Species Richness

Species richness is defined as the total number of plant species recorded within an individual wetland, while wetland species richness is defined as the total number of wetland plant species recorded within an individual wetland. Wetland species include those categorized by the *National List of Plant Species That Occur in Wetlands: California (Region 0)* (Reed, 1988) as obligate (OBL), facultative wetland (FACW), or facultative (FAC), while upland plants include those that are categorized as facultative-upland (FACU) and upland (UPL). These categories are defined as shown in Table 1.

**Table 1. Species Category Definitions**

Species Category	Definition
OBL	occur almost always in wetlands (>99% probability)
FACW	usually occur in wetlands (67%-99% probability)
FAC	equally likely to occur in wetlands and non-wetlands (34%-66% probability)
FACU	usually occur in non-wetlands (67%-99% probability)
UPL	occur almost always in non-wetlands (>99% probability)

For those wetland species not listed (as OBL, FACW, or FAC in the "National List"), or eligible for such designation, a literature review shall be conducted to determine their wetland status. A wetland species richness of 10 or greater shall be achieved at the project site by the completion of the five-year monitoring period.

### 5.2.2 Prevalence Index

The prevalence index (PI) is a floristic gradient index which ranks wetlands on the basis of the relative proportions of wetland and non-wetland species, weighted on the basis of the species' category in the Reed *National List*. For calculation of the prevalence index, each category is weighted according to the scale outlined in Table 2 below.

**Table 2. Prevalence Index Weight Scale**

Wetland Status	Weighting
OBL	1
FACW	2
FAC	3
FACU	4
UPL	5

The prevalence index is a standard method of determining whether a wetland data set is categorized as a wetland or upland plant community. By using the weightings described above, the prevalence index establishes a gradient where low values represent the "wet" end of the gradient (plant communities dominated by OBL and FACW species), and high values represent the "dry" end of the gradient (plant communities dominated by FACU and UPL species).

PI values range from 1 to 5, with a value of 1 indicating that all species in that sample are obligate (OBL) wetland species and a value of 5 indicating that all species are obligate upland (UPL) species, with intermediate values indicating the relative importance of wetland species. To be considered a wetland, the area must have a prevalence index value less than 3.0 (U.S. Fish and Wildlife Service, *et. al.*, 1989). The PI for each wetland shall be calculated using the following formula:

$$PI = \frac{1*f(OBL) + 2*f(FACW) + 3*f(FAC) + 4*f(FACU) + 5*f(UPL)}{f(OBL) + f(FACW) + f(FAC) + f(FACU) + f(UPL)}$$

Upon the completion of the five-year monitoring period, wetlands on the site must achieve a prevalence index value less than 3.0.

### **5.3 Mitigation Monitoring Responsibility**

The project proponent, or its successor, is the responsible party for monitoring constructed wetlands within the reclamation areas. Any maintenance or remediation required to bring the constructed wetlands into compliance with the measures outlined in this document and in the 1995 HRP is the responsibility of project proponent. Granite Construction Company will be responsible for funding the mitigation and monitoring effort.

## 6.0 OAK/RIPARIAN WOODLAND MONITORING PROTOCOL

The following measures shall replace the vegetation monitoring parameters (section III-C2) and performance standards (section III-D) outlined in the HRP.

### 6.1 Monitoring and Reporting

Monitoring is designed to ensure compliance with the performance standards and to discover and correct conditions that are detrimental or potentially damaging to the plantings. Monitoring of the plantings will occur annually for five years, from the date of installation, conducted by a certified arborist. Monitoring will consist of a site assessment to evaluate the health of each planting. Health will be evaluated based on a qualitative scale (see Table 3 below). Only plantings receiving a rating of fair or above will be considered successful. Additional mitigation will be required for plantings that are rated poor or fail to survive.

**Table 3. Health Rating Scale**

Rating	Tree Health
Excellent	Free of any signs of stress, disease, nutrient deficiency, or parasites. Wounds, if any, all healed.
Good	Some evidence of stress, disease, nutrient deficiency, or parasites. Minor leaf loss or deformity. Any wounds nearly healed, or showing satisfactory progress toward healing.
Fair	Clear evidence of stress, disease, nutrient deficiency, or parasites. Moderate loss or deformity of leaves or buds. Wounds showing evidence of closure but with moderate amounts of exposed wood.
Poor	Widespread evidence of stress, disease, nutrient deficiency, or parasites. Substantial leaf loss or deformity, bud death, or other pathology. Wounds showing little or no closure, with substantial exposed wood. High potential for tree mortality.

