

1 However, as discussed further
 2 below, approximately 500 feet of
 3 dunes at the east end of Broad
 4 Beach that were either unprotected
 5 or protected by sand bag or
 6 Sakrete revetments were eroded
 7 landward 80 to 100 feet in the
 8 winter of 2013-2014 after wave
 9 attack destroyed these coastal
 10 protections structures (Illustration
 11 4-5). This erosion brought the
 12 shoreline to within 30 to 50 feet of
 13 some of these homes and into
 14 close proximity with OWTS serving
 15 these homes.



Illustration 4-5: This alternative would involve the removal of the eastern end of the existing emergency rock and sand bag revetments. While leach fields and other improvements would remain approximately 15 feet from the calculated wave run-up zone, this area of Broad Beach has sustained substantial damage within the 2013-2014 storm season when a 25-year storm event substantially damaged and removed existing sand bag revetments.

16 Similar to the Project, public use of,
 17 and access along, the beach berm
 18 under this alternative would be
 19 permitted along the beach to the
 20 toe of the restored dunes where a line of rope or cable and signs would prohibit access
 21 to dune habitats. This rope or cable system, combined with the approximately 50-foot-
 22 wide dune system, would also ensure resident privacy. In addition, rather than provide
 23 for 112 coastal access walkways across the restored dunes as included in the Project,
 24 this alternative would include installation of unpaved shared private coastal access
 25 walkways, with one walkway approximately every 300 feet to be shared between six
 26 homes. These walkways would be connected by a shared path along the back dune,
 27 lined with a sand fence along the seaward side to minimize sand migration into private
 28 yards and minimize resident and pet access into the dune habitat. Each of these
 29 walkways would be roped off to minimize private access into the dunes. This distance
 30 was selected as an intermediate value that would improve dune habitat quality while
 31 minimizing disruption to private homeowner beach access.

32 The existing two public vertical coastal access points along Broad Beach Road would
 33 remain open and the two public trails across the dunes would be roped off to limit
 34 access into the dunes. Additionally, this alternative would also recognize the public's
 35 rights to pass along public land below the January 2010 MHTL and across existing
 36 LAEs. This would ensure that over the long-term after nourishment ceases, the
 37 revetment is removed, and the beach and dunes erode, the public would continue to
 38 have access across the beach. Public access to and along these LAEs would be
 39 available when the sensitive dune habitats that overlie these LAEs eventually erode
 40 over the long-term and public access to these LAEs becomes necessary and available.

1 Construction would be similar under this alternative in terms of beach nourishment, and
2 grading of the beach and dunes by heavy equipment. However, under this alternative,
3 additional bulldozers and cranes would be necessary to remove the eastern portion of
4 the revetment. Additionally, up to 1,000 new trips by heavy haul trucks would be
5 required initially to transport armor stones from the eastern segment of the emergency
6 revetment off Broad Beach. Further, additional heavy construction equipment would be
7 required if OWTS were upgraded on the eastern end of Broad Beach. Major
8 components of this alternative would include:

- 9 • Removing approximately 1,617 feet (with septic system upgrades) or 1,136 feet
10 (without upgrades) of the existing revetment, using heavy cranes, bulldozers, and
11 up to 1,000 heavy haul truck trips to transport boulders off of the beach;
- 12 • Potentially relocating up to 19 OWTS on the eastern end of Broad Beach;
- 13 • Transport of 600,000 cy of sand from inland quarries to Broad Beach via 43,000
14 heavy haul truck trips;
- 15 • Transporting the sand from storage areas at Zuma Beach and hauling it up coast
16 to Broad Beach with heavy trucks or scrapers;
- 17 • Redistributing sand on Broad Beach as needed with earthmoving equipment,
18 such as bulldozers, and grading the beach fills to required dimensions;
- 19 • Creating a system of unpaved shared walkways to provide private lateral and
20 vertical private coastal access for homeowners across the new dune system;
- 21 • Providing two vertical public access trails across the dunes to connect existing
22 access points to the widened beach and ensuring public lateral access along the
23 widened beach seaward of the OHWM;
- 24 • Backpassing of 25,000 to 35,000 cy of sand annually from the east to west end
25 of the beach based using heavy equipment such as scrapers and bulldozers;
26 backpassing would be initiated based on beach width and profile changes;
- 27 • Initiating one future major renourishment event of approximately 450,000 cy in
28 roughly 10 years; and
- 29 • Potential use of up to 1,617 feet of sand bag revetments during coastal erosion
30 events to protect the dune system and homes from wave attack.

31 Potential Impacts to Public Trust Resources

32 This alternative would differ from the Project in that it would remove at least 1,136 feet
33 of the revetment on the eastern end of Broad Beach. With landward relocation of up to
34 19 OWTS on the eastern end of Broad Beach, approximately 480 additional feet of
35 revetment would be removed for a total of 1,617 feet. However, landward relocation of
36 the existing OWTS would result in additional construction-related impacts. Even without
37 landward relocation of the existing OWTS, approximately 27 percent of the revetment
38 would be removed on the eastern end of Broad Beach.

1 However, depending upon storm intensity and direction, removal of revetment could risk
2 impacts to private improvements over the short- to mid-term. While both implementation
3 strategies of this alternative would provide a hard stabilization structure protecting the
4 shore along middle portions of Broad Beach where erosion is greatest, recent storm
5 damage at the east end of Broad Beach may indicate heightened vulnerability of this
6 area to erosion. Although a soft stabilization, using a newly widened dune system, to
7 provide protection for the eastern end of Broad Beach would likely provide protection
8 over the short- to mid-term, improvements closest to the shoreline could be subject to
9 damage. This alternative would result in major changes to impacts with regard to
10 coastal processes, terrestrial biological resources, recreation, and public access, public
11 health and safety hazards, and utilities and service systems. Major changes to impacts
12 to these resource areas are discussed in detail below, while the resource areas with
13 negligible changes to impacts are summarized in Table 4-10 at the end of this
14 subsection.

15 *Air Quality and Greenhouse Gases:* Criteria pollutant emissions would incrementally
16 increase relative to the Project due to the operation of additional heavy equipment
17 necessary to remove the revetment, including up to 1,000 additional heavy haul trips to
18 remove the revetment rock. These emissions would increase the severity of Impact AQ-
19 1, particularly for emissions VOCs, which would exceed SCAQMD and VCAPCD
20 thresholds for project-level significance under the Project, and NO_x, which would exceed
21 SCAQMD and VCAPCD thresholds for both onsite and project-level significance under
22 the Project, including SCAQMD LSTs for construction activities. Relative to the Project,
23 emissions of both of these criteria pollutants would incrementally increase under this
24 alternative, as there would be additional construction activities, as well as heavy haul
25 truck trips (Appendix G). Additionally, there would be an incremental increase in other
26 criteria pollutants including CO, SO_x, and PM. This increase in emissions relative to the
27 Project, particularly the increase in VOC and NO_x emissions, would require additional
28 AMMs, such as use of newer haul trucks with clean-burning diesel engines, but would
29 still have a major adverse effect. GHG emissions described in Impact AQ-2 would
30 remain below SCAQMD and VCAPCD thresholds. Increased TAC emissions from
31 diesel construction equipment would incrementally increase the severity of Impact AQ-
32 3, although emissions would remain below thresholds.

33 *Coastal Processes, Sea Level Rise, and Geologic Hazards:* Erosion of the sandy beach
34 and dune after the cessation of nourishment would continue as described under the
35 Project, with potential benefits of beach nourishment enduring for an estimated 10 to 20
36 or more years with renourishment and backpassing. Under this alternative, potential
37 damage to homes, OWTS, and accessory structures from coastal erosion, as well as
38 associated indirect impacts to public trust resources identified in Impact CP/GEO-2,
39 would be substantially increased in the eastern area of Broad Beach, where a large
40 segment of the revetment would be removed. While beneficial impacts to these homes
41 would increase and likely be protected by the nourished beach and dune system over

1 the short- to mid-term as described in Impact CP/GEO-3, over the long-term, without the
2 revetment as a last line of defense against wave attack, these homes, OWTS, and other
3 private improvements would be more vulnerable to damage resulting from coastal
4 erosion.

5 Potential for such damage is illustrated by the recent landward erosion of the dune
6 system at the eastern end of Broad Beach during winter 2013-2014. During this winter,
7 dunes at the eastern 500 feet of Broad Beach were eroded 80 to 100 feet landward and
8 coastal protection structures (i.e., sand bag and Sakrete revetments) were damaged or
9 destroyed. Although there was a major storm event on March 2, 2014, it has been
10 estimated that this was a 25-year storm. Similar storm events would overwhelm the
11 dune system, potentially exposing the houses and septic systems to damage,
12 particularly during a 100-year event. Such a storm may also overwhelm and destroy any
13 sand bag revetments installed under this alternative. Anticipated SLR of approximately
14 8.5 inches by 2030 would have less erosion effects as described in Impact CP/GEO-8,
15 including increased frequency and intensity of storm surges and wave attack.

16 While creation of a wider beach and dune system, and use of sand bag revetments
17 would likely provide protection to homes and OWTS over at least the short- to mid-term,
18 removal of the revetment under this alternative his may ultimately result in potential
19 major indirect impacts to public trust resources due to the release of septic effluent and
20 debris from damaged structures (e.g., septic tanks and leach fields). These impacts
21 would exhibit a similar character and extent under both implementation strategies.
22 Implementation of this alternative without OWTS upgrades would involve a larger
23 portion of revetment being retained; however, the existing OWTS would be closer to
24 wave run-up and would be more likely to experience persistent wave attack. Relocating
25 the OWTS landward may result in reduced potential for septic effluent release, but
26 landward retreat and reliance on dunes and sand bag revetments would eventually
27 leave improvements subject to damage due to increased potential for wave attack.

28 Removal of the revetment on the eastern end of Broad Beach would lead to more
29 erosion and rapid damage to homes, ancillary structures, and OWTS over the long-term
30 after the cessation of nourishment. This would ultimately likely result in adverse indirect
31 effects on public trust resources and may trigger future requests for installation of
32 another emergency revetment. Removal of the revetment would also decrease
33 structural stability and increase impacts described in CP/GEO-1. All other impacts
34 described in Section 3.1, *Coastal Processes, Sea Level Rise, and Geological*
35 *Resources* would be similar to the Project.

