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July 14, 2014

Andrew McAllister
Commissioner and Presiding Member
California Energy Commission
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Sacramento, California 95814

RE: Coastal Commission's 30413(d) Report for the Proposed AES Southland, LLC Huntington Beach Energy Project – Application for Certification #12-AFC-02

Dear Mr. McAllister:

On July 10, 2014, the Coastal Commission, at public hearing, unanimously approved forwarding the attached report for the California Energy Commission's ("CEC's") consideration. The report assesses the proposed Huntington Beach Energy Project ("HBEP") for conformity to the Coastal Act's Chapter 3 resource protection and use policies and the policies of the City of Huntington Beach's certified local coastal program ("LCP"). The assessment provides findings and recommended conditions that will allow the proposed project to be built and operated consistent, to the extent feasible, with those policies.

The project, proposed by AES Southland, LLC (hereafter "AES" or "the applicant"), involves demolishing the existing Huntington Beach Generating Station and replacing it with the new HBEP that would include two independently operating power blocks producing a total of up to 939 megawatts of electricity. This new facility would end the current power plant's reliance on its "once-through cooling" system that uses large volumes of seawater to cool the existing generating units.

Pursuant to the Warren-Alquist Act, the CEC has sole permitting authority for locating or modifying power plants with a greater than 50-megawatt capacity, including those located in the coastal zone. Nevertheless, section 30413(d) of the Coastal Act expressly authorizes the Coastal Commission to participate in the CEC's proceedings and provide findings with respect to specific measures to bring a power plant project located within the coastal zone into conformity with Coastal Act and LCP policies. Warren-Alquist Act section 25523(b) requires the CEC is to include the Coastal Commission's recommended specific provisions in its final project decision unless it finds that they are infeasible or would cause greater adverse environmental impacts. Staff of the two Commissions have developed a Memorandum of Agreement that describes the manner in which the two Commissions will coordinate their respective reviews and identifies the process for the CEC to consider the Coastal Commission's findings and recommended specific provisions (provided in the report's Attachment 2).

The proposed facility is also within an area that, in the 1980s, both the Coastal Commission and the CEC designated as suitable for energy facility expansion. At the time, that designation was meant to allow for reasonable expansion of existing facilities like this along the coast. With time, the state's electrical grid has developed a reliance on having some of these generating facilities located at or near these coastal locations. While we generally support the proposed HBEP being constructed at this site and recognize its role in providing grid support, we also recognize that it will be subject to several relatively severe site hazards during its expected 30-year operating life. These hazards, described in the attached report, include seismic events, floods, tsunamis, and the expected effects of sea level rise along this stretch of the coast. We therefore urge the CEC to take these hazards into consideration, not only through adopting our recommended conditions, but through implementing a planning process to start identifying less hazardous sites for future energy facility locations and expansions.

For this proposed project, the Coastal Commission has focused its Coastal Act section 30413(d) review on the project's potential adverse effects in five key issue areas: (1) land use and alternatives, (2) environmentally sensitive habitat areas ("ESHA") and wetlands, (3) hazards associated with flood, tsunami, and sea level rise, (4) geologic hazards, and (4) public access to the shoreline. As described in the attached report, the Coastal Commission recommends the CEC adopt several specific provisions in its final decision to ensure the proposed project is consistent to the maximum extent feasible with relevant Coastal Act and LCP policies. Our recommendations are summarized immediately below:

- **Land Use and Alternatives:** the entire power plant site and some of the surrounding area has been designated by both the CEC and Coastal Commission as suitable for reasonable expansion of energy facilities. The HBEP as currently proposed does not fully use the area available to it and instead proposes to use offsite areas for staging and construction parking, which may result in increased adverse effects on wetlands public access to the shoreline. We recommend the CEC evaluate whether AES can site more of its proposed expansion activities within the onsite and adjacent designated areas and whether this will result in an overall reduction of the proposed project's adverse effects on coastal resources.

- **Wetlands and Environmentally Sensitive Habitat Areas (ESHA):** the site is adjacent to the recently restored Magnolia Marsh, which provides known or potential habitat for several sensitive species. To more fully conform to Coastal Act and LCP policies, we recommend modifying several of the FSA's proposed conditions:

    - The LCP requires development be at least 100 feet, and further, if feasible from wetlands or ESHA. We recommend that **Condition BIO-7** be modified to ensure all project-related development is at least 100 feet from those areas and that **Condition GEN-2** be modified to ensure that approved project plans reflect any resulting changes in the components of the energy facility.

    - The FSA does not evaluate expected levels of groundwater pumping during project construction; however, the volumes and extent of this dewatering could affect nearby wetlands and ESHA. We recommend that **Condition GEO-1** be

modified to require AES to conduct a geotechnical investigation that identifies expected dewatering volumes and the spatial extent of drawdown effects of that dewatering. If the investigation shows that dewatering is likely to affect nearby wetlands or ESHA, we further recommend the CEC ensure AES implements necessary mitigation measures – e.g., sheet piles, slurry walls, alternative dewatering methods, etc. – that will avoid these effects, and that any structural mitigation measures are included on the final design plans required pursuant to **Condition GEN-2**.

- The project will result in relatively high noise and vibration levels in the adjacent ESHA/wetland areas that are likely to affect nearby listed sensitive bird species. **Condition BIO-9** requires that noise levels during breeding and nesting season (February 1 through August 31) not exceed 60 decibels or 8 decibels above ambient levels. We recommend this condition be modified to also limit noise levels to no greater than 65 decibels within 100 feet of any active nest site.

  Project-related pile driving is likely to exceed these standards, so we also recommend that **Condition BIO-9** be modified to allow pile driving only outside of breeding and nesting season.

- **Flood, Tsunami, and Sea Level Rise:** The HBEP is considered a "critical facility" and is meant to provide reliability to the regional electrical grid. However, the facility and project site are subject to several types of flood or tsunami events, as well as sea level rise. To ensure the HBEP meets requirements applicable to critical facilities and relevant LCP provisions, we recommend three new conditions:

  - Proposed **Condition Soil&Water-8** would require AES to submit documentation that the facility is protected from the 500-year flood event, and that any changes to the facility design be included in the final project design submittals required pursuant to the FSA's **Condition GEN-2**.

  - Proposed **Condition GEO-3** would require AES to submit a Facility Hazard Emergency Response Plan, developed in coordination with local government entities and property owners, that includes measures needed to protect the facility from expected tsunami runup levels, 100-year and 500-year flood events, as well as the increase in sea level rise expected during the project life. This Plan is to also include concurrence from nearby property owners that the Plan accurately reflects expected hazards and from the City that the Plan is consistent with its hazard mitigation planning efforts. AES is to also include any structural or non-structural mitigation measures proposed to address these hazards in its final project design submittals required pursuant to **Condition GEN-2**.

  - The LCP prohibits shoreline protective devices for projects located in a tsunami runup zone. Proposed **Condition GEN-9** therefore would prohibit AES from constructing such devices.

- **Geologic Hazards:** The facility and site are subject several relatively extreme seismic hazards, including ground shaking, liquefaction, and lateral spread. The FSA's **Condition GEO-1** requires AES to conduct a site-specific geotechnical investigation, but results of that study are not yet available. We therefore recommend that **Condition GEO-1** be modified so that if the studies and analyses conducted show that mitigation measures necessary to address the site's geologic hazards would result in greater or more significant adverse effects to coastal resources than have thus far been identified, these studies and analyses be provided for additional public comment and review by the CEC.

  We also recommend a new proposed **Condition GEO-4**, which, similar to proposed **Condition GEO-3**, would require AES to provide documentation from the City that the facility's mitigation measures resulting from the above site investigations are consistent with the City's hazard mitigation plans.

- **Public Access:** The project as currently proposed would result in several adverse effects on public access to the shoreline, due primarily to its effects on traffic and nearby parking. One of its proposed construction parking locations would occupy up to 225 parking spaces used for beach parking, and we recommend that the FSA's **Condition TRANS-3** be modified to delete this parking area from the project's parking plans. We also recommend the project's traffic assessment be modified to include two nearby projects – the proposed Poseidon desalination facility and the Ascon Landfill cleanup project – both of which are expected to occur during the HBEP's construction period and that could substantially increase nearby traffic and affect public access to the shoreline. This modified assessment should be incorporated into the project's traffic plan as required pursuant to **Condition TRANS-3**.

The Coastal Commission recommends the CEC adopt the specific provisions more fully described in the attached report as part of any final approval of 12-AFC-02. The Commission has determined that these specific provisions are necessary to bring the proposed project into conformity with relevant provisions of the Coastal Act and the LCP.

Thank you for your consideration of the Coastal Commission's findings and recommendations.

Sincerely,

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Executive Director

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Coastal Commission Report
to
California Energy Commission
on
Application for Certification 12-AFC-02
– AES Huntington Beach Energy Project –

Reviewed pursuant to
Coastal Act Section 30413(d)

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ATTACHMENTS

EXHIBITS

I. FINDINGS AND RECOMMENDED SPECIFIC PROVISIONS

A. PROJECT DESCRIPTION

The Huntington Beach power plant is an existing electrical generating facility located in the City of Huntington Beach (see **Exhibit 1 – Area Map**). It is owned and operated by AES Southland, LLC (hereafter, either "the applicant" or "AES"). The power plant site covers about 60 acres in the southeast portion of the City and borders the Pacific Coast Highway, the Magnolia Marsh wetlands, and a flood control channel (see **Exhibit 2 – Site Plan**). A switchyard within the site is owned and operated by Southern California Edison.

The existing facility includes five electrical generating units, four of which are currently operational. The facility's existing generating units are cooled using a "once-through cooling" process in which AES pumps in up to several hundred million gallons per day of seawater from an open intake located about 2500 feet offshore. As the seawater is pumped through the facility, it removes excess heat from the generating units and is then discharged back into the Pacific Ocean through an outfall pipe.