Monitoring reports will be prepared annually for each monitoring period until the five-year monitoring period ends. The basic purpose of the monitoring reports is to present data and summary statistics for each planting area. Any conditions detrimental to the plantings (erosion, predation, etc.) identified during monitoring will also be discussed. Actions to correct these conditions will be identified in the annual monitoring report. Because temporary irrigation may be needed for the first several years, the effectiveness and necessity of the watering regime for each planting area should be addressed in the monitoring report. Copies of the annual monitoring report will be submitted to Yolo County by December 31<sup>st</sup> of each monitoring year.

Should monitoring indicate that the plantings are not achieving the performance standard, the permittee will meet with representatives of the County to discuss appropriate remediation or maintenance actions required to achieve the performance standard. These may include replanting additional trees, per the guidelines established in this restoration plan, enhanced control of competing vegetation, and protection from predation.

## **6.2 Performance Standard**

In order to ensure the ongoing success of the plantings, the following performance standard has been established. A minimum of eighty percent (80%) of the total plantings will survive annually (exhibiting fair health characteristics, or higher) and become established in the restoration sites. If the plantings fail to meet the performance standard, they shall be replaced annually, under the guidelines of this management plan, to meet the 80% survival goal.

## **6.3 Mitigation Monitoring Responsibility**

The project proponent, or its successor, is the responsible party for monitoring oak and riparian woodland plantings within the reclamation areas. Any maintenance or remediation required to achieve the performance standard is the responsibility of project proponent. Granite Construction Company will be responsible for funding the mitigation and monitoring effort.

## 7.0 REFERENCES

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- Granite Construction Company. 2001. *Off-Channel Reclamation Plan: Capay Plant, Yolo County, California.*
- Reed, P.B., Jr. 1988. *National List of Plant Species That Occur in Wetlands: California (Region 0).* U.S. Fish and Wildlife Service. Biological Report 88(26.10).
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- Zentner and Zentner. 1995. Cache Creek Aggregates Habitat Restoration Program. Sacramento, CA

**CACHE CREEK AGGREGATES  
HABITAT RESTORATION PROGRAM**

**Zentner and Zentner**

**Lafayette  
Sacramento**

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## I. HABITAT RESTORATION PLAN

### A. INTRODUCTION

#### 1. Project Site Definitions

For this report, the "project site" consists of all areas on the Cache Creek Aggregates (CCA) land that will be mined as proposed in the 1995 CCA long-term mining application. For the purposes of the reclamation plan, the project site has been divided among seven Areas as shown in *Figure 1*, arranged in order of mining and reclamation. After mining, these areas will be "reclaimed" to agricultural or other uses or "restored" to habitat uses.<sup>1</sup> For the purposes of this restoration plan, the portions of these areas that will be restored to habitat are described as the "restoration zones".

On the southern edge of the project site, within the project boundary, a strip of land approximately 200 feet wide will be left unmined on the northern edge of Cache Creek.<sup>2</sup> This strip is a setback from the creek edge to provide a buffer for the creek; it will be termed the "creekside zone" for this report. South of the creekside zone and outside the project boundary, the north bank of Cache Creek (the area between the creek edge and the bottom of the creek bank) will be described as the "creek zone".

Native grasses will also be planted on the slopes of the lands reclaimed after mining to agricultural; these areas are termed "hedgerows" in this report. Additionally, a row of fast-growing and large trees will be planted between County Road 85 and the mining operations and between the northeastern edge of the project site and the future plant site; these strips are described as the "vegetative screen".

