4.5.1 INTRODUCTION

This resource section evaluates the potential environmental effects related to geology and soils from implementation of PLAN Hermosa. The analysis includes a review of regional geology, seismicity and faulting, and soils.

Issues regarding water quality impacts from soil erosion are discussed in Chapter 4.8, Hydrology and Water Quality. PLAN Hermosa Public Safety Element policies and implementation actions presented in the implementation plan guide development and infrastructure practices designed to protect residents and structures from seismic-related hazards.

NOP Comments: No comments were received in response to the Notice of Preparation (NOP) addressing the geology and soils analysis. Comments included written letters and oral comments provided at the NOP scoping meeting.

Reference Information: Information for this resource chapter is based on numerous sources, including the PLAN Hermosa Technical Background Report (TBR) and other publicly available documents. The TBR prepared for the project is attached to this document as **Appendix C**.

4.5.2 ENVIRONMENTAL SETTING

Appendix C-9 describes the regional and local conditions related to geology and soils. Key findings of the environmental setting are presented below.

GEOLOGY AND TOPOGRAPHY

Hermosa Beach is located along the southwestern margin of the Los Angeles Basin and Coastal Plain. The Los Angeles Basin is an alluvial-filled basin bounded to the north and east by the Santa Monica, San Gabriel, and Santa Ana mountains and to the west and south by the Pacific Ocean and the Palos Verdes Peninsula.

The planning area is underlain by Holocene-age dune sands located west of the adjacent older alluvial deposits of the Los Angeles Basin. Beneath the surficial dune sands is the Pleistocene-age San Pedro Formation, consisting of unconsolidated and semi-consolidated stratified sands with some clays, silts, and gravels. The late Pliocene-age Pico Formation, consisting of marine siltstones and sandstones, sits beneath the San Pedro Formation. Beneath the Pico Formation is the early Pliocene-age Repetto Formation, consisting of siltstones with layers of sandstones and conglomerates. Beneath the Repetto Formation is the Miocene-age Puente Formation, which contains the primary oil reservoir in the planning area (City of Hermosa Beach 2014).

Hermosa Beach sits at the southwest end of Santa Monica Bay and ranges in elevation from sea level in the west to about 200 feet above sea level at inland locations (USGS 1981).

SEISMIC HAZARDS

The primary seismic hazards in the city are fault ground ruptures and ground shaking. Secondary seismic hazards include liquefaction, lateral spreading, differential settlement, landslide-induced earthquakes, and subsidence.

Seismic Ground Shaking and Fault Rupture

Earthquakes can cause strong ground shaking that may damage property and infrastructure. The strength of an earthquake is generally expressed in two ways: magnitude and intensity. The magnitude is a measure that depends on the seismic energy radiated by the earthquake as recorded on seismographs. The intensity at a specific location is a measure that depends on the

effects of the earthquake on people or buildings and is used to express the severity of ground shaking.

The most commonly used scale to measure earthquake intensities (ground shaking and damage) is the Modified Mercalli Intensity (MMI) Scale, which measures the intensity of an earthquake's effects in a given locality and is based on observations of earthquake effects at specific places. On the MMI Scale, values range from I to XII (see **Table 4.5-1**). While an earthquake has only one magnitude, it can have various intensities, which decrease with distance from the epicenter and vary depending on the underlying soil conditions (CGS 2002). **Table 4.5-1** provides descriptions of the effects of ground shaking intensities along with a general range of moment magnitudes that are often associated with those intensities.

