4.6 HYDROLOGY AND WATER QUALITY

This section was prepared utilizing existing data from a variety of sources and specifically data obtained from the following sources:

- Seawave Run-up Analysis, proposed Grover Beach Lodge, Grover Beach, San Luis Obispo County, California, prepared for Pacifica Companies for City of Grover Beach by GeoSolutions, Inc., August 26, 2010 (report is contained in Appendix K of this EIR).
- Preliminary Hydrology Study, Grover Beach Lodge, prepared for Pacifica Companies for City of Grover Beach by Construction Testing & Engineering, Inc, October 29, 2010 (report is contained in Appendix K of this EIR).
- City of Grover Beach Storm Water Management Program, March 2010.
- Preliminary Hydrology Study for: Grover Beach Lodge, City of Grover Beach, California, prepared for Pacifica Companies for City of Grover Beach by Construction Testing & Engineering, Inc., January 19, 2012 (report is contained in Appendix N of this Revised FEIR).
- Seawave Runup Analysis – Revised, Proposed Grover Beach Lodge, Grover Beach, San Luis Obispo County, California, prepared for Pacifica Companies for the City of Grover Beach by GeoSolutions, Inc., January 13, 2012 (report is contained in Appendix N of this Revised FEIR).

4.6.1 Existing Conditions

4.6.1.1 Site Hydrology

Figure 4.6~~7~~-1 shows the existing hydrologic conditions of the project site. The majority of the proposed project site is within the floodway of Meadow Creek and is subject to 100 year flooding (or areas with a flood elevation that has a one percent chance of being exceeded each year) as designated by the Federal Emergency Management Agency (FEMA), National Flood Insurance Program, Flood Insurance Rate Maps (FIRM), as revised August 28, 2008. Figure 4.6~~7~~-2 designates the flood boundaries for the 100-year and 500-year levels of flood. Generally, Meadow Creek overflows during a 100-year storm and floods the site between the creek and the existing dune complex to the west.

Meadow Creek

The waters of Meadow Creek originate in the rural and urbanized unincorporated area of San Luis Obispo County and incorporated Pismo Beach and Arroyo Grande. The creek enters the city in a buried structure near U.S. Highway 101 and Oak Park Blvd. The Meadow Creek channel then follows a route parallel to Highway 101 and El Camino Real to 4th Street where it enters the City of Pismo Beach and the sixty-nine acre Pismo Lake Ecological Preserve. It then leaves the preserve and enters Grover Beach at the north City boundary. Eventually, it will flow south to a flap gate at Arroyo Grande Creek and then into the Oceano Lagoon.

Originally, the creek made its way through beach sands to the Pacific Ocean near the North Beach Campground, but it was diverted and channelized in the early 1900s to its current route along Highway 1 to the Oceano Lagoon. Since the 1900s, the primary function of this creek has been to channel runoff from urbanized portions of Grover Beach and the Oak Park residential area; this use continues today.

The City currently adds stormwater to Meadow Creek at the West Grand Avenue drainage structure (refer to Appendix D for excerpts from the City's existing stormwater plan) and at a North Front Street drainage structure just north of the golf course. During high flood periods, Meadow Creek overflows its banks north of the State Park golf course and south at the Oceano Lagoon. During major flood events or if there are blockages in the channel, the waters will overflow the creek onto the project site. Since the creek is principally used for drainage, sediment and pollutants that have entered the creek have reduced its carrying capacity and have "clogged" the creek. In addition windblown sand has also contributed to sedimentation of the creek, particularly in the area of West Grand Avenue and Pier Avenue.

4.6.1.2 Flooding and Drainage

Tsunami

In general, coastal Grover Beach is protected from tsunami hazards by the area's wide beaches and coastal dunes. Several small tsunami events have been recorded in San Luis Obispo County, none of which have caused major damage in Grover Beach.

The proposed project site is shown entirely within the County of San Luis Obispo Tsunami Inundation Area as shown on Plate 2 in the Wave Run-up Analysis Report prepared by GeoSolutions, Inc, and contained in Appendix K.

Lopez Dam

The City's General Plan Safety Element shows that the proposed project site is located within the Lopez Dam failure inundation zone. However, due to the fact that the project site is approximately 8 miles downstream of the dam, the flood waters are anticipated to be dispersed by the time it reaches the project site and would not affect the property. The proposed project would not interfere with emergency evacuation plans related to dam failure.