36 *Utilities and Service Systems:* While the existing OWTS on the eastern end of Broad
37 Beach would be protected by beach nourishment and dune restoration over the short- to
38 mid-term, following the cessation of nourishment activities, these OWTS would be
39 vulnerable to wave attack as the beach erodes in 10 to 20 or more years. This would

1 decrease the beneficial impacts described in Impact UTL-1. Installation of a sand bag
2 revetment along up to 1,617 of beach may prevent damage to these systems during
3 minor storm or a single major event, but may be ineffective during a severe storm
4 season and over the long term. Under this alternative up to 19 OWTS could be feasibly
5 relocated landward which would reduce the long term potential for effluent release
6 following the cessation of nourishment; however, as demonstrated by recent wave
7 attack and erosion of 80 to 100 feet of dunes, all septic systems seaward of the
8 residences lacking revetment protection would still have some potential to be impacted.
9 This would substantially increases impacts to public trust resources associated with
10 release of sewage effluent identified in Impact UTL-2. An analysis of impacts to leach
11 fields is included in the Broad Beach Coastal Engineering Report, completed by Moffatt
12 & Nichol (Appendix B). Following cessation of nourishment and erosion of the beach
13 and dunes after 10 to 20 or more years, residents of threatened homes may request or
14 install another emergency revetment to prevent these impacts to septic OWTS and the
15 associated indirect impacts to public trust resources. Effects on public drainage systems
16 as described in Impact UTL-3 would be similar to the Project.

17 *Terrestrial Biological Resources:* Removal of the revetment on the eastern end would
18 entail the operation of heavy construction equipment within degraded dune habitats,
19 resulting in additional major adverse effects associated with Impact TBIO-2. This impact
20 could be compounded by the landward relocation of existing OWTS. However, the most
21 recent reconnaissance survey at Broad Beach found that the eastern reaches of Broad
22 Beach were eroded extensively during storm events in March 2014 exposing and
23 damaging sand bag and Sakrete revetments and further eroding degraded southern
24 foredune habitat. Use of heavy construction equipment would also increase adverse
25 effects associated with Impact TBIO-4 due to the increased potential for hazardous
26 spills in ESHAs. Removal of the revetment on the eastern end would increase the
27 severity of Impact TBIO-5. Additionally, the removal of the revetment on the eastern end
28 of Broad Beach presents another adverse long-term impact as wave action may
29 potentially erode southern foredune habitat in this area following the erosion of the
30 nourishment material, increasing impacts described in TBIO-8. Creation of shared
31 walkways would also reduce habitat fragmentation impacts identified in Impact TBIO-7.
32 Impacts TBIO-1 and TBIO-3 would be similar to the Project.

33 *Recreation and Public Access:* Removal of the revetment on the eastern end of Broad
34 Beach would increase short-term adverse disruption of recreational access associated
35 with Impact REC-1. However, this alternative would be incrementally more consistent
36 with coastal public access and recreation policies as the revetment would be removed
37 off public lands on the eastern end of Broad Beach. However, up to 72 percent of the
38 existing revetment would be retained in place. The retention of the western portions of
39 the revetment would continue to make this alternative inconsistent with coastal public
40 access policies. Further, depending on location, installation of emergency sand bag
41 revetments could also constrain public lateral access or obstruct LAEs. Alternative 6

1 would increase short-term beneficial effects identified in Impact REC-3, and decrease
 2 long-term impacts related to cessation of nourishment described in Impact REC-4.
 3 Impact REC-2 would be similar to the Project.

4 *Marine Water Quality:* Removal of the eastern end of the revetment would result in the
 5 potential for impacts to marine water quality to occur resulting from long-term erosion
 6 and potential damage to existing OWTS occurring behind the existing revetment. Under
 7 this alternative, the beneficial impacts described under Impact MWQ-3 would be much
 8 less beneficial as the existing revetment would be removed and would no longer serve
 9 as the last line of defense for existing development at Broad Beach. This would
 10 constitute a major adverse impact and would likely require the construction of an
 11 additional temporary emergency revetment following the long-term erosion of Broad
 12 Beach after the cessation of nourishment activities. Impacts MWQ-1, MWQ-2 and
 13 MWQ-4 would either have similar or incrementally increased impacts in relation to the
 14 Project.

15 *Other Resource Areas:* This alternative would have similar or incrementally more severe
 16 impacts relative to the Project for scenic resources, marine biological resources, cultural
 17 and paleontological resources, noise, public health and safety hazards, traffic and
 18 parking, and environmental justice.

Table 4-10. Alternative 7 – Changes in Impact Severity

Resource Area	Relative Change in Impact Severity	Discussion
Scenic Resources	Incremental Short-term Increase and Long-term Decrease in Adverse Impacts	There would be a slight increase in adverse effects associated with Impact SR-2, as this alternative would result in additional construction equipment relative to the Project. However, removal of the revetment along the eastern end of Broad Beach would eliminate the potential for long-term exposure in this area incrementally reducing the adverse effects associated with Impact SR-1. The use of emergency sand bag revetments could leave litter along the beach if and when destroyed by wave action. All other scenic resource impacts would be similar to the Project.
Marine Biological Resources	No Major Change in Adverse Impacts	Impacts to marine biological resources would remain similar or slightly increased relative to the Project. However, over the long term after cessation of nourishment as the beach and dunes erode in 10 to 20 or more years, OWTS could be damaged or destroyed leading to release of effluent into the marine environment.
Cultural and Paleontological Resources	No Major Change in Adverse Impacts	Additional disturbance of the near shore environment associated with removal of the eastern end of the emergency revetment would result in an increased potential to disturb cultural resources, slightly increasing the severity of the adverse effects associated with Impact CR-1. However, as heavy equipment would only be operated on the seaward side of the revetment, the probability of uncovering undocumented cultural resources would be minimal. All other cultural and

Table 4-10. Alternative 7 – Changes in Impact Severity

Resource Area	Relative Change in Impact Severity	Discussion
		paleontological impacts would be similar to the Project.
Noise	Incremental Increase in Adverse Impacts	Operation of additional heavy haul trucks, cranes, and bulldozers used during revetment removal would incrementally increase the severity of Impacts N-1, N-2 and N-3.
Public Safety and Health Hazards	Incremental Increase in Adverse Impacts	Additional heavy equipment used during revetment removal would increase the potential for incidental release of hazardous materials, resulting in an incremental increase in the severity of Impact HAZ-2. Further, operation of additional heavy equipment on the beach would increase the short-term hazardous conditions during construction, incrementally increasing the severity of Impact HAZ-3. Impact HAZ-5 would also become a long-term or permanent beneficial impact instead of having a short- to mid-term duration. Impact HAZ-1 would also no longer be relevant, as the revetment would no longer be present to create potential hazards.
Traffic and Parking	Incremental Increase in Adverse Impacts	Revetment removal would require additional truck trips and additional heavy equipment over that required for the Project. This would incrementally increase severity of the adverse effects associated with Impact TR-1 and potentially TR-2, depending on the drop-off location of the removed boulders.
Environmental Justice	No Change	There would be no appreciable difference in impacts relative to the Project.

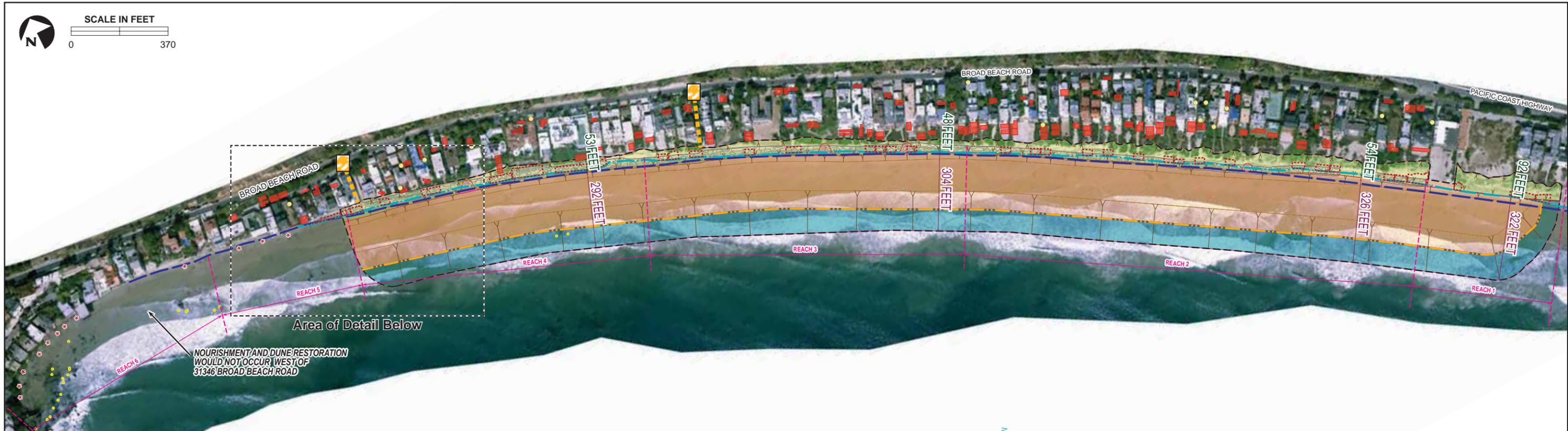
1 **4.2.8 Alternative 8: No Beach Nourishment at West Broad Beach with Revetment**
2 **at Current Location**