Proposed Huntington Beach Energy Project ("HBEP")
In June 2012, AES submitted its Application for Certification ("AFC") to the Energy Commission. AES is proposing to upgrade and expand the facility on about 28.6 acres of its site with new equipment that would produce about 936 MW of electrical power (see **Exhibit 3 – Conceptual Aerial View**). The proposed HBEP is more fully described in the CEC's Final Staff Assessment ("FSA"), available here: http://docketpublic.energy.ca.gov/PublicDocuments/12-AFC-02/TN202405_20140602T085620_Final_Staff_Assessment.pdf

The main project components include demolition of the existing generating units, and construction of two new power blocks, each capable of generating up to about 470 megawatts. The new facility will be air-cooled and will therefore no longer rely on using seawater for cooling. Visually, the new facility will have an overall lower profile than the existing facility – for example, the existing facility includes two boiler exhaust stacks about 200 feet high, while the proposed HBEP would have a maximum height of about 120 feet. AES has proposed a visual enhancement and screening plan that includes three surfboard sculptures leaning against the HBEP and a mesh screen around part of the facility that resembles a wave (see **Exhibits 4a and 4b – Proposed Visual Amenities**). In April 2014, the City adopted a resolution supporting these proposed visual enhancements.

AES proposes to construct the HBEP in stages by first demolishing some of the generating units to provide a footprint for one of the new power blocks, then demolishing some of the remaining units to allow for construction of the second power block, and then completing demolition of the existing generating units and support structures. During the construction period, AES proposes to locate its construction laydown area on about six acres of this site, along with about 16 acres of its Alamitos Generating Station, located about 15 miles north in the City of Long Beach. The CEC's review anticipates an expected construction period of about eight years and a power plant operating life of 30 years, which would extend to between 2050 and 2055.

B. REGULATORY FRAMEWORK AND STANDARD OF REVIEW

Pursuant to the Warren-Alquist Act, the CEC has exclusive siting authority over thermal electric power plants of 50 megawatts or greater capacity proposed to be built in California. According to section 25500 of the Warren-Alquist Act, "The issuance of a certificate by the [Energy] commission shall be in lieu of any permit, certificate, or similar document required by any state, local or regional agency, or federal agency to the extent permitted by federal law, for such use of the site and related facilities, and shall supersede any applicable statute, ordinance, or regulation of any state, local, or regional agency, or federal agency to the extent permitted by federal law." Section 25523(a) of the Warren-Alquist Act additionally requires the CEC to assess the manner in which the proposed facility is to be designed, sited, and operated in order to protect environmental quality and assure public health and safety. Moreover, section 25523(d)(1) of that Act requires that the CEC make findings regarding the conformity of the proposed project with all applicable laws, including federal laws, such as the Coastal Zone Management Act.[1]

The CEC evaluates and makes its determination regarding proposed facilities through its Application for Certification (AFC) process. When the CEC is considering licensing a facility pursuant to its AFC process, it is the lead state agency for purposes of the California Environmental Quality Act (CEQA), and the FSA includes analyses similar to those normally provided in an Environmental Impact Report (EIR). The FSA provides the CEC staff analysis of the proposed project, examines engineering, environmental, public health, and safety aspects of the facility, and includes proposed conditions of certification, which are similar to mitigation measures identified in an EIR.

While the CEC has exclusive jurisdiction over siting proposed power plants as described above, both the Coastal Act and the Warren-Alquist Act provide a role for the Coastal Commission to play in the CEC's review of power plants proposed to be located in the coastal zone. Both Acts include mechanisms authorizing the Coastal Commission to evaluate whether the proposal conforms to Coastal Act policies and to inform the CEC of the results of this evaluation. Section 30413(d) of the Coastal Act requires the Coastal Commission to 1) "participate in proceedings" that the CEC undertakes pursuant to its siting authority "with respect to any thermal powerplant…to be located…within the coastal zone," and 2) submit to the CEC a report (hereinafter, the "30413(d) report") on the proposed project's conformity with the Coastal Act's resource protection and use policies, and the policies and implementing ordinances of the certified local coastal program ("LCP") (in this case, the certified LCP of the City of Huntington Beach). Additionally, Warren-Alquist Act Section 25523(b) requires the CEC to include in its decision on the AFC any "specific provisions" provided by the Coastal Commission in its 30413(d) report to bring the proposed project into conformity with the policies of the Coastal Act. That section also establishes that the CEC may omit the specific provisions of the Coastal Commission's report only if the CEC finds that adopting the provisions would result in greater adverse impact on the environment or that such provisions would not be feasible. Staff of the two Commissions have prepared a Memorandum of Agreement that describes the manner in

[1] The CEC does not review or issue NPDES permits, and the power plant operator must still obtain those permits from the State or Regional Water Quality Control Boards, as the federal Environmental Protection Agency delegated that authority to just those Boards.

which the two Commissions will coordinate their respective reviews and identifies the process for the CEC to consider the Coastal Commission's findings and recommended specific provisions (see **Attachment B – Memorandum of Agreement**).

Coastal Act section 30413(d) directs that the Coastal Commission's report consider and make findings regarding the following:

> *(1) The compatibility of the proposed site and related facilities with the goal of protecting coastal resources.*
>
> *(2) The degree to which the proposed site and related facilities would conflict with other existing or planned coastal-dependent land uses at or near the site.*
>
> *(3) The potential adverse effects that the proposed site and related facilities would have on aesthetic values.*
>
> *(4) The potential adverse environmental effects on fish and wildlife and their habitats.*
>
> *(5) The conformance of the proposed site and related facilities with certified local coastal programs in those jurisdictions, which would be affected by any such development.*
>
> *(6) The degree to which the proposed site and related facilities could reasonably be modified so as to mitigate potential adverse effects on coastal resources, minimize conflict with existing or planned coastal-dependent uses at or near the site, and promote the policies of this division.*
>
> *(7) Such other matters as the commission deems appropriate and necessary to carry out this division.*

This report is the Coastal Commission's analysis of the proposed project's conformity with the Chapter 3 policies of the Coastal Act and the certified LCP. For this proposed project, the Coastal Commission has focused on the following issue areas: (1) land use, (2) wetlands and environmentally sensitive habitat areas (ESHA), (3) flood, tsunami, and sea level rise, (4) geologic hazards, and (5) public access and recreation. The Coastal Commission's analysis relies largely on the information contained in the CEC staff's Final Staff Assessment ("FSA"), the evidentiary record of this AFC proceeding that has been compiled thus far, and on information identified in the Substantive File Documents described in Attachment A to this report.

C. LAND USE AND ALTERNATIVES

AES proposes to construct the HBEP on part of its existing power plant site. As noted in the FSA's Land Use Section (page 4.5-7), the City's LCP and Land Use Element designate the site as "Public," with allowable uses including public utilities and infrastructure. The site is also within the City's "Subarea 4G – Edison Plant" designation, which allows utility uses and wetland conservation. The FSA's Alternatives Section (at pages 6-7 and 6-8) further identifies the site and adjacent areas as being designated by both the Energy Commission and Coastal Commission as suitable for energy facility expansion.

That designation results from studies and mapping conducted by the two Commissions to identify areas within the state's coastal zone that were unsuitable for locating or expanding power plants due to the presence of sensitive coastal resources.[2] Those studies and mapping effort also identified areas that were suitable for reasonable expansion of existing power plants. For this Huntington Beach site, the identified expansion area includes the entirety of the power plant site as well as the adjacent Plains America Tank Farm.

Despite this designation, AES is currently proposing to use only a portion of the area designated for the HBEP's expansion. Of the approximately 58 acres of the AES power plant site, all of which is within the designated area, the proposed expansion would use only 28.6 acres. Approximately 10 acres are occupied by the existing Southern California Edison substation, which will remain, but there is at least one on-site area, along with the above-mentioned Plains America Tank Farm area that are within the designated expansion area, that appear to be at least partially available for the proposed project and that, if used, could help reduce project-related adverse impacts:

- The AES site includes an 11-acre former tank farm area. AES stated in its AFC application that it intends to lease this area to Poseidon Water for construction of a desalination facility; however, it is unclear when this might occur, and it appears that at least part of this site may be available for at least short-term use during the approximately eight years of planned project construction.

  Part of this tank farm site consisted of wetlands that AES removed without benefit of a coastal development permit, which is the subject of a Coastal Commission staff investigation of a potential violation.[3] Commission staff estimated that the wetlands covered about 3.5 acres of the site; however, it appears that some of the remainder of this site could be used for the power plant expansion.

[2] See Coastal Commission, *Designation of Coastal Zone Areas Where Construction of an Electric Power Plant Would Prevent Achievement of the Objectives of the California Coastal Act of 1976*, adopted September 1978, revised 1984, re-adopted December 1985, San Francisco, CA, and Energy Commission, *Opportunities to Expand Coastal Power Plants in California*, Staff Report P700-80-001, June 1980, Sacramento, CA.

[3] See Commission staff's August 3, 2012, Data Adequacy letter for 12-AFC-02 and Commission staff report for Poseidon Water – Appeal #A-5-HNB-10-225 and Application No.: E-06-007, November 2013, available at: http://documents.coastal.ca.gov/reports/2013/11/W19a-s-11-2013.pdf

- Across the flood channel adjacent to the AES site is the Plains America Tank Farm, an approximately 32-acre site that is within the area designated as suitable for power plant expansion. AES is proposing to use about 1.9 acres of that site for construction parking, but similar to the AES tank farm site above, much more of the Plains America site may be available for use for the proposed expansion project, which would likely reduce expected project impacts.

Instead of fully using these areas designated for expansion, AES is proposing to locate several project components offsite and outside the designated area. These include locating three of its five proposed construction parking sites outside the area and locating about 16 acres of project staging at AES's Alamitos Energy Facility about 15 miles north of the expansion site. This approach frustrates the intent of designating the facility site and the surrounding area for consolidation and expansion of energy facilities. It also increases the proposed project's adverse impacts on public access to the shoreline by increasing project-related traffic along 15 miles of coastal highway and using up to 225 parking spaces the City established to provide beach access (see additional discussion in this report's Section I.G – Public Access). This approach will also result in increased adverse effects and potential spills to wetlands adjacent to the Alamitos site and the Pacific Coast Highway route, which include Los Cerritos, the Seal Beach National Wildlife Refuge, Bolsa Chica, and the Huntington Beach wetland complex.