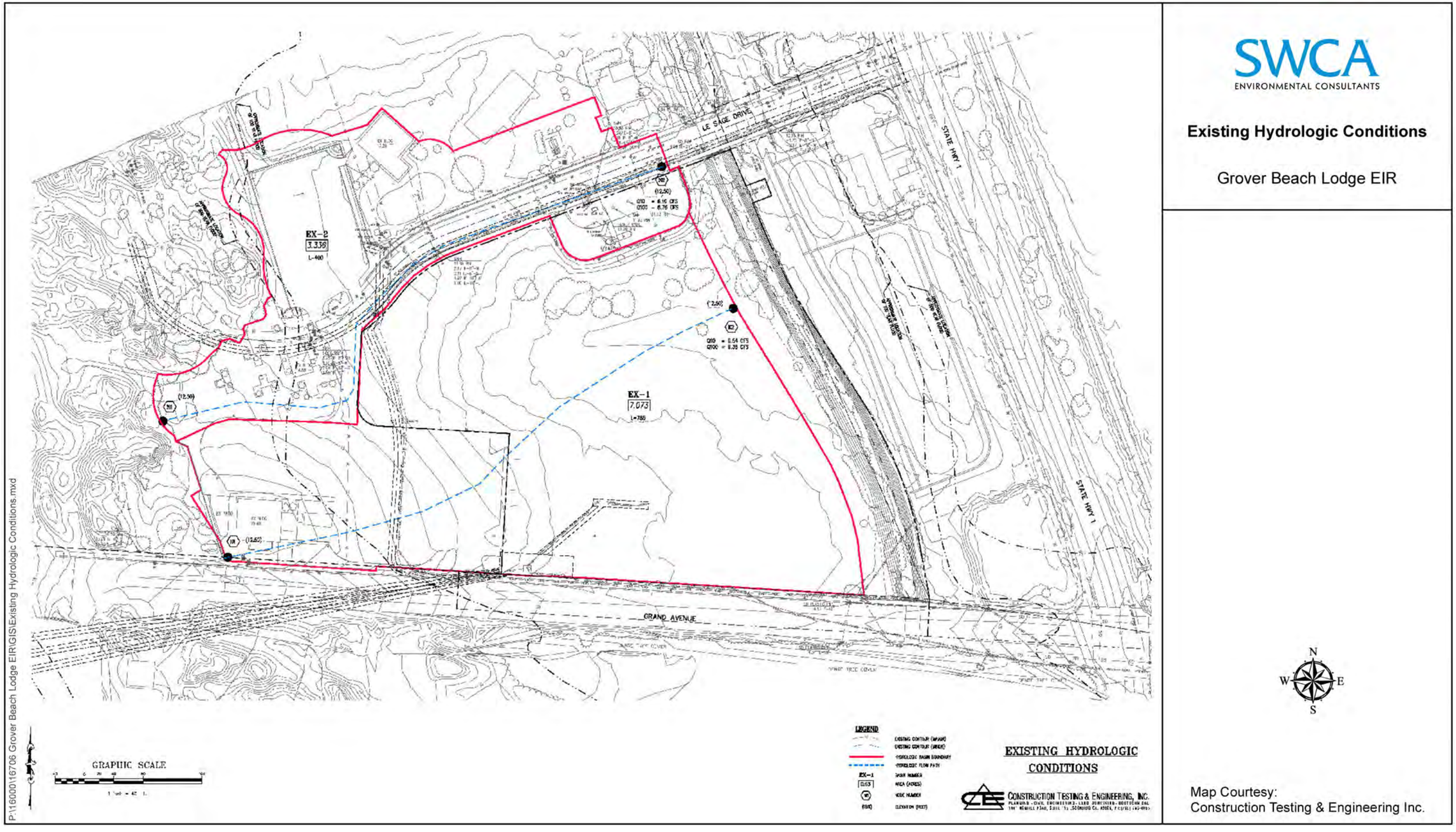
Wave Run-up

The Wave Run-up Analysis (Appendix K) and an additional Wave Runup Analysis revised at the request of the California Coastal Commission (January 13, 2012, Appendix N) prepared by GeoSolutions, Inc. is incorporated by reference and evaluates the potential for wave run-up at the project site (refer to Appendix N).

Based on 27 years of data, the National Oceanic and Atmospheric Administration (NOAA) has estimated that the relative sea level change would be approximately 32 cm, or approximately one foot of elevation change, However, this elevation change is expected to be higher due to climate changes.

San Luis Obispo County has received a grant from the Local Government Commission, the National Center for Conservation Science & Policy and the Kresge Foundation to evaluate climate change adaptation. According to a Telegram-Tribune newspaper article, the County of San Luis Obispo is considering using a higher elevation change based on California conditions. EPA scientists are confident that based on the warming trend, sea levels will rise 3.3 to 4.6 feet by year 2100 (*Climate Change is Hot Topic In County*; article found on http://net10.org); however, these estimates have not yet been adopted as the official basis for determining potential sea level rise. The revised GeoSolutions report utilized the ~~one~~ 4.6 foot elevation change as the official and documented estimate.

Figure 4.6-1. Existing Hydrologic Conditions



SWCA ENVIRONMENTAL CONSULTANTS

Existing Hydrologic Conditions

Grover Beach Lodge EIR

Map Courtesy:
Construction Testing & Engineering Inc.

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Figure 4.6-2. FEMA 100-Year Flood Map