3 Description

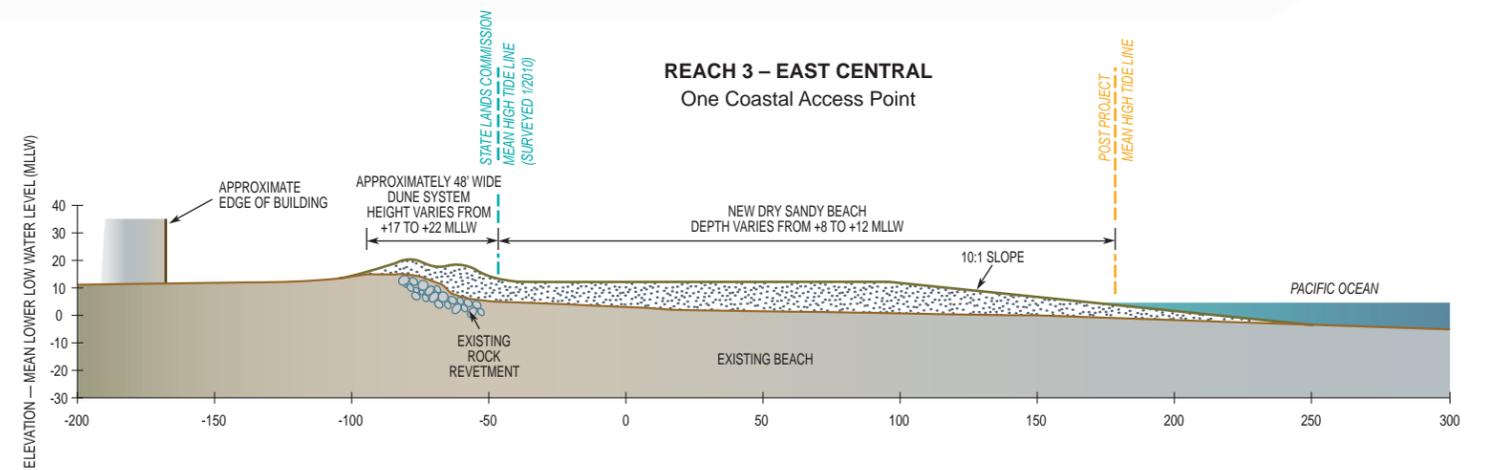
4 This alternative would include beach and dune restoration as well as retention of the
5 existing revetment, as described for the Project. However, this alternative would also
6 include a major reduction in beach nourishment and dune restoration both in terms of
7 the footprint of nourished beach affected and the volume of sand placement. Under this
8 alternative, the proposed nourishment Project would be reduced by 25 percent to
9 approximately 4,650 feet of nourished beach, approximately 1,550 feet less than the
10 6,200 feet described for the Project. Additionally, the nourishment would only occur on
11 the central and eastern segments of Broad Beach. Nourishment would extend from
12 Trancas Creek west 4,650 feet and terminate at 31346 Broad Beach Road at the
13 western end of the emergency revetment, just west of the existing western public
14 coastal access point. For the western 25 percent of Broad Beach, this alternative would
15 emphasize protection of public trust resources represented by rocky intertidal and
16 subtidal habitats rather than those provided by sandy beach habitats, public coastal
17 access, recreation, and natural coastal protection. The Project would remain unchanged
18 along approximately 75 percent of the beach under this alternative.

19 The existing emergency revetment would remain in its current location with dune
20 restoration and beach nourishment burying the revetment as described for the Project.
21 While other alternatives could be combined with this alternative (e.g., Alternative 1 or
22 Alternative 2), no relocated or modified structures are proposed under this alternative.
23 This alternative would include placement of approximately 460,000 cy of sand on the
24 central and eastern regions of Broad Beach, with volumes adjusted based on the
25 Project's beach nourishment and dune restoration design and profile over this reduced
26 length. Under Alternative 8, the nourished beach would be as wide as 300 feet near the
27 east end of Broad Beach. As a part of this alternative, a renourishment event including
28 the deposition of approximately 380,000 cy within the same central and eastern areas of
29 the beach would occur after approximately 10 years.¹² However, the timing and quantity
30 of renourishment event may vary depending on results of the intensive monitoring plan
31 and backpassing.

¹² Precise renourishment volumes are difficult to forecast. A much smaller beach footprint would need to be recharged with sand, but backpassing may provide less effective at extending beach life due to the more limited Project area and lower sand volumes available to backpassing.



Detail



LEGEND			
	Existing Public Access		Proposed Restored Dune
	Approximate Limits of Beach Nourishment/ New Beach		Area of Dune or Beach Face (3:1 and 10:1 slopes)
	Existing Emergency Revetment to be Permanently Permitted		State Lands Commission Mean High Tide Line (surveyed 1/2010)
	Proposed New Dry Sandy Beach		Applicant Mean High Tide Line (surveyed 10/15/2009)
	Proposed New Intertidal Beach Area		Post Project Mean High Tide Line
	Existing Septic Tank		Existing Leach Field/Drain Field
	Existing Lateral Access Easements (LAEs)		Easement on file, but no dry beach to dedicate
	Surf Grass		Property Address
	Property Address		

Note: Beach dimensions and post project average high water line reflect beach status immediately after completion of beach nourishment and construction/shaping activities; the equilibrium beach that would result from dynamics such as waves, tidal and wind action would likely be of somewhat different dimensions.

1

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1 Additionally, dune habitats would be established and restored in the central and eastern
2 reaches of the beach by creating a sand berm that would run along the length of the
3 beach, with a minimum of 2 feet of sand over the rock revetment. The berm would
4 extend approximately 30 to 50 feet inland and 0 to 10 feet seaward of the revetment,
5 depending on location. The dune system, consisting of hummocks varying in height
6 from 17 to 22 feet above MLLW would be constructed on top of this berm. The width of
7 the dune system would vary from 40 to 60 feet, with most sections being approximately
8 50feet wide. The western 1,500 feet of beach would remain a mix of rocky intertidal
9 areas and sandy beach, depending on seasonal sand flow in the littoral cell.

10 Similar to the Project, public use of, and access along, the beach berm under this
11 alternative would be permitted along the central and eastern segments of the beach to
12 the toe of the restored dunes where a line of rope or cable and signs would prohibit
13 access to the dunes. This rope or cable system, combined with the approximately 40- to
14 80-foot-wide dune system, would also ensure resident privacy. In addition, rather than
15 provide for 112 coastal access walkways across the restored dunes as included in the
16 Project, this alternative would include installation of shared private coastal access
17 walkways, with one walkway approximately every 300 feet to be shared between six
18 homes. These walkways would be connected by a shared path along the back dune,
19 lined with a sand fence along the seaward side to minimize sand migration into private
20 yards and minimize resident and pet access into the dunes. Each of these walkways
21 would be roped off to minimize private access into the dunes. This distance was
22 selected as an intermediate value that would improve dune habitat quality while
23 minimizing disruption to private homeowner beach access. Public access to the west
24 would continue, but be feasible primarily during lower tides as the beach is largely
25 submerged during medium and high tides. Direct beach access from the approximately
26 27 homes on the western end of Broad Beach, including the areas of newly widened
27 beach to the east, would also be restricted to lower tides.

28 The existing two public vertical coastal access points along Broad Beach Road would
29 remain open and the two public trails across the dunes would be roped off to limit
30 access into the dunes. However, beach access from the western coastal access point
31 would be available generally only on the nourished beach to the east as the western
32 end of Broad Beach would largely be tide-limited. Additionally, this alternative would
33 also recognize the public's rights to pass along public land below the January 2010
34 MHTL and across existing LAEs. This would ensure that over the long-term after
35 nourishment ceases, the revetment is removed, and the beach and dunes erode, the
36 public would continue to have access across the beach. Public access to and along
37 these LAEs would be available when the sensitive dune habitats that overlie these LAEs
38 eventually erode over the long-term and public access to these LAEs becomes
39 necessary and available.

40 Major components of this alternative would include:

- 1 • Transport of approximately 460,000 cy of sand from inland quarries to Broad
2 Beach via approximately 33,000 heavy haul truck trips;
- 3 • Transporting the sand from storage areas at Zuma Beach up coast to the central
4 and eastern segments of Broad Beach using heavy trucks or scrapers;
- 5 • Redistributing sand on eastern and central Broad Beach as needed with
6 earthmoving equipment, such as bulldozers, and grading the beach fills to
7 required dimensions;
- 8 • Creating a system of shared walkways to for homes along eastern and central
9 Broad Beach to provide private lateral and vertical private coastal access for
10 homeowners across the new dune system;
- 11 • Providing two vertical public access trails across the dunes to connect existing
12 access points to the widened beach and ensuring public lateral access along the
13 widened beach seaward of the OHWM;
- 14 • Performing backpassing of the sand, ranging from 25,000 to 35,000 cy, from the
15 east to central portion of Broad Beach based on triggers and using heavy
16 equipment such as scrapers and bull dozers; and
- 17 • Initiating one future major renourishment event of approximately 380,000 cy in
18 roughly 10 years.

19 Potential Impacts to Public Trust Resources

20 This alternative to the Project would largely avoid or substantially reduce direct and
21 indirect burial of intertidal and near shore subtidal habitats as well as minimizing indirect
22 turbidity impacts to marine biological resources. Burial of rocky intertidal and subtidal
23 habitats within Lechuza Cove and offshore of Lechuza Point would be largely avoided.
24 This alternative would limit direct burial and indirect offshore turbidity impacts by
25 eliminating nourishment described for the Project along the 1,500 feet of beach west of
26 31346 Broad Beach Road at the western terminus of the emergency revetment just
27 west of the existing western public coastal access point.

28 This alternative would result in changes to impacts associated with air quality and
29 terrestrial biological resources. Additionally, this alternative would result in the greatest
30 trade-offs between different public trust resources, with protection of rocky marine
31 habitats prioritized over public coastal access and beach recreation, sandy beach
32 habitats and coastal protection. By eliminating nourishment west of 31346 Broad Beach
33 Road, approximately 25 percent of Broad Beach that would have been fully accessible
34 and usable by the public and existing residents under the Project would not be widened,
35 with access primarily limited to low tides. Rather, this area would remain similar to
36 existing conditions over the short- to mid-term, with beach erosion potentially continuing
37 or accelerating over the long-term. Approximately 27 homes, septic systems and other
38 private improvements would not receive protection from wave attack provided by the
39 wider beach and dune system and would continue to be exposed to coastal processes.