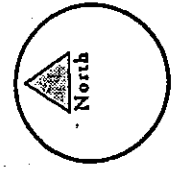
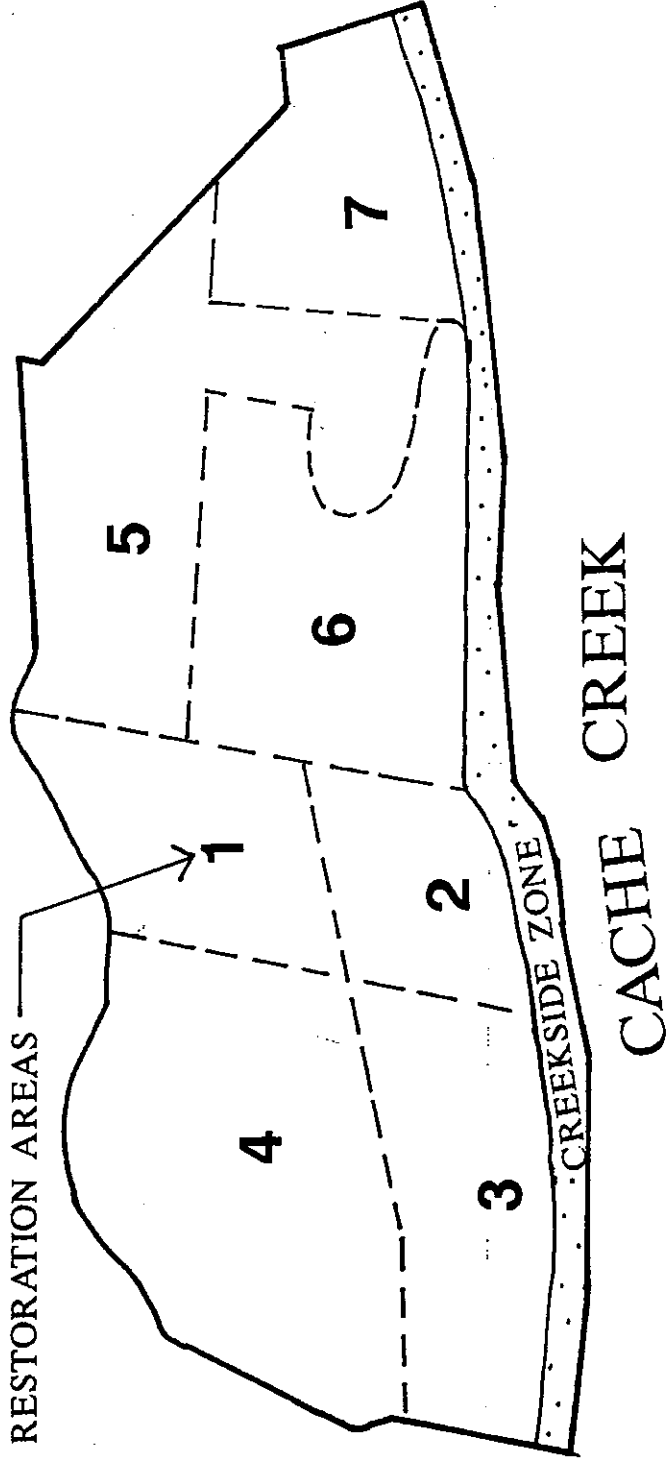
#### 2. Plan Organization

This plan is organized into three major sections. The first section describes the plan and provides plan goals, design objectives, and descriptions of the restoration zones. The second section provides an introduction to the history and requirements of aggregate mining restoration and concludes with descriptions of the vegetation associations to be planted in the restoration zones and their hydrology and soil requirements. The third section describes the monitoring program and performance standards for the restoration zones.

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<sup>1</sup> "Reclamation" is the broad term applied to all post-mining activities meant to reconstruct mined land. "Restoration" is used in this document to refer specifically to those reclamation activities that will result in the construction of native habitats.

<sup>2</sup> The creek edge is defined herein as the "Test 3" line as defined in the Technical Studies and Recommendations for the Lower Cache Creek Resource Management Plan (CCRMP).





## **B. GOALS**

The goals for the restoration plan include the following:

1. Restore high quality natural habitat dominated by appropriate native plants to those areas not reclaimed for agricultural or other uses.
2. Restore the creek channel to a configuration consistent with County plans that will increase the natural values of the Creek.
3. Provide an appropriate monitoring and maintenance program, including financing, that will ensure that restoration is successful.

## **C. DESIGN OBJECTIVES**

The design of the habitat restoration zones was guided by the following objectives.

1. Provide a buffer along the northern edge of the Creek between the project site and the Creek to provide an ecological connection from the Creek to the project site and to protect the low-flow channel of the Creek from capture by the mined lands.
2. Provide a relatively low gradient slope along the southern (Creek-side) edge of the mined lands in the project site to provide a further buffer for the Creek and further assurance that this slope will revegetate rapidly and successfully, thus establishing an ecological connection with the Creek and protection of the natural channel.
3. Provide a relatively low gradient slope in the restoration zone between the annual average high water (AHW) and average low water (ALW) to increase the area subject to periodic flooding and exposure and thereby increase habitat and wildlife diversity, which are promoted by these conditions.
4. Vary the form of the slope in the habitat areas to increase shoreline length which will, in turn, increase wildlife habitat and vegetation "ecotones" (edge areas that tend to have high wildlife use).
5. Vary bottom contours where they will be left above ALW to take advantage of seasonal cycles of inundation and exposure to increase habitat diversity.
6. Provide for restoration in the creek zone that will be consistent with the CCRMP and promote natural creek values such as habitat diversity and flood conveyance.