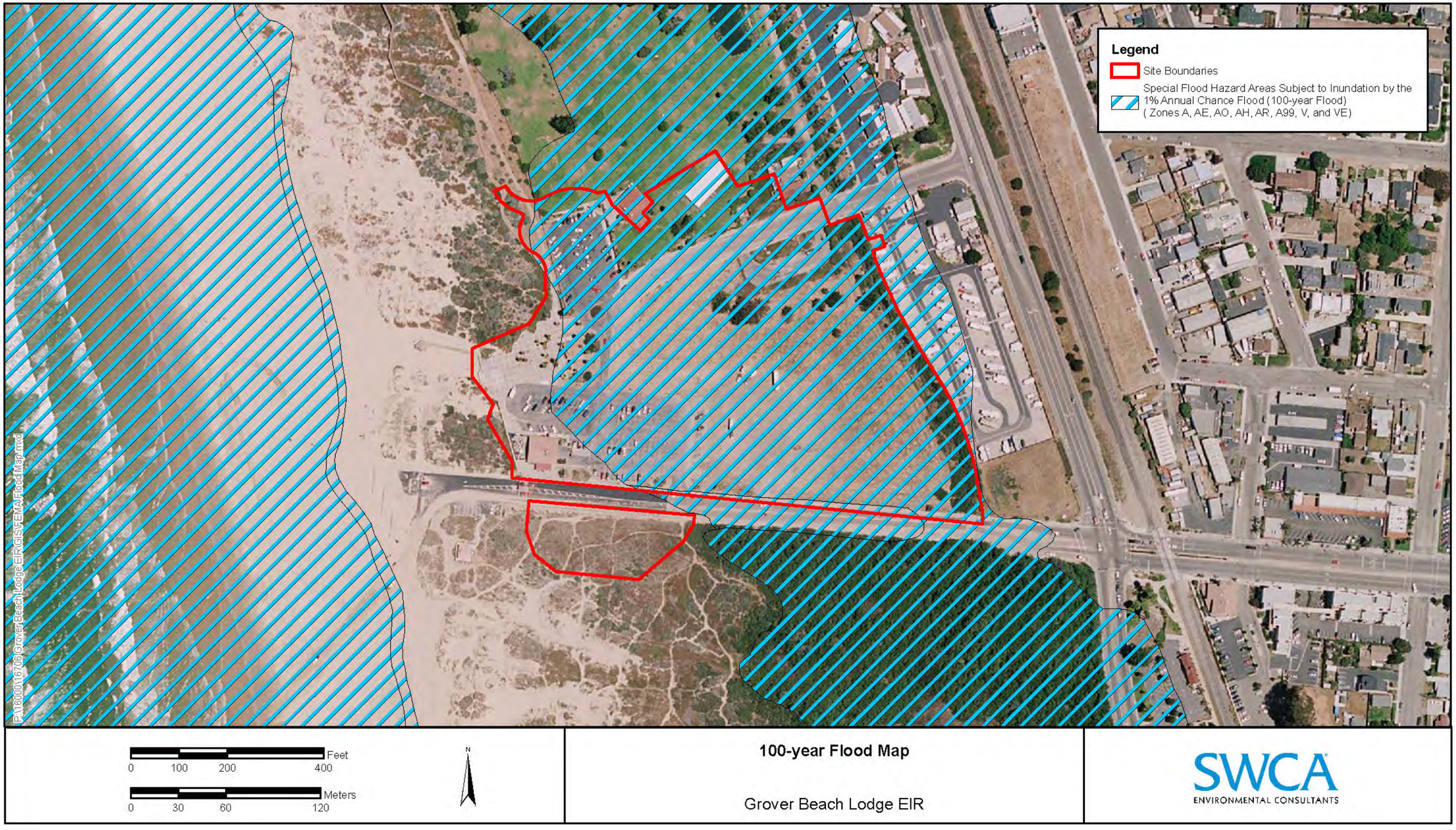

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Figure 4.6-3. Estimated Wave Runup

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The mean high-higher water level (MHHW) added with a maximum water level and global warming factor of 4.6 feet ~~one foot~~ equals 9.24 ~~5.64~~ feet, which is the still water level calculated for the site. This is calculated as follows:

> ~~100-year Stillwater elevation +~~ 5.32 feet (MHHW) + 2.33 feet (maximum water level above MHHW) + 4.6~~1~~ foot sea level change = ~~+~~ 12.25 ~~8.65~~ feet (mean low lower water or MLLW). Conversion from MLLW to NGVD 29 data is 3.01 feet (~~3.01-8.65~~12.25 – 3.01 MLLW) results in 9.24 ~~5.64~~ feet NGVD29 stillwater elevation.

The approximate low elevation at the property is 9 feet~~; the property is approximately 3.3 feet above mean high-high tide with a maximum water level and global warming factor~~ and the mean high high water level, coupled with a maximum water level and global warming factor is 9.24 feet stillwater elevation. Therefore, the mean high high tide with a maximum water level and global warming factor is greater than the approximate low elevation at the site.

Wave heights are estimated to be 6 to 10 feet and storm surge is estimated at 2.0 feet. Determination of wave run-up is based upon the largest wave which would break on the beach in the project vicinity, and is calculated by GeoSolutions (page 3 of the Wave Run-up study in Appendix K, and page 2 of the revised Wave Runup Study in Appendix N) to be about 7.5 feet.

Adding the 9.24~~5.64~~ foot still water level, the approximate level of storm run-up level for the site is 16.74 ~~13.14~~ feet (NGVD29 datum).

~~This value is greater than the low elevations of the property. Assuming that the County of San Luis Obispo adopts a global warming factor for sea level rise greater than the historic 1 foot rise, the still water level added with a global warming factor of a maximum of 4.6 feet would raise the storm run-up level of the site from 13.14 feet (which includes a 1-foot global warming factor) to 16.74 feet.~~

Based on topographic maps for the property, the dune area between the proposed project and the beach area has an average elevation of 20 feet for most of the dune complex; the worst case wave run-up of 16.74 feet is less than the elevation of the average elevation of the dune complex to the west of the project site.

Low spots in the dune complex exist west of the project site and these were evaluated to determine whether or not there were any areas that would allow wave run-up onto the site, assuming worst case assumptions regarding wave run-up. Appendix K contains a spot elevation map based on the actual topography of the site and the revised Wave Runup Study in Appendix N (January 2012) identifies a low elevation of approximately 18.2 feet in the dune complex. One low spot is located in the vicinity of the existing boardwalk and observation platform at the west boundary of the site. However, this low spot is greater in elevation than the worst case estimate of stillwater elevation and storm run-up (16.74 feet) and is expected to be sufficient to deter wave run-up from entering the site. ~~There is an existing seawall in the vicinity of the observation platform that could be extended and perhaps heightened if needed to provide a barrier to wave run-up, provided that the wall were higher than the worst case elevation of 16.74 feet.~~ The picnic area is at a higher elevation (averaging between 18.5 feet and 16.5 feet) and would also deter wave run-up if the elevations are left the same or are higher once this area is reconstructed. The entrance to the State Park Vehicular Recreation Area rises from 16.7 feet at the end point of West Grand Avenue to 21.2 feet at the entry station; these elevations appear to deter wave run-up from running along West Grand Avenue and entering the site along the southern boundary where elevations are lower, from 9.4 feet to 13.5 feet.

The following is a summary of other studies that have estimated sea level rise and wave run-up along the California coast. Each of these studies estimated less than a 4.6 foot sea level rise; therefore, the analysis provided above represents the worst case scenario for the project site and the basis of the impact analysis below. These other studies are provided for informational comparative purposes only. The revised report is consistent with and reaches the same conclusions of the Pacific Institute study, discussed below as the worst case run-up estimate, and therefore, does not constitute significant new information that would result in new or changed impacts or mitigation measures.

