7. HALF MOON BAY LANDFILL

County of San Mateo

VULNERABILITY SUMMARY

The Half Moon Bay closed landfill (Landfill) is **highly vulnerable** to erosion and future impacts of sea level rise. Stored waste could potentially be exposed in the future following severe erosion or slope collapse, making the asset highly sensitive; the asset is already exposed to daily wave action and scour. Adaptive capacity of the asset is moderate, as erosion can be reduced through protective measures such as a seawall. However, consequences from the exposure of waste could be detrimental to the surrounding habitats and special status species, and could create a public health hazard for nearby residents or recreationists who use the site for its trails and open space.

SENSITIVITY	*EXPOSURE*	*ADAPTIVE CAPACITY*	*CONSEQUENCES*
High	*High*	*Moderate*	*High*

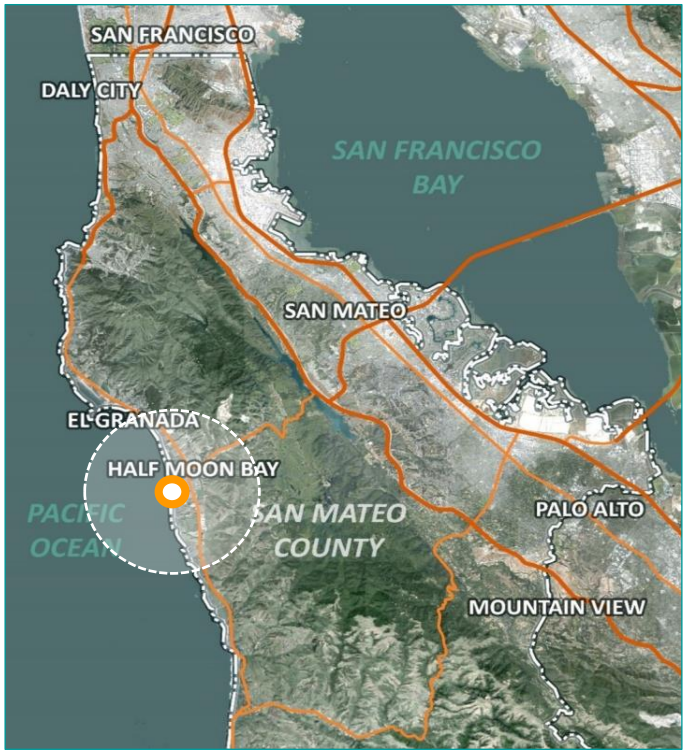
ASSET CHARACTERISTICS

End of Magnolia St & Pacific Ocean | Half Moon Bay

Asset Description and Function:

The Landfill is an unlined Class III solid waste disposal site that was an illegal dump and burning site until 1958. The County assumed management responsibilities and operated the site as a landfill from 1971-76. It was graded and capped in 1978, and designated officially closed in 1997. Waste is underground and includes primarily inert material, yard waste, and small amounts of residential trash. The site perimeter is an important recreational asset and the California Coast Trail (CCT) crosses its western edge.

Asset Type	Closed Landfill
Asset Risk Class	4
Size	14 acres
Year of Construction	Pre-1958 (illegal use)
Elevation	Cover at 50 feet Waste depth unknown
Level of Use	NA (closed)
Annual O&M cost	$150,000
Special Flood Hazard Area	Asset is not in SFHA
Physical Condition	Good
Landowner	County of San Mateo



Underground Facilities

Waste is underground along with stormwater and drainage outlets that empty at the beach. Gas monitoring wells are underground on site.

Environmental Considerations

The Landfill is located in an area that has potential for the occurrence of special status plant and animal species and is shown on City maps to contain environmentally sensitive habitat areas (ESHA) as well as potential ESHAs where habitat may be present.

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ASSET SENSITIVITY

The asset is highly sensitive to erosion, as past storm events have exposed waste. Furthermore, the Landfill was created by filling ravine gullies with waste, and it is unlined, making it easily erodible. A concrete block mat revetment protects the bank of the Landfill to a certain extent to minimize the likelihood of the landfill eroding and exposing waste. The recreational uses of the site (trails) may be moderately sensitive to erosion as waste exposure could create a public health hazard and could result in a decrease of visitors to the area. Furthermore, erosion that causes bank failure near the section of the CCT could affect trail use and trail connectivity at the site as well. See profile on California Coast Trail for more information (AVP #1).