TABLE 4.5-1
EFFECTS OF RICHTER MAGNITUDE AND MODIFIED MERCALLI INTENSITY

Mw	Modified Mercalli Scale	Effects of Intensity
1.0–3.0	I	I. Not felt except by a very few under especially favorable conditions.
3.0–3.9	II–III	II. Felt only by a few persons at rest, especially on upper floors of buildings. Delicately suspended objects may swing. III. Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
4.0–4.9	IV–V	IV. Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably. V. Felt by nearly everyone, many awakened. Some dishes, windows, etc., broken; a few instances of cracked plaster; unstable objects overturned. Disturbances of trees, poles, and other tall objects sometimes noticed. Pendulum clocks may stop.
5.0–5.9	VI–VII	VI. Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight. VII. Everybody runs outdoors. Damage negligible in building of good design and construction; slight to moderate in well-built ordinary structures; considerable in poorly built or badly designed structures; some chimneys broken. Noticed by persons driving motor cars.
6.0–6.9	VIII–IX	VIII. Damage slight in specially designed structures; considerable in ordinary substantial buildings, with partial collapse; great in poorly built structures. Panel walls thrown out of frame structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. Sand and mud ejected in small amounts. Changes in well water. Persons driving motor cars disturbed. IX. Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb; great in substantial buildings, with partial collapse. Buildings shifted off foundations. Ground cracked conspicuously. Underground pipes broken.
7.0 and higher	X or higher	X. Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations; ground badly cracked. Rails bent. Landslides considerable from river banks and steep slopes. Shifted sand and mud. Water splashed (slopped) over banks. XI. Few, if any, (masonry) structures remain standing. Bridges destroyed. Broad fissures in ground. Underground pipelines completely out of service. Earth slumps and land slips in soft ground. Rails bent greatly. XII. Damage total. Practically all works of construction are damaged greatly or destroyed. Waves seen on ground surface. Lines of sight and level are distorted. Objects are thrown upward into the air.

Source: CGS 2002

Faults are classified as "active" and "potentially active." An active fault is one that has had surface displacement within Holocene time (about the last 11,000 years), while a potentially active fault is one that has been active during Quaternary time (last 1,600,000 years). These definitions are used in delineating Special Studies Zones as mandated by the 1994 Alquist-Priolo Earthquake Fault Zoning Act.[1] A fault rupture is the sudden release of elastic energy that results from the sliding of one part of the earth's crust past another. The resulting fracture is known as a fault, while the sliding movement of earth on either side of a fault is called fault rupture.

The planning area is not located in a fault-rupture hazard zone, as defined by the Alquist-Priolo Earthquake Fault Zoning Act (CGS 2010). Based on information from the California Geological Survey (2010), no known major active faults are located in the planning area. The closest active faults are the Newport-Inglewood fault, approximately 5 miles to the east, and the Palos Verdes fault, approximately 2 miles to the west (CGS 2010). An inactive offshore fault, named Offshore Fault 103, is approximately 1.4 miles west of the planning area (City of Hermosa Beach 2014). **Figure 4.5-1 (Regional Faults)** shows the location of the planning area relative to mapped active and potentially active faults in Southern California.

Historic records indicate that the planning area has experienced seismic ground shaking from a number of seismic events over the last century and a half. For example, the 1933 Long Beach earthquake, which occurred on the nearby Newport-Inglewood fault, caused serious damage to weak masonry structures and killed 115 people throughout the region. The earthquake had an estimated moment magnitude of M6.4 on the Richter scale (City of Hermosa Beach 2014; USGS 2013b; Southern California Earthquake Data Center 2014).

[1] The Alquist-Priolo Earthquake Fault Zoning Act requires the California State Geologist to establish regulatory zones now known as Earthquake Fault Zones; prior to January 1, 1994, these zones were known as Special Studies Zones.

FIGURE 4.5-1
REGIONAL FAULTS

Legend

- Alquist-Priolo Fault Zones
- Accurately Located Fault Trace
- Approximately Located Fault Trace
- Inferred Fault Trace