According to the shoreline study completed by the CCC in 2001 (Overview of Sea Level Rise and Some Implications for Coastal California), "by 2100, it is very likely that water levels will be 3 feet higher than they are currently." The same CCC study states that as a general rule of thumb, between 50 and 100 feet of beach width on a gently sloping beach would be lost for every foot of sea level rise (CCC 2001). Therefore, based on information generated by the Coastal Commission, it can be estimated for this project that approximately 150-300 feet of beach from the mean high high water line may be affected by sea level rise by 2100 (and within the lifetime of the structure). The same amount of sea-level rise would result in less than 150-300 feet of beach loss on a moderately or steeply sloping beach.

More specifically, the CCC report shows that Port San Luis experienced approximately 1.5 mm/yr of sea level rise between 1945 and 1993 for a total of 72 mm (0.24 feet) over 48 years (CCC 2001, Figure 4). Therefore, Port San Luis has experienced sea level rise of approximately 0.005 feet per year since 1945. Using this rate, sea level rise at Port San Luis from existing conditions would be approximately 0.445 feet in 2100 (0.005 x 89 years). Specific information for Port San Luis shows a lower sea level rise than that estimated by the CCC report.

~~GeoSolutions used the USGS Coastal Vulnerability Assessment for Santa Barbara's estimates and the National Oceanic and Atmospheric Administration's estimates for sea level rise as the background for its wave run-up study (refer to Appendix K of this EIR). The study conservatively estimated one foot of sea level rise by 2100 (refer to Appendix K of the EIR). According to the CCC study, this would only result in 50 to 100 feet of beach loss in this area. Please refer to Appendix K for the wave run-up analysis, excerpts from various sources including elevation maps.~~

Most recently, the Pacific Institute conducted an in-depth analysis of sea-level rise on the California coastline in 2009. The report, The Impacts of Sea-Level Rise on the California Coast, estimated between a 1.0 and 1.4 meter (3.28 to 4.6 feet) rise in sea levels in California by 2100. The full report can be found at http://www.pacinst.org/reports/sea_level_rise/.

The most conservative estimate of 4.6 feet in sea level rise, based on the Pacific Institute report as well as consistent results of a County study on climate change funded by a grant from the Local Government Commission, has been analyzed in the EIR. The DEIR found that wave run up could potentially occur in Areas A and B through a low point in the dune complex located adjacent to the existing beach viewing deck and picnic area; however, information in the revised Wave Runup Study (January 2012) indicates that the low elevation of the dune complex would still be greater in elevation than the worst case stillwater elevation and wave run-up. Mitigation was proposed to reduce this impact, including construction of a dune or other obstacle to deter wave run up and associated dune erosion. The project refers to an existing low retaining wall in this area that could be extended and/or heightened to provide additional wave run up protection. However, t~~T~~he CCC has stated that this is not an allowable use for new

development, and the new elevation data in the revised report indicates that the mitigation would not be required.

~~Even without construction of any type of barrier, the~~The revised Wave Runup Study, Pacific Institute and CCC reports on sea level rise ~~would~~ indicate that the potential for impacts on the proposed project would not be likely. The westernmost point of the proposed project boundary is located approximately 430 feet from the mean high high water line (MHHW) and does not affect the existing dune structures or the shoreline. The first proposed structure is located approximately 630 feet inland of the MHHW. This is well beyond the CCC's estimated zone of disturbance between 150 and 300 feet. The Pacific Institute also indicates a potential 4.6 foot sea-level rise along the coast. Based on tide datums calculated by NOAA between 1983 and 2001, the MHHW line at Port San Luis is at about 1.6 meters. GPS data indicates that the dune complex located between the proposed project and the ocean is of sufficient height to block a 4.6 foot rise in sea levels. Maps prepared by the Pacific Institute to demonstrate impacts of sea-level rise along the California coast indicate that no portion of the project site would be impacted by the estimated 4.6 foot sea level rise scenario (Refer to California Flood Risk: Sea Level Rise, Pismo Beach Quadrangle Map, available at: http://www.pacinst.org/reports/sea_level_rise/hazmaps.html).

Figure 4.6-3 shows the potential run-up area based on the CCC report (between 150 and 300 feet of beach loss) and the approximate MHHW line after a 3 foot sea-level rise (estimated by the CCC) and a worst case 5 foot sea-level rise (4.6 feet estimated by the revised Wave Runup Study by GeoSolutions, Inc., January 2012, and the Pacific Institute). The project site is situated approximately 360 additional feet inland from the estimated MHHW after a 5 foot rise in sea levels. Safety at the project site does not appear to be an issue due to the distance from the shore.

Since determination of erosion 50 years into the future is speculative at best, the worst-case wave run-up was used in the DEIR (4.6 feet increase in sea level). ~~The CCC, in the 2001 report, estimates a 3 foot rise. If a 3 foot rise is used, then the wave run-up would be adjusted to an elevation of 15.74 feet, which is less than the elevation of the drainage that was of concern. Under this analysis, a dune, landscape berm or other improvement (as opposed to extension of the existing sea wall) would not be necessary. At 15.74 feet wave run-up, water would not likely encroach into the project area.~~

Storm Water Retention

During large storm events, the project site provides storm water retention for a short period since the site elevations are lowest. No formal storm water retention is present on the site, and the water flows to Meadow Creek.