SHORELINE VULNERABILITY

Erosion Extent and Exposure Analysis

The western edge of the Landfill is located within the area identified by the Pacific Institute study (2012) as susceptible to erosion by the year 2100. The yellow band (see map on the right) represents the eastern extent of erosion that can be expected. The site is located near a residential neighborhood as shown in the photo.

The site is highly exposed to coastal erosion and wave action, and the most recent significant erosion occurred in 2010. Waves in the early 1990s also eroded portions of the marine terrace, exposing the Landfill along the cliff face, which warranted repairs and regrading, including the installation of a concrete block steel chain mat revetment on the slope to reduce future erosion.

Groundwater seepage into the Landfill is occurring, but it is unknown whether saltwater could intrude in a way that would compromise the Landfill.

It is likely that the inland extent of erosion into the Landfill will increase with sea level rise, especially in areas where there is already erosion and headcutting, such as at the southern drainage outlet which is migrating upstream at a rate of 7-10 feet per year.

Cross-Cutting Vulnerabilities

The Landfill is owned by the County, but maintenance of the surrounding drainage system, the trail, the parking lot, and the bridge are in the jurisdiction of the City of Half Moon Bay. As sea level rise exacerbates erosion and headcutting at the drainage outlet, the Landfill will become more susceptible to damage; any solutions to address one issue will likely require coordinating across both entities, nearby residents, and the CCT.

Western edge of landfill within future erosion extent.

Historical slide/bank failure area.

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ADAPTIVE CAPACITY, CONSEQUENCES, AND POTENTIAL ADAPTATION

Adaptive Capacity

Adaptive capacity of the asset is moderate, as there is some ability to protect against erosion; for example, the County built a concrete block steel chain mat revetment on the slope to protect the Landfill from wave erosion and scour, and to minimize the likelihood that waste could be exposed. Furthermore, County staff engage in regular monitoring of the site and its revetment to minimize the potential for future erosion, waste exposure, and pollutant leaching. The recreational uses of the site have a high adaptive capacity because, if waste were exposed or a section of the trail eroded, visitors could still use the site (after waste removal) and take an alternate path set farther back from the cliff.

Consequences

If the coastal bluff adjacent to the Landfill eroded severely enough, it could cause a landslide and subsequently expose waste. To date, waste exposure has been minor and no impacts to water quality have occurred. However, severe erosion could cause waste to spill into surrounding areas. This would pose both environmental and public safety hazards to local habitat (coastal and semi-aquatic) and special status species, to recreationists, and to residents in nearby houses. Water quality could be negatively affected as well. The associated cleanup costs could be large, and any waste exposure could result in a fine for violations of waste discharge requirements. It is unknown if there are hazardous materials in the Landfill; if there were, then environmental and public health impacts could be even more severe. Furthermore, waste exposure could reduce tourism. The scale of impact would likely be local; however, potential environmental impacts could affect a greater region, particularly if water quality were affected.

Additional Important Information

Many regulatory agencies are involved in the asset's management, making adaptation challenging. Agencies include: State Regional Water Quality Control Board, CalRecycle, County Building and Planning Department, County Environmental Health Services, US Army Corps of Engineers, California Coastal Commission, California Department of Fish and Wildlife, City of Half Moon Bay, and Bay Area Air Quality Management District.

Asset-Specific Adaptation

In the near-term, it may be necessary to reinforce and enhance the seawall protecting the asset and preserving its recreational benefits. In the long-term, however, it may make more sense to perform a clean closure, and relocate the waste away from a vulnerable area (for example, to Ox Mountain). The land could then be returned to a county Park, and this segment of the CCT could be relocated inland if needed.

Vulnerable Closed Landfills

There is another Asset Vulnerability Profile on vulnerable closed landfills: Mussel Rock Landfill (see AVP #6). The vulnerability assessment analysis shows that there are 9 vulnerable solid waste facilities in the County. Three of these facilities are active, such as the Shoreway Environmental Center, while six are closed.

Headcut and severe erosion at southern drainage outlet.

Landfill cap, looking west.