Source: CGS 2010

Landslides

A landslide is the downhill movement of masses of earth material under the force of gravity. Factors contributing to landslide potential include steep slopes, unstable terrain, and proximity to earthquake faults. This process typically involves surface soil and an upper portion of underlying bedrock. Movement may be very rapid or so slow that a change of position can be noted only over a period of weeks or years. The size of a landslide can range from several square feet to several square miles. There are several landslide zones in Hermosa Beach, as shown on **Figure 4.5-2 (Landslide and Liquefaction Zones)**. These zones have a potential for permanent ground displacement, based on previous landslide movement or local topographic, geological, geotechnical, or subsurface water conditions. They are identified as follows: one near South Park, east of Monterey Boulevard between 2nd Street and 6th Street; one on the city's southern border at the intersection of Valley Drive and Ardmore Avenue; one to the north of Gould Avenue between Ardmore Avenue and Pacific Coast Highway (State Route [SR] 1); and one on the western border of the city between 8th Street and 6th Street. An additional landslide zone is located just east of the city limits between Havemeyer Lane and Haynes Lane in Redondo Beach (DOC 1999). Future development in these zones requires mitigation of potential landslide hazards.

Liquefaction

Liquefaction is the loss of soil strength caused by a sudden increase in pore water pressure during shaking and is one of the most destructive secondary effects of seismic shaking. Liquefaction occurs primarily in saturated and loose, fine- to medium-grained soils. Liquefaction occurs most often where groundwater lies within 30 feet of the surface, but it may also occur in areas where groundwater is up to 50 feet beneath the surface.

In general, the entire planning area west of Hermosa Avenue may include potentially liquefiable layers, as shown on **Figure 4.5-2**. A liquefaction zone is also identified in the southern portion of the planning area near the northeast corner of Monterey Boulevard and Herondo Street.

If groundwater levels in these areas rise to within 30 to 50 feet of the ground surface, the sediments would have a moderate to high susceptibility for liquefaction. The highest water levels recorded in Hermosa Beach are measured at 10 feet deep along the coast (DOC 1998). The type of soil present along the city's coastal area indicates the potential for large liquefiable areas. This area could become larger as the sea level rises and causes groundwater tables to rise as well. For more information on sea level rise, please refer to Section 4.8, Hydrology and Water Quality.

Lateral Spreading

Lateral spreading occurs as a result of liquefaction in which a subsurface layer becomes a liquefied mass, and gravitational and inertial forces cause the mass to move downslope. Development within landslide or liquefaction zones generally requires additional design considerations of different construction methods. This type of secondary seismic hazard is not expected to occur, as most of the liquefaction areas in the city are located in relatively flat areas (City of Hermosa Beach 2014).

FIGURE 4.5-2
LANDSLIDE AND LIQUEFACTION ZONES

Legend

- City Boundary
- Coastal Zone Boundary
- Liquefaction Zone
- Earthquake-Induced Landslide Zone

Source: CGS 2010

Differential Settlement

Differential settlement is a process whereby soils settle non-uniformly, potentially resulting in stress and damage to structures. Native earth materials in Hermosa Beach are relatively dense and therefore not prone to seismically induced settlement (City of Hermosa Beach 2014).

SOILS

The California Department of Conservation (DOC) prepared soil maps for the state of California by US Geological Survey (USGS) quadrangle; the planning area lies within the Redondo Beach quadrangle. The oldest Quaternary geologic unit mapped in the Redondo Beach quadrangle is the Pleistocene San Pedro Formation. The only identified soil substrate mapped in the planning area is Quaternary Older Alluvium (DOC 1998).

Erosion

Soil erosion is a process whereby soil materials are worn away and transported to another area by either wind or water. Rates of erosion can vary depending on the soil material and structure, placement, and human activity. In the planning area, opportunities for accelerated erosion include the steepening of slopes, removing ground cover, and other human-induced activities associated with construction and landscaping.

Expansive Soils

Expansive soils consist largely of clays, which greatly increase in volume when saturated with water and shrink when dried. It does not appear that expansive clays or soils exhibiting shrink-swell characteristics underlie the planning area. However, since no citywide soil report exists, expansive and collapsible soils are analyzed on a project-by-project basis.

4.5.3 REGULATORY SETTING

Federal, state, and local laws, regulations, and policies pertain to geology and soils in the planning area. They provide the regulatory framework for addressing aspects of geology and soils that would be affected by implementation of PLAN Hermosa. The regulatory framework for geology and soils is discussed in detail in **Appendix C-9**. The following summarizes key regulations used to reduce potential environmental impacts of implementing PLAN Hermosa.

