

RECLAMATION PLAN

ROCKAWAY QUARRY

PACIFICA, CA



PREPARED FOR: BAYLANDS SOILS PACIFICA

PREPARED BY:



DATED: 03/19/2020

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I. INTRODUCTION AND SUMMARY

A. Plan Description and Organization

The Pacifica Quarry was a side hill, open pit mine from which limestone, greenstone, shale and chert were harvested, crushed, screened and sold for construction purposes. Mining ceased in 1987 and the Quarry has been the site of a variety of uses and development proposals since then. Notwithstanding any future development, though, the State Mining and Reclamation Act (SMARA) of 1975, as amended, requires that the mine be reclaimed. More specifically, SMARA states that, "reclamation of mined lands is necessary to prevent or minimize adverse effects on the environment and to protect the public health and safety...and that mined lands are reclaimed to a usable condition which is readily adaptable for alternative land uses" (Sect. 2710).

This Reclamation Plan was prepared pursuant to SMARA and the City of Pacifica Mining and Reclamation Ordinance. The Plan is organized in the same fashion as the 1998 Pacifica Quarry Reclamation Plan, the most recent Plan approved by the City, with additional discussion as derived from the "Reclamation Plan Review Checklist" of the California Department of Conservation's Office of Mine Reclamation (OMR). This Reclamation Plan comprises the final grading, drainage and environmental protection measures required to leave the site in a condition that is safe, stable and readily adaptable to alternate land uses in conformance with SMARA.

B. General Data Concerning the Quarry

Mineral Property and ID: Pacific Quarry; 91-41-0001

Operator: William J. Gilmartin IV
Baylands Soil Pacifica, LLC
225 3rd Street,
Oakland CA 94607
(650) 381-0100

Owner of Surface Rights: Paul C. Heule
Preserve@Pacifica, LLC
231 West Fulton
Grand Rapids, MI 49053
(616) 855-3322

Owner of Mineral Rights: same as above

Agent for Plan Process:	Matt Walsh
	Walsh Engineering 1108 Garden St., Suite 202 San Luis Obispo, CA 93401 (805) 319-4948
Location	Rockaway Quarry, Pacifica
APN	018-150-110, 120 & 150

C. Quarry Location

The Pacifica Quarry is located on the San Mateo County coast in an area bounded by Rockaway Beach to the south, Mori Point Ridge to the north, Highway 1 to the east and the Pacific Ocean to the west in the City of Pacifica. **See Exhibits 1 and 2.**

D. Background

1. Purpose

As noted in the 1998 Plan, "Reclamation", as defined in the Public Resources Code (Section 2733), is the combined process of land treatment that minimizes water degradation, air pollution, damage to aquatic or wildlife habitat, flooding, erosion and other adverse effects from surface mining so that mined lands are left in a usable condition which is readily adaptable to alternate land uses and create no danger to public health and safety. Reclamation activities, therefore, are viewed as corrective to the physical disturbances resulting from past quarry activity. Reclamation work does not constitute a development project but rather is viewed as the rehabilitation of an existing facility.

The Project would reclaim the Rockaway (formerly Pacifica) Quarry in the City of Pacifica, San Mateo County, California. "Reclamation" is defined in the Public Resources Code (Section 2733) as "the combined process of land treatment that minimizes water degradation, air pollution, damage to aquatic or wildlife habitat, flooding, erosion and other adverse effects from surface mining so that mined lands are left in a usable condition which is readily adaptable to alternate land uses and create no danger to public health and safety." Thus, reclamation activities are viewed as corrective to the physical disturbances resulting from past quarry activity and required under State law. The Project would:

- Satisfy objectives included in the SMARA
- Restore the landscape to its historic state through the creation of natural plant communities via the implementation of a focused native revegetation planting plan

- Provide for safe pedestrian and emergency vehicle access to the Project Area
- Provide safe public access along coastal trails and bluffs by stabilizing and grading existing slopes that present safety hazards
- Establish dedicated trails that allow safe public access through the Project Area between the Rockaway beach/retail center and the Golden Gate National Recreation Area in accordance with the California Coastal Act
- Minimize erosion and sedimentation transport by improving on-site drainage and water quality
- Minimize grading to the maximum extent practicable in a manner that is consistent with the other objectives and maintains an average 2-to-1 slope on the reclaimed Project Area
- Install signage in potentially dangerous areas to prevent accidents
- Discourage illegal trespassing by reclaiming the Project Area in a manner that provides secure and safe public access and use in lieu of the existing homeless encampments, vagrancy and threats to the potential public use which characterize the existing conditions on the Project Area due to the cessation of quarrying activities
- Improve the scenic corridor and aesthetics of the Project Area by restoring it to pre-quarry conditions that provide views of the ocean in a manner supporting a future alternate use in accordance with SMARA and the Pacifica General Plan
- Reclaim the property in a self-sustaining manner such that additional maintenance or other management activities are not required
- Replace an existing culvert structure that is currently clogged with debris to improve natural hydrology

2. History

The Pacifica Quarry property is divisible between the Quarry (western) parcel of 47.1 acres and the Flats (eastern) parcel of 39.1 acres. This Reclamation Plan considers both Quarry Parcels (86.2 acres total). The eastern parcel will contain temporary access for construction equipment and materials, along a specified route and creation of a wetland as mitigation for wetland loss on the western parcel. Although the eastern parcel was used in support of Quarry operations and has been significantly disturbed, it has already been partially reclaimed by the City of Pacifica as part of its work in 1999-2000 (see below for more detail).

The Quarry property has seen active use since at least the mid-1700s when Spanish

soldiers quarried lime here for the Presidio in San Francisco (Quarry Products 1976). There is some evidence that the Ohlone mined this area as well. Under the ownership of the E. B. and A. L. Stone Company, it supplied limestone for the rebuilding of San Francisco after the 1906 earthquake. From 1907-1920, the Ocean Shore Railroad ran through the site on its way to San Francisco. Extensive blasting was used in support of the mining in the 1920's and 1930's until the blasting was halted by court order (Hunter 1997). While the Quarry was actively mined from 1900 on, the eastern parcel was used for buildings and settling ponds, quarry roads, conveyor belts a truck scale and washing area. These uses were "obliterated" and the parcel "filled by 1993" (Aquifer Sciences 2001); the City-approved 1998 Reclamation Plan excluded this parcel from the reclamation area, indicating that reclamation was considered complete there.

By the 1970's, though, mining declined as the demand for limestone decreased. The last commercial operator, Quarry Products, Inc. closed the quarry in 1987. Subsequently, the quarry pit was partially filled with earth taken from the Vallemar Road cut created to expand Highway 1 (Holman & Associates 2002).

Once the quarry operations were suspended, the property was used for a variety of enterprises, including an annual rodeo. However, in 1996, the City received permits to construct a wastewater treatment and recycling facility on the north edge of the property. These permits also allowed the City to relocate Calera Creek, which had been a man-made ditch running through the center of the eastern parcel to a new, separate parcel of 17.21 acres running between the Quarry parcel and the eastern parcel. As part of these permits, the City also agreed to grade the eastern parcel and to fill "the old channelized creek [and] 7+ acres of previously damaged and scattered wetlands on site "(Coastal Commission Coastal Development Permit 1-95-40).

Photo 1 shows the property in 2000, shortly after the treatment plant was built and the eastern parcel graded.



Photo 1

Pacifica Quarry, an oblique from the north in about 2000. The Quarry is in the right- center of the photo, just west of the newly constructed Calera Creek. The eastern parcel is in the left-center of the photo with Highway to its left (east); note its recently graded appearance and relatively level condition.

Ownership of the Quarry is now vested in the Preserve@Pacifica, 231 West Fulton, Grand Rapids, MI 49053 (616) 855-3322. **Appendix A** provides the Property Legal Description.

3. Current Conditions

The project site is a former mine dominated by often-steep slopes, non-native plant species and informal accessways. For ease of discussion, the site includes the following elements from roughly north to south: the Hilltop (the high ground on the north edge of the parcel); the East Flank (the hillside comprised mostly of old quarry debris on the east slope of the West Parcel); the Quarry Face (the scarp left by mining in the parcel center); the Quarry Pit (the bowl remaining in the bottom of the old quarry); the Southern Bluff (the old edge of the Quarry on the south adjacent to the ocean); and the East Parcel (flat land used for mine equipment staging, spoils and access to the rest of the site) (**Exhibit 3**).

The Hilltop is the high ground of the parcel and is located above the Quarry Face and East Flank and south of the adjacent GGNRA's Mori Point. The Hilltop is relatively flat and smooth and extends down over the south slope to a shear zone just above the limestone of the Quarry Face. The hilltop also has two mounds protruding

approximately 20 feet above the surface. In contrast with its adjacent landscapes, the surface of the Hilltop has soil and moderate vegetation cover. The invasive pampas grass (*Cortaderia selloana*) and the native coyote brush (*Baccharis pilularis*) are the predominate species (see Appendix B for a vegetation map and assessment).

The East Flank is steeply sloped and is comprised predominately of exposed fill and gains approximately 220 feet in elevation. At the bottom of the East Flank, an old access road cuts across and up the slope. The road cuts north across the East Flank and then turns south and continues across the Face. The grade of the slope varies throughout the section with several small, relatively flat, plateaus. The section is moderately vegetated; the lower slope is dominated by pampas grass while the upper, more stable slope contains a variety of native coastal shrubs such as coyote brush and California sage brush (*Artemisia californica*).

The Quarry Face is predominately an exposed limestone face with approximately 170 feet in elevation gain. The lower two thirds of the Face are steep, comprised of exposed limestone, and are sparsely vegetated. Approximately 120 feet above the old quarry floor, two thirds of the way up the Face, an old access road cuts horizontally across the Face. Above the road, the Face gives way to the Hilltop at the geologic shear zone that separates the limestone from greenstone (see the section below on Local Geology for more information). The access road and upper slope have moderate vegetation cover. Vegetation is predominately non-native and is dominated by pampas grass.

The Quarry Pit is predominately flat and vegetated with non-native species. Steep slopes, including the Face, surround the Pit to the north, west, and south. To the east, the Quarry Pit abuts the City-owned parcel and Calera Creek. An approximately 7,800 square foot, 10 foot deep depression is located near the eastern edge. North of the depression is an elevated, predominately exposed rock surface. Approximately 20 Monterey cypress (*Hesperocyparis macrocarpa*) trees are located along the southern border of the Quarry Pit. The composition of vegetation in the western portion of the Quarry Pit in the Western Parcel is dominated by pampas grass (*Cortaderia jubata*); however, remaining portions of the Quarry Pit are now dominated by Mediterranean barley (*Hordeum marinum*) and sweet fennel.

The Southern Bluff abuts the Pacific Ocean to the south, is steeply sloped, and is comprised on the surface of predominantly exposed and unstable rock slopes. The slopes are sparsely vegetated with pampas grass. The ridge has moderate vegetation cover comprised predominately of non-native species dominated by non-native species, including sweet fennel (*Foeniculum vulgare*), short podded mustard (*Hirschfeldia incana*), and rape mustard (*Brassica rapa*). However, shrub species, such as poison oak (*Toxicodendron diversilobum*), have begun to colonize the Southern Bluff. This area has also been called the "arm and the knob" or other terms as the bluff ends in a promontory including large, highly visible rocks on the southern face.

The East Parcel is located adjacent to Highway 1, directly east and south of Calera Creek. Topography is relatively flat, with elevations ranging from approximately 20 feet to 65 feet above mean sea level. This parcel is dominated by non-native grasses, such as pampas grass, Mediterranean barley, ripgut brome (*Bromus diandrus*), Italian ryegrass (*Festuca perennis*), and non-native herbs and shrubs, including sweet fennel, bristly ox-tongue (*Helminthotheca echioides*), and Sydney gold wattle (*Acacia longifolia*). Much of the central portion of the Eastern Parcel is dominated by pampas grass. A large patch of non-native Fuller's teasel (*Dipsacus sativus*) occurs along the southern edge of the Eastern Parcel. Monterey cypress trees line the western and southern edges of the Eastern Parcel and the walking trail that bisects the Eastern Parcel (i.e., the southern portion of the existing access road depicted in **Exhibit 3**). Several isolated willows (*Salix* spp.) now occur in non-wetland areas and a patch of willows now grows in the southwestern corner of the Eastern Parcel. Jurisdictional wetlands and an ephemeral ditch are also located onsite, see **Appendix E**.