Project-related adverse effects could be avoided or substantially reduced if AES was able to use more of the adjacent areas designated for energy facility expansion. To more fully use the two sites mentioned above, AES may have to remove all or some of the several decommissioned fuel oil storage tanks and associated pipelines; however, the cost and effort of removing this equipment is well within the scope of the project and is similar to work done as part of other AFC proceedings.

Coastal Commission Recommended Specific Provisions

Based on the information available in the AFC record, use of all or part of these areas appears to provide a feasible method to potentially reduce project-related impacts. The Commission therefore recommends the following Specific Provisions to allow Coastal Act and LCP conformity:

- First, CEC staff should determine the availability of these sites for the proposed project by reviewing documentation showing the legal status of the AES and Plains America Tank Farm sites. If all or part of the sites are available for use during this project, CEC staff should prepare a modified staff assessment that identifies whether use of one or both sites will reduce the project's overall expected adverse impacts. The modified assessment should evaluate whether using all or part of the sites for construction staging or parking would reduce the project's expected adverse impacts, including reducing adverse effects on traffic and public access to the shoreline along the 15 miles between HBEP and Alamitos. The assessment should also consider whether use of all or part of either site may be limited due to land use or other conflicts with relevant LCP policies as described below in Section I.D – Wetlands and Environmentally Sensitive Habitat Areas (ESHA).

- Next, should this modified assessment show that all or part of the two sites are available and their use would reduce project-related impacts, we recommend the CEC provide additional opportunity for public review and comment on the modified assessment and possible new or modified conditions.

Conclusion
The Commission finds that the CEC's implementation of the above-recommended Specific Provisions would allow the proposed project to be consistent to the extent feasible with relevant policies of the Coastal Act and LCP.

D. WETLANDS AND ENVIRONMENTALLY SENSITIVE HABITAT AREAS (ESHA)

Coastal Act Section 30231 states:

> *The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface waterflow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.*

Coastal Act Section 30240 states:

> *(a) Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas.*
> *(b) Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade those areas, and shall be compatible with the continuance of those habitat and recreation areas.*

LCP Policy C 6.1.4 states:

> *The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain organisms and for the protection of human health shall be maintained and, where feasible, restored.*

LCP Policy C 6.1.20 states:

> *Limit diking dredging, and filling of coastal waters, wetlands, and estuaries to the specific activities outlined in Policy 30233 and 30607.1 of the Coastal Act and to those activities required for the restoration, maintenance, and/or repair of the Municipal Pier and marina docks. Conduct any diking dredging and filling activities in a manner consistent with Section 30233 and 30607.1 of the Coastal Act.*

LCP Policy C 7.1.2 states, in relevant part:

> *Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values…*

LCP Policy C 7.1.3 states:

> *Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade those areas, and shall be compatible with the continuance of those habitat and recreation areas.*

LCP Policy C 7.1.4 states:

> *Require that new development contiguous to wetlands or environmentally sensitive habitat areas include buffer zones. Buffer zones shall be a minimum of one hundred feet setback from the landward edge of the wetland, with the exception of the following:*
>
> *A lesser buffer may be permitted if existing development or site configuration precludes a 100 feet buffer, or conversely, a greater buffer zone may be required if substantial development or significantly increased human impacts are anticipated. In either case, the following factors shall be considered when determining whether a lesser or wider buffer zone is warranted. Reduced buffer zone areas shall be reviewed by the Department of Fish and Game prior to implementation.*
>
> *a) Biological significance of adjacent lands: The buffer should be sufficiently wide to protect the functional relationship between the wetland and adjacent upland.*
> *b) Sensitivity of species to disturbance: The buffer should be sufficiently wide to ensure that the most sensitive species will not be disturbed significantly by permitted development, based on habitat requirements of both resident and migratory species and the short and long term adaptability of various species to human disturbance.*
> *c) Susceptibility of parcel to erosion: The buffer should be sufficiently wide to allow for interception of any additional material eroded as a result of the proposed development based on soil and vegetative characteristics, slope and runoff characteristics, and impervious surface coverage.*
> *d) Use existing cultural features to locate buffer zones: The buffer zones should be contiguous with the environmentally sensitive habitat areas and make use of existing features such as roads, dikes, irrigation canals, and flood control channels where feasible.*

LCP Policy C 7.1.5 states, in relevant part:

> *Notify County, State and Federal agencies having regulatory authority in wetlands and other environmentally sensitive habitats when development projects in and adjacent to such areas are submitted to the City.*

LCP Policy C 7.2.7 states:

> *Any areas that constituted wetlands or ESHA that have been removed, altered, filled or degraded as the result of activities carried out without compliance with Coastal Act requirements shall be protected as required by the policies in this Land Use Plan.*

LCP Policy I-C 8(c) states, in relevant part:

> *For proposed projects within the Coastal Zone, utilize the development review/environmental review process to accomplish the following:*
>
> 1. *Examine each development's potential to affect habitat. To the maximum extent feasible project impacts on habitat shall be minimized through avoidance. In the event mitigation is necessary, mitigation shall be provided on-site if feasible or within the general vicinity if on-site mitigation is not feasible. Determine the necessity for Mitigation Agreements or other coordination with the California Department of Fish and Game, California Coastal Commission and/or federal agencies to obtain necessary permits for developments that appear to affect habitat.*
> 2. *Permit resource dependent and incidental public service related land uses within wetlands and environmentally sensitive habitat areas only if consistent with the following Coastal Act policies: Section 30233 and Section 30240.*
> 3. *Require improving the natural biological value, integrity and function of coastal wetlands and dunes through native vegetation restoration, control of alien plants and animal,* [sic] *landscape buffering and development setbacks.*
> 4. …
> 5. *Review any development proposed for non-wetland areas to ensure that appropriate setbacks and buffers are maintained between development and environmentally sensitive areas to protect habitat quality…*

The findings below separately assess two types of project-related impacts – first, direct wetland impacts within the potential project footprint, and then indirect impacts to adjacent wetlands and ESHA that are likely to occur during facility construction and operations. Both the Coastal Act and the City's LCP include policies requiring the protection of biological productivity in wetlands and environmentally sensitive habitat areas. The policies require that development adjacent to environmentally sensitive areas be sited and designed to prevent impacts which would significantly degrade those areas. The LCP requires buffer zones be established around wetlands to protect them from proposed development.

Direct Wetland Impacts

The FSA states that there are no wetlands within the proposed project footprint, which appears to accurately reflect current conditions within the proposed site. However, as noted above in this report's Section I.C – Land Use and Alternatives, the Commission recommends that CEC staff evaluate whether other areas within or adjacent to the power plant site are available for the proposed project and whether the use of these areas might reduce project-related impacts to coastal resources. These areas include the 11-acre AES tank farm within the power plant site and the adjacent 32-acre Plains America Tank Farm, of which AES plans to use approximately 1.9 acres.

Regarding the AES tank farm area, we understand that it is currently devoid of wetland characteristics; however, as noted above, AES's removal of wetland vegetation in that area several years ago is the subject of a Commission staff investigation of a potential violation. Pursuant to LCP Policy C7.2.7, the areas formerly containing wetlands remain subject to the LCP's wetland and ESHA protection policies.[4] The adjacent Plains America Tank Farm area appears to have similar wetland characteristics within part of its 32 acres, and may have similar limitations on its use. As stated in the previous section, we recommend that the CEC staff evaluation assess the effect of these policies on the potential use of these sites, and that the evaluation be provided for additional public review and comment as part of this AFC proceeding.

Indirect Impacts to Wetlands and ESHA

Several components of the project as currently proposed are inconsistent with LCP Policy C7.1.4, which requires new development to be located at least 100 feet from wetlands.[5] Additionally, project construction and operations are expected to cause adverse indirect impacts to nearby wetlands and ESHA due to dewatering, noise, and vibration. These impacts are described below, along with recommended conditions to ensure the project avoids and minimizes these impacts to the extent feasible, as required by relevant LCP and Coastal Act provisions.

[4] For a more complete description of site characteristics and Commission jurisdiction, see the November 2013 Coastal Commission staff report, available here: http://documents.coastal.ca.gov/reports/2013/11/W19a-s-11-2013.pdf

[5] "Development," as defined in Section 30106 of the Coastal Act and in the LCP, means "on land, in or under water, the placement or erection of any solid material or structure; discharge or disposal of any dredged material or of any gaseous, liquid, solid, or thermal waste; grading, removing, dredging, mining, or extraction of any materials; change in the density or intensity of use of land, including, but not limited to, subdivision pursuant to the Subdivision Map Act (commencing with Section 66410 of the Government Code), and any other division of land, including lot splits, except where the land division is brought about in connection with the purchase of such land by a public agency for public recreational use; change in the intensity of use of water, or of access thereto; construction, reconstruction, demolition, or alteration of the size of any structure, including any facility of any private, public, or municipal utility; and the removal or harvesting of major vegetation other than for agricultural purposes, kelp harvesting, and timber operations which are in accordance with a timber harvesting plan submitted pursuant to the provisions of the Z'berg-Nejedly Forest Practice Act of 1973 (commencing with Section 4511).

As used in this section, "structure" includes, but is not limited to, any building, road, pipe, flume, conduit, siphon, aqueduct, telephone line, and electrical power transmission and distribution line."

Background
The HBEP site is part of an extensive area of coastal wetlands and dunes that formerly extended for several miles along this area of the coast. The project site is adjacent to the Magnolia Marsh, which provides a mix of wetlands and environmentally sensitive habitat areas (see **Exhibit 5 – Huntington Beach Wetlands Conservancy Site Plan**). Similar habitat extends onto the HBEP site adjacent to the flood control channel.