FEDERAL

- **Earthquake Hazards Reduction Act:** US Congress passed the Earthquake Hazards Reduction Act in 1977 to reduce the risks to life and property from future earthquakes in the United States through the establishment and maintenance of an effective earthquake hazards reduction program. To accomplish this goal, the act established the National Earthquake Hazards Reduction Program. This program was substantially amended in November 1990 by the National Earthquake Hazards Reduction Program Act, which refined the description of agency responsibilities, program goals, and objectives.

STATE

- **Alquist-Priolo Act:** The Alquist-Priolo Earthquake Fault Zoning Act was created to prohibit the location of structures designed for human occupancy across the traces of active faults (lines of surface rupture), thereby reducing the loss of life and property from an earthquake. The planning area does not contain Alquist-Priolo Earthquake Fault Zones (CGS 2010).

- **Seismic Hazards Mapping Act:** The 1990 Seismic Hazards Mapping Act (Public Resources Code Sections 2690–2699.6) addresses hazards such as strong ground shaking, earthquake-induced landslides, and, in some areas, zones of amplified shaking. The act established a mapping program for areas that have the potential for liquefaction, landslide, strong ground shaking, or other earthquake and geologic hazards. The California Geological Survey (CGS) is the primary state agency charged with implementing the act and provides local jurisdictions with the seismic hazard zone maps that identify areas susceptible to liquefaction, earthquake-induced landslides, and amplified shaking.

- **California Building Code (CBC):** The California Building Standards Commission is responsible for coordinating, managing, adopting, and approving building codes in California. The 2013 CBC became effective on January 1, 2014, and updated all the subsequent codes under the California Code of Regulations (CCR) Title 24 (24 CCR), which provides minimum standards for building design. The State requires local governments to adopt Title 24 on a triennial basis. Where no other building codes apply, Chapters 16, 17, 18, 20, and 21 of the 2010 CBC regulate excavation, foundations, and retaining walls.

- **California Coastal Act:** The California Coastal Act of 1972 created the California Coastal Commission to enact policies and standards in its coastal development permit decisions. Among many issues, the Coastal Commission and the coastal development permit program protect against loss of life and property in the Coastal Zone from coastal hazards, including geologic hazards (Section 30006.5, Public Resources Code, Division 20, California Coastal Act). Section 30262(5) of the act also provides that "development will not cause or contribute to subsidence hazards unless it is determined that adequate measures will be undertaken to prevent damage from such subsidence."

LOCAL

- **City of Hermosa Beach Municipal Code:** Chapter 15.36 of the Municipal Code promotes public safety and welfare by reducing the risk of death or injury that may result from the effects of earthquakes on existing unreinforced masonry bearing wall buildings. The provisions of the chapter require existing seismically unreinforced buildings to be retrofitted and provide minimum seismic reinforcement standards for new buildings.

- **City of Hermosa Beach Building Requirements:** The City requires developers to submit a geotechnical report before starting construction on new buildings. As mentioned above, groundwater levels under sites located west of Hermosa Avenue can be as shallow as 10 feet from the surface. The geotechnical reports ensure that new developments appropriately consider and design geological, soil, and seismic safety conditions for each project site.

4.5.4 IMPACTS AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

For the purposes of this EIR, impacts on geology and soils are considered significant if adoption and implementation of PLAN Hermosa would:

1) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, involving:

    a) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on

other substantial evidence of a known fault. Refer to California Geological Survey (formerly Division of Mines and Geology) Special Publication 42.

b) Strong seismic ground shaking.

c) Seismic-related ground failure, including liquefaction.

d) Landslides.

2) Result in substantial soil erosion or the loss of topsoil.

3) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse.

4) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property.

5) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater.

The City of Hermosa Beach Municipal Code does not include provisions for new development with on-site septic systems and there are no existing individual septic systems within the city. Therefore, there would be no impact related to the use of septic tanks or alternative wastewater disposal systems. This topic will not be discussed further in this EIR.