E. Geology of the Quarry

1. Regional Geology

The following is taken directly from the geotechnical report (**Appendix C**; Geocon 2018):

"Pacifica is located within the Coast Ranges Geomorphic Province of California, on the west side of the San Francisco peninsula. The Coast Ranges are a series of northwest trending mountains and valleys that extend along much of California's coast and inland to the Central Valley and Klamath Mountains. Topography is controlled by the predominant geological structural trends within the Coast Range that generally consist of northwest trending synclines, anticlines and faulted blocks. The dominant structure is a result of both active northwest trending strike-slip faulting, associated with the San Andreas Fault system, and east-west compression within the province.

The San Andreas Fault (SAF) is a major right-lateral strike-slip fault that extends from the Gulf of California in Mexico to Cape Mendocino in northern California. The SAF forms a portion of the boundary between two tectonic plates on the surface of the earth. To the west of the SAF is the Pacific Plate, which moves north relative to the North American Plate, located east of the fault. In the San Francisco Bay Area, movement across this plate boundary is concentrated on the SAF and also distributed, to a lesser extent, across a number of other faults including the Hayward, Calaveras and Rodgers Creek faults, among others. Together, these faults are referred to as the SAF system.

Basement rock west of the SAF is generally granitic, while to the east it consists of a chaotic mixture of highly deformed marine sedimentary, submarine volcanic and metamorphic rocks of the Franciscan Complex. Both are typically Jurassic to Cretaceous in age (205 to 65 million years old). Overlying the basement rocks are Cretaceous (about 140 to 65 million years old) marine, as well as Tertiary (about 65 to 1.6 million years old) marine and non-marine sedimentary rocks with some continental volcanic rock. These Cretaceous and Tertiary rocks have typically been extensively folded and faulted largely as a result of movement along the SAF system, which has been ongoing for about the last 25 million years, and regional compression during the last about 4 million years. The inland valleys, as well as the structural depression within which San Francisco Bay is located, are filled with unconsolidated to semi-consolidated deposits of Quaternary age (about the last 1.6 million years). Continental deposits (alluvium) consist of unconsolidated to semi-consolidated sand, silt, clay and gravel, while the bay deposits typically consist of soft organic-rich silt and clay (bay mud) or sand.

Based on geologic mapping by the United States Geological Survey (USGS), the site is generally mapped as limestone and greenstone of the Franciscan Complex to the west of Calera Creek with Quaternary age alluvium and terrace deposits to the east of the creek. The mapping (published in 1994) depicts areas of fill in the East Flank area and along the present alignment of Calera Creek, which was realigned subsequent to the USGS mapping.”

2. Local Geology

For the Quarry property as a whole, United States Geological Survey (USGS 1994) mapping shows the area west of Calera Creek (the Quarry) to be dominated by limestone and greenstone of the Franciscan Complex while east of the Creek contains Quaternary age alluvium and terrace deposits. The mapping also shows areas of fill in the East Flank and along the present alignment of Calera Creek, which was realigned after the USGS mapping in 1999.

Specific geologic conditions for the reclamation site are discussed in more detail below; refer to Figure 2 of Appendix C, the geotechnical report, for locations.

a. Limestone

The Quarry Face is made up of highly competent limestone. These beds are stable with the exception of minor spalling. Exposed rock north and above the limestone (part of the Hilltop) is greenstone, an altered volcanic rock. The limestone bedding strikes northeasterly and the greenstone bedding strikes northwesterly. A shear zone,

extending from about elevation 130 to elevation 180, separates the limestone and greenstone and the Quarry Face from the Hilltop. Its extension to the east also separates the Face from the East Flank of the quarry. The mid-slope shear zone and materials above this are considered a zone of weakness necessitating construction of stable slope.

b. Fill (Qf)

Fill material is present in numerous locations but especially notable in the Quarry Pit, East Flank, Hilltop, the Southern Bluff and East Parcel. Fill materials in the Pit appear to have been placed and graded, but documentation of the fill placement, quality, or compaction has not been discovered. Dumped Fill, unconsolidated material associated with the former quarry operations, has been dumped or pushed down existing slopes in the East Flank and Southern Bluff areas, and is discussed separately below.

Fill in the Pit is 20 ft thick or more over limestone bedrock and consists variously of loose to medium dense silty sandy gravel, clayey gravel, and gravel with sand, cobbles, boulders up to approximately 2 ft maximum dimension, and asphalt fragments. Further east, near the Creek, fills are 6 to 15 ft thick and consist of silty sands and clays with variable amounts of gravel and clayey to gravelly sands. Various debris were observed in the fills and included wire, fabric, asphalt fragments, and concrete chunks up to approximately 2½ ft in maximum dimension. Historic evidence indicates much of this fill likely came from off-site.

c. Dumped Fill (Qdf)

Dumped fill is material that was pushed or dumped down slopes at the site. Dumped fill is present as relatively thin cover (approximately 5 feet or less) over limestone bedrock along the top of the Southern Bluff and down much of the Bluff's southwest (ocean-facing) slope, where it actively sloughs into the ocean.

At the east end of the Quarry Face, dumped fill forms a ramp consisting of loose limestone gravel, cobbles, and boulders. Dumped fill on the East Flank consists variously of loose to medium dense silty sandy gravel, silty gravel, gravelly sand, and silty clay, with trace cobbles, boulders, and chunks of asphalt. The dumped fill here ranges from approximately 5 to 17 ½ feet.

d. Alluvium (Qa)

Alluvium was found below the fills that mantle the Eastern Flats and consists of silty to sandy lean to fat clays. Prior studies by others included soil borings that extended to approximately 40 feet and reported predominantly fine-grained soils (silts and clays) with some occurrences of dense to very dense sands and gravel.

F. Natural Resources

1. Wetlands and Other Waters

A delineation of wetlands and other waters potentially subject to the jurisdiction of the Corps of Engineers (Corps), and the SF Bay Regional Water Quality Control Board (RWQCB) was completed by Zentner and Zentner and WRA on the West Quarry Parcel and East Quarry Parcel, respectively. These delineations were completed in the spring/summer of 2015 and August of 2015. The complete results are attached as **Appendix D**. The majority of the site is uplands, composed primarily of grasslands, dominated by invasive upland species, and exposed rock slopes and surfaces. In total, the Project Area contains approximately 0.25 acre of features that would potentially fall under the jurisdiction of the Corps, and RWQCB, including: 0.25 acre of seasonal wetlands. Of this 0.25 acre, approximately 0.22 acre would be permanently impacted by the Project due to grading and 0.02 acre would be temporarily impacted for site access (see **Appendix E**, Figure 2).

The vegetation in much of the seasonal wetlands consists of a matrix of FAC and FACW species such as rabbit's foot grass (*Polypogon monspeliensis*; FACW) and toad rush (*Juncus bufonius*; FACW). The soils at the wetland data points generally have a color between 10YR 4/1 and 10YR 3/2 with occasional mottles. The wetland soils are primarily silty with small gravel throughout.

Additionally, the Corps would claim all portions of Calera Creek that extend up to the ordinary high water mark. The RWQCB would claim portions of Calera Creek that extend up to top of bank. The CCC would potentially claim up to the landward edge of riparian vegetation along Calera Creek. However, the Project would not impact Calera Creek or riparian vegetation along it in any way.

The wetlands on the western parcel will be graded and filled as part of the Reclamation Plan. Mitigation for the loss of these wetlands will consist of the creation of 0.60 acre of wetlands on the eastern parcel; see attached Wetland Mitigation Plan, **Appendix E**. Additionally, an outlet culvert from the detention basin in the Quarry floor will tie into the existing western Calera Creek culvert under the access bridge to provide for stormwater runoff from the Quarry. No diversion will be necessary with this tie-in approach.

2. Special Status Species

The Pacifica Quarry property as a whole site has been subject to a number of special-status species surveys; see the attached special-status species assessment (**Appendix F**) for details.

These surveys have found the following species on the Quarry parcel:

1. California red-legged frog (CRLF; *Rana aurora draytonii*, FT, CSC, IUCN:VU), found occasionally as juveniles in the old Quarry pond. According to Swaim (2009), the juveniles in this pond do not progress to adults due to the shallowness of the depression. Calera Creek also hosts CRLF.
2. Pappose tarplant (*Centromadia paryi* spp. *parryi*, BLM:S, Rare Plant Rank -1B.2).
3. Rose leptosiphon (*Leptosiphon rosaceus*, CNPS Rank 1B.1)

Other listed or otherwise special status species have been found either in Calera Creek or on the eastern parcel. These include the following:

1. San Francisco Garter Snake (*Thamnophis sirtalis tetrataenia*, FE, SE, CFP), found in 1989 in two ponds on the eastern parcel but extirpated at that time and not observed since despite directed surveys for this species;

A series of conservation measures are proposed to ensure that impacts to these and other species that might occur on-site are avoided and minimized to the maximum extent practicable (see Section V.C. of this Reclamation Plan for conservation measures).

G. Archaeological/Cultural Resources

Holman and Associates performed a historical and cultural assessment of the Project Area in 2002 (Appendix G, Cultural Resources Report). Holman and Associates reviewed relevant resources, including a records search at the Northwest Information Center of the California Historical Resources Information System at Sonoma State University prior to conducting a field archaeological survey in the Project Area. Holman and Associates found two prehistoric sites, SMA-162 and SMA-268, during their analysis, both in the eastern parcel (outside of the Project Area). Both sites were heavily disturbed and were likely excavated elsewhere, as soils were likely deposited in the eastern parcel (Holman and Associates 2002). The Project would not impact either site.

SMA-162 is located in a man-made berm outside of the Project Area. This site was first identified in 1974 and is not likely an in situ prehistoric site. This resource was not located in its original location when discovered and did not have its original composition. Items within the site were determined to be remains of one or more archeological sites that originated in the Sharp Park area. These items had been transported during road construction and were stockpiled at Reina del Mar as fill material. This site is located approximately 100 feet south of the paved egress route in the Project Area that would be used for site access. Since all

equipment and vehicles will remain on the egress route (i.e., the existing road alignment), SMA-162 will not be impacted by the Project.

SMA-268 is located north of Calera Creek near the existing wastewater treatment facility. This site extends to the berm west of Highway 1; however, its extent is a rough estimate. This site was first recorded during a 1986 Caltrans survey but has been known since 1963. In 1963, a shell midden containing obsidian tools, projectile points, and human remains were removed when Highway 1 was expanded. In 1993, the site was described as a habitation site with dark brown midden containing many shell fragments, mammal bones, and fire-affected rock; all of which was partially covered with up to 70 centimeters of fill. The site was impacted during restoration of Calera Creek in the 1990s. The site would not be located in an Area of Potential Affects associated with the Project.

Additionally, although the Rockaway Quarry was a historically important feature to Pacifica and the region, little cultural evidence of this feature remains on-site. No sacred sites or other potentially significant resources, including architectural resources, were identified, or were evident in the records of the Native American Heritage Commission, San Mateo County Historical Association, or Pacifica Historical Society. Thus, the Project would not impact cultural or historical resources.

H. Planning History and Environmental Documentation

Quarry Products, Inc. operated the Pacifica Quarry until February 1987. In 1991, the then-owners applied for and received approvals for a Reclamation Plan and Quarry Use Permit (QUP-706-92). Note that the City requires approval of a QUP for Reclamation Plans. The City (QUP) completed and adopted a Negative Declaration for this approval.

In 1996, the owners applied for and received approval of a revised Reclamation Plan and QUP. The 1996 Plan differed from the 1991 Plan in the following ways.

1. The 1991 Plan contemplated constructing a buttress fill at the toe of the East Flank slope to stabilize loose fill and historic landslide deposits. The 1996 proposed to remove all of the unconsolidated material, recompacting part of it in place to create a level Pad (Pad B) and using part of it to fill the quarry pit.
2. Subsequent to 1991, Highway One work generated fill that was deposited in the quarry pit (see History above). The filling was consistent with the 1991 Reclamation Plan although not completed by the landowner. The 1996 Plan proposed filling the pit further, to elevation 85.
3. The City purchased 12 acres of the Property for a wastewater treatment plant and subsequently built the plant and relocated Calera Creek from the Quarry Property's eastern parcel to a new parcel between the two Property parcels.
4. The 1996 Plan proposed lowering the Southern Bluff to approximately 85 in elevation over most of its length.

The 1996 Reclamation Plan involved cutting and filling approximately 807,200 cubic yards of earthen material during two phases of work. Depth of cut from the existing ground surface varied from a few feet to 55 feet. Fill generated by this work would be placed in the Quarry Pit to form Pad A at elevation 85.

The City approved this Plan and adopted a Mitigated Negative Declaration (MND).