Much of this habitat complex is being restored and protected by the Huntington Beach Wetlands Conservancy, including restoration of the adjacent Magnolia Marsh starting in 2009. One of the main goals of the Conservancy's restoration plan is to "maximize salt marsh/tidal habitats with no net harm to threatened and endangered (T&E) species existing on site such as the Belding's Savannah Sparrow." The Magnolia Marsh and other nearby wetland areas provide known or potential habitat for at least several dozen listed sensitive species.[6] The habitat types within and immediately adjacent to the project site include coastal scrub and salt panne, which is noted as particularly important to the endangered Belding's Savannah Sparrow (see **Exhibit 6 – Huntington Beach Wetlands: Vegetation Communities** and **Exhibit 7 – Sensitive Species Habitats**). Although the Magnolia Marsh area has been identified as being subject to significant negative stressors due to nearby industrial uses,[7] a 2010 survey identified 26 separate sparrow territories in the Magnolia Marsh, which represents about 25% of the territories in the full Huntington Beach wetland complex.[8] The Magnolia Marsh restoration project is expected to provide suitable breeding habitat for the endangered Light-footed Clapper Rail, which also breed nearby.[9]

Required Buffer
LCP Policy C7.1.4 requires a minimum 100-foot buffer between new development and ESHA/wetland areas. The proposed project layout includes locating structures and development activities within 100 feet of nearby ESHA and wetlands, which results in non-conformity to this LCP policy. The proximity of these activities and the habitat areas also exacerbates some of the other indirect adverse impacts described below, including potential dewatering of wetland habitat during project construction, and adverse effects of noise, vibration, and project lighting on listed sensitive species known or potentially occurring in those areas during both construction and operations. The FSA includes proposed **Condition BIO-7**, which identifies a number of

[6] From Moffatt & Nichol, *Huntington Beach Wetlands: Habitats and Sensitive Species*, August, 2004. See also California Energy Commission, *Final Staff Assessment for 12-AFC-02 – Biological Resources, Table 2*, May 2014.

[7] See Solek, Christopher, and Eric Stein, *An Evaluation of Wetland Restoration Projects in Southern California using the California Rapid Assessment Model (CRAM): A Final Report to the Southern California Wetlands Recovery Project*, Technical Report 659, February 2012.

[8] See Zembal, Richard, and Susan Hoffman, *A Survey of the Belding's Savannah Sparrow (Passerculus sandwichensis beldingi) in California – Final Report to California Department of Fish and Game, South Coast Region*, September 2010.

[9] See September 12, 2012 USFWS comment letter regarding potential adverse effects of proposed AES power plant replacement, California Energy Commission Application For Certification No. 12-AFC-02.

measures that, if implemented, will reduce the project's indirect impacts on nearby wetlands (see FSA, pp. 4.2-62 to 4.2-65).

Coastal Commission Recommended Specific Provision

- To ensure the project conforms to the extent feasible with LCP Policy C7.1.4, we recommend the Energy Commission modify **Condition BIO-7** to require that AES move all project-related development to be at least 100 feet, and further, if feasible, from nearby areas that meet the Coastal Commission's definition of wetlands or ESHA. We also recommend that the project plans required pursuant to **Condition GEN-2** reflect this change in the project layout.

  This recommended modification would also require AES to submit a revised project plan showing that all project-related development is at least 100 feet from those areas. From the proposed project layout presented in the AFC, it appears this would require moving a few structures and development activities no more than a few dozen feet further inward on the site, which appears feasible based on the amount of space available within the project site.

Avoiding Effects of Construction Dewatering on Adjacent ESHA/Wetland Areas
Groundwater levels beneath both the HBEP and the adjacent wetlands are within a few feet of the ground surface. Results from groundwater monitoring wells on the HBEP site indicate that groundwater levels fluctuate with tidal levels in the adjacent flood control channel and show that the site's groundwater is responsive to and directly connected to groundwater in nearby areas, including the adjacent wetlands. The FSA notes that excavation needed to construct project foundations will likely require dewatering and removal of liquefiable soils, though it does not identify the expected depths, amounts, or possible adverse impacts of these activities.

Analyses conducted by Commission staff for the adjacent proposed Poseidon project site, which has similar groundwater and liquefaction characteristics, show that liquefiable soils extend to a depth of about 20 feet below grade. The dewatering volumes needed to excavate those soils to construct two of that project's proposed structures were estimated at 740,000 gallons per day and 1.28 million gallons per day, respectively, which would occur over several months and total about 84 million gallons. Site geotechnical data provided by Poseidon showed that the radius of influence from its expected dewatering operations – that is, the distance within which groundwater levels would be reduced – would be up to 225 feet from the dewatering locations and would encompass parts of the adjacent ESHA/wetland areas. Based on these analyses, Commission staff recommended conditions for the proposed Poseidon project that required additional geotechnical investigations and implementation of dewatering methods that avoided potential drawdown in those habitat areas. The HBEP site's similar characteristics make it likely to have similar drawdown potential, though it is unclear from documentation provided in the AFC review where the dewatering would occur and what drawdown levels to expect.

Coastal Commission Recommended Specific Provisions

Drawdown that affects nearby ESHA/wetland areas would be inconsistent with LCP Policies 6.1.4, 7.1.2, and 7.1.3, which require that habitat values be maintained and

protected. To ensure project dewatering is done in a manner consistent with these policies, the Commission recommends the CEC modify FSA **Condition GEO-1** to require AES to conduct a geotechnical investigation that identifies expected dewatering volumes and the spatial extent of drawdown expected from that dewatering. If the investigation shows potential drawdown effects to nearby ESHA/wetland areas, the Condition would also require AES to identify and implement methods to avoid those effects, such as installing sheet piles, slurry walls, or other similar barriers, or conduct alternative dewatering methods that would avoid drawing down groundwater in these sensitive areas. The Commission also recommends that these structural mitigation methods be included on any relevant final design plans required pursuant to FSA **Condition GEN-2**. These modifications provide a feasible method to avoid potential adverse dewatering impacts to adjacent habitat areas.

Reducing Effects of Project Noise and Vibration on Adjacent ESHA/Wetland Areas
The FSA (see page 4.2-34, Biological Resources, Table 3) identifies expected construction noise levels at several locations within nearby ESHA/wetland areas. At the closest locations within the adjacent Magnolia Marsh, noise levels from project construction are expected to range from the mid-60 dBA level to greater than 70 dBA. It notes that the loudest of the construction activities would be pile driving, with levels of 104 dBA at 50 feet, 86 dBA at 375 feet, and 73-78 dBA at more than 1000 feet.[10]

The FSA notes that these noise levels during project construction could discourage sensitive species from using nearby habitat areas and adversely affect their breeding or nesting behavior, and that chronic exposure to excessive noise has been demonstrated to adversely affect foraging behavior, reproductive success, population density, and community structure. Although avian species may be more sensitive to noise during breeding and nesting season, several types of "take" or harm identified above could occur any time of year due to the relatively high noise levels expected from both project construction and operation.

Commission staff contacted staff of the California Department of Fish and Wildlife (CDFW) regarding guidance on acceptable noise levels and mitigation measures for construction projects near habitat areas used by sensitive avian species.[11] Both CDFW and the U.S. Fish and Wildlife Service have developed and implemented recommended measures on a number of such projects, and the agencies' work with CalTrans has resulted in a more detailed set of thresholds than the above-referenced "typical noise threshold," for use in identifying potential "take" or harm to sensitive species.[12] These thresholds range from "hearing damage" to "masking," which is a level preventing or reducing communication among individuals, and can result from proximity to construction equipment like that being used for this project.

[10] dBA is a measure of the relative loudness of sounds through the air, in decibels. Decibels describe the intensity of sound, and are logarithmic – for example a 60 dBA sound is perceived as twice as loud as a 50 dBA sound. Typical sound levels include 30-35 dBA in quiet, rural areas, 70-75 dBA for freeways from about 50 feet away, and 100 dBA for a jet taking off from 1000 feet away.

[11] Commission staff personal communication with CDFW staff, September 19 and October 18, 2013.

[12] See, for example, Dooling, Robert, and Arthur Popper, *The Effects of Highway Noise on Birds*, prepared for California Department of Transportation, September 2007.

The conclusions and recommendations of CDFW and USFWS essentially identify potential harm or "take" when noise levels are above ambient and greater than about 60 dBA. These sound levels are considered harmful to avian species and could result in "take" of special status species that use these ESHA/wetland areas, such as Belding's Savannah Sparrow, California Least Tern, and Light-footed Clapper Rail. Mitigation measures employed by both CDFW and USFWS generally require that applicants conduct monitoring to ensure sound levels remain below thresholds known to result in take and conduct nesting surveys and ongoing monitoring to identify and avoid potential adverse effects to nesting birds. The USFWS has recommended several mitigation measures be implemented for the project, including considering which will generate construction-related noise at levels similar to Poseidon's project, including considering the entire wetlands area adjacent to that project a sensitive receptor and that the project include design features that maintain noise levels at or below ambient conditions.[13]

CDFW has also identified several bird species as being particularly sensitive to vibration, including the Light-footed Clapper Rail, and CDFW specifically prohibits pile driving during their nesting season due to its relatively high levels of both noise and vibration.[14]
While the FSA describes the expected decibel levels from pile driving, it does not identify the expected increase in groundborne noise and vibration levels (VdB) that would occur in the ESHA/wetland areas during project operations, particularly during pile driving.[15]
To reduce noise effects on nearby avian species, the FSA's proposed **Condition BIO-9** would require AES to implement a Noise Monitoring Plan during breeding and nesting season (February 1 to August 31 each year). The Plan would require continuous noise monitoring at three specified locations and would require noise levels not exceed 8 dBA above ambient levels or 60 dBA, whichever is greater. It would also require that monitoring devices be reviewed daily during any construction occurring within 400 feet of the project's fenceline with the Magnolia Marsh areas and during any pile-driving activities. If construction noise exceeds these levels, AES would be required to implement noise-reduction measures, such as installing temporary sound walls or other similar barriers, moving noise-generating activities further from the ESHA/wetland areas, and avoiding pile driving or confining pile driving to project areas furthest from the Marsh areas.