## D. AREA DESCRIPTIONS

### 1. Introduction

*Figure 2* shows the proposed habitat restoration plan. The restoration zones consist of a strip of land in Area 2, the entirety of Area 3, the south and west portions of Areas 4 and 6, the creekside and creek zones, the hedgerow areas, and the vegetative screen along Road 85. The extent of the area available for habitat restoration purposes was determined after accommodating lands that could be reclaimed to agricultural use and that could be reclaimed as groundwater recharge zones. Because these two uses were determined to be of high value (due primarily to County goals emphasizing these uses and the relative paucity of existing habitat values on the project site), habitat restoration was focused on the remaining lands of the project site and certain additional lands as described below. Following are descriptions of each of the seven reclamation areas, the restoration zones within these areas, and the other restoration zones, including their topography, hydrology, soil conditions, and proposed vegetation associations.<sup>3</sup>

### 2. Area 1

Area 1 will be reclaimed as agricultural land and is not further reviewed for this plan.

### 3. Area 2

Area 2 consists primarily of reclaimed pastureland. However, in the southern portion of the Area, a restoration zone will be created at the lowest end of the field that will be dominated by freshwater marsh. *Figure 3* provides a plan view and cross-section. The restoration zone will be approximately 40 feet in width. The highest elevation in this zone will be at 170 ft, the approximate level of the AHW<sup>4</sup> in this Area. On the south side of the zone, the upper edge will be at the bottom of a 4:1 slope from the southern edge of the project site while the north side of the restoration zone will be at the terminus of a long, gentle slope to be reclaimed as pastureland. The bottom of the restoration zone will be at 165 ft, approximately 5 ft. above the ALW. Accordingly, at least the lowest portions of this zone will be saturated to the surface for approximately 50% of each year.

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<sup>3</sup> Three vegetation associations will be planted in the restoration zones: freshwater marsh (including an aquatic element); riparian woodland; and valley oak woodland. These associations, and the species to be planted in each, are described in more detail in the following section of this plan.

<sup>4</sup> AHW and ALW as used in this report are based on the groundwater analyses prepared by Wallace, Kuhl and Associates for CCA. For each restoration zone, the average AHW and ALW were computed based on the readings for the entire Area and the results used to determine habitat boundaries.

This Area will be reclaimed using primarily fines from the plant operation which will provide for a relatively low permeability. Because the fines will hold runoff relatively well, most of this zone and some area adjacent to the zone (approximately 10 to 20 feet) will support a predominance of freshwater marsh species. To the extent that the pasturelands are irrigated, this zone may increase in extent.

These freshwater wetlands will primarily function to treat runoff from the pasturelands. Freshwater marshes have a long and well-described history of use as water quality treatment systems. Treatment is a result of the high productivity (growth) of marsh plants, which acts to absorb nutrients from waters flowing through the marshes and the isolation of sediment-adsorbed pollutants in marsh sediments. The major pollutant generated by pasturelands primarily is nutrients in the form of nitrogen-rich compounds; freshwater marshes are well adapted to treat these materials.

#### 4. Area 3

Area 3 provides a variety of habitat values. *Figure 4* provides a plan view; *Figure 5* provides a cross-section across the entire mined basin. First, the slope from the southern edge of the project site is a relatively constant 4:1 from the existing ground level to the ALW. This slope provides further buffering for the Creek and will be planted with valley oak woodland species to ensure its stability and habitat value. This slope will be established by mining to the proposed grade. Accordingly, the soils will be native soils that are relatively permeable and which will promote deep-rooted woodland trees and shrubs.

Second, the area between AHW and ALW on the west, north, and east slopes will average 4:1. These slopes are transitional between the 2:1 slopes from existing ground level and the 1.5:1 slopes below ALW (*Figure 6*). These slopes will be reconstructed from mined materials. These salvaged soil materials are important to the survival of native grasses, forbs, and marsh species. While the highly permeable native soils are well-suited for deep-rooted trees and shrubs, they are not conducive to more shallow-rooted species. Additionally, these slopes (especially the south-facing north slope and west-facing east slope) will be more xeric (drier) than the southern, north-facing slope and the water-retention capability of less permeable soils will be important to plant survival here.

Third, these slopes have been varied to create a series of coves and undulations in the shoreline to maximize shoreline length (*Figure 7*). These shoreline undulations will also be constructed from mined materials providing for relatively less permeable soil than the native material. Where surplus overburden or clays become available, they will be deposited "off-shore" to create submerged peninsulas.