In 1998, the owners proposed a revised Reclamation Plan. This Plan did not include the creation of Pad B at the Eastern Flank and instead graded the East Flank to a natural slope. The Southern Bluff grade was also reduced. Additionally, there were several small differences between the 1996 and 1998 drainage plans. Generally, though, the 1996 and 1998 Plans were highly similar but the reclamation cost was increased for the financial assurances analysis. The City approved this Plan in May 1998, including a requirement that the Coastal Commission approve the Plan (letter of Mignone Wood, LSA to Ms. Alicia Johnson, OMR, Oct. 12, 2009). The applicant apparently submitted the Plan to the Commission and the Commission then generated a list of additional required materials but no further action was taken on the application.

II. THE SURFACE MINING OPERATION

A. Area and Facilities Affected by the Quarry Operation

Exhibit 3, Site Plan shows the overall property boundary, the project area, the reclamation areas, and the adjoining lands. The areas of the property outside of the reclamation areas shown in Exhibit 3 are not subject to disturbance. Additional area within the East Parcel will be used for access and wetland mitigation.

There are no remnant mining facilities, equipment or other materials such as monitoring wells, portals, shafts, etc. remaining on the Quarry parcel; accordingly, no demolition or removal of facilities is proposed.

An existing bunker, presumably used to store demolition equipment, is outside the property boundaries and will not be affected by reclamation (see Exhibit 3 for its location).

B. Access to the Quarry

Pacifica Quarry is located from State Highway 1 (Cabrillo Highway) by traveling westward from the signalized intersection at Reina del Mar Avenue.

The site does not have any formal pedestrian facilities such as trails. In response to Coastal Commission requirements, an access plan for reclamation has been prepared; it is attached as **Appendix H**. The tuck haul routes and potential effects of truck trips on the project site and surrounding roadways have also been analyzed and the results can be found in **Appendix L**.

C. Date Quarry Operation Began

As noted above, Pacifica Quarry is one of the oldest quarries in California. Early records indicate that the lime pits at Rockaway Beach furnished whitewash for the San Francisco Presidio in the late 1700s and that limestone was used for building foundations near the Sanchez Adobe in Pacifica. Substantial mining began about 1907 and a series of mining companies worked the site over the years. Quarry Products, Inc. took over operation of the Pacifica Quarry at the end of 1975 and operated it until the quarry was closed in 1987.

D. Termination Date

As noted above, the Quarry closed in 1987, and no further mining is planned for the site. The quarry is listed as a local resource for mining by the State, the location of the Quarry, its proximity to homes and businesses, and the lack of a viable market or practicable transportation strategy for the quarry product militate against future mining.

E. Permitting, Phasing and Operation Schedule

The reclamation work will require permits from the City of Pacifica, the California Coastal Commission, the US Army Corps of Engineers, the San Francisco Bay Regional Water Quality Control Board, and the United States Fish and Wildlife Services.

Phasing plan provided in **Table 1**, phase descriptions provided below.

TABLE 1
Phasing Plan

Benchmark	Approximate Time Frame
250,000 cubic yards of soil imported and deposited on the Property in accordance with the Approved Amended Reclamation Plan	12 months after approval of the Approved Amended Reclamation Plan by the City
500,000 cubic yards of soil imported and deposited on the Property in accordance with the Approved Amended Reclamation Plan	24 months after approval of the Approved Amended Reclamation Plan by the City
750,000 cubic yards of soil imported and deposited on the Property in accordance with the Approved Amended Reclamation Plan	36 months after approval of the Approved Amended Reclamation Plan by the City
970,000 cubic yards of soil imported and deposited on the Property in accordance with the Approved Amended Reclamation Plan	48 months after approval of the Approved Amended Reclamation Plan by the City
Grading of the Property completed in accordance with the Approved Amended Reclamation Plan	48 months after approval of the Approved Amended Reclamation Plan by the City
Revegetation of the Property completed in accordance with the Approved Amended Reclamation Plan	48 months after approval of the Approved Amended Reclamation Plan by the City
All of the Work is completed in accordance with the Approved Amended Reclamation Plan	48 months after approval of the Approved Amended Reclamation Plan by the City

Phase 1 - West Quarry Parcel

Work will be completed on the West Quarry Parcel in 4 sub-phases (Phase 1A, 1B, 1C and 1D).

Phase 1A

The initial Phase 1A will include site preparation and site clearing of the West Quarry Parcel and Calera Creek culvert crossing. Work will also include placement of 250,000 cy of imported fill in the areas at the Calera Creek culvert crossing/access point and the Quarry Pit located on the West Quarry Parcel.

Phase 1B

This Phase will include excavation of 85,000 cy of cut material at the top of the Main Face, East Flank and Quarry Pit for rough grading of the access path/multi-use trail and stabilization of the top of the hillside. Placement of an additional 250,000 cy of imported fill in the Quarry Pit and East Flank to raise the grade and generate the rough grades for the Access Path/Multi-Use Trail along the East Flank up to the top of the Main Face will also be included in this Phase.

Phase 1C

Phase 1C will include placement of an additional 250,000 cy of imported fill in the Quarry Pit. Additional work in this Phase will include construction of the concrete lined drainage ditches, swales, storm drain lines, and drop inlets along the Access Path/Multi-Use Trail and Hilltop located on the Upper Main Face and East Flank of the West Quarry Parcel. It will also include the sedimentation junction structure and culvert tie in located at the Calera Creek Crossing.

Phase 1D

The final Phase on the West Quarry Parcel will include placement of an additional 220,000 cy of imported fill at the Quarry Pit and rough grading for the Access Path/Multi-Use Trail within the Quarry Pit Area. It will also include construction of the swales, concrete lined drainage ditches, swales, storm drain lines, drop inlets and the junction structure(s) located in the Quarry Pit Area. Additional construction will be fine grading, construction of the structural section of the full length of the Multi-Use Trail on the West Quarry Parcel in compliance with the Quarry Reclamation Plan documents.

F. End Use

The end use for the reclamation work is open land. As used here, this refers to an open space condition without unsafe or hazardous site conditions. This will require grading to create safe slopes, installation of local drainage facilities to ensure erosion control, and re-vegetating the site to achieve a character that is relatively natural in appearance. Future mining of the former Quarry Parcel will not occur.

III. RECLAMATION GRADING

A. Summary

Appendix I contains the Reclamation Grading and Drainage Plans.

The design of reclamation work was guided by the following goals:

1. Create safe slopes in place of existing unsafe conditions. In that regard, much if not all, of the work is the result of geotechnical requirements (see **Appendix C**, the project Geotechnical Report with more detail below¹).
2. Minimize grading to the maximum extent practicable; this reduces potential impacts and limits costs.
3. Provide for safe pedestrian and emergency vehicle access.
4. Mitigate appropriately for environmental impacts.
5. Where possible, e.g., the hilltop, restore natural appearances.

The Reclamation Plan results in the cut of approximately 85,000 cubic yards (CY) of earth and the fill of approximately 1,024,000 CY of earth. The Reclamation Plan will have a net difference of 970,000 CY of fill. The wetland restoration work will result in an additional minor amount of fill on the floor (see below for more detail).

The vast majority of the reclamation work will be focused on the Hilltop, the interior of the Southern Bluff and the Quarry floor in furtherance of the above goals; the discussion below provides more detail on each of the Quarry areas.

B. Current Grading Plan vs. 1996 Grading Plan

a. Introduction

Overall, the Grading Plan is meant to respond to the site's geotechnical issues and create safe slopes, safe access or other conditions that conform to surrounding topography. The slope stability criteria reflect the following: (1) State requirements as set by the Office of Mine Reclamation (OMR), which would require that slopes steeper than 2:1 be stabilized—a standard requirement unless the slope is an exposed rock face with a relatively high integrity (such as the limestone face we are leaving intact); (2) our objective of minimizing cut and fill to reduce environmental impacts, as noted above; (3) City of Pacifica standards (Pacifica requires a minimum 3:1 slope unless a steeper slope is supported by a geotechnical report) and (4) our recent field explorations (soil

¹ Note that the Geotechnical report includes some guidance from earlier versions of the Reclamation Plan; thus p. 12 of the report addresses placement of stability fills on cut slopes. These were once a part but are no longer part of the Plan.

borings, etc.) and other, past analyses as reflected in the Geotechnical Report. In short, 2:1 or gentler slopes are considered stable for open space uses² and the Reclamation Plan does not exceed this standard, except for the Quarry face where the geotechnical analysis indicates the exposed limestone has considerable structural integrity and is stable in its current form.

There are no mine wastes with the exception of the dumped fills and those are addressed as necessary as part of this Plan. The following grading discussion is organized from roughly north to south.

b. Hilltop

The Hilltop is presently a mix of fills and old cuts with mounds and hillocks of material reaching 270 ft. in elevation (all elevations are NGVD) with low points at 230 ft; the Hilltop's lower edge is the geologic shear zone that rests atop of Quarry face. For the hilltop, the Plan seeks to: (1) create a more natural, rounded appearance similar to the pre-mining condition; (2) on the west, provide for a safe accessway between the hilltop and the ocean bluff--the flat hilltop here results in a very steep grade for the trail just downslope of this; and (3) steepen the slope on the south and southeast to provide for the transition to the 2:1 slope above the preserved limestone face. Cross-section A in Appendix H provides a good depiction.

The Reclamation Plan thus calls for grading the unstable materials above the shear zone on the south and southwest to a 2:1 slope and rounding the surface of the Hilltop to create a more natural form while maintaining the elevation and creating a more accessible slope on the west. The 1996 Plan called for a height reduction of about 10 to 20 ft. and a significant amount of soil excavation (see Appendix H, cross-section A). As compared to the 1996 Plan, the current plan will preserve more of the Hilltop, while only removing dumped fill.

c. East Flank

The East Flank is an unevenly sloped area that includes both old quarry fills and a buried landslide (see Appendix C, Geotechnical Report). The 2015 Geotechnical analysis determined that the slope and buried landslide are stable and do not require treatment if this area is not disturbed. Accordingly, except for the multi-use trail described below, the Plan will not disturb this area. The northern portion of this area also includes the only remnant native-dominated vegetation associations on-site (see **Appendix B** for the vegetation mapping) and preserving these is consistent with the Reclamation Plan goals.

² SMARA states: “(d) Final reclaimed fill slopes, including permanent piles or dumps of mine waste rock and overburden, shall not exceed 2:1 (horizontal:vertical), except when site-specific geologic and engineering analysis demonstrate that the proposed final slope will have a minimum slope stability factor of safety that is suitable for the proposed end use, and when the proposed final slope can be successfully revegetated.” (Article 9). The City standards (9-2.12) simply require compliance with SMARA.

The Reclamation Plan provides for the construction of a multi-use trail that curves across the southern side of the East Flank to the top of the Hilltop, essentially duplicating an existing accessway. This access will be 12 ft wide and will have concrete swales for drainage (See Appendix I for details). The new access will replace the existing, heavily eroded trails that currently cross this relatively steep slope. The trail will also avoid the native-dominated vegetation associations (see Appendix H, the access plan, for more detail). The 1996 Reclamation Plan called for creation of a building pad in this area. The Planning Commission review of the 1996 Plan required that this area be restored as a slope.

d. Quarry Face

The Quarry Face is presently a steep rock face with a geologic shear zone (a structural discontinuity between two different geologic formations) that separates the Face from the Hilltop. The 2015 geotechnical analysis concluded that the Quarry Face is a geologically stable feature that does not require regrading. In accordance with the Reclamation Plan goals, no work will occur on the Quarry Face and it will be preserved.

The 1996 Reclamation Plan called for cutting the face back considerably, by as much as 50 ft. vertically. This cut was done in order to balance cut and fill onsite. The current plan will preserve more of the hillside in order to restore the previous slope to a more natural state.

e. Quarry Pit

The Quarry Pit is presently an uneven mix of pits, fills and slopes. The Reclamation Plan proposes to fill this to a natural pre-mining slope (see **Appendix I**, cross-section F). The only addition will be a multi-use trail that will be used to access the lookout located on the western end of the property (as indicated in **Appendix I**).

As noted in the geotechnical report, the Quarry Pit is an area of undocumented fill, does include some non-soil elements and the Reclamation Plan does not propose to compact it at this time. There is no current, overt evidence of differential settlement in this area. Given the number of relatively steep slopes in and around the floor and the presence of a perched basin, significant differential settlement would have been visible. In short, this area appears to be stable at this time despite the history and condition of fill.