1 Additionally, this alternative would not reduce impacts associated with the Project's
2 consistency with coastal public access and recreation polices. However, this alternative
3 could be combined with either Alternative 1 or Alternative 2, which would relocate the
4 existing revetment landward, but this would also result in associated impacts described
5 for these alternatives above. Resource areas with major changes to impacts under
6 Alternative 8 relative to the Project are discussed in detail below, while the resource
7 areas with negligible changes to impacts are summarized in Table 4-11 at the end of
8 this subsection.

9 *Air Quality and Greenhouse Gases:* Under Alternative 9, criteria pollutant emissions
10 would be reduced relative to the Project as there would be approximately a 25 percent
11 reduction in the number of heavy haul truck trips corresponding to reduced nourishment
12 volume. Under this alternative there would be approximately 10,000 fewer truck trips
13 relative to the Project. However, while emissions would be reduced under this
14 alternative it would not substantially reduce the severity of Impact AQ-1, particularly for
15 emissions of VOCs, which would continue to exceed SCAQMD and VCAPCD
16 thresholds for project-level significance, and NO_x, which would continue to exceed
17 SCAQMD and VCAPCD thresholds for onsite and project-level significance, including
18 SCAQMD LSTs for construction activities (Appendix G). Similarly, GHG emissions
19 described in Impact AQ-2 would decrease and would be further below SCAQMD and
20 VCAPCD thresholds, and toxic air contaminants would also be incrementally reduced.

21 *Coastal Processes, Sea Level Rise and Geologic Hazards:* Under this alternative
22 erosion of beach and dunes after cessation of nourishment and central and eastern
23 Broad Beach east of 31346 Broad Beach Road would continue as described under the
24 Project, with the benefits of nourishment in these areas enduring for an estimated 10 to
25 20 or more years and the revetment then becoming exposed as a result of persistent
26 wave action. Anticipated SLR of approximately 8.5 inches by 2030 would further
27 exacerbate erosion effects, including increased frequency and intensity of storm surges
28 and wave attack. However, it is unclear as to whether the nourished beach would erode
29 more quickly under this alternative as it would be unprotected along the western edge
30 due to the lack of nourishment in Lechuza Cove and more exposed to wave attack.
31 Further, it is unclear as to whether backpassing under this alternative would be as
32 effective as described for the Project. Due to the reduced volume of sand included in
33 the nourishment event it is likely that less sand would be available for subsequent
34 backpassing and backpassing would not occur at the far west end of the Beach in
35 Lechuza Cove.

36 As no nourishment would occur on the western end of Broad Beach under this
37 alternative, approximately 27 homes and associated improvements (e.g., OWTS) along
38 the western 1,500 feet of Broad Beach would potentially continue to erode over this 20
39 year period as this area would not experience the benefits of two nourishment events
40 described in Impact CP/GEO-6 and would be more susceptible to the adverse impacts

1 related to sea level rise identified in Impact CP/GEO-8. This would represent a major
2 adverse effect relative to the Project as erosion of the western end of Broad Beach
3 could result in additional indirect impacts to the residences and private improvements in
4 this area, particularly the residences that are not fronted by individual shoreline
5 protection devices. Approximately 27 homes and associated improvements exist along
6 these 1,500 feet of beach on the western end of Broad Beach. Based on
7 reconnaissance level field surveys a total of three of these homes are unprotected and
8 15 have what appears to be substandard seawalls, revetments, or pilings that may
9 expose these homes and improvements to damage in major storm events. Under this
10 alternative, after the revetment is exposed, potential impacts of coastal processes on
11 the revetment identified in Impact CP/GEO-2 and associated indirect impacts to public
12 trust resources identified in Impact CP/GEO-3 would remain similar to those described
13 for the Project as the revetment would not be redesigned or reinforced under this
14 alternative. However, exposure of 27 homes to wave attack would create a new major
15 adverse impact not identified for the Project. Based on initial review of existing coastal
16 protection structures, 18 of these homes may construct or apply for permits to construct
17 improved coastal protection.

18 Additionally, the reduced sand volume under Alternative 8 would result in corresponding
19 reductions to beneficial impacts associated with Impact CP/GEO-7, as approximately
20 140,000 cy that would have been available for down coast movement under the Project
21 would be reduced but would not be deposited on the western 25 percent of Broad
22 Beach. Impact CP/GEO-7 would remain beneficial under Alternative 8 as the effects of
23 the longshore currents on the remaining 460,000 cy of sand deposited on Broad Beach
24 would still occur over the short- to mid-term. However, over the long-term, longshore
25 currents would transport this sand farther down coast and possibly offshore as
26 described for the Project. Impacts related to the existing revetment (CP/GEO-1), sand
27 compatibility (CP/GEO-4), and tides, currents, and wave height and direction (CP/GEO-
28 5) would remain similar to those described for the Project.

29 *Terrestrial Biological Resources:* Under Alternative 8, a revegetated dune system would
30 not be established west of 31346 Broad Beach Road or the western end of emergency
31 revetment as this area would not be nourished as described for the Project. This
32 alternative would eliminate dune restoration over approximately 1,500 feet or
33 approximately 25 percent of CSLC Lease Area, reducing beneficial impacts to terrestrial
34 biological resources identified in Impact TBIO-6 associated with creation of sandy
35 intertidal habitats, such as grunion spawning areas and shorebird foraging habitat.
36 However, the benefit of this impact as it applies to the western portion of Broad Beach is
37 questioned, as the dune restoration would displace sensitive marine habitat (discussed
38 below). The remaining 75 percent of dune system described for the Project would still
39 be restored and revegetated with native species. Consequently, though lessened,
40 beneficial impacts associated with TBIO-6 would still occur.

1 The reduced nourishment volume, approximately 140,000 cy less sand than described
2 for the Project, would reduce impacts associated with the increased closure period of
3 Trancas Lagoon and the Zuma Wetlands described in Impact TBIO-5. However, as 76
4 percent of the nourishment volume would still be applied up coast of these features, this
5 sizable reduction in nourishment volume would not substantially reduce these impacts.

6 Construction-related impact to terrestrial biological resources identified in Impacts TBIO-
7 2, TBIO-3, and TBIO-4 would be incrementally reduced due to the reduction in direct
8 impact area, total sand volume applied, and number of truck trips used for hauling.
9 Additionally, requiring shared private coastal access walkways would also substantially
10 reduce disturbance of the proposed dune system described in Impact TBIO-7, protecting
11 this newly established and restored dune habitat.

12 *Marine Biological Resources:* The reduced and phased nourishment west of 31346 Broad
13 Beach Road, within Lechuza Cove would substantially reduce impacts to rocky intertidal
14 and near shore subtidal marine habitats, including impacts to surfgrass, kelp, and other
15 sensitive marine organisms. Implementation of Alternative 8 would substantially eliminate
16 direct impacts to rocky intertidal habitats within Lechuza Cove and off Lechuza Point
17 described in Impact MB-2 and associated conflicts with ESHA policies identified in Impact
18 MB-8, with direct burial impacts limited to scattered rocky outcrops and limited cluster of
19 surf grass along central Broad Beach. While some nourishment sand could move back up
20 coast, over the long-term, no nourishment in this area would mean that rocks would
21 continue to be exposed in spring when sand levels are seasonally low, and buried
22 during the fall when sand levels are typically high. Therefore, this alternative, in
23 combination with monitoring for potential indirect burial of intertidal habitats west of
24 31346 Broad Beach Road would substantially reduce adverse impacts to intertidal
25 habitats would be appropriately mitigated.

26 **AMM MB-ALT-8: Baseline Surveys for Sensitive Rocky Intertidal Habitats.** In
27 coordination with AMM MB-2b, the Project Applicant shall contract with qualified
28 biologists to conduct regular monitoring of biological resources and habitat
29 quality of sensitive rocky intertidal habitats west of 31346 Broad Beach Road.
30 The transects shall be consistent with those used to establish baseline intertidal
31 habitat conditions. Surveys shall be conducted prior to Project completion,
32 following Project completion and again prior to renourishment. A control site shall
33 be established that is acceptable to the California State Lands Commission
34 (CSLC) staff. The summaries of these monitoring surveys shall be prepared and
35 submitted to CSLC staff for review. Any adverse impacts to sensitive rocky
36 intertidal habitats shall be provided to the agencies as part of AMM MB-2b
37 (applies to Alternatives 8 and 9 only).

38 For reasons similar to those described above for rocky intertidal habitat, this alternative
39 would also substantially reduce Impact MB-4 to subtidal habitats and organisms. As the

1 footprint of the beach would be reduced by approximately 25 percent under this
2 alternative, Alternative 8 would reduce nourishment by 140,000 cy and largely avoid even
3 indirect impacts to shallow subtidal reefs along the western 1,500 feet of Broad Beach,
4 including mortality of surfgrass and kelp off Lechuza Point. This would substantially
5 reduce the smothering or burial of additional subtidal habitat beyond the actual footprint
6 of the expansion. However, known and potential subtidal reefs that occur off of central
7 Broad Beach outside of the seaward edge of proposed fill could still be covered by
8 remobilized sand, particularly during post construction reshaping of the beach by waves
9 and tides. Therefore, although greatly reduced, Impact MB-4 (subtidal habitats) would still
10 have a major adverse effect.

11 Impacts to subtidal reefs off of the rest of Broad Beach, including burial and indirect
12 turbidity impacts, would still occur. The reduced nourishment volumes may also result in
13 an incremental decrease in impacts to down coast marine resources, as a reduced
14 volume of sand would be available for down coast transport to Zuma Beach, Point Dume
15 State Beach, and Los Angeles county beaches. Additionally, intertidal habitat areas and
16 shoreline marine biological resources farther south may be indirectly affected by
17 changes in sand supply and distribution through littoral drift. This may result in
18 additional reductions to impacts to marine biological resources down coast as identified
19 in Impact MB-7. However, as 76 percent of the proposed nourishment volume would still
20 be applied to Broad Beach under this alternative, this reduction in the severity of down
21 coast transport impacts likely would be incremental for down coast marine biological
22 resources.