ANALYSIS APPROACH

The impact analysis of PLAN Hermosa implementation evaluates geological hazards and their potential to affect future development. The following impact analysis is based on a review of published information, surveys, and reports regarding regional geology and soils. Information was obtained from private and governmental agencies and Internet websites, including the USDA Natural Resources Conservation Service, the California Geological Survey, and the US Geological Survey.

DRAFT PLAN HERMOSA POLICIES AND IMPLEMENTATION ACTIONS

PLAN Hermosa policies and implementation actions that reduce potential geology and soils impacts include the following:

Policies

Public Safety Element

- **1.1 Evaluate risks.** New buildings and infrastructure will evaluate seismic, fire, flood, and coastal storm hazard risks and comply with California Building Code standards to minimize risk.
- **1.2 Prepare geotechnical reports.** Geotechnical reports will be prepared for new development projects in areas with the potential for liquefaction or landslide.
- **1.9 Facilitate retrofits.** Encourage and facilitate retrofits of seismically high-risk buildings.
- **1.10 Consider site-specific soil conditions.** Require new structures to consider site-specific soil conditions.

Implementation Actions

- SUSTAINABILITY-16. Revise the Municipal Code as necessary to ensure it reflects up-to-date practices to reduce potential for soil erosion and ways to minimize or eliminate the effects of grading on the loss of topsoil.
- SUSTAINABILITY-17. Develop a citywide expansive and corrosive soils screening tool to reduce the need for site-specific soil reports.
- SUSTAINABILITY-18. Where feasible, new development or redevelopment shall be sited and designed to minimize alteration of natural landforms by conforming to the local topography; preventing substantial grading or reconfiguration of the project site; requiring that man-made contours mimic natural contours; ensuring that graded slopes blend with the existing terrain of the site and surrounding areas; and clustering structures to minimize site disturbance and to minimize development area.
- SAFETY-1. Continue to adopt and enforce the most up-to-date California Building Standards Code and California Fire Code, with appropriate local amendments.
- SAFETY-2. Continue to inventory unreinforced brick masonry, soft-story, and other seismically vulnerable private buildings. Identify potential funding sources to assist with seismic retrofits.
- SAFETY-3. Enforce seismic design provisions of the current California Building Standards Code related to geologic, seismic, and slope hazards, with appropriate local amendments.
- SAFETY-4. For properties identified as possibly containing acidic, expansive, or collapsible soils, require site-specific soil condition reports and appropriate mitigation as a condition of new development.
- SAFETY-6. Evaluate the landslide potential of a project site and require implementation of landslide mitigation measures when, during the course of a geotechnical investigation, areas prone to landslide are found. Potential landslide mitigation measures include, but are not limited to the following:
    - Avoidance: Developments should be built sufficiently far away from the threat that they will not be affected even if a landslide does occur.
    - Reduction: Reduction of landslide hazards should be achieved by increasing the factor of safety of the landslide area to an acceptable level, based on current engineering standards and practices. This can be accommodated by eliminating slopes with active/inactive landslides, removing the unstable soil and rock materials, or applying one or more appropriate slope stabilization methods (such as buttress fills, subdrains, soil nailing, crib walls, etc.).
- SAFETY-7. Require projects located within the Liquefaction Areas identified in PLAN Hermosa to evaluate the liquefaction potential and require implementation of mitigation measures when, during the course of a geotechnical investigation, shallow groundwater (60 feet or less) and potentially liquefiable soils are found. Potential liquefaction mitigation measures include, but are not limited to, soil densification or compaction, displacement or compaction grouting, and use of post-tensioned slab foundations, piles, or caissons.