As well, differential settlement, should it occur, is not a significant issue here. The Plan proposes to fill the Quarry Pit but the slope will be relatively gentle. As a result, there is not a sufficient concern to cause undue loading of the soils, which might trigger settlement. Also, since there is only a trail access, certain amounts of differential settlements could occur without harm.

The 1996 Reclamation Plan called for filling this area to about 85 ft with a steep slope down to Calera Creek. Again, the current plan does away with the flat area for future

development and instead restores the entire hillside to pre-mining grades, with softer slopes.

f. Southern Bluff

The Southern Bluff is a steep-sided remnant of the old hillside transformed by quarry mining and topped by old quarry fills. Loose soil and uneven surfaces on the top of the southern end of the bluff will be regraded to form a stable, gently sloping surface that will also allow access to ocean views. For the most part, though, the existing elevation of the bluff will be preserved at 90 to 110 ft. The interior slope of the Southern Bluff will be regraded with fill to a stable 2:1 slope and a gentle 5:1 slope in the northwestern-most area. No cut or fill is proposed on the outside (ocean side) of the bluff. The Reclamation Plan will thus preserve the “knob”--the high ground at the easternmost end and the lower elevation dramatic rock formation (see **Appendix H** cross-sections C, D and E).

The 1996 Reclamation Plan cut almost the entire southern bluff down to 85 ft. The Planning Commission review of the 1996 Plan required that the “majority of the knob” be preserved but permitted cutting down the remainder of the bluff.

g. Eastern Parcel

The Eastern Parcel is presently a relatively flat area containing several natural features such as wetlands and an ephemeral stream. The only work to be done on the Eastern Parcel is wetland mitigation and temporary reclamation improvements. The wetland mitigation (see **Appendix E**) will consist of a wetland mitigation pond and seasonal wetland mitigation. Existing access roads will only be maintained as necessary to cause minimal impact on the existing environment and hiking trails.

The 1996 Reclamation Plan also did not contain any grading on the Eastern Parcel.

h. Summary

The Reclamation Plan proposes cut slopes only in two areas: (1) on the south slope of the hilltop, where the greenstone layer at the shear zone and above is being cut to a 2:1 slope, reflecting its relative instability but also to provide safe pedestrian access and a more natural form; and (2) a small area at the south end of the southern ridge where an area of unstable dumped fill is removed, that also will provide improved pedestrian access and views. Fill occurs in three areas: 1) On the inside of the southern bluff, where existing slopes are very steep (often steeper than 1:1) and engineered fill will be used as a mantle to flatten that slope. Where the fill is relatively minimal (the southern end), a 2:1 slope is proposed. Where the fill is more extensive (the northern end), a 5:1 slope is proposed.; and (2) The Quarry Pit will be filled in and the hillside will be restored the natural conditions.

C. Geotechnical Requirements and Other Considerations

The following summarizes the Geotechnical Report (**Appendix C**) recommendations not covered above. As noted there, the reclamation work is generally driven by the geotechnical recommendations and its goal of providing safe slopes and safe access.

The 1996 Reclamation Plan concluded that the local cliffs that overlook the Pacific Ocean are highly stable cliffs with erosion rates less than ½ foot per year. The Geotechnical Report completed for this Plan reviewed selected aerial photographs and observed the cliffs during the field explorations and generally concurs with these rates. It appears likely that erosion rates in slopes or bluffs comprised of limestone, which comprise the great majority of the bluffs, will be less than ½ foot per year. However, the report goes on to note that there is a good deal of dumped fill mantling the underlying bedrock and this is “more susceptible to erosion” (p. 5). No structures are proposed near the cliff edges and even the informal access path is located well back from the cliff edge.

The site is not within a currently established State of California Earthquake Fault Zone for surface fault rupture hazards. In addition, web-based mapping by the USGS indicates that no Quaternary age faults are present at the site. No active faults with the potential for surface fault rupture are known to pass directly beneath the site. Therefore, the potential for surface rupture due to faulting occurring beneath the site during is considered low.

The site is not located within a State of California Seismic Hazard Zone for liquefaction and no further geotechnical investigations for any improvements should be required. Sea level rise is an issue for any coastal development. The work area addressed by this Plan is well above any projections for sea level rise and sea level rise is not likely to affect the erosion rate for the underlying bedrock on the oceanside of the work area. Sea level rise may also result in increased storm-related forces, which could increase erosion of the dumped fill mantling the bedrock on the coastal bluffs but, as noted above, there are no structures proposed near the bluff edge and the informal access trail is sited well away from the bluff edge.

The critical grading onsite will be a maximum of two units horizontal to one unit vertical for any cut or fill operations. These critical grades will only occur in small segments, as most of the site will be graded to soften up the existing slope. In certain areas (noted in **Appendix C**) remedial grading will be required to ensure slope stability. This process requires the removal of existing unsuitable soils onsite and the import of acceptable fill materials. Removed material can be used as engineered fill as long as it is processed per the geotechnical specifications. Per the Geotechnical Report (**Appendix C**), unsuitable materials are defined as old fills and landslide deposits. This operation constitutes roughly 11-20 of vertical feet of fill on the West Quarry Parcel, and 6-7 feet of fill on portions of the East Quarry Parcel. The extent and location of onsite unsuitable material is also

graphically represented in the Geotechnical Report (see Geologic Map). Fill operations will be conducted with imported fill having an Expansion index less than 90, Plasticity Index less than 20, and internal angle of friction of 30°, and a cohesion of at least 200 psf under drained conditions. The Geologic Cross-Sections show the location and extent of the remedial grading that will be necessary. To protect the slope, benching will be required in certain areas and subdrains will be placed in the locations noted in the plan. Additionally, final slopes will be protected against erosion through revegetation of the proposed hillside, as well as sediment control measures per the Erosion Control Plan (**Appendix I**). Also, refer to the Revegetation Plan (**Exhibit 4**) for the type of hydroseeding to be conducted. No materials onsite will be mined for the use of additional backfilling and grading materials.

IV. DRAINAGE

A. Summary

The Drainage Plan is Sheet C2.0 of the grading plan set, provided as **Appendix I**. Overall, drainage after reclamation is conveyed through a series of concrete ditches, vegetated swale and pipes to the ultimate discharge point of Callera Creek. Before the runoff is directed into the creek, it will be collected in the sediment junction structures to provide settling of any sediment collected en-route. See below under Environmental Protection for more detail on erosion control and compliance with the applicable stormwater pollution prevention regulations.

B. Drainage Plan

As with the grading, the following discussion is organized from roughly north to south.

The upper section of the Hilltop will be graded to a rounded hillock that drains in a southerly direction. Two drainage terraces with a concrete ditch will be built along the graded slope on the southern face of the hilltop to collect runoff (**Appendix H**, page C3.0 for ditch details). The two terraces will run parallel to each other with the lower terrace approximately 30 feet below the upper terrace. A concrete ditch located along the multi-use trail will capture runoff from the hillside below the hilltop. The three ditches then flow into a sub-surface storm drain system that follows the multi-use trail down into the sedimentation junction structure (see **Appendix I**, page C3.0 for detail) located next to the trail's crossing along Calera Creek.

The East Flank will be left in its current condition except for the multi-use trail (see **Appendix I**, page C3.0 for trail details). A concrete ditch will be built along the new trail. The ditch will have inflows to the storm drain system at intervals throughout. The storm

drain will flow down the access road and into the sedimentation junction structure mentioned above.

The Quarry Face and Pit will be filled in with a slope that mimics what would be the natural conditions before the mining occurred. Drainage will travel through sheet flow along the hillside to the concrete ditch located along the proposed multi-use trail. Additionally, a graded terrace with a concrete ditch will be constructed to prevent direct runoff into Calera Creek. Both the runoff from the hillside and runoff collected in the terrace will be directed to the sedimentation junction structure.

The Southern Bluff will be preserved on its ocean (western) side. Most of the Southern Bluff's interior slope will be softly graded towards the proposed trail. Runoff will drain via sheet flow to the vegetated swale located along the base of the bluff. From here, the stormwater will be directed through a separate sedimentation junction structure and then to Calera Creek.

The East Parcel will continue to drain to the culverts located at the southwest corner of the property, where it ultimately discharges into Calera Creek. To avoid an impact the existing site drainage, two temporary 24 inch culverts will be used to convey drainage from one side of the existing access road to the other. Also, the existing culverts near the site entrance along Highway 2, will be replaced.

C. Flood Protection

The reclamation area and the entire Quarry parcel are outside of the 100-year flood zone as shown in the Grading Plans. Additionally, a Hydrology Report (**Appendix K**) was also completed in order to identify and possibly mitigate the effect on all existing facilities. As a result of analysis, it was concluded that the project would decrease the peak flow produced during the 100-year, 24-hour storm event. The softening of slopes, in addition to revegetation of the hillside, were the two biggest factors driving this change. The hydraulic analysis was also utilized in the design process that not only were the impacts on the existing storm features negated, but that the proposed facilities were also designed to convey the entirety of the 100-year storm.

D. Stormwater System

After the stormwater leaves the sedimentation junction structure it makes its way in the proposed pipe network that ultimately discharges to Calera Creek. A connection is needed to tie-in the proposed storm drain system. The location of this tie-in will occur at the existing triple barrel 72" culvert crossing. The proposed storm drain pipe will tie-in at the northern most existing 72" culvert pipe. The outside of the existing culvert pipe will be exposed and the proposed pipe will tie into the top of the existing pipe and be sealed. Scheduling of this tie-in will occur during dry season in effort to have no impacts.

V. ENVIRONMENTAL PROTECTION

A. Surface and groundwater protection

The Grading and Drainage Plans (**Appendix I**) and project C3 compliance (see **Appendix J**) includes erosion control measures, revegetation, and other measures designed to ensure reclamation is completed in accordance with State Water Resources Control Board (SWRCB) and Regional Water Quality Control Board (RWQCB) guidance and regulations. Measures are included that are designed to protect the surface and groundwater quality as well as prevent siltation of downslope areas such as Calera Creek.

For example, the proposed erosion control on the 2:1 slopes follows the CASQA and Cal Trans standards for these slopes. Interrupting the length of a slope with fiber rolls is effective in reducing sheet and hill erosion. Note also that while the slopes above the Quarry face that will be cut to 2:1 could be characterized as bedrock, this is highly fractured material, which is why it requires stabilization and planting or staking and is not difficult in this material. Also, some of the steeper fill slopes will require jute netting in addition to the hydroseeding and fiber rolls, as shown on the attached plans. Lastly, check dams and drop inlet protection measures will also reduce the amount of sediment collected while construction is taking place.

Due to its proximity to the ocean, there are no groundwater recharge areas on-site.

As described in the Drainage and C3 Plans, site-specific sediment and erosion control plans have been developed. Grading and revegetation (see below) have been designed to minimize the potential for erosion and convey surface water runoff safely. The erosion control is defined by the San Mateo Countywide Stormwater Program C.3 Guidance.

There will be no proposed impact which will affect streambed channels and streambed banks. Grading done within the proximity of the top of the bank will occur during months of below average precipitation. See the Erosion Control Plan (**Appendix I**) for specific erosion and sediment control measures designed to protect the streambank and limit sedimentation.

B. Vegetation

1. Existing Vegetation

Presently, the Quarry is dominated by pampas grass, an invasive shrub. However, the northernmost and coastal fringe portions of the Quarry are dominated by native vegetation associations as shown in **Appendix B**. The Hilltop, for example, is dominated by pampas grass but also includes the native coyote brush. The bottom of the East Flank

is also dominated by pampas grass while the upper slope contains a variety of native coastal shrubs such as ceanothus (*Ceanothus thyrsiflorus*) and California sage brush (*Artemisia californica*). The Quarry Face is predominately non-native and is dominated by pampas grass. The Quarry Pit is also vegetated with non-native species including pampas grass and perennial pepperweed, another invasive exotic. The Southern Bluff has moderate vegetation cover comprised predominately of non-native species including fennel (*Foeniculum vulgare*) and mustard (*Brassica nigra*).

Interestingly, just off-site, on the western edge of the eastern parcel are several good stands of purple needle grass (*Nassella pulchra*). These are likely derived from the hydroseeding that was done in 2000 as part of the City's efforts after grading the eastern parcel. As shown in Photo 1, this area (the strip just east of the City path along Calera Creek) was graded as recently as 2000. A local ecologist (Ron Maykel, personal communication) stated that purple needle grass was included in the hydroseeding mix for this area. This is a reasonable indication that this species will do well over time from hydroseeding.