23 The reduced volume of sand and the absence of construction activities on the west end
24 of Broad Beach would incrementally reduce short-term construction related impacts to
25 marine biological resources identified for the Project in Impacts MB-3, MB-4, MB-5, and
26 MB-6.

27 *Recreation and Public Access:* As the emergency revetment would be retained under
28 this alternative, Alternative 8 would have similar impacts associated with recreation and
29 public access described in REC-4.

30 Alternative 8 would incrementally reduce public access benefits associated with a wider
31 dry sandy beach realized under the Project. Under the Project, the nourished beach and
32 dune profile described for the Project would end at 31346 Broad Beach Road. This
33 would leave the western end of Broad Beach (approximately 25 percent of the CLSC
34 Lease Area) in its current condition, generally inaccessible to the public except at low
35 tides and would limit opportunities to use this area for sunning, swimming, and other
36 forms of beach recreation. However, the majority of Broad Beach would provide
37 enhanced opportunities for this type of beach recreation within the proposed beach and
38 dune areas. Broad Beach west of the existing rock revetment is unique from the rest of
39 Broad Beach, because of the rocky intertidal habitat and biological resources that exist

1 at this location. A 2012 public survey of beachgoers at Broad Beach indicated that
2 tidepooling was an attraction for some beachgoers. Under existing conditions,
3 swimming and playing in the surf zone are attractive at the east end of Broad Beach,
4 and less so at the far west end. Although access would not be enhanced at the west
5 end of Broad Beach and would continue to be limited to low tide conditions, this
6 alternative would help maintain the unique existing habitats and tidepooling as a
7 recreation resource. The public would still have improved access for the remainder of
8 Broad Beach.

9 Private homeowners with beach stairways from the 27 homes along the west end of the
10 beach would be unable to access newly widened beaches on central and west Broad
11 beach, except at low tides or by walking along the road to a public coastal access point.
12 Finally, the existing narrow intertidal beach would be expected to narrow more quickly
13 over the 20 year Project life. Additionally, SLR may further reduce public access during
14 low tide conditions. Consequently, under this alternative, impacts described for REC-3
15 pertaining to public access would be less beneficial than those described for the Project.
16 Construction-related impacts from initial nourishment and backpassing operations would
17 remain similar to those identified for the Project in Impacts REC-1 and REC-2.

18 *Marine Water Quality:* Under this alternative turbidity impacts identified in MWQ-1 within
19 Lechuza Cove would be minimized resulting in a corresponding reduction to impacts
20 described for marine biological resources. Additionally, reduced construction-related
21 activities associated with this alternative would incrementally reduce impacts to Trancas
22 Lagoon and to resuspension of sand contaminants identified in MWQ-2 and MWQ-4.
23 However, while rocky intertidal habitats are concentrated in the western end of Broad
24 Beach, across the length of Broad Beach this reduction in turbidity would not
25 substantially reduce marine water quality impacts described for the Project. Additionally,
26 as no nourishment would occur within the western end of Broad Beach the OWTS at the
27 18 homes with either no protection or substandard shoreline protection measures would
28 be exposed to wave attack, which would substantially reduce the beneficial impacts of
29 MWQ-3 described for the Project.

30 *Utilities and Service Systems:* As described for marine water quality impacts above,
31 under this alternative the revetment would be retained in place similar to the Project, but
32 the western end of Broad Beach would not be nourished. Consequently, potential
33 impacts to OWTS on the western end of Broad Beach would be increased substantially,
34 particularly for those residences without individual shoreline protection devices. This
35 exposure to wave attack would substantially reduce the beneficial impacts of UTL-1 and
36 increase the potential impacts associated with long-term exposure of the OWTS

37 *Other Resource Areas:* This alternative would have similar impacts to the Project in
38 terms of its effects on scenic resources, environmental justice, and utilities and service
39 systems. Impacts to traffic and parking, cultural, historic, and paleontological resources,

- 1 public health and safety hazards, and noise would be incrementally reduced due to the
- 2 decreased levels construction activity associated with the reduced sand volumes.

Table 4-11. Alternative 8 – Changes in Impact Severity

Resource Area	Relative Change in Impact Severity	Discussion
Scenic Resources	Incremental Reduction in Adverse Impacts	Over the short-term, beneficial impacts of nourishment would not be realized on the western end of Broad Beach as the individual revetments and exposed house pylons in this area would not be covered. Similar to the Project, permanent authorization of the revetment through a long-term lease and approval of CDPs would create the potential for long-term degradation of the visual environment of Broad Beach after nourishment activities end and natural coastal erosion causes the revetment to become exposed as described in Impact SR-1.
Cultural and Paleontological Resources	No Major Change in Adverse Impacts	There would be no appreciable difference in impacts relative to the Project, although construction-related Impacts identified in Impacts CR-2 and CR-3 may be incrementally reduced due to the reduced construction and hauling activities.
Noise	No Major Change in Adverse Impacts	Residences on the western end of Broad Beach would experience less noise and nourishment would terminate at the end of the existing revetment. While there may be a reduced duration of nourishment due to the reduced nourishment volume on the western end of Broad Beach, this reduction would be incremental at most, consequently the remaining residences and public users along Broad Beach would experience similar noise levels as described in Impact N-1, N-2, and N-3.
Public Health and Safety Hazards	Incremental Reduction in Adverse Impacts	This alternative would result in a slight decrease in the adverse effects associated with Impact HAZ-2, as the duration of nourishment and the presence of heavy construction equipment would be reduced as no nourishment volume would occur on the western end of Broad Beach. However, this reduction in the duration of nourishment would be incremental at most and would not substantially reduce Impact HAZ-2. Similar to the Project adverse effects under this alternative would be reduced through implementation of AMMs HAZ-2, HAZ-3a, and HAZ-3b.
Traffic and Parking	Incremental Reduction in Adverse Impacts	The reduction in nourishment volume would result in a corresponding reduction of approximately 10,000 heavy haul truck trips, which would likely incrementally reduce traffic and congestion on PCH and the inland routes, and in Zuma Beach Parking Lot 12, incrementally reducing the severity of the adverse effects associated with Impact TR-1. These impacts would be further reduced through implementation of AMM TR-1.
Environmental Justice	No Major Change in Adverse Impacts	There would be no appreciable difference in impacts relative to the Project.

4.2.9 Alternative 9: Reduced and Phased Beach Nourishment at West Broad Beach with Existing Revetment

Description

Similar to the Project, this alternative would include beach and dune restoration as well as retention of the existing revetment at Broad Beach; however, this alternative would differ from the Project and the other alternatives described above in three key ways:

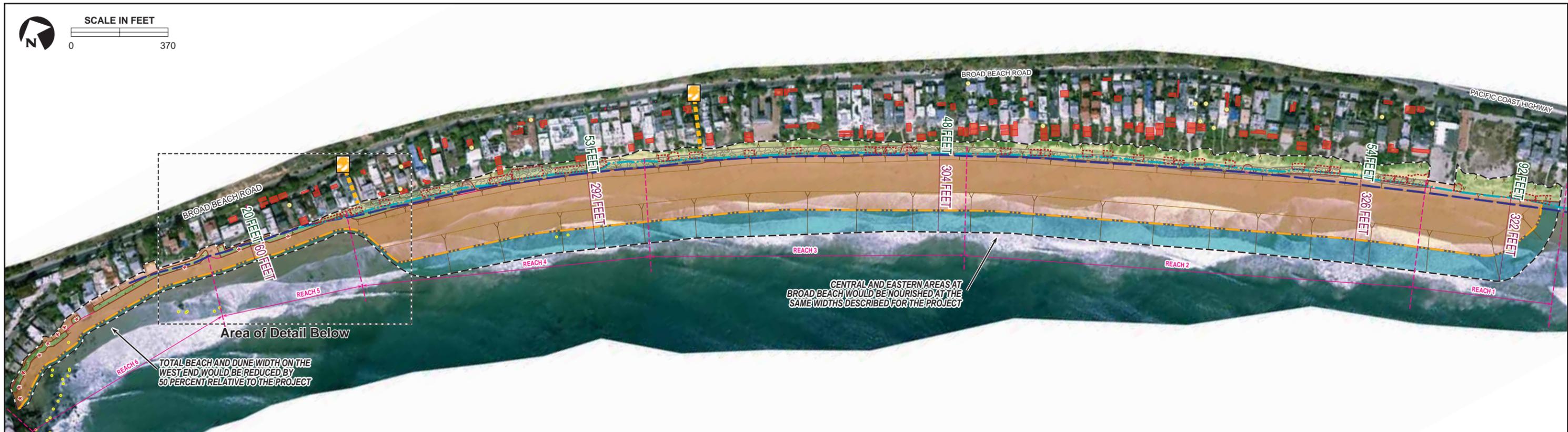
1. Reduced beach nourishment volume at the west end of Broad Beach and Lechuza Cove with 60,000 cy of sand placed within a nourishment footprint reduced by 50 percent west of 31346 Broad Beach Road and the western public coastal point;
2. Phased nourishment events at the west end of Broad Beach and within Lechuza Cove, with approximately 30,000 cy of sand placed within the same reduced footprint during each of the two phases to reduce post construction sand dispersal and loss; and
3. An unvegetated dune berm within Lechuza Cove west of 31502 Broad Beach, the house on pilings overlying beach.

The goal of this alternative would be to minimize burial of rocky intertidal and subtidal habitats by significantly reducing beach width and sand volumes within and adjacent to these sensitive resources on the western end of Broad Beach, while still restoring a wider sandy beach in this area. This alternative would include a reduced beach nourishment and dune restoration volume of 520,000 cy due to a reduced sand volume and placement footprint west of 31346 Broad Beach Road and the western coastal access point, where the existing emergency revetment ends. This alternative would minimize direct and indirect impacts associated with burial of intertidal and shallow subtidal habitat near Lechuza Point while also providing some benefits of beach nourishment for coastal access and for protection of properties along the western 1,500 feet of Broad Beach. Beginning west of 31346 Broad Beach Road and western public coastal access point this alternative would taper the profile of the renourished beach within Lechuza Cove, reducing beach width, footprint and profile. Under the Project, the dune system would be approximately 51 feet in width with a 114 foot wide sandy beach protruding seaward a total of 165 feet from existing homes. In contrast, under this alternative the dune system would be reduced to approximately 20 feet in width and the beach width would be reduced to approximately 60 feet, protruding seaward only 80 feet from existing homes. This would represent more than a 50 percent reduction in total renourishment footprint within the western end of Broad Beach. This tapering of the beach from east to west would likely necessitate lighter duty vehicles to distribute sand at the western end of Broad Beach, where the narrow beach would restrict access and turning radius for heavy duty equipment (i.e., scrapers) proposed by the Project for the sand deposition activities.