Coastal Commission Recommended Specific Provisions

We generally concur with the FSA's proposed approach to avoiding and reducing noise-related effects in the nearby ESHA/wetland areas. However, we recommend two modifications to **Condition BIO-9** to ensure consistency with LCP provisions requiring protection of these habitat areas and to be consistent with previous City and Coastal Commission determinations regarding noise impacts on wildlife.

[13] See September 10, 2012 letter from USFWS to California Energy Commission regarding Application for Certification 12-AFC-02.

[14] Commission staff personal communication with CDFW staff, October 18, 2013.

[15] Groundborne noise and vibration is measured using "VdB," or vibration decibel levels, to distinguish it from airborne sound. Very low VdB levels can be imperceptible, but levels of around 100 VdB and higher can cause structural damage.

- **Recommended modified noise threshold:** First, we recommend the **Condition BIO-9** allowable noise threshold be modified as follows:

  "The project owner shall prepare and implement a Wildlife Noise Monitoring Plan throughout construction and demolition activities taking place during the bird breeding season (February 1 to August 31). Sound levels in Upper Magnolia and Magnolia marshes shall not exceed 8 dBA above ambient levels or 60 dBA (hourly average Leq), whichever is greater. **In addition, sound levels within the marshes and within 100 feet of active nests (as identified during the nesting surveys required pursuant to Condition BIO-8) shall not exceed 65 dBA.**"

This would be consistent with the City's approach in other nearby projects where the City has cited the 60 dBA threshold as causing adverse impacts to avian species and where it has prohibited noise- and disturbance-generating construction activities adjacent to the Magnolia Marsh during the Belding's Savannah Sparrow breeding season (see, for example, City of Huntington Beach CDPs #2006-005 and #PW-08-003, both for nearby construction projects). It would also be consistent with conditions of the Commission's recent approval of a bridge construction project in the nearby Bolsa Chica Wetlands requiring that noise levels not exceed 65 dBA within 100 feet of any active nests (see the Commission's May 2013 approval of CDP 5-12-191). This recommended condition appears feasible, given that it has been implemented in similar construction projects in and near nearby ESHA/wetland areas.

- **Recommended prohibition on pile driving during nesting season:** Regarding vibration effects, we recommend that **Condition BIO-9** be modified to require AES schedule and conduct all pile driving activities outside the February 1 through August 31 breeding and nesting season. **Condition BIO-9** currently lists pile driving avoidance as one of several feasible noise reduction techniques that AES could implement if its activities exceed the noise threshold; however, as noted above, the FSA already anticipates that expected noise levels will exceed that threshold. Additionally, pile driving is expected to cause substantial vibration levels (VdB), in the nearby marsh areas, though the FSA does not identify those expected levels. Given the expected threshold exceedance and the additional unquantified but likely significant vibration-related effects, this modification would further reduce expected adverse project-related effects on nearby ESHA and wetland areas.

Conclusion

The Commission finds that the CEC's implementation of the above-recommended Specific Provisions would allow the proposed project to be consistent to the extent feasible with relevant policies of the Coastal Act and LCP.

E. FLOOD, TSUNAMI, AND SEA LEVEL RISE HAZARDS

Coastal Act Section 30253 states, in relevant part:

> *New development shall do all of the following:*
> *(a)Minimize risks to life and property in areas of high geologic, flood, and fire hazard.*
> *(b) Assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs.*

LCP Policy I-C.20, Environmental Hazards Element, states:

> *Enforce and implement the policies and programs of the Environmental Hazards Element of the General Plan to the extent that these programs and policies are not inconsistent with the City's Local Coastal Program.*

The relevant and applicable policies and programs of the above-cited Environmental Hazards Element are listed below. [Figures in parentheses at the end of each Environmental Hazards Policy refer to the Implementation Program applicable to each Policy.]

> Environmental Hazards Policy 5.1.1 states: *Identify tsunami and seiche susceptible areas, and require that specific measures be taken by the developer, builder, or property owner, during major redevelopment or initial construction, to prevent or reduce damage from these hazards and the risks upon human safety (see Figure EH-8). (I-EH 1 and I-EH 4)*
>
> Environmental Hazards Program I-EH 4, Development Review or Environmental Review Process, states: *During development review (site plan, tract map, etc.) and/or environmental review, require:*
>
> *a. building structures proposed in liquefaction, unstable soil/slope conditions, flood prone areas, high water tables, peat or other geologic hazards prone areas to determine potential problems and to require mitigation measures;*
> *b. a potential seismic/geologic damage assessment to be conducted for essential public utilities (gas, water, electricity, communications, sewer) and require that appropriate mitigation measures be incorporated;*
> *c. critical or sensitive facilities and uses to be located in areas where utility services and continuous road access can be maintained in the event of an earthquake;*
> …
> *g. that proposed critical, essential, and high-occupancy facilities be subject to seismic review, including detailed site investigations for faulting, liquefaction, ground motion characteristics, and slope stability, and application of the most current professional standards for seismic design;*
> *h. that proposed projects located in the tsunami hazard areas (Figure EH-9):*
> - *are designed to minimize beach/bluff erosion and the need for sand replenishment along city beaches; and*

- *consider design options which reduce the potential for damage to private property and threats to public safety, i.e., raised foundations, ground floor parking with upper level uses.*

LCP Coastal Element Hazards Section C10.1.19 states:

> *Identify tsunami and seiche susceptible areas (Figure C-30), and require that specific measures be taken by the developer, builder or property owner during major redevelopment or initial construction, to prevent or reduce damage from these hazards and the risks upon human safety. Development permitted in tsunami and seiche susceptible areas shall be designed and sited to minimize this hazard and shall be conditioned to prohibit a shoreline protective device.*

The HBEP site is subject to adverse effects from floods, tsunamis, and sea level rise. These hazards are described separately below, along with recommended Specific Provisions to allow consistency with relevant Coastal Act and LCP policies.

Sea Level Rise

The project site is within an area of the Orange County coastline that has been singled out as being particularly susceptible to sea level rise. It has a wide range of critical infrastructure, including the existing proposed power plant and proposed HBEP, that will be affected unless significant effort is taken to protect, replace, or remove it. A recent study found that the Orange County coastline has structures worth more than $17 billion (in 2000 dollars), including the power plant, that are vulnerable to a 4.5-foot rise in sea level, which is a level expected before the end of this century.[16] Another recent study found a more immediate danger in the area of the HBEP site where up to 5,000 nearby homes are at risk due to sea level rise by 2020.[17]

California has adopted the 2013 *State of California Sea-Level Rise Guidance Document* ("*State Guidance Document*), based on guidance from the 2012 NRC Report, *Sea Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future*.[18] These documents, considered the current best-available science on sea level rise projections, anticipate sea level rise of up to two feet by 2050 and up to 5.5 feet by 2100 along this part of the Orange County shoreline. These projections are also consistent with the Commission staff's recently published draft guidance for incorporating sea level rise hazards and projections into LCP and coastal development permit review.

[16] Heberger, Matthew, et al., *The Impacts of Sea-Level Rise on the California Coast*, prepared by the Pacific Institute for the California Climate Change Center – California Energy Commission, California Environmental Protection Agency, Metropolitan Transportation Commission, California Department of Transportation, the California Ocean Protection Council, March 2009.

[17] See Climate Central, *Surging Seas: Sea Level Rise Analysis*, June 2013.

[18] For more information on the NRC Report, go to http://www.nap.edu/catalog.php?record_id=13389 and on the OPC Guidance, go to: http://www.opc.ca.gov/webmaster/ftp/pdf/docs/2013_SLR_Guidance_Update_FINAL1.pdf .

The *State Guidance Document* cautions that its sea level rise projections likely underestimate the amount of increase and that uncertainties about these projections increase as planning timeframes increase – i.e., they are likely more accurate for the immediate couple of decades and less so for subsequent decades. It notes that the rate of sea level rise is not expected to be linear and that it is likely to rise faster later in this century. The *State Guidance Document* recommends that state agencies during project evaluation consider the projected lifespan of the facility, its cost, and the impact or consequence of damage or loss of the facility. It also recommends that consideration be given to the project's adaptive capacity, impacts, and risk tolerance for projects with an expected timeframe beyond 2050.[19]

Importantly, and as noted in the *State Guidance Document*, the expected increase in water levels are likely to occur not just at some point several decades in the future, but also during shorter-term events in the very near future, such as storm waves, or during recurring events like El Nino. The *State Guidance Document* notes that, "[w]here feasible, consideration should be given to scenarios that combine extreme oceanographic conditions on top of the highest water levels projected to result from SLR over the expected life of a project." It also states that water levels during these large, short-term events along some parts of the coast have already exceeded sea level rise levels projected for 2030 and have reached levels projected for 2050.

The FSA evaluates the proposed project based on a 30-year operating life, which would extend until between approximately 2045 and 2055, depending on the eventual project construction schedule. This would subject the facility to hazards associated with a sea level rise of up to about two feet, which is expected by about 2050. As illustrated in **Exhibit 8 – Predicted Sea Level Rise**, a two-foot water level increase could result in the facility becoming an "island" separated from nearby inland areas during high tides, floods, storm surges, or other similar events. The increase in sea level will also alter shoreline processes, such as the rate and location of beach erosion, though the extent of these changes has not yet been determined. Additionally, the site is already subject to tidally-influenced high groundwater tables, with monitoring wells having shown groundwater at or above the existing grade.[20] Groundwater levels are expected to rise with those of sea level, with the higher groundwater table affecting the facility's foundations, and increasing its susceptibility to hazards such as liquefaction and lateral spread. The facility would also likely be subject to other secondary or indirect effects, such as salt water intrusion into foundations, changes in the flood channel hydraulics, potential increased sedimentation in the flood channel with an associated loss of flood conveyance, and others. As discussed below, although site elevations are above most expected flood and tsunami runup levels, those levels and the associated risks will increase with sea level rise. Therefore, although the project site is about one-half mile from the current shoreline, site conditions and its location make it likely that, unless mitigated, the facility will be affected by the predicted higher water levels during its operating life.

[19] See also California Emergency Management Agency, California Natural Resources Agency, and Federal Emergency Management Agency, *California Adaption Planning Guide: Planning For Adaptive Communities*, September 2012.