4.6.1.3 Site Specific Hydrologic Conditions

An analysis of flooding conditions at the site was prepared for the applicant by Construction Testing and Engineering, Inc (CTE) and the report is contained in Appendix K. A revised Preliminary Hydrology Report was prepared in January 2012 to account for proposed project revisions and relocation of the conference center to a standalone building at the northeast corner of the project site (Appendix N). This revised study provides the predevelopment summary of the hydrology of the site for a two-year, 10-year, 25-year, and 100-year condition (refer to Table 1 in the study in Appendix N~~K~~). For a 100-year storm (worst case), in its existing condition, the 10.5~~4~~ acre drainage area will result in a runoff flowrate of 22.33 cfs~~18.14 cfs~~. This drainage currently flows into Meadow Creek.

The proposed drainage plan is to maintain the existing runoff and limit diversion, and to provide a storm water management plan to treat the storm runoff. The proposed drainage plan is divided into ~~eight basins~~ten runoff areas that will eventually drain easterly to Meadow Creek. The proposed horse staging relocation area south of West Grand Avenue will be constructed with a dirt base; hydrologic conditions would remain unchanged and are considered not to increase the pre-development hydrologic conditions. Table 3~~2~~ in Appendix N~~K~~ summarizes the post-development conditions without detention, and Table 4~~3~~ summarizes pre and post development comparison with no detention. Without detention, ~~T~~the difference at a 100-year storm event is 1.34 ~~3.96~~ cfs. Table 4.6-1 summarizes the post development runoff with detention for the project at various ~~flood~~ storm events and Table 4.6-2 compares the pre-and post-development ~~comparison~~ conditions with detention. The difference with detention compared with existing conditions is ~~-0.63~~ a decrease of 6.45 cfs for a 100-year ~~flood~~ storm event.

Table 4.6-1. Post Development Summary with Detention

Basin	Area (acre)	Impervious Percentage	Q2 (cfs)	Q10 (cfs)	Q25 (cfs)	Q100 (cfs)
PR-1A	0.831 ~~0.733~~	49.56 ~~51.72~~	*0.14* ~~*0.23*~~	*0.18* ~~*0.45*~~	*0.18* ~~*0.48*~~	*0.21* ~~*0.56*~~
PR-1B	0.398 ~~0.835~~	60.89 ~~55.06~~	0.16 ~~0.75~~	0.20 ~~1.23~~	0.21 ~~1.39~~	0.24 ~~1.77~~
PR-1C	0.518	61.06	*0.24*	*0.34*	*0.35*	*0.33*
PR-2	0.725 ~~0.769~~	45.68 ~~40.51~~	*0.58* ~~*0.28*~~	*0.20* ~~*0.47*~~	*0.21* ~~*0.53*~~	*0.24* ~~*0.59*~~
PR-3	0.476 ~~0.805~~	46.01 ~~32.06~~	*0.11* ~~*0.25*~~	*0.15* ~~*0.46*~~	*0.16* ~~*0.49*~~	*0.18* ~~*0.56*~~
PR-4	0.974 ~~1.371~~	13.31 ~~22.32~~	*0.08* ~~*0.34*~~	*0.13* ~~*0.55*~~	*0.14* ~~*0.56*~~	*0.16* ~~*0.68*~~
PR-5	1.309 ~~0.981~~	32.32 ~~28.03~~	*0.17* ~~*0.41*~~	*0.22* ~~*0.46*~~	*0.24* ~~*0.49*~~	*0.27* ~~*0.56*~~
PR-6	1.150 ~~0.995~~	57.03 ~~65.98~~	1.19 ~~1.11~~	1.95 ~~1.83~~	2.20 ~~2.07~~	2.80 ~~2.62~~
PR-7	1.199 ~~1.226~~	78.47 ~~69.71~~ ~~61.89~~	1.23 ~~1.29~~	2.02 ~~2.11~~	2.28 ~~2.39~~	2.90 ~~3.22~~ ~~3.03~~
PR-8	2.922 ~~2.694~~	85.86 ~~77.88~~ ~~75.45~~	3.55 ~~3.03~~	5.83 ~~4.98~~	6.59 ~~5.63~~	8.55 ~~7.32~~ ~~7.14~~
TOTAL	**10.502** ~~**10.409**~~	**56.13** ~~**53.79**~~ ~~**52.24**~~	**7.45** ~~**7.69**~~	**11.22**~~**14.54**~~	**12.56** ~~**14.03**~~	**15.88** ~~**17.88**~~ ~~**17.51**~~

Source: Preliminary Hydrology Study, CTE; Refer to Appendix N~~K~~, Table 6~~4~~

Table 4.6-2. Pre- and Post-Development Comparison with Detention

Basin	Q2 (cfs)	Q10 (cfs)	Q25 (cfs)	Q100 (cfs)
EXISTING	7.72~~7.70~~	12.69~~12.64~~	14.34~~14.29~~	22.33~~22.27~~ ~~18.14~~
PROPOSED	7.45~~7.69~~	11.22~~12.54~~	12.56~~14.03~~	15.88~~17.88~~ ~~17.51~~
DIFFERENCE	***0.27*** ~~***0.01***~~	***1.47*** ~~***0.10***~~	***1.78*** ~~***0.26***~~	***6.45*** ~~***4.39***~~ ~~***0.63***~~

The preliminary grading plan shows storage ponds that satisfy the city requirement for five of the ~~basins~~ drainage areas designated on Figure 2-9. However, due to site constraints including the 100-year flood elevation of 8.0 (CGB datum), providing ponding basins above or below ground for the remaining ~~hydrological basins~~drainage areas was determined by CTE to not be physically achievable. In order to satisfy the City's ~~storage~~ retention requirements, the applicant proposes that four of the ponds would be ~~designed~~ sized to ~~as detention basins which will~~ decrease the post-development runoff to pre-existing runoff rates for the entire project. The detention basins would also act as volume-based treatment control BMPs and the detention basins would drain easterly into Meadow Creek. The runoff from these four detention basins would not co-mingle with any untreated runoff. Further information regarding the storage and detention ponds is provided in the CTE report in Appendix ~~K~~N.