IMPACTS AND MITIGATION MEASURES

IMPACT 4.5-1 ***Would PLAN Hermosa Expose People or Structures to Substantial Adverse Effects Associated with Fault Rupture and Seismic Hazards?*** *PLAN Hermosa would provide for and regulate future development and reuse projects in the city, including buildings and structures that would potentially expose people and structures to seismic hazards. Implementation of existing laws, regulations, and policies, as outlined in the Regulatory Setting subsection, and PLAN Hermosa policies would minimize seismic hazards impacts to people and structures to a* ***less than significant*** *level.*

As previously discussed, the planning area is located in a seismically active area and could experience seismic ground shaking and seismic-related ground failure (i.e., liquefaction and landslides) from earthquakes on active faults. The city is already developed, and people and structures in Hermosa Beach are subject to both existing primary and secondary geological hazards. To prevent loss of life and property, the City of Hermosa Beach adopted the California Building Code as outlined in Title 15, Buildings and Construction, of the City's Municipal Code.

The current adopted CBC includes design criteria for seismic loading and other geologic hazards, including design criteria for geologically induced loading from geological hazards. While shaking impacts could be potentially damaging, they would also be reduced in their impacts due to CBC criteria that recognize this potential. The CBC includes provisions for buildings to structurally survive an earthquake without collapsing and includes measures such as anchoring to the foundation and structural frame design. Additionally, Chapter 15.36 of the City's Municipal Code requires existing seismically unreinforced buildings to be retrofitted. This requirement would apply to infill development or redevelopment that would reuse existing buildings considered "high risk buildings" (as defined in Municipal Code Section 15.36.030) that have at least one unreinforced masonry bearing wall (Section 15.36.020).

PLAN Hermosa policies and implementation actions would further protect people and structures from risks associated with seismic-related hazards. For instance, Public Safety Element Policy 1.1 would require that all new buildings and infrastructure be evaluated for seismic hazard risks, while Policy 1.2 requires geotechnical reports be prepared for new development projects in areas with the potential for liquefaction or landslides. Additionally, implementation actions SAFETY-6 and SAFETY-7 require that future project sites be evaluated for landslide and liquefaction potential. The site-specific geotechnical investigations and actions SAFETY-6 and SAFETY-7 would ensure that proposed buildings developed under PLAN Hermosa are properly designed to address these constraints.

Thus, while PLAN Hermosa would result in the exposure of people to dangers associated with earthquakes, applicable building standards and implementation of PLAN Hermosa policies and implementation actions would minimize these dangers. The plan would not increase the potential for seismic activity or the inherent risks that come with living in a seismically active region. Therefore, this impact would be **less than significant**.

Mitigation Measures

None required.

IMPACT 4.5-2 ***Would PLAN Hermosa Result in Substantial Soil Erosion or Loss of Topsoil?*** *PLAN Hermosa would provide for and regulate future development and reuse projects in the city, which would entail ground-disturbing activities that could lead to soil loss. Compliance with existing policies regarding soil erosion and implementation*

of PLAN Hermosa policies would minimize impacts associated with erosion and loss of topsoil. This impact would be ***less than significant.***

PLAN Hermosa implementation could result in actions that would require soil-disturbing activities such as grading, hillside construction, and other activities that could accelerate soil erosion and expose topsoil. Landscaping activities could also result in soil exposure and limited soil erosion.

However, all construction activities would be required to comply with CBC Chapter 70 standards, which would ensure implementation of appropriate measures during soil-disturbing activities to reduce erosion. Project construction would also comply with City Municipal Code grading and erosion standards, as outlined in Chapter 8.44, Stormwater and Urban Runoff Pollution Control Regulations. PLAN Hermosa implementation actions SUSTAINABILITY-16 and SAFETY-1 would further reduce erosion associated with future construction by requiring the City to update both the Municipal Code and the building code to reflect the most up-to-date practices for soil erosion prevention.

Additionally, development involving clearing, grading, or excavation that causes soil disturbance of 1 or more acres, or a project involving less than 1 acre that is part of a larger development plan and includes clearing, grading, or excavation, is subject to provisions of the National Pollutant Discharge Elimination System (NPDES) State General Permit (Order No. 2009-0009), as discussed in Section 4.8, Hydrology and Water Quality. Any development of this size in the planning area would be required to prepare and comply with an approved stormwater pollution prevention plan (SWPPP). The SWPPP considers the full range of erosion control best management practices, including any additional site-specific and seasonal conditions. Such existing requirements would significantly reduce the potential for substantial erosion or topsoil loss to occur in association with new development.