Flooding

The FSA describes the proposed project as having final grades of between 12 and 16 feet above sea level. It notes that the project site is within an area classified as "Zone X" by the Federal Emergency Management Agency (FEMA), a designation describing an area that is protected by levees from the 100-year flood but is still within the 500-year flood zone. The City's Environmental Hazards Chapter, completed in 1996, additionally identifies the project site as being within a City-designated Flood Zone (see FSA, Soil and Water Resources, Figure 2 – Huntington Beach Flood Zones (FEMA, 2009).

The HBEP site is within an area that has been subjected to numerous severe floods. It is adjacent to the Huntington Beach Flood Control Channel, which was built in the 1960s in response to local flooding and is managed by the Orange County Flood Control District. The District recently upgraded a section of the Flood Channel near the project site to handle projected 100-year flood events. The site is also within the Prado Dam Failure Inundation Zone (see **Exhibit 9 – Prado Dam Failure Inundation Zone**), which the City established in recognition of the potential failure of the Prado Dam, an earthen structure in the upper Santa Ana River watershed built before modern seismic-resistant designs. Failure of the dam would flood over 100,000 acres, including most of the area of Huntington Beach surrounding the proposed project, with an inundation area of up to 15 miles wide and water levels of greater than 30 feet in some areas. Maximum water levels at the HBEP site from that event are estimated to reach elevations of between 10 and 15 feet.

For structures such as the HBEP that are proposed to be located in flood-prone areas, the LCP's Environmental Hazards Program I-EH 4 requires, during development or environmental review, that potential problems in flood-prone areas be identified and mitigation measures be required. The City has also developed several planning documents to help implement the Environmental Hazards Chapter of its LCP. These include the City's FEMA-approved Flood Management Plan, which describes the policies and actions the City is to implement to ensure its eligibility for FEMA flood insurance and other similar programs. FEMA has established that planning and siting for "critical facilities," which include police and fire stations, hospitals, and electrical facilities such as the proposed project, be based on avoiding risks from the 500-year flood event.[21] The City has also adopted the Huntington Beach/Fountain Valley Hazard Mitigation Plan, which identifies the power plant as a critical facility.[22]

The site and proposed facility are subject to three different types of flood risks. First, although the site is protected from the 100-year flood event by sheet piling on the adjacent flood control channel, those structures are not designed to resist the area's seismic forces. The site and facility could experience a 100-year flood event if those structures are damaged. Second, the project site is within the 500-year flood zone, and, as noted above, a critical facility such as the power plant is to be protected from the 500-year flood elevation and its risk assessment is to be based on that

[21] See, for example, *Design Guide for Improving Critical Facility Safety from Flooding and High Winds*, FEMA Publication 543, January 2007, as well as CalEMA criteria described at: http://hazardmitigation.calema.ca.gov/plan/local_hazard_mitigation_plan_lhmp

[22] Available at: http://hazardmitigation.calema.ca.gov/docs/lhmp/Huntington_Beach_Fountain_Valley_Cities_of_LHMP.pdf

500-year event. These events and their associated risks are reasonably foreseeable, since during the project's eight years of construction and its 30-year operating life, it would have about a 1 in 3 chance of experiencing the 100-year flood and a 1 in 14 chance of experiencing the 500-year flood event.[23] Finally, as noted above, the facility is within the Prado Dam Inundation Zone, which would result in flood elevations of between 10 and 15 feet at the HBEP site.

Commission staff used data from the adjacent flood control channel and from a hydrologic analysis of the adjacent Huntington Beach wetlands that show a 100-year flood elevation of between about 9 to 10.2 feet in a nearby portion of the flood channel.[24] Data were not available for the 500-year flood event from the City or provided in the FSA, though it is presumably higher. Adding the two feet of projected increase in sea level rise puts the 100-year flood elevation at between 12 and 13 feet, which is in the same range as expected tsunami elevations described below and somewhat lower than inundation from a Prado Dam failure.

Flooding from any of these events could cause significant adverse impacts. For example, below grade facility components could be subject to complete inundation, potentially resulting in plant outages. Additionally, debris carried by a flood could damage above-grade components of the facility, or conversely, structural debris from the facility could damage nearby structures or property. Potential and likely risks include temporary or permanent loss of electricity production to the area, damage to adjacent properties, and increased public costs to provide measures that would protect the facility from these flood events. These flood risks will increase with the expected increase in sea level rise during the project's operating life. The degree of flood protection provided at the site is already influenced by the tides – that is, flood waters are released more slowly during a high tide than during a low tide and back up into the channel and surrounding areas during a high tide – and this effect will increase with sea level rise.

Tsunami Hazards

Although the site is located about one-half mile inland from the shoreline, it is subject to significant tsunami hazards. The site sits within a Tsunami Runup Zone the City designated in 1996 that extends about a mile inland from the shoreline (see **Exhibit 10 –Tsunami Runup Zone**).[25] At the time of that designation, the City identified expected tsunami elevations of up to five feet for a 100-year event and up to 7.5 feet for a 500-year event. More recent data and updated studies show the site is subject to higher runup levels and more severe tsunami risks. The 2009 California Geological Survey *Tsunami Inundation Map* for the Huntington Beach area shows the site within a tsunami runup zone in this part of the City that extends more than two miles inland, with expected water levels within parts of that zone of up to 16 feet above mean sea

[23] The calculation used to determine these probabilities is $r = 1-(1- 1/T)^N$, with T = the return period (i.e., the 100- or 500-year event), N = the expected life of the facility (i.e., eight years construction and 30 years operation), with r equal to the probability that the event will occur at least once in N years. During a 38-year facility life, there is about a 32% probability it would experience a 100-year event and about a 7% probability it would experience a 500-year event.

[24] See Federal Emergency Management Agency, *Flood Profiles, Huntington Beach Channel (D01)*, December 15, 2009, and Moffatt & Nichol, *Hydrologic and Hydraulic Baseline Report*, prepared for Huntington Beach Wetlands Conservancy, August 18, 2004.

[25] This map is the Figure C-30 referenced in LCP Policy C 10.1.19 above.

level (see FSA Soil and Water Resources, Figure 3 – 2009 Tsunami Inundation Map for Huntington Beach).[26]

This 2009 Map is based not on 100- or 500-year probabilities, but on the maximum expected inundation an area could experience from either far-field tsunamis (i.e. those tsunamis that are generated far from Huntington Beach) and from locally generated or near-field events.[27] For each mapped area of the coast, the CGS identified expected inundation levels for every 30-meter grid within the modeled runup zone. The site's tsunami risk and its expected tsunami runup elevations are also based in part on nearby seafloor bathymetry and other characteristics offshore of Huntington Beach that create a tsunami amplification area.[28]

The City's LCP requires that proposed projects within its designated Tsunami Runup Zone be evaluated for consistency with several of the Environmental Hazards policies identified above. In addition, Coastal Element section C10.1.19 requires that development located in tsunami or seiche susceptible areas be designed to prevent or reduce damage from these events. This LCP policy also prohibits the installation of shoreline protective devices as mitigation against tsunamis or seiches.

As noted in the FSA, the CGS modeling used to develop the tsunami runup maps shows a projected runup elevation at the power plant site of approximately 11 feet above mean sea level (msl). This elevation would result from at least two events – a magnitude 7.6 earthquake on the nearby offshore Catalina fault or a magnitude 9.2 event in Alaska's Aleutian Islands. With up to two feet of sea level rise expected during the project life, the maximum expected runup elevation would increase to about 13 feet above mean sea level. Final grades of the proposed project would have elevations ranging from about 12 to 16 feet above mean sea level; however, several important facility components and foundations will be below grade. The site may also be subject to seiches running up the flood control channel, though modeling for those events is apparently not available.[29]

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[26] A more recent study suggests even greater inundation levels at or near the site. A September 2013 report, *Science Application for Risk Reduction (SAFRR) Tsunami Scenario*, published by the California Natural Resources Agency, Department of Conservation, and California Geological Survey and the United States Geological Survey and Department of Interior, describes a tsunami scenario for the California coast that would result from a 9.1 earthquake in the Aleutians. The modeled tsunami would inundate large areas of the coastline, including areas with significant economic and infrastructure importance. This study used multiple coarse- and fine-grained models to identify likely inundation depths and water velocities, which were used to determine likely levels of damage along key parts of the coast, such as the Ports of Long Beach and Los Angeles. The study did not identify specific runup elevations along the Huntington Beach shoreline, but noted that in nearby Newport Beach, tsunami elevations could reach up to about 20 feet above msl with velocities of up to about 60 feet per second (or roughly 45 miles per hour).

[27] Tsunami inundation analyses used in land use planning often refer to 100-year and 500-year events, based on FEMA's methods for floodplain mapping. For several reasons, however, determining tsunami probabilities is significantly more difficult than predicting flood events. Tsunamis occur less frequently than floods, their historic and prehistoric records are often less exact, and the events that generate them can occur over a much larger area.

[28] See Legg, Borrero, and Synolakis, *Evaluation of Tsunami Risk to Southern California Coastal Cities*, Federal Emergency Management Agency and Earthquake Engineering Research Institute, January 2003.

[29] A seiche is a wave generated by the same types of events that cause a tsunami, but that occurs within an enclosed water body such as a bay, reservoir, or, in this case, a flood control channel.

As evidenced by recent tsunami events worldwide and in California, an 11- to 13-foot tsunami can cause significant adverse impacts. At this site, it would result in partial inundation and possible damage to below-grade facility components. It is also likely that damaged structural components could contribute structural debris to the tsunami and worsen the damage at the facility and at nearby structures and properties. Smaller tsunamis can also prove damaging – for example, the Orange County Multi-Hazard Mitigation Plan describes a one- to three-foot tsunami as being highly destructive[30] – and at this site, a smaller tsunami could create the same "island" effect as described in the flood hazard discussion above.