2. Revegetation Procedure

Areas within the limits of Project grading activities would be revegetated using three distinct plant palettes based on site conditions. The hilltop and east flank would support a mixture of native scrub, forbs, and grasses. The quarry pit of the Project Area contains shallow soils and flat topography that would support a meadow community of native grasses and forbs. The southern bluff receives significant coastal exposure and can support native grasses and a variety of native forbs. Table 1, below, provides acreages for each seed palette type that would be incorporated into the Revegetation Plan. Figure 1 depicts the Revegetation Plan.

The recommendations in the Revegetation Plan are intended to comply with the requirements of the SMARA, Public Resources Code Section 2710 et seq., and SMARA's reclamation standards at Code of Regulations, Title 14, section 3705 et seq. (Reclamation Standards).

The ultimate goal for revegetation in the Project Area is to restore and blend native vegetation into the surrounding landscape. This refers to the reclamation of disturbed lands to a self-sustaining community of native species as described in the Reclamation Standards. Post-regrading revegetation would be sufficient to stabilize the surface against the effects of long-term erosion and is designed to meet the post-extractive and unmanaged land use goals of the Revegetation Plan. As a result, revegetation would visually integrate with the surrounding open space areas and provide for permanent soil protection.

All proposed revegetation would be accomplished through hydroseeding, which would

take place between October 15 and November 15 with an appropriate tackifier, such as wood fiber mulch. Seed mixtures are varied according to successes and failures of regional hydroseeding efforts, slope, and soil types. Tasks described in this Revegetation Plan would provide native vegetative cover for final contours, thus controlling erosion and stabilizing slopes in the Revegetation Plan Area. Revegetation efforts would utilize plant materials capable of self-regeneration without continued dependence on irrigation, soil amendments, or fertilizer in accordance with the Reclamation Standards. The following revegetation types would be incorporated into the Revegetation Plan Hydroseeding Specifications

Hydroseeding locations are shown on the Revegetation Plan, **Exhibit 4**. Species by location are given below. All materials are to be applied by commercial hydromulch equipment at standard mulch rates with seed totals as provided below but without fertilizer (fertilizer will promote weeds while the natives are adapted to low fertility soils). Table 1 below provides the seeding details. The species selected are based on three factors: (1) native to the region as defined by local flora and plant lists (see McClintock et al 1990, Anderson and Morgan 1973, and EIP Associates 2006); (2) affinity for the specific soil and other conditions found at that specific location based on those same and more general flora and our experience; and (3) noted capability of germination from hydroseeding based on our experience.

Additionally, the proposed vegetated swale seed mix for the project includes native grass and forb species, which are tolerant of varied moisture and soil conditions, and are commonly used in swale applications. The plant species will develop a dense root structure and vegetative cover to provide maximum pollutant filtration and discourage erosion. They will be implemented via hydroseeding. In addition, the species will provide habitat and food sources for pollinators and aesthetic benefits.

TABLE 2.1
Hydroseeding species

Hilltop and East Flank		Rate (lbs per acre)	Notes
Blue wild rye	<i>Elymus glaucus</i>	5.0	High germination rate from seed, known from Pedro Pt.
California aster	<i>Aster chilensis</i>	0.5	Moderate germ rate, common coastal spp.
California brome	<i>Bromus carinatus</i>	2.0	High germ rate, coastal spp.
California poppy	<i>Eschscholzia californica</i>	0.5	High germ rate, common locally
California sage	<i>Artemisia californica</i>	0.5	Low germ. Rate but abundant locally
Coffeeberry	<i>Rhamnus californica</i>	0.5	Low germ rate but abundant locally
Common yarrow	<i>Achillea millefolium</i>	1.0	High germ rate, common through out the Quarry.
Coyote brush	<i>Baccharis pilularis</i>	1.0	Low germ rate but abundant locally
Creeping wild rye	<i>Elymus triticoides</i>	5.0	Low germ rate, found locally but not abundant but provides excellent erosion control.
Farewell to Spring	<i>Clarkia rubicunda</i>	0.5	Moderate germ rate and abundant locally
Lizard tail	<i>Eriophyllum staechadifolium</i>	0.5	Moderate germ rate and abundant locally
Purple needle grass	<i>Stipa pulchra</i>	2.0	Moderate germ rate and abundant locally
Small fescue	<i>Vulpia microstachya</i>	5.0	High germ rate; common on coast, good erosion control
Valley sky lupine	<i>Lupinus nanus</i>	0.5	Low germ rate but abundant locally

Quarry Pit			
California oat	<i>Danthonia californica</i>	1.0	Low germ rate but good mesic coastal site spp
Common yarrow	<i>Achillea millefolium</i>	1.0	High germ rate, common throughout Quarry.
Hairgrass	<i>Deschampsia elongata</i>	1.0	Moderate germ rate and good coastal spp.
Meadow barley	<i>Hordeum brachyantherum</i>	2.0	Moderate to high germ rate and abundant on coast
Red fescue	<i>Festuca rubra</i>	2.0	Moderate to high germ rate and abundant on coast
Small fescue	<i>Vulpia microstachya</i>	5.0	High germ rate; common on coast, good erosion control
Southern bluff			
California brome	<i>Bromus carinatus</i>	2.0	High germ rate, coastal spp.
California poppy	<i>Eschscholzia californica</i>	0.5	High germ rate, common locally
Coastal strawberry	<i>Fragaria chiloensis</i>	0.5	Low to moderate germ rate

			but abundant on coast
Gold fields	<i>Lasthenia californica</i>	0.5	Low to moderate germ rate but abundant on coast
Purple needle grass	<i>Stipa pulchra</i>	2.0	Moderate germ rate and abundant locally
Seaside daisy	<i>Erigeron glaucus</i>	0.5	Low to moderate germ rate but abundant on coast
Small fescue	<i>Vulpia microstachya</i>	5.0	High germ rate; common on coast, good erosion control
Tidy tips	<i>Layia platyglossa</i>	0.5	Low to moderate germ rate but abundant on coast
Valley sky lupine	<i>Lupinus nanus</i>	0.5	Low germ rate but abundant on coast
Varied color lupine	<i>Lupinus variicolor</i>	0.5	Low germ rate but abundant on coast

TABLE 2.2
Vegetated Swale Seed Mix

Botanical Name	Common Name	Rate (Pure Live Seed [pounds per acre])
<i>Achillea millefolium</i>	yarrow	0.3
<i>Deschampsia cespitosa</i>	tufted hair grass	2.0
<i>Elymus triticoides</i>	creeping wildrye	8.0
<i>Festuca microstachys</i>	small fescue	6.0
<i>Festuca rubra "Molate"</i>	Molate red fescue	8.0
<i>Hordeum brachyantherum</i>	meadow barley	8.0
<i>Sisyrinchium bellum</i>	blue eyed grass	4.0
Total		36.3

Seed will be derived from local sources, e.g. coastal San Mateo County, although exceptions can be allowed for wind-pollinated species to expand the source area to the San Francisco Bay Area.

3. Performance Standards and Monitoring

1. Monitoring.

A qualified biologist, restoration ecologist, or landscape architect will monitor general site conditions following completion to ensure that performance standards have been met. Improvements will be maintained and repairs made for a period of at least three years following completion. General site inspections will be made at least twice per year, before the rainy season (approximately September) and after the rainy season (approximately March), for at least three years. These assessments will document the general site conditions and identify immediate maintenance needs, such as weed control or erosion repair.

To ensure adherence to the guidelines of this Plan, all vegetation monitoring activities will be monitored by a qualified biologist, restoration ecologist, or landscape architect. Monitoring must be performed to document revegetation success. One growing season after hydroseeding, the Revegetation Plan Area will be monitored at least twice per year during the following three year period. The frequency of general site inspections and/or quantitative monitoring may be adjusted as needed to most accurately and efficiently identify maintenance or performance issues. Typically, site visits are conducted at the end of the growing season (September) to document success and cover of shrubs, but some herbaceous vegetation is preferentially monitored earlier in the year when it is identifiable (June). A spring visit is important to monitor weeds so a treatment program can be established before seeds are set in the summer. However, these are just guidelines. Site-specific conditions will be assessed to determine the best monitoring timeframe for this Project.

Revegetation sites will be identified on a map and monitored to assure that standards are adequately achieved within a minimum of 80 percent success rate, as required by Reclamation Standards.

Sampling plots will be selected randomly throughout the areas seeded with grasses, herbs, and shrubs to determine native species richness and percent cover of each species. As with the planting areas, sampling will occur in nested plots, with shrubs assessed within a 5-meter radius and herbs within a 1-meter radius from the plot

center. The nested approach means that once a plot center is randomly selected, shrubs are assessed within a 5-meter radius and herbs within a 1-meter radius from the plot center. Monitors will identify and count all shrubs in their respective plots. Cover of all native versus non-native shrubs and native versus non-native herbs within each layer will be estimated within each respective plot, and all species will be identified to the extent possible.

2. Performance Standards

The performance standards will be measured through comparisons of species richness, shrub density, plant cover, species composition, and the presence of noxious weeds. These terms are defined and detailed in Table 4.

Table 4
Performance Criteria Parameters

Parameter	Description	Desired Trajectory
Species Richness	The number of different plant species growing in the area	Species richness is expected to be low at the outset due to varying germination rates of species within the hydroseed mix. After approximately two years, richness will likely increase as seeds have been exposed to sufficient environmental factors to trigger germination. Richness will likely taper off during Years three to five while the most appropriate species for the specific area/microclimate persist and reproduce. The result is a patchwork of large numbers of few species based on what the given area can support. This should be observed in reference sites as well since there are generally only a few dominant plants present in stable plant communities.
Plant Cover	A quantitative measure or ocular estimate of foliar and basal plant cover, expressed as absolute cover. Robust, self-sustaining vegetation is associated with adequate	Total plant cover is expected to increase over the first three to four years following revegetation, as grasses and forbs become established. As the structure of vegetation communities transitions from grasses and forbs to shrubs over time, total cover may decrease slightly because grasses will be shaded out and young shrubs are not likely to provide as high a percent cover. As these transitions occur, monitoring methods and/or

	soil nutrients and low density soil.	performance criteria can be adapted to realistically identify success or failure. For example, after vegetation communities transition away from grassland, the measured parameter could be switched from plant cover to plant density (number of stems per area). Plant density also would be expected to increase over the first few years of shrub or tree establishment when individual plants are small and numerous, then density would decrease as some are shaded out. The plant community is not likely to reach a state of dynamic equilibrium (i.e. stabilize) for at least 10-15 years. However, this five-year monitoring period is intended to help ascertain the longer-term trajectory of vegetation at this site.
Species Composition	A relative measure of the type and abundance of different plant species, measured as percent abundance of target species relative to a reference site. Typically used to determine if target species are present to assess the trajectory of vegetation at a site.	Target species are expected to increase over the duration of monitoring. Species composition is expected to become more diverse up to between five and ten growing seasons, at which time it is expected to be relatively stable.
Presence of Noxious Weeds	Plant census to determine the presence and/or dominance of noxious weeds, expressed as absolute cover.	Weed presence is expected to be relatively high in the first three seasons and control is critical in those years so that long-term colonization by weeds is minimized.

Acceptable threshold values for each of these parameters for each type of hydroseeding mix are presented in Tables 5 and 6. Threshold values were created with input from professionals who have experience with the proposed species in this eco-region. These tables describe the minimum targets for plant survival, species composition, and plant cover. These performance standards were tailored to each seeded community based on growth patterns for the plants in the seed mix. Performance standards represent anticipated conditions three years after installation. SMARA requirements state that performance standards must be met for two consecutive years without significant human intervention prior to release of financial assurances. Revegetation of approximately 33.2 acres in the Revegetation Plan Area is intended to create

approximately 30- 85 percent coverage within three years of installation, depending on the revegetation community.

Several of the performance criteria require reference sites for comparison. Potential reference sites are abundant in Project Area and should be placed close to planting areas in locations that support the desired plant community.

Since reference sites represent intact native communities, it is understood that revegetation areas may not attain their same level of maturity within three years. Therefore, the success criteria are expressed as a percentage compared to what was observed in a reference site and are not anticipated to reach the same level observed in reference sites during the monitoring period.

Instead, the goal of the performance criteria is to demonstrate improvement success over time, such that they may eventually reach reference site levels at maturity.

Species richness (the number of species present in the overstory and understory) in the Revegetation Plan Area is expected to increase each year for approximately three to five growing seasons, after which time it is expected to decrease slightly before becoming relatively stable.