The project site currently drains naturally into Meadow Creek. The Hydrology Study, in Appendix N~~K~~, reports that in a 100-year storm event, the existing site creates 22.33 ~~22.27~~ cfs of peak flow runoff into Meadow Creek. Although the proposed project increases impervious surfaces by approximately 11%, because the proposed project would utilize detention basins to slow surface water runoff into Meadow Creek and allow percolation into the ground, in a 100-year storm event the proposed project would result in 15.88 ~~17.88~~ cfs of peak flow runoff into Meadow Creek. The project would result in a net peak flow reduction of 6.45 ~~4.39~~ cfs into Meadow Creek. The Hydrology Study also shows net reductions in peak flows during 2-year, 10-year, and 25-year storms (Appendix N).

Construction Testing & Engineering, Inc. has provided additional hydrological data, which supports the original report and provides an additional comparison of pre- and post-development runoff volumes in a 100-year storm event. The ~~May 2, 2011~~January 19, 2012 Preliminary Hydrology Study ~~Addendum~~ (refer to Appendix N~~K~~ of this EIR) concludes that the existing site creates 2.76 ~~2.679~~ acre feet of water volume in a 100-year storm. Utilizing the detention basins as designed in the ~~Draft~~Revised Final EIR (January 2012) and detailed in the Project Description, the post-development project would result in 2.761 ~~2.631~~ acre feet of volume in a 100-year storm. Therefore, the proposed project would ~~also~~ result in a 0.001 acre-feet increase in runoff volume ~~a net reduction of total volume of runoff of 0.048 acre feet~~ in a 100-year storm event. The project applicant proposes to utilize the proposed ponds in basins PR-1A, 2, 3, 4 and 5 to reduce the post-development runoff volume to pre-existing rates for the entire project (refer to Appendix N for additional information).

Storm Water Management

The applicant proposes Low Impact Development (LID) techniques, along with volume and flow based treatment control BMPs, including pervious pavement, vegetated swales, and bio-infiltration basins. LID uses site based planning and design strategies to manage the quantity and quality of stormwater runoff. The proposed LID design would reduce the amount of runoff by mimicking the natural hydraulic function of the existing site. The design includes infiltration using landscape features, and detention basins to filter, slow, and infiltrate surface runoff at the source.

All basins designated on the proposed site plan, Figure 2-5, will drain into landscape areas, detention basins, and bio-infiltration basins (bioswales). On site impervious areas will be directed into pervious landscaping and promote infiltration to the maximum extent possible. Runoff from parking lots will be directed to landscape areas and then into bio-infiltration basins. The detention basins will incorporate a storm drain control structure that will control the

proposed runoff for the 100 year flood, 85th percentile (first flush) and LEED storm water quality and quantity requirements (LEED is described in Chapter 2 of this EIR).

4.6.1.4 Water Quality

The issue of surface water quality is important because of the habitat value of the area's creeks and tributaries, including habitat for several endangered or threatened plant and animal species. Surface waters entering watercourses from undeveloped areas usually travel over vegetative cover, and erosion and sedimentation is a slow, gradual process. Urbanized areas typically contain pollutants on the ground surface that are harmful to water quality. These include heavy metals, hydrocarbons, detergents, fertilizers, and pesticides that originate from vehicle use and commercial and residential land use activities. For the most part, these pollutants are associated with sediments that collect on roadways and are flushed into the creek system with dry weather flows during construction or by rainfall. Construction activities also create erosion and cause sediment to be transported off-site by surface water runoff. Therefore, water quality depends mainly on the hydrologic characteristics of the drainage basin, the makeup of the soils in the watershed and sources of pollution in the watershed. The City's SWMP (Appendix K) discusses the surface water quality issues with respect to Meadow Creek watershed, of which the proposed project site contributes sediment and some pollutants, since much of the site drains via sheet flow to the creek. The appendix material includes the types of pollutants and sediments that have been identified in the West Grand Avenue stretch of the creek. Sand transport is a specific issue in the vicinity of the site since it is located adjacent to the dune complex and beach. Parking of vehicles and trailers on the site are the primary causes of pollutants specifically from the site, along with traces of organics due to equestrian use of the site. Salt water intrusion into groundwater is also identified as a water quality concern. The SWMP also includes measures to control or reduce sediments and pollutants from entering the creek through best management practices (BMPs) and these measures are required to be met by construction and land development activities.

The applicant has indicated that the proposed detention basins and bio-infiltration basins have been designed for water quality purposes and will be designed according to Urban Runoff Quality Management specifications. The hydrology report in Appendix K provides additional information on design specifications.

4.6.2 Regulatory Setting

Surface water and groundwater resources and their associated water quality are regulated in California through many different applicable laws, regulations, and ordinances administered by local, state, and federal agencies. The United States Army Corps of Engineers (USACE), California Department of Water Resources, Central Coast RWQCB, and the City are the primary agencies responsible for the protection of watersheds, floodplains, and water quality. These agencies ensure that the hydrologic characteristics of surface water and groundwater are considered, so that the existing identified beneficial uses are not impaired. Similarly, water quality regulations are designed to limit the discharge of pollutants to the environment, maintain surface water and groundwater quality, protect fish and wildlife and their habitats, and protect beneficial uses. This section describes regulations relevant to construction of the proposed project.

4.6.2.1 Federal and State Policies and Regulations

Federal and state agencies have jurisdiction over specific activities conducted in or connected to drainages, stream channels, wetlands and other water bodies. The federal government

supports a policy of minimizing "the destruction, loss, or degradation of wetlands" (Executive Order 11990, May 24, 1977). The USACE and the EPA regulate the placement of dredged and fill material into "waters of the United States," including wetlands, under Section 404 of the Clean Water Act (CWA). For all work subject to a 404 permit, project approval also must be obtained from the RWQCB via either a certification or a waiver under Section 401 of the CWA stating that the project would comply with applicable water quality regulations.