Tsunami mitigation

Other than locating proposed facilities outside of tsunami runup areas, the simplest approach to preventing or reducing tsunami-related hazards is to elevate structures above expected runup levels. However, elevating the facility's proposed structures would require significant amounts of fill and would likely redirect tsunami energy away from the facility and towards other nearby structures and properties, including the adjacent flood control levees. Additional fill could also be used to create berms around the structures while keeping the structures at the same proposed elevation; however, this approach would similarly redirect tsunami energy towards other nearby properties.

Either of these approaches would likely increase tsunami-related damage and safety risks and would therefore not conform to the LCP's Environmental Hazards Policy 5.1.1. Additional fill would also involve increased truck traffic, with the associated adverse effects on public access and air quality. The additional fill could also affect the groundwater regime beneath the project site and in the adjacent wetlands and flood control channel.

Other possible mitigation approaches include incorporating tsunami-resistant design features into structures that are subject to inundation. These features include enclosing below-grade structures within reinforced concrete walls to resist tsunami forces, protecting tanks against uplift due to tsunami buoyant forces, and others.[31] Another standard approach for facilities in tsunami-prone areas is to develop and implement a safety plan that includes on-site signage, training for facility personnel to know how to recognize tsunami watches and warnings that may be issued, and identifying an evacuation site.

Coastal Commission Recommended Specific Provisions to Avoid and Reduce Flood- and Tsunami-related Effects

To address these hazards and their associated risks to the proposed facility, and to allow consistency with relevant provisions of the Coastal Act and LCP, the Commission recommends the CEC include the new and modified conditions shown below as part of any approval of the AFC. Proposed **Condition Soil&Water8** will ensure that the proposed critical facility is sited to be protected from both the current and future predicted 500-year flood elevation. Proposed **Condition GEO-3** is meant to allow

[30] See the Municipal Water District of Orange County, *Orange County Regional Water and Wastewater Multi-Hazard Mitigation Plan*, February 2012.

[31] See, for example, the 2008 Federal Emergency Management Agency's (FEMA's) *Guidelines for Design of Structures for Vertical Evacuation from Tsunamis*.

consistency with the health, public safety, and damage prevention components of Environmental Hazard Policy EH 5.1.1 and Environmental Hazards Program I-EH 4 by requiring AES to submit a Facility Hazard Emergency Response Plan prepared in coordination with other nearby property owners and government entities that identifies the hazards to the facility and to nearby structures owned by others, and that identifies measures that will be implemented to avoid or reduce these hazards. This recommended Condition also requires AES to provide documentation from these other nearby landowners and government entities that the plan accurately reflects expected hazards. It further requires AES provide documentation from the City that the proposed project is consistent with the goals and objectives of the City's Flood Management Plan, which is meant to help the City implement its LCP's Environmental Hazards Chapter. To address specific tsunami-related LCP policies, proposed **Condition GEO-3** also ensures the facility includes adequate life safety measures, as required by LCP Policy I-EH 4(g). **Condition GEO-3** also requires AES to submit for CPM approval a project design approved by a structural engineer identifying structural elements that allow project personnel to immediately remove themselves to one or more locations that will not be subject to tsunami inundation or that will be safe from inundation. Finally, recommended **Condition GEN-9** prohibits the project owner from constructing a shoreline protection device, as required pursuant to the LCP's Coastal Elements Hazards Section C10.1.19.

- **Recommended New Condition SOIL&WATER8: Flood Damage Prevention. Prior to the start of construction, AES shall submit for CPM review and approval, certification from a licensed engineer that the proposed facility is elevated above, or protected from, a 500-year flood event at the project site that includes an additional 24 inches of sea level rise. The engineer's determination shall describe the methods and include the calculations used to determine the elevation of the current 500-year flood event at the site and those used to determine the elevation of a future 500-year flood event with the additional 24 inches of sea level rise expected during the facility's thirty year operating life.**

  The elevations and proposed changes to the facility design shall be incorporated into the final project design submittals required pursuant to Condition GEN-2.

- **Recommended New Condition GEO-3: Flood and Tsunami Hazard Mitigation Planning. Prior to the start of construction, AES shall submit for CPM review and approval, a Facility Hazard Emergency Response Plan developed in coordination with the City of Huntington Beach, Southern California Edison, and the Orange County Flood Control District. The Facility Hazard Emergency Response Plan shall include, at a minimum:**

  1. **Results of hydraulic and hydrodynamic modeling using methods approved by the Federal Emergency Management Agency (FEMA) or the National Oceanic and Atmospheric Administration (NOAA) showing the effects of the facility's proposed structures on other nearby structures**

(including, but not limited to, structures associated with the existing adjacent power plant, the on-site Southern California Edison substation, and the Orange County Flood Control Channel) during: (1) a tsunami runup of 11 feet above mean sea level with an additional two feet of sea level rise (for a total runup of 13 feet above mean sea level); (2) the 100-year flood event with an additional two feet of sea level rise; and (3) the 500-year flood events as determined pursuant to Condition SOIL&WATER8.

2. **Concurrence from Southern California Edison and the Orange County Flood Control District that the modeling efforts accurately reflect expected hazard levels at these nearby structures, and concurrence from the City of Huntington Beach that the Plan is consistent with the City's most recent Hazard Mitigation Plan and Multi-Hazard Mitigation Plan prepared pursuant to California Government Code Sections 8685.9 and 65302.6 and 44 CFR 201.6 et. seq.**

3. **Structural and non-structural measures AES will implement to avoid, or if infeasible to avoid, to reduce any identified adverse effects of tsunami and flood events and to ensure human safety. Structural measures shall include either those that allow facility personnel immediate vertical evacuation to safe areas above tsunami runup elevations or those that allow facility personnel to remain inside structures that are not subject to inundation. The structural measures identified and required by this Plan shall be determined by a licensed structural engineer to be fully tsunami-resistant.**

Changes to the facility resulting from the above analyses shall be incorporated into the final project design submittals required pursuant to Condition GEN-2.

- **Recommended new Condition GEN-9: No Shoreline Protective Device. In the event that the approved development, including any future improvements, is threatened with damage or destruction from coastal hazards, or is damaged or destroyed by coastal hazards, protective structures (including but not limited to seawalls, revetments, groins, deep piers/caissons, etc.) shall be prohibited. By acceptance of the CEC approval, the project owner waives any right to construct such protective structures, including any that may exist under Public Resources Code Section 30235.**

Conclusion

The Commission finds that the CEC's implementation of the above-recommended Specific Provisions would allow the proposed project to be consistent to the extent feasible with relevant policies of the Coastal Act and LCP.

F. GEOLOGIC HAZARDS

Coastal Act Section 30253 states, in relevant part:

> *New development shall do all of the following:*
> *(a) Minimize risks to life and property in areas of high geologic, flood, and fire hazard.*
> *(b) Assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs.*

LCP Policy C1.1 states:

> *Ensure that adverse impacts associated with coastal zone development are mitigated or minimized to the greatest extent feasible.*

LCP Policy C 10.1.3 states:

> *Require seismic/geologic assessment prior to construction in the Alquist-Priolo Earthquake Fault Zone as shown in Figure C-28.*

LCP Policy C 10.1.4 states:

> *Require appropriate engineering and building practices for all new structures to withstand ground shaking and liquefaction such as those stated in the Uniform Building Code.*

LCP Policy I-C.20, Environmental Hazards Element, states:

> *Enforce and implement the policies and programs of the Environmental Hazards Element of the General Plan to the extent that these programs and policies are not inconsistent with the City's Local Coastal Program.*

The relevant and applicable policies and programs of the above-cited Environmental Hazards Element are listed below. Figures in parentheses at the end of each Environmental Hazards Policy refer to the Implementation Program applicable to each Policy.

> Environmental Hazards Policy 1.1.4 states: *Evaluate the levels of risk based on the nature of the hazards and assess acceptable risk based on the human, property, and social structure damage compared to the cost of corrective measures to mitigate or prevent damage. (I-EH 3 and I-EH 4)*

> Environmental Hazards Policy 1.2.1 states: *Require appropriate engineering and building practices for all new structures to withstand groundshaking and liquefaction such as stated in the Uniform Building Code (UBC). (I-EH 5)*

Environmental Hazards Program I-EH-1, Studies/Mapping/Master Plans, states, in relevant part:

a. Conduct, prepare and/or update the following as funding permits:

...

- *an assessment of potential damage to essential utility and transportation infrastructure and public service facilities due to geologic/seismic hazards. The findings of the assessment should be utilized in the review of proposed development projects, and used for maintaining and updating emergency preparedness plans;*

Environmental Hazards Program I-EH-3, Alquist-Priolo Earthquake Fault Zone, states:

a. Continue to implement the Alquist-Priolo Earthquake Fault Zone requirements.
b. Implement the fault classification system suggested by Leighton & Associates (April 17, 1986) with regard to faults in the City susceptible to fault rupture, and establish a study requirement based on risk and structure importance.

Environmental Hazards Program I-EH 4, Development Review or Environmental Review Process, states:

During development review (site plan, tract map, etc.) and/or environmental review, require:
d. building structures proposed in liquefaction, unstable soil/slope conditions, flood prone areas, high water tables, peat or other geologic hazards prone areas to determine potential problems and to require mitigation measures;
e. a potential seismic/geologic damage assessment to be conducted for essential public utilities (gas, water, electricity, communications, sewer) and require that appropriate mitigation measures be incorporated;
f. critical or sensitive facilities and uses to be located in areas where utility services and continuous road access can be maintained in the event of an earthquake;
…
i. that proposed critical, essential, and high-occupancy facilities be subject to seismic review, including detailed site investigations for faulting, liquefaction, ground motion characteristics, and slope stability, and application of the most current professional standards for seismic design;

Environmental Hazards Program I-EH-5 – Ordinances:

a. Enforce the most current Uniform Building code adopted by the State of California.
b. *Prepare ordinances prohibiting the location of critical or sensitive facilities or high occupancy facilities within a predetermined distance of an active or potentially active fault.*

The proposed HBEP site and vicinity is subject to several types of relatively severe geologic hazards, including surface fault rupture, ground shaking, liquefaction, and lateral spread. The analysis provided below shows that there is a significant probability that the project would experience one or more of these hazards during its expected operating life. In addition, the expected increase in sea level described above will increase the risk from some of these hazards during the project's operating life. The site's seismic setting and its specific seismic hazards are briefly described below, followed by several recommended conditions to allow the proposed facility to more fully conform to relevant Coastal Act and LCP policies.