By the fifth growing season following planting, the total number of planted and naturally recruited native trees, and shrubs in the Revegetation Plan Area will be equal to at least 65 percent of the reference site. All planted and recruited trees and shrubs counted must be alive and in good health. This performance standard is more than adequate to ensure successful establishment with 50 to 100 percent canopy cover at maturity, which may not be achieved for more than 10 years.

Species composition (the number of species present) in the Revegetation Plan Area will be documented for two purposes: (1) recording which target native species are best suited to site conditions, and (2) tracking competition between native and non-native species. Since species richness does not contribute to erosion control, this performance standard will not be evaluated for all revegetation types.

Plant cover assessments, targeting an 80% to 90% confidence level, should be conducted by measuring absolute cover using point transect, quadrats along transects, plots, or aerial photograph analysis. While various monitoring methods are acceptable, the methodology should be consistent or comparable from year to year.

In addition to vegetation monitoring to assess the success of revegetation efforts, the density of weeds (non-native invasive plants), measured as absolute cover, will be assessed as part of vegetation sampling. Weed presence is expected to be relatively high in the first three growing seasons following final reclamation, thus weed management is critical in those years to minimize long-term weed colonization.

For the purposes of Revegetation Plan Area maintenance and monitoring, non-native non-graminoid plants listed in the Cal-IPC Inventory (2018) as “Highly” invasive will be considered invasive weeds subject to control and performance standards. If invasive weeds are found to exceed 10 percent cover within a minimum mapping unit of 0.25 acre over all sampled quadrats, weed abatement activities will commence.

Though work will occur throughout the Revegetation Plan Area, the majority of weed control will be focused in meadow areas where pampas grass seed contamination will be abundant and seeded vegetation will be less vigorous than scrub species planted on steeper slopes. As the native seeded shrubs begin to grow and mature, they will shade out and outcompete the majority of non-native species. Therefore, as native plants thrive on the slopes, invasive species will diminish in cover. Table 5 and 6 below provide 5-year performance standards for revegetation types that will be employed in the Revegetation Plan Area.

Table 5
Proposed Performance Standards for Grass and Forb Seeded Communities
(Southern Bluff and Quarry Pit)

Performance Criteria	Monitoring Method	Year 1	Year 2	Year 3	Year 4	Year 5	Response
Species Richness	Transect/plots or relevé with species ID	25%	50%	65%	70%	75%	Reseed natives and/or remove non-target species
Plant Cover (absolute cover, 80-90 percent confidence level)	Transect/plots or aerial photo analysis	5%	10%	20%*	40%	75%	Reseed and/or identify and repair influencing variable
Noxious Weed Cover (absolute cover of Cal-IPC “High” rated noxious weeds)	Transect/plots or ocular assessment and mapping of entire revegetated area	<30%	<30%	<30%	<25%	<20%	Additional managing of non-target species

Table 6

Proposed Performance Standards for Scrub, Grass and Forb Seeded Communities (Hilltop and East Flank)

Performance Criteria	Monitoring Method	Year 1	Year 2	Year 3	Year 4	Year 5	Response
Species Richness	Transect/plots or relevé with species ID	25%	50%	65%	70%	75%	Reseed natives and/or remove non-target species
Shrub Density (number of shrubs observed relative to a reference site)	Plant census in transect/plot	3%	8%	15%	20%	50%	Substitute failing species with target species that are thriving.
Species Composition	Transect/plots or relevé with species ID	10%	20%	40%	60%	75%	Reseed natives and/or
Plant Cover (absolute cover, 80-90 percent success rate)	Transect/plots or aerial photo analysis	5%	10%	20%	40%	50%	Reseed natives and/or identify and repair influencing
Noxious Weed Cover (absolute cover of Cal-IPC "High" rated noxious weeds)	Transect/plots or ocular assessment and mapping of entire revegetated area	<30%	<30%	<20%	<20%	<20%	Additional managing of non-target species

3. Maintenance

Maintenance of revegetation areas across the site will occur as necessary based on post-revegetation monitoring and the evaluation of meeting performance standards.

Maintenance of Revegetation Plan Area will consist of reseeding unsuccessful revegetation areas to the extent necessary to achieve the performance goals, to limit the extent of noxious weeds, and to repair of erosion damage. If any significant rills or gullies are identified in the Revegetation Plan Area, remedial actions will include reseeding of the area with an approved erosion control seed mix, and if necessary, slope stabilization measures will be undertaken.

If revegetation efforts are not successful within three years following initial seeding, the under-performing areas will be reevaluated to determine the measures necessary to improve performance. If necessary, these areas will be reseeded and/or replanted with methods modified as needed. This may include the use of container stock and irrigation, or simply additional seeding during the wet season. Prior to reseeding, the operator will evaluate previous revegetation practices to identify methods to benefit the overall revegetation effort. If, after a site is reseeded, revegetation efforts still do not yield satisfactory results, additional reseeding or other intervention methods may be required. Weed control is necessary to reduce the occurrence of undesirable non-native plant species that may invade the Revegetation Plan Area where disturbance has removed the native plant cover and where active and natural revegetation is occurring. Weeds compete with native plant species for available moisture and nutrients, and consequently interfere with revegetation efforts.

As discussed above, species listed by Cal-IPC (2018) as highly invasive will be considered problematic and will be targeted during maintenance of this revegetation effort if they exceed the designated threshold of 10 percent cover within a minimum mapping unit of 0.25 acre. The percent cover of weeds, abatement measures recommended and undertaken, and other observations on weed control will be included in vegetation monitoring reports. Weed abatement responsibilities may cease once performance standards have been met for each phase of revegetation efforts, unless invasive species in completed the Revegetation Plan Area are deemed a threat to nearby efforts still in progress. The quarry slopes are anticipated to receive limited general maintenance due to steep slopes in the area. Annual monitoring to ensure that erosion control is performing adequately is recommended. If any major erosion is evident, reapplication of hydroseed is recommended. Weed abatement can be achieved best by early detection and removal to reduce the potential for additional seed set. Removal of weeds should be done by hand or mechanically. If seed heads are present on plants, the material should be bagged and disposed of off-site. Use of herbicide application is also permissible if it is not feasible to conduct weed management by hand

4. Adaptive Management.

Every restoration project requires flexibility in managing its success. Adaptive management is an approach that allows for changes to be made along the way and centers on a six-step process of: (1) Assessing, (2) Designing, (3) Implementing, (4) Monitoring, (5) Evaluating, and (6) Adjusting (Nyberg 1999). The strategies described above may prove to be less efficient than other strategies developed at a later date. Therefore, if a different planting strategy is implemented in the Revegetation Plan Area, for which the above performance standards and monitoring guidelines cannot be followed, a revision to this Plan will be submitted as a substitute for this document or portions thereof.

5. Vegetation maintenance procedures

Weed control is likely to be the foremost issue for vegetative maintenance. Table 7 shows the invasive species found on the western parcel of the Quarry property (See Appendix B for the complete list) arranged by their California Invasive Plant Council (IPC) class (Cal-IPC 2006). Among non-native plants known to occur in the Project Area, the following species are particularly invasive and should be targeted:

TABLE 8
Invasive species on the western parcel of the Quarry property

Species		IPC class	Frequency of Occurrence
Common Name	Latin Name		
Pampas grass	<i>Cortaderia jubata</i>	High	Co-Dominant
Himalayan blackberry	<i>Rubus armeniacus</i>	High	Common
Freeway iceplant	<i>Carpobrotus edulis</i>	High	Common
New Zealand spinach	<i>Tetragonia tetragonioides</i>	High	Common
Cape ivy	<i>Delairea odorata</i>	High	Common
French broom	<i>Genista monspessulana</i>	High	Common
English ivy	<i>Hedera helix</i>	High	Common
Poison hemlock	<i>Conium maculatum</i>	Moderate	Co-Dominant
Mediterranean barley	<i>Hordeum marinum</i>	Moderate	Co-Dominant
Italian thistle	<i>Carduus pycnocephalus</i>	Moderate	Co-Dominant
Rose clover	<i>Trifolium hirtum</i>	Moderate	Co-Dominant
Silverleaf cotoneaster	<i>Cotoneaster pannosus</i>	Moderate	Common
Wild oat	<i>Avena fatua</i>	Moderate	Co-Dominant
Ripgut grass	<i>Bromus diandrus</i>	Moderate	Common
Italian Rye grass	<i>Festuca perennis</i>	Moderate	Co-Dominant
Sea fig	<i>Carpobrotus chilensis</i>	Moderate	Common
Bull thistle	<i>Cirsium vulgare</i>	Moderate	Common
Fuller's teasel	<i>Dipsacus fullonum</i>	Moderate	Common
Short-podded mustard	<i>Hirschfeldia incana</i>	Moderate	Co-Dominant
Ngaio tree	<i>Myoporum laetum</i>	Moderate	Infrequent
Ox-tongue	<i>Helminthotheca echioides</i>	Limited	Abundant
Monterey Cypress	<i>Hesperocyparis macrocarpa</i>	Limited	Co-Dominant

In addition to the species listed above, any non-graminoid weed listed as a "high" priority species by the Cal-IPC (2018) (or equivalent reputable organization/agency) will

be targeted for removal and/or management if it is observed in or near Revegetation Plan Area. Also, any non-native species prevalent enough to negatively influence the results of monitoring and performance standards may be targeted for removal or management.

Detailed instructions for removing particular, non-native species can be found in *The Weed Workers' Handbook—A Guide to Techniques for Removing Bay Area Invasive Plants* (Cal-IPC 2004). Weed management may include a combination of mechanical removal and chemical treatment. General recommendations for weed management are outlined below:

1. Herbicide Application

Herbicide application is an effective means of controlling many invasive species as long as it is consistent with the local and regulatory approvals for the Project. Where herbicide treatment of weeds is appropriate, herbicide must be applied by a licensed pesticide applicator. Where herbicide treatment of weeds in aquatic settings (riparian habitat, wetlands, and seeps) is authorized and appropriate, the licensed applicator must use a product approved by the U.S. Environmental Protection Agency (EPA) for use in aquatic settings. The Revegetation Plan Area falls within an area that was designated in 2010 by US Fish and Wildlife Service as Critical Habitat for CRLF. As such, the area is covered by a federal district court stipulated injunction. The use of certain pesticides (including herbicides commonly used in weed management) is restricted in this buffer area. Localized spot treatments and the cut stump application of herbicides restricted by the EPA's 2006 California red-legged frog stipulated injunction may be permitted in the Revegetation Plan Area as long as the application does not occur within 60 feet of any aquatic feature. The EPA's website on Pesticides: Endangered Species Protection Program (<https://www.epa.gov/endangered-species>) should be consulted before chemical treatment of weeds is planned.

2. Non-native Shrubs

Woody shrubs and their roots should be removed using hand or power tools. If woody shrubs cannot be mechanically removed, their trunks should be cut and immediately treated with herbicide, with the roots left in place. This is particularly important for controlling French broom and non-native blackberry, which will re-sprout from cut stems if not treated with herbicide.

3. Herbaceous Plants

Herbaceous non-native species can be removed using almost any combination of methods that is suitable for a given site; however, they should be removed or treated prior to flowering and seed development. English ivy and other vines can be treated with herbicide and/or scraped out of the soil with hand tools or small earth-moving equipment. Pampas grass should be dug out of the soil using hand tools or small earth moving equipment to completely remove the rootball. Any pampas grass plants with plumes containing seeds should have their seed heads cut and bagged to prevent seeds from spreading around the site. Annual species, such as mustards and thistles, can be mechanically removed or treated with herbicide.

4. Non-native Tree Removal

Mature invasive trees do not occur in the Revegetation Plan Area; however, small seedlings are likely to appear from nearby seed sources. Any necessary permits must be acquired prior to removing or trimming trees. The City of Pacifica does not protect trees under 50 inches in circumference at 2 feet above the natural grade. The County of San Mateo protects trees with a circumference of 38 inches or more 4.5 feet above the ground. Wherever possible, vegetation removal or trimming should be avoided during bird nesting season (February 15–July 31). Tree removal during the nesting season will be permitted only if a pre-construction nest survey is conducted by a qualified biologist or restoration ecologist immediately prior to work to confirm the absence of nesting birds.

5. Heritage Trees

The City includes the following as heritage trees: “All trees within the City of Pacifica, exclusive of eucalyptus, which have a trunk with a circumference of fifty (50”) inches (approximately sixteen (16”) inches in diameter) or more, measured at twenty-four (24”) inches above the natural grade; or (2) A tree or grove of trees, including eucalyptus, designated by resolution of the Council to be of special historical, environmental, or aesthetic value.”