Since 1990, regulations have increasingly emphasized the control of water pollution from non-point sources, which include stormwater systems and runoff from point-source construction sites and industrial areas. In California, the State Water Resources Board (SWRCB) issued a statewide General Permit to regulate runoff from construction sites involving grading and earth moving in areas over one acre. The SWRCB is acting to enforce requirements of the federal CWA, pursuant to regulations issued by the EPA for the National Pollutant Discharge Elimination System (NPDES). This state order requires construction projects covered under the General Permit to use the "best available technology economically achievable," and the "best conventional pollution control technology." Each construction project subject to the permit is required to have a Storm Water Pollution Prevention Plan (SWPPP) prepared, which identifies likely sources of sediment and pollution and incorporates measures to minimize sediment and pollution in runoff water.

The State Department of Water Resources also is responsible for coordinating flood-fighting activities and is authorized to receive requests from public agencies for assistance during floods. Should flooding occur, these agencies would have policies and regulations to address management of flooding hazards.

4.6.2.2 Local Policies and Regulations

The City of Grover Beach's General Plan includes policies and implementation programs related to water quality, drainage control, and surface water run-off, in addition to protection of wetlands and natural resources. The recently approved Land Use Element Update policies and implementation measures include specific measures; these are summarized in Chapter 3 of this EIR.

Storm Water Management Plan

The City of Grover Beach also has the Storm Water Management Plan that was prepared to "comply with the requirements of the Storm Water Phase II Final Rule" and to "achieve the following conditions:

1. Maximize infiltration of clean stormwater, and minimize runoff volume and rate
2. Protect riparian areas, wetlands, and their buffer zones
3. Minimize pollutant loading; and
4. Provide long-term watershed protection."

Appendix L of the SWMP includes specific architectural standards for Meadow Creek that will be required to be followed for any construction or development within the Meadow Creek watershed areas. The applicant will be required to comply with these standards.

Protection of Water Resources and Wetlands

The LCP also includes policies and implementation measures for protection of water resources and wetlands within the city limits. These have also been summarized in Chapter 3 of this EIR; refer to Table 3-1 for specific policies related to Coastal Act policies and protection of water resources and wetlands in the coastal zone. The proposed project includes the construction of bioswales just outside the edge of riparian vegetation. The bioswales have been included by the applicant to address the need for filtration of drainage into the creek. Since the creek was originally realigned to act as stormwater drainage it has been impacted by realignment activities, storm water runoff, pesticides, and other pollutants; therefore, has degraded value as aquatic habitat. The LCP for the area requires all projects to consider the pollution filtering capabilities of Meadow Creek during project design and evaluation. LCP Policy states the following:

> "4. Policy: The existing sediment filtering capabilities of Meadow Creek as it passes through the Coastal Planned Commercial area shall be maintained and where feasible it shall be enhanced through the use of "stilling devices" to filter out additional oils and sediment (LCP Coastal Resources Component, Part 2.1.5, Recommendations, B. Inland Resource Areas, Water Resources, and Meadow Creek (Western Branch) Policy 4; page 26 of the City of Grover beach, Local Coastal Program)
>
> "5. That there shall be a minimum of a 50 foot buffer, or other appropriate buffer established by a habitat restoration plan approved by the Department of Fish and Game, on both sides of the portion of Meadow Creek north of Grand Avenue. The purpose of this buffer is to protect and enhance the habitat values and filtration capabilities of Meadow Creek while recognizing that for most of its length north of Grand Avenue there is existing development on both sides of the creek." (LCP Coastal Resources Component, Part 2.1.5, Recommendations, B. Inland Resource Areas, Water Resources, and Meadow Creek (Western Branch) Policy 5; page 26 of the City of Grover Beach, Local Coastal Program)

The City's proposal includes the bioswales to improve water quality in Meadow Creek and increase habitat values. The proposal of bioswales, although they would be manmade features within the 50-foot buffer, would meet the policy by filtrating stormwater prior to it entering the creek.

4.6.3 Thresholds of Significance

Criteria for evaluating the significance of hydrology and water quality impacts included in the CEQA Guidelines, Appendix G, are directed toward identifying substantial changes in drainage patterns, drainage volumes, or violations of water quality standards. Impacts would be considered significant if the proposed project would result in any of the following:

- Potentially degrade surface or groundwater quality below standards established by the Regional Water Quality Control Board;
- Substantially interfere with groundwater recharge;
- Substantially alter the existing drainage pattern of the area such that substantial erosion or sedimentation occurs;

- Substantially alter the existing drainage pattern or substantially increase the rate or amount of surface runoff in a manner which results in flooding;
- Create or contribute runoff which would exceed the capacity of stormwater drainage systems; or
- Substantially add additional sources of polluted runoff to a water body.

4.6.4 Impact Assessment and Methodology

Development adjacent to or near surface waters is subject to specific design and construction conditions in order to ensure the project's stormwater is adequately contained and directed without adversely affecting downstream locations. Typically, impacts would occur if the proposed project directed construction or operations runoff to areas where downstream capacity would be exceeded.

The determination of water quality significance is based on a review of typical construction site pollutants usually found on job sites that might contribute disproportionate amounts of polluting materials in runoff and effect the long-term management of the runoff may have on water quality factors in Meadow Creek such as temperature and turbidity and sedimentation.

4.6.5 Project-Specific Impacts and Mitigation Measures

4.6.5.1 Drainage and Flooding

The direct effect of development of the project will be to replace the existing vacant area of the project site with a lodge and conference center consisting of parking lots, buildings, walkways, native vegetation, paved picnic areas, and a new restroom. For the most part, these areas are impervious surfaces and they will have the effect of increasing both the total volume of stormwater runoff and the peak flow of runoff. Based on the drainage report by CTE (January 2012, Appendix N), detention will reduce the pre-development flows by 6.45 ~~4.39~~ 0.68 cfs, thereby meeting the goal of on site drainage retention.