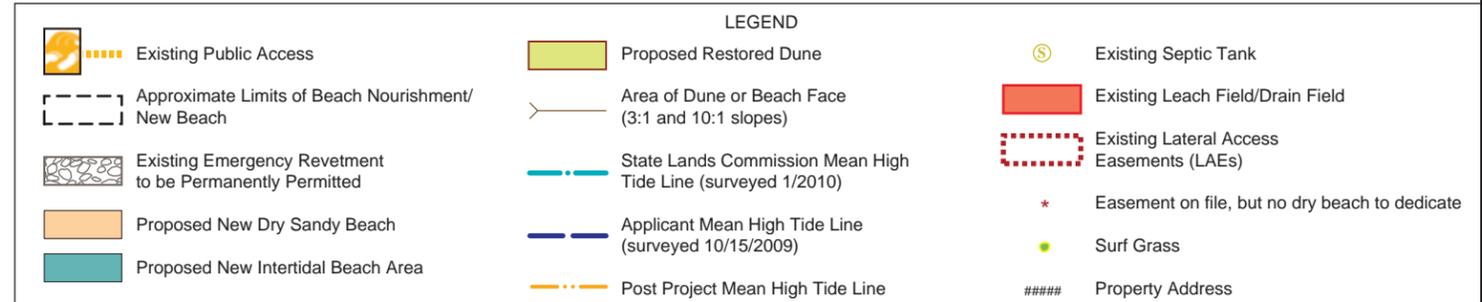
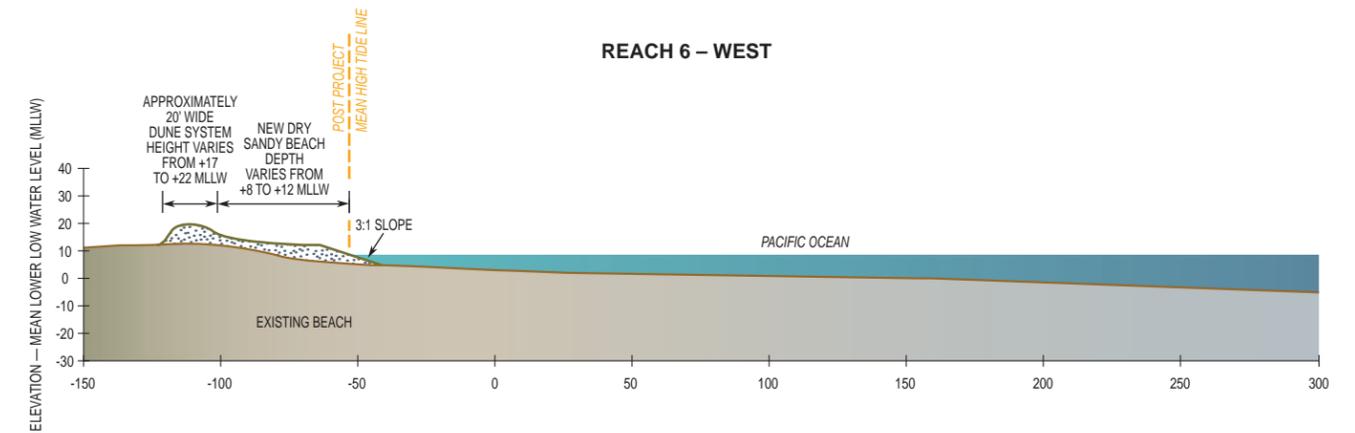
1 Additionally, nourishment within Lechuza Cove would occur in two phases under this
2 alternative. It is estimated that approximately 25 percent of initial sand nourishment
3 volume moves offshore or down coast immediately following construction as the beach
4 reaches equilibrium. This phased approach would minimize post construction sand loss
5 and reduce indirect burial and turbidity impacts to the rocky intertidal and subtidal
6 habitats off of Lechuza Cove. The first phase would occur at the beginning of the initial
7 beach nourishment event, with haul trucks or scrapers transporting the sand to the
8 western end of Broad Beach. Following the deposition of 30,000 cy of sand west of
9 31346 Broad Beach Road within the reduced footprint, the nourishment of the
10 remainder of Broad Beach east of 31346 Broad Beach Road would occur. After
11 completion of the nourishment east of 31346 Broad Beach Road, another 30,000 cy of
12 cubic sand would be deposited on the western end of Broad Beach with the same
13 reduced footprint. Each of these phased nourishment events would occur over the same
14 footprint west of 31346 Broad Beach Road; however, the first phase would be filled to a
15 reduced depth. For example, the first phase would establish a dune berm approximately
16 8.5 feet deep and a beach berm approximately 7 feet deep within the reduced footprint.
17 The second phase would increase the depth of the dune berm to up to 17 feet and
18 increase the depth of the beach berm up to 14 feet.¹³ Similar to the Project, a
19 renourishment event including the deposition of 450,000 cy would occur after
20 approximately 10 years; however, this re-nourishment event would also in two phases
21 on the west end of Broad Beach, within a similarly limited nourishment footprint.
22 Additionally, the timing and quantity of renourishment event may vary depending on
23 results of the intensive monitoring plan and success of backpassing.

24 Under this alternative, dune restoration would take three different approaches. East of
25 31502 Broad Beach Road dune restoration would remain identical to that described for
26 the Project. Dune habitats would be established and restored by creating a sand berm
27 that would run along the length of the beach, with a minimum of two feet of sand over
28 the rock revetment. The berm would extend approximately 30 to 50 feet inland and 0 to
29 10 feet seaward of the revetment, depending on location. The dune system, consisting
30 of hummocks varying in height from 17 to 22 feet above MLLW would be constructed on
31 top of this berm. The width of the dune system would vary from 50 to 60 feet wide.

¹³ Ultimate post construction beach depth would also be governed by wave action and tides that would reshape the beach and disperse sand. Beach depth and width would likely change during the intervening 6 months between deposition phases at the west end of Broad Beach. However, under this alternative, the second phase of nourishment would be restricted to the 60 foot wide initial footprint.



Detail



Note: Beach dimensions and post project average high water line reflect beach status immediately after completion of beach nourishment and construction/shaping activities; the equilibrium beach that would result from dynamics such as waves, tidal and wind action would likely be of somewhat different dimensions.

1

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1 However, in the 1,500 feet of nourished
 2 beach west of 31346 Broad Beach Road
 3 and the western coastal access point the
 4 dune berm would be narrowed to 20 feet in
 5 width. While the dune berm between 31346
 6 Broad Beach Road and 31052 Broad Beach
 7 Road (i.e., the house on pilings)
 8 would be subject to dune restoration activities
 9 described for the Project, the 450 feet of
 10 narrow dune west of 31052 Broad Beach
 11 Road would not be vegetated with native
 12 dune species. This area would remain an
 13 unvegetated berm as habitat within the cove
 14 appears to be historically more
 15 characteristic of coastal bluff and beach
 16 (see Illustration 4-6).



Illustration 4-6: Under this alternative the narrow dunes to the west of 31502 Broad Beach Road would not be vegetated. This area would be attractive for walking and tide pooling but would not provide restoration for terrestrial dune habitat.

17 Similar to the Project, public use of, and access along, the beach berm under this
 18 alternative would be permitted along the beach to the toe of the restored dunes where a
 19 line of rope or cable and signs would prohibit access to ESHAs within the dunes. This
 20 rope or cable system, combined with the approximately 50 -foot-wide dune system east
 21 of 31052 Broad Beach Road and the 20-foot-wide dune system west of 31052 Broad
 22 Beach Road, would ensure resident privacy. In addition, rather than provide for 112
 23 coastal access walkways across the restored dunes as included in the Project, this
 24 alternative would include installation of shared private coastal access walkways, with
 25 one walkway approximately every 300 feet to be shared between six homes. These
 26 walkways would be connected by a shared path along the back dune, lined with a sand
 27 fence along the seaward side to minimize sand migration into private yards and
 28 minimize resident and pet access into the dune habitat. Each of these walkways would
 29 be roped off to minimize private access into the dunes. This distance was selected as
 30 an intermediate value that would improve dune habitat quality while minimizing
 31 disruption to private homeowner beach access. However, west of 31346 Broad Beach
 32 Road and the western public coastal point extending west to 31052 Broad Beach Road
 33 (i.e., the house on pilings), the narrow beach and dune habitat would appear to limit
 34 opportunities for a shared back dune walkway; individual walkways for each would be
 35 permitted, but would be lined by bollards and ropes to limit both public and private
 36 access into the dunes. In the 450 feet west of 31052 Broad Beach Road (house on
 37 pilings), dunes would be sand only and would not be roped off or fenced.

38 The existing two public vertical coastal access points along Broad Beach Road would
 39 remain open and the two public trails across the dunes would be roped off to limit
 40 access into the dunes. Additionally, this alternative would also recognize the public's
 41 rights to pass along public land below the January 2010 MHTL and across existing

1 LAEs. This would ensure that over the long-term after nourishment ceases, the
2 revetment is removed, and the beach and dunes erode, the public would continue to
3 have access across the beach. Public access to and along these LAEs would be
4 available when the sensitive dune habitats that overlie these LAEs eventually erode
5 over the long-term and public access to these LAEs becomes necessary and available.