The proposed reclamation work in the West Parcel may require removal of 16 Heritage Trees. The Heritage Tree Survey and Map is included in Appendix M of this Report for reference. It is proposed to remove the 16 Heritage Trees identified on the Map to provide for a viable reclamation of the property to restore the pre-mining topography of the historical hillside. This proposal is in compliance with PMC section 4-12.05(c)(2 & 3). Refer to Appendix M for the Tree Protection Plan, which further details tree removals and protection.

C. Conservation Measures

The proposed action will include measures to avoid or minimize effects to listed species and the surrounding environment. Work activities will be scheduled to minimize effects to listed species; all personnel working on the proposed action will receive environmental sensitivity training; Best Management Practices (BMPs) will be implemented to minimize impacts; and specific conservation measures relevant to focal listed species will be adhered to.

General Avoidance and Minimization Measures

1. The following avoidance and minimization measures will be implemented during the proposed action to reduce adverse effects to sensitive species. All permit conditions, legal requirements, and appropriate excavation and engineering practices associated with the proposed action will be followed. Such measures include the Regional Water Quality Control Board, and Corps recommended BMPs, including water quality protection and development of a spill management plan.

Avoidance and Minimization Measures for Federal-listed Species

(Note: Avoidance and minimization measures specific to CRLF and SFGS that will be implemented during the proposed action are outlined below.)

1. Employees on the project shall attend a Workers Environmental Awareness Training Program (WEAP) prior to beginning work at the site. The WEAP shall consist of a brief presentation by a USFWS-approved biologist which may be given either in person or via an automated PowerPoint presentation. The program will include a description of visual identification of any special-status species and required habitat, an explanation of the status of these species and their protection, consequences of non-compliance, and a description of the Project-specific measures being taken to reduce effects to these species. Documentation of the training (i.e. a sign-in sheet) will be retained at the site and will be submitted with applicable reports.
2. The qualifications of any approved biologists or biological monitors shall be presented to the USFWS for review and approval at least ten (10) working days prior to their start of work at the site. These individuals will hereafter be referred to as Service-approved biologists.
3. A service- approved biologist shall be on-site during initial grading activities in each area.
4. A service- approved biologist shall be given authority to stop any work that may result in take of listed species.
5. A service- approved biologist shall conduct pre-construction surveys for CRLF and SFGS no more than 48 hours prior to the commencement of work.
6. The boundaries of the Project Area shall be clearly delineated with highly visible stakes, fencing or flagging.

7. Exclusionary fencing will be placed around the Project Area (including along the existing access roads and mitigation access paths) to prevent CRLF and SFGS from entering the Project Area. Fencing shall consist of silt fence or suitable substitute (e.g. ERTEC 48 inch high visibility orange fencing) which will be buried at least 6-inches below the surface (or sealed in a like manner) to prevent incursion under the fence, and shall stand at least 36-inches above ground. The fence shall also be made of an opaque material. Exit funnels will be installed to allow any animals that may be occupying the Project Area to escape.
8. Exclusion fencing shall be inspected and maintained throughout the project. Fencing will be removed only when all construction equipment is removed from the site.
9. The exclusion fence shall be checked for breaches on a daily basis by the an on-site representative who will be trained by a service-approved Biologist. Fence checks will be conducted on a daily basis and repairs will be made accordingly. A service-approved biologist will verify the fence status on a weekly basis to verify the fence is maintained in good condition.
10. If at any time a CRLF is observed within the Project Area and relocation is necessary, the animal will be transported to a suitable relocation site within Calera Creek, outside of the Project Area and released as detailed in the Relocation Plan.
11. If a SFGS is observed within the Project Area, work will be halted until the animal leaves the Project Area of its own volition
12. To prevent inadvertent entrapment of wildlife, any excavated, steep-walled holes or trenches more than 12 inches deep shall either be covered at the close of each working day, or have one or more escape ramps constructed of earth fill or wooden planks installed. Before any such holes or trenches area filled, they will be inspected for wildlife by a Service-approved biologist.
13. To eliminate attractants of predators, any food-related trash shall be disposed of in closed containers and removed form the site regularly.
14. Mono-filament netting or similar material shall not be used on any erosion control devices specified in the SWPPP.
15. All vehicle traffic shall be restricted to established or temporary access roads, and reclamation areas. A site wide 20 mile-per-hour speed limit shall be observed.
16. Agency staff (USFWS, etc.) shall be allowed to access the site; however, advance notice of 48 hours must be provided and a Project representative must escort agency staff throughout the process.
17. No work with heavy equipment shall occur until 30 minutes after sunrise, and all work with heavy equipment shall cease 30 minutes before sunset.
18. Trail signage and placards/interpretive signage will be included as part of the proposed action.

Administrative Measures

(Note: most of the following environmental protection measures are also found as minimization measures in the special status species assessment)

1. Reclamation Plan Adherence. The Applicant shall complete all work as presented in the Reclamation Plan. Any alterations or plan changes to the Reclamation Plan or exhibits shall be submitted by the Applicant to the City for acceptance prior to the commencement of work.
2. Documentation at Project Site. Applicant shall make the Reclamation Plan and all related permits readily available at the project site at all times and shall be presented to personnel from state, federal, or local agencies upon request.
3. Inspections. Agency personnel may inspect the work performed at the project site at any time. As a result of field inspection, agency personnel may require additional conditions be applied to protect sensitive biological resources. Such conditions may be amended into the Reclamation Plan with the consent of both parties.
4. Unauthorized Take. The Applicant shall comply with all applicable state and federal laws, including the California and Federal Endangered Species Act. This Plan does not authorize the take of any state or federally endangered listed species, except as authorized by the relevant agency.
5. Notification of Work Initiation/Completion. Applicant will notify the appropriate agencies 48 hours prior to the initiation of construction, and forty-eight hours following completion of work. Initial notification shall include the name(s) and contact information of the person(s) overseeing the project site as well as a project schedule that includes the start date, estimated end date, weekly work days and hours of operation.
6. Definitions. The following definitions shall apply throughout this agreement:
 - Designated/Qualified Biologist - a person with a combination of academic training and professional experience in the biological sciences employed by the Applicant who has undergone training in avoidance and minimization measures specific to special-status species potentially present at a given site. The designated/qualified biologist shall be approved in advance by the US Fish and Wildlife Service (USFWS).
 - Biological Monitor -person(s) appointed by the designated/qualified biologist who are responsible for ensuring that the measures of this Agreement are

properly performed to protect against take when the designated/qualified biologist is not present. The appointed biological monitors) are required to have completed the pre-construction training and must be familiar with the Reclamation Plan and permits.

- Debris - non-living vegetative or woody matter, trash, concrete rubble, etc. This definition does not include living vegetation.
- Environmentally Sensitive Fencing - a fencing system installed to prohibit entry by onsite personnel and equipment to protect sensitive natural resources.
- Raptors -birds that belong to the order Strigiformes and Falconiformes (birds of prey).
- Heavy Equipment - any equipment larger than a light pick-up truck.
- Project Boundary -the boundary line at which no work will occur outside of for the project as described in the Reclamation Plan.
- Restoration -a general term used to refer collectively to all physical modifications to existing conditions (i.e., removal of hardscape, re-contouring, planting, invasive species control activities, modification of hydrology, and other activities) needed to enhance, replace or supplement natural habitat functions.
- Special-Status Species - any species identified as a candidate or sensitive species in local or regional plans, policies or regulations, or by the USFWS as threatened or endangered, candidate species, species of special concern, or fully protected species. Plants on Lists 1A, 1B, or 2, published by the California Native Plant Society, are also considered special status species.

Work Periods and Planning

7. To minimize adverse impacts to wildlife and their habitats, work adjacent to Calera Creek (within 100ft of the bank of Calera Creek) will be limited to April 15 to October 31, except for any work including the construction of any improvements that are needed to the existing land bridge that crosses Calera Creek. Re-vegetation work included in the Project may be done at any time and at any location on the site, provided that appropriate erosion control BMPs are implemented.
8. Construction Work Hours. No project activity will be initiated until thirty (30) minutes after sunrise and all project activity will cease thirty (30) minutes prior to sunset.
9. Work Limit - Lighting. All lighting shall be turned off thirty (30) minutes prior to sunset, unless required for safety or security purposes. All project lighting left on after sunset will focus only on areas of impact to avoid light pollution to natural

and sensitive areas outside the project limits and avoid disruption to nocturnal wildlife behavior.

10. Work Limit-Vehicle Speed Limit. No vehicle conducting any action or movement on paved access roads may go over twenty (20) miles per hour. Vehicles include but are not limited to tractors, excavators, skid-steers, personnel vehicles, pick-up trucks, and dump trucks.

Wildlife Protection- Terrestrial Resources

11. Designated/Qualified Biologist. At least fourteen (14) days before initiating ground- or vegetation-disturbing activities, the Applicant shall submit to the USFWS in writing the name, qualifications, business address, and contact information for a designated/qualified biologist. The designated/qualified Biologist shall be knowledgeable and experienced in the biology and natural history of local biotic resources present at the project site. The designated/qualified biologist shall be responsible for monitoring Project related activities as required by the Reclamation Plan and permits.
12. Biological Monitoring. A biological monitor appointed by the designated/qualified biologist and/or designated/qualified biologist shall be available to arrive on site within a reasonable amount of time (one (1) to two (2) hours) when not required on site as per the terms of the Reclamation Plan and permits.
13. Designated/Qualified Biologist Monitoring Requirements. A designated/qualified biologist shall be present on site during the following activities:
 - All ground-disturbing activities within 100 feet of the upland limit of the riparian vegetation.
 - All vegetation removal and/or stripping.
14. On-Site Education. The Designated Biologist shall conduct a pre-construction training session for all employees, contractors, or personnel otherwise working on the project site who will take part in any action within the project boundaries prior to performing any work on-site. The program shall consist of a presentation that includes a discussion of the biology of the habitats and species identified in the Reclamation Plan and present at this site. The Designated Biologist shall also include as part of the education program information about the distribution and habitat needs of any special status species that may be present, legal protections for those species, penalties for violations, and project-specific protective measures included in this Agreement. Interpretation shall be provided for non-

English speaking employees, contractors, or personnel otherwise working on the project site prior to their performing work on-site. Upon completion of the education program, employees, contractors, or personnel otherwise working on the project sites shall sign a form stating they attended the program and understand all protection measures. A handout that summarizes the education program including images of special status species shall also be distributed to all personnel working on the Project. These forms shall be filed at the worksite offices.

15. Environmentally Sensitive Areas (ESA). Environmentally sensitive areas (Calera Creek and associated riparian vegetation locations will be designated as ESAs and exclusion fencing (see below) installed under the supervision of the qualified biologist. No on-site personnel, light equipment, or heavy equipment are permitted to enter the ESA designated areas. The ESA fencing will be monitored and maintained throughout the course of the project by the designated biological monitor, or by the qualified biologist when onsite.

16. Exclusionary Fencing. An exclusionary fencing system will be installed along the edge of Calera Creek between the upper limit of the Creek riparian vegetation (hereafter simply Calera Creek) and the Project boundaries as follows:

Prior to any metamorphosis of CRLF in the Quarry pond but no later than April 1, exclusionary fencing will be installed along the project boundaries between Calera Creek and the work area with the exception of the Quarry pond, which shall be included in the Creek protection area. Immediately following the installation of the fencing, weekly monitoring of the pond and the fencing near the pond will be initiated. If no CRLF are found in the pond for a successive three weeks of surveys, the fencing around the pond will be moved to the edge of the Creek. If CRLF are found at any time, the surveys and fencing around the pond will continue and the fencing be maintained on a weekly basis until the CRLF metamorphosize and leave the pond and/or three successive weeks pass without evidence of CRLF, at which time the fencing will be moved to the edge of the Creek.

The fencing will be standard silt fencing at least forty-eight (48) inches in height that will be trenched six (6) inches into the soil. The soil will then be compacted against both sides of the fence to prevent wildlife from gaining access underneath. The stakes will be placed on the uphill side of the fence.

No gaps or holes are permitted in the fencing system, except for pedestrian and vehicle entry points.

The entry/exit points may be constructed in the fencing system for equipment and personnel, but the qualified biologist must ensure no wildlife is capable of entering the fenced off site via the gate. The gate structure must be flush to the ground with no holes or gaps.

The fence will be inspected daily by a qualified biologist prior to the initiation of construction for holes, gaps, or access points, which shall be repaired upon discovery.

17. San Francisco Garter Snake (SFGS) Assessment and Avoidance. A qualified biologist shall conduct pre-construction surveys for SFGS (forty-eight) 48 hours prior to the initiation of construction, including ground disturbing activities.