Since erosion impacts are often dependent on the type of development, intensity of development, and amount of lot coverage of a particular project site, impacts can vary. However, compliance with existing standards and implementation of PLAN Hermosa policies would minimize the potential for soil erosion and loss of topsoil. Therefore, this impact would be **less than significant**.

Mitigation Measures

None required.

IMPACT 4.5-3 ***Would PLAN Hermosa Locate Structures on Unstable and Expansive Soils?*** *PLAN Hermosa would provide for and regulate future development and reuse projects in the city. Because Hermosa Beach has a low potential for expansive soils and PLAN Hermosa contains policies to minimize development in areas with unstable or expansive soils, this impact would be* ***less than significant****.*

As discussed above, it does not appear that expansive clays or soils exhibiting shrink-swell characteristics are present in the planning area. As such, the potential for exposure to these types of hazards from implementation of PLAN Hermosa would be low.

Additionally, the CBC and other related construction standards apply seismic requirements and address certain grading activities. The CBC includes common engineering practices requiring special design and construction methods that reduce or eliminate potential expansive soil-related impacts. These methods can include overexcavation of foundations, import of more stable material, positive drainage systems, or changes in structure design to mitigate for unstable soils. Compliance with CBC regulations would ensure the adequate design and construction of building foundations to resist soil movement.

PLAN Hermosa Public Safety Element implementation action SUSTAINABILITY-17 would require the City to develop a citywide screening tool to identify areas in which site-specific soil conditions reports may be needed. Such reports also include specific engineering design methods for construction in areas with these types of soils if necessary. Further, implementation action SAFETY-4 requires new structures to consider site-specific soil conditions. These measures would further reduce the potential for loss of life from development on expansive or unstable soils.

Development under PLAN Hermosa would be designed and constructed in accordance with applicable engineering standards and local policies that address soil stability. Therefore, this impact would be **less than significant**.

Mitigation Measures

None required.

CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

Site-specific topography, soil conditions, and surrounding development determine geological and soil-related impacts, which generally are not considered cumulative in nature. For example, seismic events may damage or destroy a building, but the development of a new building would not cause other areas to be more susceptible to seismic hazards. However, erosion and sediment deposition can be cumulative in nature, depending on the type and amount of development proposed in a given geographical area. The cumulative setting for soil erosion consists of existing, planned, proposed, and reasonably foreseeable land use conditions in Hermosa Beach and the South Bay Cities Council of Governments (COG) planning area.

IMPACT 4.5-4 ***Would PLAN Hermosa Contribute to Cumulative Geologic and Soil Hazards Impacts?*** *Implementation of PLAN Hermosa, in addition to other existing, planned, proposed, approved, and reasonably foreseeable development projects in the South Bay Cities COG planning area, may result in cumulative soil erosion impacts. However, compliance with existing regulations intended to reduce soil erosion during construction would reduce this impact to* ***less than cumulatively considerable****.*

PLAN Hermosa's intent is to minimize soil erosion through implementation of new policies and continued strengthening of existing policies. As discussed above, adoption and implementation of PLAN Hermosa would not lead to substantial soil erosion or topsoil loss. It would also not result in any changes to existing federal, state, and city policies and standards regulating soil erosion. As such, compliance with existing City policies and implementation of PLAN Hermosa policies would offset Hermosa Beach's contribution to cumulative soil erosion impacts.

Further, new development in the region would have to abide by CBC regulations. Additionally, and as described above, all development involving clearing, grading, or excavation that causes soil disturbance of 1 or more acres, or any project involving less than 1 acre that is part of a larger development plan and includes clearing, grading, or excavation, would be subject to the State General Permit and would be required to prepare and implement an approved SWPPP containing erosion control measures.

Because policies and programs included in PLAN Hermosa and existing federal and state regulations would reduce the potential for soil erosion and loss of topsoil, cumulative impacts would be **less than cumulatively considerable**.

Mitigation Measures

None required.

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