6 Major components of this alternative would include:

- 7 • Transport of 520,000 cy of sand from inland quarries to Broad Beach via 37,300
8 heavy haul truck trips;
- 9 • Transporting of sand from storage areas at Zuma Beach up coast to Broad
10 Beach with heavy trucks or scrapers;
- 11 • Redistributing sand, beginning with the western end of Broad Beach, as needed
12 with earthmoving equipment, such as bulldozers, and grading the beach fills to
13 required dimensions;
- 14 • Implementing phased nourishment west of 31346 Broad Beach Road and the
15 western coastal access point, with the first phase depositing sand at a reduced
16 depth over a footprint that extends not more than 80 feet seaward from existing
17 homes, and the second phase, occurring after the nourishment of the rest of
18 Broad Beach, depositing sand over the same footprint to a full depth (i.e., up to
19 17 foot deep dune berm and 14 foot deep beach berm);
- 20 • Creating a system of shared walkways to provide private lateral and vertical
21 private coastal access for homeowners across the new dune system east of
22 31346 Broad Beach Road and the western coastal access point;
- 23 • Permitting individual walkways for homes west 31346 Broad Beach Road and the
24 western coastal access point, with dunes roped off and revegetated in the area
25 extending west to 31052 Broad Beach Road (i.e., the house on pilings), but with
26 dunes not revegetated or roped off in the 450 feet of Lechuza Cove;
- 27 • Providing two vertical public access trails across the dunes to connect existing
28 access points to the widened beach and ensuring public lateral access along the
29 widened beach seaward of the OHWM;
- 30 • Performing backpassing of the sand, ranging from 25,000 to 35,000 cy, from the
31 east to west end of the beach based on triggers and using heavy equipment such
32 as scrapers and bulldozers (average of 25,000 cy/year); and
- 33 • Initiating one future major renourishment event of approximately 450,000 cy in
34 roughly 10 years.

35 Potential Impacts to Public Trust Resources

36 This alternative would reduce direct burial of intertidal and near shore subtidal habitats
37 as well as potentially reduce indirect turbidity impacts to marine biological resources
38 within Lechuza Cove and offshore of Lechuza Point. This alternative would limit direct
39 burial by reducing the footprint of nourishment west of 31346 Broad Beach Road by

1 more than 50 percent to 80 from 160 feet when compared to the Project. It would also
2 reduce indirect offshore burial and turbidity through phased nourishment which would
3 reduce initial sand volume losses from the post construction beach.

4 This alternative would also result in changes to impacts associated with air quality and
5 terrestrial biological resources. Additionally, this alternative would result in trade-offs
6 between protection of marine biological resources and public access and recreation. By
7 narrowing the width of the renourished beach west of 31346 Broad Beach Road,
8 approximately 25 percent of Broad Beach would be reduced somewhat in terms of
9 accessibility to both resident and public users relative to the Project. Additionally, this
10 alternative would not reduce impacts associated with the Project's consistency with
11 coastal public access and recreation polices. However, this alternative could be
12 combined with either Alternative 1 or Alternative 2, which would relocate the revetment
13 landward, but this would also result in associated impacts described for these
14 alternatives above. Resource areas with major changes to impacts under Alternative 9
15 relative to the Project are discussed in detail below, while the resource areas with
16 negligible changes to impacts are summarized in Table 4-12 at the end of this
17 subsection.

18 *Air Quality and Greenhouse Gases:* Under Alternative 9, criteria pollutant emissions
19 would be incrementally reduced relative to the Project as there would be a reduction in
20 the number of heaving haul truck trips corresponding to reduced nourishment volume.
21 Under this alternative there would be approximately 5,700 fewer truck trips relative to
22 the Project (Appendix G). However, while emissions would be reduced under this
23 alternative it would not substantially reduce the severity of Impact AQ-1, particularly for
24 emissions of VOCs, which would continue to exceed SCAQMD and VCAPCD
25 thresholds for onsite and project-level significance, and NO_x, which would continue to
26 exceed SCAQMD and VCAPCD thresholds for onsite and project-level significance,
27 including SCAQMD LSTs for construction activities. Similarly, GHG emissions described
28 in Impact AQ-2 would decrease and would be further below SCAQMD and VCAPCD
29 thresholds, and toxic air contaminants would also be incrementally reduced.

30 However, while this alternative would reduce criteria pollutant emissions and GHG
31 emissions associated with hauling sand for initial nourishment, it may incrementally
32 increase construction emissions from backpassing as described Impact AQ-1. Due to
33 the narrow profile of the renourished beach west of 31346 Broad Beach Road,
34 backpassing triggers may be met more often on the western end of broad beach. It is
35 not expected that backpassing would occur more than once a year, but the
36 unanticipated loss of sand during large storm events may increase the pressure for
37 backpassing from residences on the western end of the beach.

38 *Coastal Processes, Sea Level Rise, and Geologic Hazards:* Under this alternative
39 erosion of beach and dunes after cessation of nourishment would continue as described

1 under the Project, with the benefits of nourishment enduring for an estimated 10 to 20 or
2 more years and the revetment then becoming exposed as a result of persistent wave
3 action. Anticipated SLR of approximately 8.5 inches by 2030 would further exacerbate
4 erosion effects, including increased frequency and intensity of storm surges and wave
5 attack. However, under this alternative, erosion of the west end of the beach would
6 occur more quickly relative to the Project due to the reduced width of the nourished
7 beach in this area. Consequently, impacts from coastal processes identified in Impact
8 CP/GEO-8 may be more substantial on the western end of Broad Beach, and short term
9 beneficial impacts related to nourishment identified in impact CP/GEO-6 would be
10 reduced. Under this alternative, after the revetment is exposed, potential impacts of
11 coastal processes on the revetment identified in Impact CP/GEO-2 and associated
12 indirect impacts to public trust resources would remain similar to those described for the
13 Project as the revetment would not be redesigned or reinforced under this alternative. In
14 addition, impacts to unprotected homes, or those with substandard revetments or pilings
15 along west broad beach would be potentially exposed to damage from wave attack, with
16 more severe impacts than those for the Project as identified in Impact CP/GEO-3 (See
17 Figure 4-10). Impacts related to the existing revetment (CP/GEO-1), sand compatibility
18 (CP/GEO-4), and tides, currents, and wave height and direction (CP/GEO-5) would
19 remain similar to those described for the Project.

20 The reduced sand volume under Alternative 9 would result in corresponding reductions
21 to beneficial impacts associated with Impact CP/GEO-7, as approximately 80,000 cy
22 that would have been available for down coast movement under the Project would not
23 be deposited on the western 25 percent of Broad Beach. Impact CP/GEO-7 would
24 remain beneficial under Alternative 9 as the effects of the longshore currents on the
25 remaining 520,000 cy of beach sand deposited on Broad Beach would still occur over
26 the short- to mid-term. However, over the long-term, longshore currents would transport
27 this sand farther down coast and possibly offshore as described for the Project.

28 *Terrestrial Biological Resources:* This alternative would result in reduced dune
29 restoration over approximately 1,500 feet or approximately 25 percent of the CSLC
30 Lease Area. Under Alternative 9, the dune berm to the west of 31346 Broad Beach
31 Road and the western coastal access point would not be sculpted into hummocks and
32 would be narrowed to 20 feet and crossed by approximately 19 private walkways in
33 1,100 feet (one walkway every 60 feet). Further, in the 450 feet west of 31502 Broad
34 Beach Road (i.e., the house on pilings) the dune would remain 20 feet wide and would
35 not be revegetated with native species. However, as described above, the habitat within
36 Lechuza Cove appears to have been historically more characteristic of coastal bluffs
37 and beach. Additionally, the majority of the dunes along the remainder of Broad Beach
38 would continue to be revegetated with native species and subject to access
39 management provisions. Consequently, beneficial impacts associated would continue
40 elsewhere along Broad Beach, while protection of marine biological resources would
41 receive greater emphasis within Lechuza Cove. However, the benefit of this impact as it

1 applies to the western portion of Broad Beach is questioned, as the dune restoration
2 would displace sensitive marine habitat (discussed below).

3 The reduced nourishment volume, approximately 80,000 cy less sand than described
4 for the Project, would reduce impacts associated with the increased closure period of
5 Trancas Lagoon identified in TBIO-5. However, as 86 percent of the nourishment
6 volume would still be applied up coast of these features, this incremental reduction in
7 nourishment volume would not substantially reduce these impacts. This reduction in the
8 nourishment volume on the western end of Broad Beach may increase the pressure for
9 backpassing by residents in this area following unanticipated large losses of sand
10 following storm events. However, only
11 one backpassing event would be
12 expected to occur annually and the total
13 area affected by backpassing would be
14 less; therefore impacts associated with
15 TBIO-3 may be slightly reduced. Other
16 construction-related impact to terrestrial
17 biological resources identified in
18 Impacts TBIO-2 and TBIO-4 would be
19 incrementally reduced due to the
20 reduction in direct impact area, total
21 sand volume applied, and number of
22 truck trips used for hauling. Additionally,
23 requiring shared private coastal access
24 walkways would also substantially
25 reduce disturbance of the proposed
26 dune system described in Impact TBIO-
27 7, protecting this newly established and
28 restored dune habitat. Finally, long-term degradation would have similar impacts to
29 newly created dune habitat to those described for the Project in Impact TBIO-8.



Illustration 4-7: This alternative would substantially reduce impacts to marine biological resources within Lechuza Cove. However, it would also leave the boulder field on the western end of Broad Beach relatively exposed and would result in a narrow beach width west of 31346 Broad Beach Road and the western public access point. Consequently, this alternative would include trade-offs with recreation and public access.

30 *Marine Biological Resources:* The reduced and phased nourishment west of 31346 Broad
31 Beach Road and the western public coastal access point would reduce direct burial of
32 rocky intertidal and near shore subtidal marine habitats, including surfgrass, kelp, and
33 other sensitive marine organisms (see Figure 4.10). As discussed below, this alternative
34 would also reduce indirect impacts to marine biological resources by limiting post-
35 construction offshore loss of beach sand and subsequent potential for indirect habitat
36 burial. However, this would result in trade-offs, with regards to decreases in recreational
37 and public access and coastal protection benefits realized under the Project (Illustration
38 4-7).