Exclusionary fencing shall be installed along the boundary with Calera Creek as described above. The project areas inside the exclusionary fencing shall be inspected for SFGS by a qualified biologist weekly.

All SFGS sightings within the vicinity of the project areas shall be reported to the USFWS within 24 hrs of observation.

18. California Red-Legged Frog (CRLF) Assessment and Avoidance. A qualified biologist shall conduct pre-construction surveys for the CRLF forty-eight (48) hours prior to the commencement of work. If CRLF are discovered at any point during the project, the USFWS shall be notified within 24 hrs.

No work is permitted to occur during the breeding season for CRLF (November 15 to May 15) within 100 feet of Calera Creek or the Quarry pond.

See above for fencing measures and CRLF.

Wildlife Protection – General

19. Open Trenches. Any open trenches, pits, or holes with a depth larger than one (1) foot shall be covered at the conclusion of work each day with a hard, non-heat conductive material (i.e. plywood). No netting, canvas, or material capable of trapping or ensnaring wildlife shall be used to cover open trenches. If use of a hard cover is not feasible, multiple wildlife escape ramps shall be installed, constructed of wood or installed as an earthen slope in each open trench, hole, or pit that is capable of allowing large (i.e. deer) and small (i.e. snakes) wildlife to escape on their own accord. Prior to the initiation of construction each day and prior to the covering of the trench at the conclusion of work each day, qualified biologist/on-site personnel shall inspect the open trench, pit, or hole for wildlife. If wildlife is discovered it shall be allowed to leave on its own accord.
20. Remove Temporary Flagging, Fencing, and Barriers. Applicant shall remove all temporary flagging, fencing, and/or barriers from the project site and vicinity of the stream upon completion of project activities.

21. Geo-Textile Fabric Restriction. No geo-textile material or filter fabric of any kind is permitted for installation in any portion of this project unless it is installed beneath areas of rock protection.
22. Open Pipes Restriction. All pipes, culverts, or similar structures that are stored at on site for one or more overnight periods will be thoroughly inspected for wildlife prior to use at the Project site.
23. Fence & Sign Post Restriction. Any fencing posts or signs, or vertical poles installed temporarily or permanently throughout the course of the Project shall have the top opening capped and/or the top three post holes covered or filled with screws or bolts to prevent the entrapment of wildlife, specifically birds of prey.
24. Allow Wildlife To Leave Unharmd. Applicant shall allow any wildlife encountered during the course of construction to leave the construction area unharmd.

Vegetation Removal

25. Vegetation Removal. The disturbance or removal of vegetation shall not exceed the minimum necessary to complete work. Precautions shall be taken to avoid other damage to vegetation by people or equipment.
26. Vegetation Clearing within Exclusionary Fencing Areas. Areas proposed to be encompassed by exclusionary fencing including staging areas, access routes, and project action areas will be surveyed as required prior to vegetation removal, installation of fencing and prior to the deployment of any staging or stockpile materials. The vegetation removal will be monitored by a qualified biologist.

Erosion and Sediment Control

27. Erosion and sediment control measures shall be used to ensure that water entering the storm drain system is equivalent in quality and character as the water above the site.
28. Erosion and sediment control measures shall be placed in front of incomplete storm drain systems to prevent debris and sediment-laden water from entering into the storm drain system. Best management practices shall be used when designing and installing such devices.
29. The contractor shall be responsible for constant maintenance of erosion and sediment control measures at all times to the satisfaction of the engineer and City agency. Erosion and sediment control measures and their installation shall be accomplished using BMPs.
30. If the storm drain system is not in place by October 15, additional measures shall be taken, which meet the satisfaction of the engineer and the City agency.
31. Storm water runoff from the construction site shall be directed toward an inlet with a sediment or filtration interceptor prior to entering the storm drain system.
32. The contractor will be responsible for cleaning water that has become polluted due to not taking necessary erosion and sediment control actions.
33. The contractor shall be responsible for cleanup of mud and debris carried onto surrounding streets and roads as a result of construction activity on the site to the satisfaction of the City agency.

34. Any denuded or disturbed soils shall be protected using best management practices.
35. The contractor is to inform all construction site workers about the major provisions of the erosion and sediment control plan and seek their cooperation in avoiding the disturbance of these control measures.
36. During the rainy season (typically October 15 to April 15), all sediment barriers are to be inspected and repaired at the end of each working day and, in addition, after each storm. The contractor shall inspect erosion and sediment control measures and inlets after each significant rainfall and daily during prolonged storm events. Sediment shall be removed when accumulations reach one third the height of the barrier and replace filter devices as necessary to ensure proper function.
37. Unstable areas will be repaired as soon as possible if damaged.
38. All graded or disturbed areas shall be stabilized immediately after grading is complete.
39. Entrance to the project shall be maintained in a condition that will prevent tracking or flowing of sediment into public right-of-way. When necessary, wheels shall be cleaned to remove sediment prior to entrance of public rights-of-way. When washing is required it shall be done in an area stabilized with crushed rock that drains into a sediment trap.
40. All sediment spilled, dropped, or tracked onto public rights-of-way shall be removed immediately using best management practices.
41. All erosion and sediment control measures shall be removed when they have served their purpose so as not to block or impede storm flow or drainage.
42. All erosion and sediment control measures shall be repaired or replaced when they are no longer functioning per best management practices.
43. The contractor shall have erosion and sediment control measures on site adequate to protect the entire site prior to the October 15 date such that it is immediately available in preparation of the upcoming winter season or in the event of an early rain.
44. After construction is complete all drainage systems associated with this Project shall be inspected and cleared of accumulated sediments and debris.
45. Hydroseed shall be either applied mechanically or by hydroseeding. Hydroseeding requires the application of fiber and stabilizing emulsion. Mechanical application shall require rolling, tamping, or otherwise working the seed approximately 0.5 inches into the topsoil.
46. This plan provides erosion control and sedimentation information and design using the following assumptions: ground has been rough graded, storm drain utilities and inlets have been installed.
47. Contractor shall adjust the sedimentation and erosion control methods as the Project develops. It shall be the Qualified Storm water Pollution Prevention Plan (SWPPP) Practitioner's responsibility to ensure that the installed erosion control and sedimentation improvements are in conformance with the state of California SWPPP guidelines and the California BMPs.
48. Temporary silt and drainage control facilities shall be installed to control and contain erosion-caused silt deposits and to provide for the safe discharge of storm waters into existing storm water facilities. Design of these facilities must be approved by the City engineer and in place prior to the start of grading.

49. The contractor shall comply with all rules, regulations, and procedures of the national pollutant discharge elimination system for construction and activities as promulgated by the California state water resource control board or any of its regional water quality control boards.
50. All materials necessary for winterization shall be available at the site by October 12, and all winterization measures shall be installed and completed by October 15.
51. Winterization shall be installed according to this plan and as directed by the Qualified SWPPP Practitioner, and shall be maintained by the contractor through April 1.
52. Fill slopes: avoid leaving shiny, smooth graded surfaces. The last grading operation shall be to walk a track-type tractor up and down the slope, creating cleat marks on the slope with contours. These will provide seed and fiber collection points.
53. Cut slopes: avoid leaving shiny, smooth graded surfaces. The last grading operation shall leave the slope in a roughened condition with 2 inches of loosened material for seeding.
54. Each fiber roll shall be securely held with 1-inch by 1-inch by 18-inch stakes (minimum).
55. If any gravel bags are moved and/or relocated in gaining access to the site during the winter months, they shall be replaced if they are no longer stable.
56. Once installed, all winterization materials should be checked before each weekend and each storm.
57. Access roads: as necessary, any sediment or other construction related materials deposited on access roads shall be removed prior to any rain event.
58. Wind erosion control: stockpiled waste material shall be contained and securely protected from wind erosion at all times when not in use.
59. The Contractor shall provide effective soil cover for inactive areas where construction activity has disturbed soil but are not scheduled to re-disturb soil for at least 14 days.
60. Discharges of groundwater or captured runoff from dewatering operations must be properly managed and disposed. When possible, send dewatering discharge to landscaped area or sanitary sewer. If discharging to the sanitary sewer, call your local wastewater treatment plant.
61. Divert run-on water from offsite away from all disturbed areas.
62. In areas of known or suspected contamination, a local agency will be called to determine whether the ground water must be tested. Pumped groundwater may need to be collected and hauled off-site for treatment and proper disposal.

Equipment and Vehicles

63. Staging Areas. Staging areas shall be located in a dry upland location, at least 100 ft away from Calera Creek. Staging areas shall be within a paved or gravel-lined site, if feasible. Stationary equipment such as motors, pumps, generators, compressors and welders, located adjacent to the stream, shall be positioned over drip-pans. Any mobile equipment or vehicles driven and/or operated in proximity to the stream shall be checked for leaks daily, and maintained, if necessary. Vehicles shall be moved away from the stream prior to refueling and lubrication.

64. Storage and Handling of Hazardous Materials. Any hazardous or toxic materials that could be deleterious to aquatic life shall be contained in watertight containers or removed from the project site. Such materials include, but are not limited to, rubbish, creosote-treated wood, raw cement/concrete or washings thereof, asphalt, paint or other coating material, and oil or other petroleum products. These materials shall be prevented from contaminating the soil and/or entering the waters of the State/US. Any such materials, placed within or where they may enter the stream, by Applicant or any party working under contract, or with permission of Permittee, shall be removed immediately. Best management practices (BMPs) shall be employed to accomplish these requirements.

Toxic and Hazardous Materials

65. Pesticide Use. Integrated pest management solutions that emphasize non-chemical pest management shall be used over chemical pesticides to the extent feasible as described in the Plan. Rodenticides and insecticides shall not be used. Herbicides may be consistent with the other provisions of this Plan with implementation of the following protective measures:
- Applicant shall use caution to apply the least practicable amount of herbicides necessary to effectively control nuisance plants.
 - Applicant shall use the least concentrated formulation of herbicide possible and practicable to accomplish the task.
 - All herbicides shall be applied by a certified pesticide applicator in accordance with regulations set by the California Department of Pesticide Regulation and according to labeled instructions.
 - Applicant shall use extreme caution to not to apply any herbicide near the Creek or other water. No herbicides shall be used within 100 ft of Calera Creek.
 - Herbicides shall only be applied on calm days with wind speed below 5 miles per hour.
 - Care shall be taken to avoid spraying native vegetation with herbicides. Spraying within 100 feet of native vegetation shall be done by hand.
 - Applicant shall only use pesticides for which a "no effect" determination has been issued by the U.S. EPA's Endangered Species Protection Program (<http://www.epa.gov/espp/>) for any species likely to occur within the project or downstream. Prior to applying pesticides, Applicant shall verify that selected pesticides are not on an endangered species bulletin issued by the U.S. EPA.

66. Removal of Trash and Debris. Applicant shall remove all raw construction materials and wastes from the project site following the completion of work. Food-contaminated wastes generated during work shall be removed on a weekly basis to avoid attracting predators to work sites. All temporary fences, barriers, and/or flagging shall be completely removed from work sites and properly disposed of upon completion of work. Applicant or its contractors shall not dump any litter or construction debris within the riparian/stream zone.
67. Re-vegetate or Seed Disturbed Soils. All upland exposed/ disturbed soils left barren of vegetation following work activities will be re-vegetated with native plants or seeded with an erosion control seed mix consisting of native forbs, shrubs, wildflowers and grasses as described in the Reclamation Plan. Re-vegetation shall be completed as soon as possible after earthmoving activities cease; however, plantings will be most successful if done during the rainy season. Seeding placed after October 15 shall be applied by hydro-seed or shall be covered with broadcast straw, jute netting, coconut fiber blanket, light mulch or a similar erosion control method. Erosion control blankets with monofilament or woven plastic strands shall not be used.

Post-Reclamation Monitoring and Maintenance

68. Reclamation work will be maintained for a period of three years. Maintenance includes repair of any slope failures and removal of fallen rock debris, cleaning and repair of drainage facilities, reseeding of bare ground and replacement of dead plants. Plant vitality will be monitored for the same three year period following planting. Slopes will be reseeded as necessary. Hydroseed areas will be maintained to achieve 50 percent cover. Weeds will be removed by hand, with a weed cutting machine or controlled herbicide application. See above for more detail.

VI. FINANCIAL ASSURANCE OF PERFORMANCE

The owners of the quarry have provided financial assurances to ensure performance of their obligations to reclaim the quarry. The total required is covered by a Certificate of Deposit made payable to the City of Pacifica and the California Department of Conservation.

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