DES Impact 1 **Vacant land will be replaced with impervious surfaces in All Areas of the proposed project, which will increase the total volume of stormwater runoff and the peak flow of runoff and contribute to downstream flooding risks.**

DES/mm-1 *Prior to issuance of a grading permit for All Areas, the applicant shall submit a final grading and drainage plan for review and approval by the Public Works Director. The plans shall be consistent with City requirements and unless ~~useless~~ otherwise specified by the Public Works Director, detention ~~retention~~ basins and bio-infiltration basins shall be designed according to the Urban Runoff Quality Management, WEF Manual of Practice No. 23, ASCE Manual and Report on Engineering Practice No. 87, ACCE, 1998, as specified in the Preliminary Hydrology Study for Grover Beach Lodge, prepared by Construction Testing & Engineering, Inc.*

DES/mm-2 *Prior to issuance of a grading permit for All Areas, the applicant shall submit a Basin Maintenance Plan to the Public Works Director for annual maintenance of storm water structure, including, detention basins and bio-*

infiltration basins, vegetated swales, rip rap energy dissipaters, and storm drain systems including catch basins and cleanouts.

Residual Impact

With mitigation, the impacts resulting from increase in total volume of stormwater runoff and peak flow of runoff from the project site are reduced to a level of insignificance.

DES Impact 2 Construction of the bioswales in Area A will be constructed within the 50 foot buffer of Meadow Creek and may affect riparian areas and natural drainage.

DES/mm-3 *Bioswale or infiltration basin design in Area A shall minimize encroachment into the 50 foot buffer zone to the greatest extent feasible. Concrete improvements to convey flow shall be located outside the 50-foot buffer area. No bioswale improvements shall occur within the existing riparian areas without approval (and obtaining the appropriate permits) from CDFG, RWQCB and the City.*

DES/mm-4 *All construction of detention basins and bio infiltration basins shall avoid the riparian corridor along Meadow Creek, and shall be consistent with biological mitigation to protect the natural habitat of Meadow Creek, including sediment fencing between the bioswale construction and the riparian corridor during construction, filtering of any drainage waters during construction before they enter the creek watershed. No mechanical equipment shall enter the riparian corridor or creek channel during construction activities.*

DES/mm-5 *Bioswale construction that encroaches into the 50-foot buffer shall be designed to incorporate native riparian and wetland vegetation consistent with the planting requirements set forth in the Biology mitigation measures BIO-1through BIO-10, BIO/mm-15 and BIO/mm-18 through BIO/mm-21.*

Residual Impact

With mitigation, the impacts are reduced to a level of insignificance.

DES Impact 3~~4~~ Construction of the equestrian parking area (Area C) will change drainage flows resulting in the need for storm drain that may, at its present configuration, encroach into wetland habitat.

DES/mm-6 *Prior to issuance of a grading permit for the equestrian parking area, the applicant shall redesign the storm drains for the parking area to avoid encroaching into riparian and wetland habitat, consistent with BIO-mm/18.*

Residual Impact

With mitigation, the impacts are reduced to a level of insignificance.

4.6.5.2 Wave Run-up

The Wave Run up information, assuming a ~~one~~ 4.6 foot rise in elevation due to global warming, indicates that increase in wave elevations would be deterred by the existing sand dunes along

the western boundary of the project site (the low elevation of the dune complex has been identified as 18.2 feet in the revised Preliminary Hydrology Report (Appendix N)). Therefore, wave run up is not expected to result in increased flooding of the property. Finished floor elevations are also above the worst case projected stillwater elevation with wave run up of 16.74 ~~13.12~~ feet.

~~Assuming a worst case sea level rise of 4.6 feet and a wave run up to 16.74 feet, there would be one low point in the dunes ranging from 15.2 to 15.6 feet along the northern boundary of the existing picnic areas. This low point could allow sea water to intrude into the property in its present elevation. The picnic area south of this low point is at elevations that would not flood. However, the low point would allow sea water to enter the site and flow into the lower elevations unless it was either blocked or the site finished floor elevations were raised higher that the projected 16.74 feet.~~

~~**DES Impact 45 Assuming a climate change factor of 4.6 feet (worst-case sea level rise as determined by the EPA for the Central Coast) is used to adjust for potential sea level rise, the proposed project Areas A and B could be inundated by wave run up exceeding 16.74 feet elevation at a low point in the dune complex between the ocean and the project site, thus causing an increase in flooding.**~~

~~*DES/mm-7 Prior to issuance of a grading permit for Area B, the City shall review wave run-up information and determine the elevations along the periphery of Area B to ensure that measures are in place to deter wave run up into Area A. If necessary, A low sea wall, a constructed dune, landscape berm, or other method to deter wave run up and associated dune erosion shall be designed by the applicant and approved by the City. Sea level rise shall either be the worst case estimate of a 4.6-foot rise (16.74 feet) or at an elevation that has been accepted by the State or County of San Luis Obispo for the life of the concession (50 years).*~~

~~Residual Impact~~

~~The low point elevation in the dune complex is 16.8 feet, and appears to be just higher than the worst-case sea level rise elevation of 16.74. With mitigation, the impacts to the project site resulting from wave run-up are reduced to a level of insignificance.~~

4.6.6 Cumulative Impacts

Stormwater runoff is required to be detained on site by City standards. The two hotel projects (Pacific Coast Hotel and Grover Beach Lodge) cumulatively would affect Meadow Creek, but mitigation measures given for both projects would reduce pollutants entering into the creek and would revegetate and restore the creek corridor. Discharge into the creek, with detention, has been calculated for both projects at less than or equal to existing conditions. Although runoff would eventually enter the creek channel, the creek would convey a better runoff product than currently is entering the system and the runoff would eventually enter into Oceano Lagoon and into the ocean.

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