39 Implementation of Alternative 9 would substantially reduce the severity of impacts to
40 rocky intertidal habitats within Lechuza Cove and off Lechuza Point described in Impact

1 MB-2. As the beach width would be decreased by approximately 50 percent, this
2 alternative would reduce the direct burial and coverage of rocky intertidal by up to 50
3 percent (see Figure 4.10). Over the long-term, the reduced cover means that more rocks
4 would be exposed in spring when sand levels are seasonally low, and burial during the
5 fall when sand levels are typically high would be reduced both in terms of area and
6 duration relative to the Project. Additionally, while nourishment would still result in the
7 100 percent mortality of sessile organisms within most of the beach footprint, the phased
8 nourishment approach would result in reduced mortality of mobile organisms immediately
9 following the nourishment event as some of these organisms in the rocky intertidal may
10 be able to burrow through the reduced overburden following the first and second phases
11 of nourishment. Further, reduced sand volumes, footprint and phased nourishment would
12 likely reduce the duration of both direct and indirect burial, a key factor in marine
13 organism survival.¹⁴ Several factors determine survival of beach invertebrate fauna
14 during burial, including sand depth, the ability for vertical migration through the sand
15 overburden, duration of burial and the recruitment potential of larvae, juveniles, and
16 adult organisms from adjacent areas (Greene 2002).

17 For reasons similar to those described above for rocky intertidal habitat, this alternative
18 would also substantially reduce Impact MB-4 to subtidal habitats and organisms. As the
19 footprint of the beach would be substantially reduced under this alternative, Alternative 9
20 would substantially limit impacts, likely avoid all or most direct burial of shallow subtidal
21 reefs during sand placement and associated mortality of surfgrass and kelp described in
22 Impact MB-4 and MB-8. While it is more difficult to estimate the total reduction in indirect
23 impacts that occur when the beach is reshaped and sand moved offshore, it can
24 reasonably be assumed that indirect impacts to these habitats would also be substantially
25 reduced due to narrower beach width and substantially reduced sand volumes.
26 Additionally, remaining impacts to rocky intertidal and subtidal habitats under this
27 alternative would be reduced through implementation of AMMs MB-2a and MB-2b.

28 Additionally, the phased placement of sand on the western end of Broad Beach would
29 result in a decrease in nearshore turbidity and indirect burial compared to the Project as
30 approximately 25 percent of placed sand is remobilized immediately post construction.
31 Therefore under this alternative, only 7,500 cy of sand would be immediately lost after
32 each of the two initial nourishment phases rather than the 35,000 cy that would be lost in
33 the same area under the Project. This would substantially reduce the indirect smothering
34 or burial of additional rocky intertidal and subtidal habitat beyond the actual footprint of
35 the expansion as both the depth and duration of burial would be reduced.

¹⁴ Many rocky intertidal and subtidal organisms are adapted to periods of burial by sand and can survive weeks or even months of burial, dependent upon the species. By limiting both the extent and duration of burial, this alternative would materially improve marine organism survival rates.



1

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1 However, phased nourishment may increase the mortality of organisms within the sandy
2 intertidal as the second phase may occur after intertidal organisms are beginning to
3 recover. Implementation of AMMs MB-2a, MB-2b, and MB-ALT-8 would ensure that any
4 adverse impacts to sensitive intertidal and subtidal habitats would be appropriately
5 mitigated. Additionally, as described for terrestrial biological resources, this alternative
6 may increase the pressure for backpassing events which could result in incremental
7 increases to the severity of impacts described in Impact MB-5.

8 The reduced nourishment volumes may also result in an incremental decrease in impacts
9 to down coast marine resources described in Impact MB-7 as a reduced volume of sand
10 would be available for down coast transport to Zuma Beach, Point Dume State Beach,
11 and other down coast beaches. Additionally, intertidal habitat areas and shoreline
12 marine biological resources farther south may be indirectly affected by changes in sand
13 supply and distribution through littoral drift. This may result in additional reductions to
14 impacts to marine biological resources down coast. However, as 86 percent of the
15 proposed nourishment volume would still be applied to Broad Beach under this
16 alternative, this reduction in the severity of down coast transport impacts likely would be
17 incremental for down coast marine biological resources. The reduced volume of sand
18 and the absence of construction activities on the west end of Broad Beach would
19 incrementally reduce short-term construction related impacts to marine biological
20 resources identified for the Project in Impacts MB-3, MB-4, MB-5, and MB-6.

21 *Recreation and Public Access:* As the emergency revetment would be retained under
22 this alternative, Alternative 9 would have similar impacts associated with recreation and
23 public access described in REC-4. However, as described for the impacts to Marine
24 Biological Resources under this alternative, impacts to rocky intertidal and other
25 sensitive marine habitats would be reduced. The dune and beach profile, per the
26 Project, at the western end of Broad Beach would be approximately 160 feet wide and
27 would substantially cover the rocky intertidal areas, particularly the boulder field fronting
28 31412 Broad Beach Road. However, under this alternative the beach width at the
29 western end would be reduced by approximately 50 percent and would leave rocky
30 intertidal areas and the boulder field at least partially exposed in the intertidal and surf
31 zone. This alternative would substantially reduce impacts to marine biological resources
32 by reducing the width of the western end of Broad Beach, but would reduce recreation
33 opportunities and public access to some degree.

34 Broad Beach west of the existing rock revetment is unique from the rest of Broad
35 Beach, because of the rocky intertidal habitat and biological resources that exist at this
36 location. A 2012 public survey of beachgoers at Broad Beach indicated that tidepooling
37 was an attraction for some beachgoers. Under existing conditions, swimming and
38 playing in the surf zone are attractive at the east end of Broad Beach, and less so at the
39 far west end. Although lateral access would be limited at the west end of Broad Beach,
40 this alternative would help minimize impacts to the existing rocky intertidal habitats while

1 still offering improved access for tidepooling as a recreation resource. The majority of
 2 Broad Beach would provide for enhanced opportunities for a full range of beach
 3 recreation within the proposed beach and dune areas.

4 The existing narrow intertidal beach would be expected to narrow more quickly over the
 5 20 year Project life. SLR may also reduce public access during low tide conditions.
 6 Impacts to public access could be reduced by reducing the length of the narrow beach
 7 on the western end of broad beach; however, this would have corresponding impacts to
 8 marine habitats in this area. These impacts could also be reduced by increasing the
 9 size of the phased nourishment events. For example, phases one and two could each
 10 consist of 40,000 to 50,000 cy of sand which would increase the depth or size of the
 11 beach on the west end while still minimizing impacts to marine habitats to some extent.
 12 Regardless, under this alternative, impacts described for REC-3 pertaining to public
 13 access would be less beneficial than those described for the Project. Construction-
 14 related impacts from nourishment and backpassing operations would have similar
 15 impacts to those identified for the Project in Impacts REC-1 and REC-2.

16 *Other Resource Areas:* This alternative would have similar impacts to the Project in
 17 terms of its effects on scenic resources, environmental justice, utilities and service
 18 systems, and marine water quality. Impacts to traffic and parking, cultural, historic, and
 19 paleontological resources, public health and safety hazards, and noise would be
 20 incrementally reduced due to the decreased levels construction activity associated with
 21 the reduced sand volumes.

Table 4-12. Alternative 9 – Changes in Impact Severity

Resource Area	Relative Change in Impact Severity	Discussion
Scenic Resources	No Major Change in Adverse Impacts	Similar to the Project, permanent authorization of the revetment through a long-term lease and approval of CDPs would create the potential for long-term degradation of the visual environment of Broad Beach after nourishment activities end and natural coastal erosion causes the revetment to become exposed as described in Impact SR-1.
Cultural and Paleontological Resources	No Major Change in Adverse Impacts	There would be no appreciable difference in impacts relative to the Project, although construction-related impacts identified in Impacts CR-2 and CR-3 may be incrementally reduced due to the reduced construction and hauling activities.
Noise	No Major Change in Adverse Impacts	There would be no appreciable difference in impacts relative to the Project. While there may be a reduced duration of nourishment due to reduced sand volume on the western end of Broad Beach, this reduction would be incremental at most.
Public Health and Safety Hazards	Incremental Reduction in Adverse Impacts	This alternative would result in a slight decrease in the adverse effects associated with Impact HAZ-2, as the duration of nourishment and the presence of heavy construction equipment may be reduced due to the reduced nourishment volume on the western end of Broad Beach. However, this reduction in the duration of nourishment would be incremental

Table 4-12. Alternative 9 – Changes in Impact Severity

Resource Area	Relative Change in Impact Severity	Discussion
		at most and would not substantially reduce Impact HAZ-2. Similar to the Project adverse effects under this alternative would be reduced through implementation of AMMs HAZ-2, HAZ-3a, and HAZ-3b.
Traffic and Parking	Incremental Reduction in Adverse Impacts	This alternative would require approximately 5,700 fewer heavy haul truck trips due to the reduced nourishment volume at the west end of Broad Beach, which would incrementally reduce traffic and congestion on the inland routes, PCH, and in the Zuma Beach parking lot, incrementally reducing the severity of the adverse effects associated with Impact TR-1, TR-3, and TR-4. These impacts would be further reduced through implementation of AMM TR-1.
Environmental Justice	No Major Change in Adverse Impacts	There would be no appreciable difference in impacts relative to the Project.
Utilities and Service Systems	No Major Change in Adverse Impacts	Under this alternative the revetment would be retained in place similar to the Project and impacts to utilities and service systems would remain similar to the Project. Potential impacts to septic systems on the western end of Broad Beach may be incrementally increased over the mid-term as there would be a reduced nourishment volume and footprint in this area; however, this would not be substantial as the entire beach would erode over the long-term exposing these areas both under this alternative and under the Project.
Marine Water Quality	Incremental Decrease in Adverse Impacts	This alternative would reduce turbidity impacts on the western end of Broad Beach identified in Impact MWQ-1 and corresponding impacts to marine biological resources identified in Impacts MWQ-2 and MWQ-4. Impact MWQ 3 would remain similar to the Project due to nourishment and retention of the existing revetment.