Finally, 10' x 10' floating islands, anchored to the basin bottom will be constructed just off-shore from these peninsulas to provide further shoreline diversity and protected wildlife habitat. These islands are 2'x 12' redwood planks secured with steel ribs and anchored with steel chain to a fixed point. These are then covered with a mixture of sand and shells to reduce vegetation growth. Islands are an important component of any open water system. Many wildlife species use islands as nesting and foraging/roosting habitat due to the low occurrence of predators and the high visibility over adjacent waters. However, providing islands is problematic in aggregate mining sites due to either the significant amount of sand and gravel that must be left or the amount of waste materials that must be dumped back to create islands. Over the past several decades, researchers have experimented and refined floating, artificial islands anchored just offshore as a way to both provide this important habitat element. These are used in this project and located just off-shore from several of the peninsulas that protrude into the open water area.

This Area also includes several other features: the southern and western edges of the project site have been curved to spare three mature valley oaks (*Quercus lobata*); the fourth valley oak on-site has also been avoided by preserving an island around the oak.

## 5. Area 4

Area 4 also provides a variety of values after mining (*Figure 8*). Much of the restoration zone in Area 4 resembles portions of Area 3: the upper slopes (above AHW) are a 2:1 grade from the edge of existing ground to AHW while slopes between AHW and ALW are 4:1. Coves and other elements to maximize shoreline length have also been included.

However, only the south and west slopes of Area 4 are part of the currently proposed restoration zone. The north and east slopes are proposed for groundwater recharge. Groundwater movement in this region is to the northeast. Accordingly, the north and east slopes of this Area will be left at 2:1 to provide for groundwater recharge through these slopes. The provision of groundwater recharge zones is dependent upon the Flood Control and Water Conservation District (FCWCD) objectives at the time of reclamation. If the FCWCD does not implement a recharge program and/or these areas are not required for recharge by the FCWCD, then alternative uses (in this case, habitat restoration) will be implemented.

A low berm will separate the western portion of Area 4 from the remainder of the Area. This berm is designed to isolate this western portion for water treatment purposes for future groundwater recharge. If the FCWCD can implement the recharge and storage programs in its current plans, this portion of the Area will be the entry point for water from the adjacent irrigation ditch to the north. The water would then flow through this portion of the Area and possible pollutants would be removed by restoration zone wetlands and through sedimentation.

Because the westernmost portion of this Area is near the foothills of the Coast Range, sand and gravel deposits are relatively thin in this portion of the Area and mining will only go to 170 ft. This elevation is between AHW and ALW (175 and 165 ft, respectively, in this area). A relatively gentle slope has been left on the western edge of this zone to provide an ecological connection with the Creek. This slope extends through AHW to the basin bottom at 165 ft. The basin bottom will then be reconfigured to create a series of islands and basins. The islands rise just a few feet above AHW while the basins have an invert below ALW and will provide refugia for fish and other wetland-related species during periods of low water. The contouring of the basin bottom of this zone is consistent with the design objectives and, at the same time, will maximize the retention time and water treatment capability of this portion of the Area.

#### **6. Area 5**

Area 5 will be reclaimed as agricultural land and is not further reviewed for this plan.

#### **7. Area 6**

Area 6 resembles portions of both Areas 3 and 4 (*Figure 9*). Like Area 3, this Area is adjacent to the creekside zone and has a relatively gentle slope from the south to ALW. Like Area 4, though, the north and eastern slopes may be used for groundwater recharge in the future and these slopes have been shown at 2:1 in this report for groundwater recharge purposes<sup>5</sup>. Additionally, the slopes around the preserved barn and outbuildings in the east central portion of this Area will be sloped at 3:1 to encourage plant growth for screening purposes.

#### **7. Area 7**

Area 7 will not include any restoration zones and is not further reviewed for this plan.

#### **9. Creekside Zone**

An approximately 200-ft wide strip will be left unmined between the northern edge of the creek and the southern edge of the project site. This strip will be left at existing grade and will include two access roads and oak woodland plantings (*Figure 10*). The two access roads consist of a haul road along the northern edge of the creekside zone for gravel truck access and a relatively narrower (12 ft) road for access to the creek zone and creekside plantings. This road will also meander slightly to increase the edge of the planted areas. The oak woodland plantings will provide an ecological connection to the creek zone and protect the Creek edge from erosion.

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<sup>5</sup> Like the proposed groundwater recharge slopes in Area 4, these slopes would be recontoured to provide for habitat restoration if groundwater programs are not needed for this Area.