Seismic setting

The proposed facility is located within a seismically-active region that includes the underlying Newport-Inglewood Fault Zone (NIFZ), which extends about 50 miles from Newport Beach to Los Angeles. It consists of a series of known faults, and geologists believe there are additional unknown faults in a zone that ranges up to somewhat more than a mile wide. The NIFZ is generally thought to be contiguous with the Rose Canyon Fault Zone which underlies parts of San Diego, trends offshore at La Jolla, and continues north to meet the NIFZ. Just offshore of the facility site is the epicenter of the geologically recent 1933 Long Beach earthquake, which was a magnitude 6.3 event on the NIFZ that resulted in significant loss of life and extensive property damage.

The City's 1996 Environmental Hazards Chapter states that faults within the NIFZ have an expected maximum earthquake of magnitude 7, an expected maximum ground acceleration of up to 1g, and potential surface fault rupture of more than ten feet in earthquakes of between magnitude 6.0 and 7.5. Other more recent reports calculate that the NIRC fault could generate a quake of up to magnitude 7.5[32] or an offshore magnitude 7.4 earthquake.[33] Various entities consider the entire NIRC fault zone as active.[34] Within that NIFZ, the California Geological Survey (CGS) has designated several specific fault segments as being within an Alquist-Priolo Earthquake Fault Zone, including a portion of the NIFZ's North Branch Fault about one-half mile from the HBEP site.[35]

[32] See *City of Huntington Beach Draft Hazard Mitigation Plan*, 2011.

[33] Grant, L., and Shearer, P., *Activity of the Offshore Newport-Inglewood Rose Canyon Fault Zone, Coastal Southern California*, from Relocated Microseismicity, Bulletin of the Seismological Society of America, Vol., 94, No. 2, pp. 747-752, April 2004.

[34] See, for example, Pischke, Gary, *Earthquakes and Folds on the Rose Canyon Fault Zone*, in *The Seismic Risk in the San Diego Region: Special Focus on the Rose Canyon Fault System*, edited by Glenn Roquemore, the Southern California Earthquake Preparedness Project, 1989.

[35] Section 1613A.2 of the California Building Code defines an "active earthquake fault" as "a fault that has been the source of earthquakes or is recognized as a potential source of earthquakes, including those that have exhibited surface displacement within Holocene time (about 11,000 years) as determined by California Geological Survey (CGS) under the Alquist-Priolo Earthquake Fault Zoning Act , those included as type A or type B faults for the U.S. Geological Survey (USGS) National Seismic Hazard Maps, and faults considered to have been active in Holocene time by an authoritative source, federal, state or local governmental agency."

The HBEP would be located within a few hundred feet of the NIFZ's South Branch Fault (see **Exhibit 11 – Mapped South Branch Fault Beneath Project Site**). The South Branch Fault is less well understood than some other segments of the NIFZ, due in part to the extensive development and areas of fill existing along the fault route, both of which tend to mask surface expressions of faulting and make investigations at depth more difficult. A 1981 study noted that the NIFZ in the immediate project area had not been designated as active mainly because of the difficulty in identifying evidence for faulting.[36] When investigating the NIFZ for designation within an Alquist-Priolo Earthquake Fault Zone, the CGS found sufficient evidence to designate just the above-referenced segment of the NIFZ's North Branch near the proposed project site. Results of geodetic studies published in 2001 found evidence suggesting that the South Branch may be active.[37] Additionally, a 2007 study of another nearby project's potential pipeline routes described the South Branch Fault as "potentially active."[38]

More recently, the City noted that additional studies of the South Branch and other fault traces could result in Alquist-Priolo Earthquake Fault Zone designations. The City had already classified the South Branch Fault as a "Category C" fault, which requires special studies and subsurface investigation for nearby proposed developments. In 2010, the City's *Beach and Edinger Corridor Specific Plan EIR*, which is a planning document for an area of the City near the HBEP site, discussed the hazards associated with the South Branch Fault and acknowledged the potential for surface fault rupture.[39] The City's 2011 Hazard Mitigation Plan describes the South Branch Fault as "active," and identifies critical infrastructure near that fault that may be subject to damage from seismic activity.

In addition to the NIFZ, the site and facility are subject to potential seismic events and significant hazards from other regional faults, including the Compton-Los Angeles Blind Thrust Fault, the Elysian Park Blind Thrust Fault, and the Palos Verdes, Whittier-Elsinore, Serra Madre-Cucamonga, and San Andreas fault systems and others.[40] For example, the project site has been

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[36] See Guptill, Paul, and Edward Heath, *Surface Faulting Along the Newport-Inglewood Zone of Deformation*, California Geology, July 1981, referencing Hart, E. W., *Fault hazard zones in California: California Division of Mines and Geology Special Publication 42 Revised Edition*, 1980.

[37] See Bender, E., et. al, *Surface Motion Detection from a Small Aperture Geodetic Network, Southern Los Angeles Basin*, from 97th Annual Meeting of Pacific Section American Association of Petroleum Geologists, 2001. The report explains that geodetic stations installed across a potential restraining bend along the south branch of the Newport-Inglewood fault zone appeared to be converging at a high rate. Assuming that surface motions accurately depict subsurface conditions, this may indicate that strain is accumulating at depth, which could indicate the South Branch Fault is active.

[38] See ENSR Corporation, *Topic Report 6 – Geological Resources*, for Woodside Natural Gas, Inc., OceanWay Secure Energy, August 2007.

[39] The EIR states, "[t]his does not mean there is no threat of surface rupture along the other fault traces [including the South Branch]: only that the current state of our knowledge about them does not indicate whether a threat is present." It further states that "it is prudent to consider the possibility of surface rupture in the design and construction of development in the Specific Plan Area south of Ellis Avenue," an area that includes the South Branch Fault.

[40] See Magorian, D. Scott, *Preliminary Review of Geotechnical Constraints and Geologic Hazards Poseidon Resources Orange County Desalination Project – North and West Tank Options*, September 7, 2002, and Municipal

identified as subject to "Very Heavy" damage from a magnitude 6.9 earthquake on the Newport-Inglewood Fault, "Moderate to Heavy" damage from a magnitude 6.6 earthquake on the San Joaquin Fault (which is approximately 2.2 miles from the site), and "Moderate" damage from earthquakes on any of several other faults, including a magnitude 6.8 earthquake on the Peralta Hills fault (about 10 miles distant), a magnitude 7.5 earthquake on the Puente Hills fault (19.5 miles distant), and a magnitude 6.8 earthquake on the Whittier fault (20.7 miles distant).[41]

Site Seismic Hazards

The HBEP site is subject to several types of seismic hazards, as described below.

Surface Fault Rupture

The FSA notes that the proposed HBEP site is likely not subject to surface fault rupture. However, AES's July 2012 site assessment identified the above-referenced South Branch Fault trace as being located below the northeast corner of the power plant site, and stated it was proposing to locate its new generating units to provide a 500-foot buffer from the mapped fault and the location of potential surface fault rupture.

As noted in the Land Use and Alternatives discussion above, the Commission recommends that Energy Commission staff evaluate whether that part of the power plant site could be used for construction staging or parking that would reduce the project's effects on offsite coastal resources. That evaluation should include consideration of potential surface fault rupture and geologic stability.

Ground Shaking

The FSA identifies a range of potential ground motions at the site expected from several different seismic events and based on different modeling approaches.[42] They range from 0.598 g up to 2.4 g, which is a relatively severe level of ground movement. Structural measures needed to respond to ground motions at the upper end of this range could require substantial alterations to the facility as it is currently proposed.

Liquefaction and Lateral Spread

Liquefaction occurs in certain soils during seismic events. It results in the soil losing its strength and acting similar to a liquid, often resulting in collapse or damage to overlying structures. Lateral spread occurs when soils that are on flat to gently sloping surfaces above liquefiable soils and adjacent to an unsupported slope move in response to a seismic event – it is essentially a landslide that occurs on nearly flat ground.

Water District of Orange County, *Orange County Regional Water and Wastewater Multi-Hazard Mitigation Plan, Orange County*, California, February 1, 2012.

[41] See the 2012 *Orange County Regional Water and Wastewater Multi-Hazard Mitigation Plan*.

[42] See FSA's Geology & Paleontology Section, page 5.2-20, Table 3.

The proposed project site is within an area the City has designated as having "Very High" liquefaction potential (see **Exhibit 12 – Map of Liquefaction Potential in Huntington Beach**). The FSA notes that conditions within the power plant site are likely conducive to liquefaction, though less so for lateral spread. As noted above, the power plant site's liquefaction and lateral spread hazards are likely to be exacerbated by the increased surface and groundwater levels associated with predicted sea level rise during the HBEP facility life. The City additionally notes in its Environmental Hazards Chapter that earthquake intensities are likely to be higher in liquefaction-prone areas than in nearby non-liquefaction prone areas. It is not clear whether the range of ground motions noted above incorporate this potential for higher intensities.

Initial geotechnical investigations conducted at the adjoining AES Tank Farm for the proposed Poseidon project showed that site to be underlain by liquefiable soils extending to about 20 feet below the ground surface.[43] Those investigations also concluded that the site had a high potential for lateral spread, due to its soil characteristics, high groundwater levels, and its location along several hundred feet of the sloping sides of the adjacent flood control channel that were not designed to resist lateral spread.[44] Poseidon considered several methods to reduce liquefaction and lateral spread effects, including building the facility on stone columns, constructing below-grade buttress walls, and over-excavating soils subject to liquefaction, and the SEIR for that project required Poseidon to conduct additional geotechnical investigations prior to constructing the facility.

The FSA includes several proposed conditions to address the above-identified risks. Proposed **Condition GEO-1** would require AES to conduct geotechnical engineering analyses and prepare an engineering report that more specifically describes the site's seismicity and anticipated geologic hazards. **Condition GEO-1** also requires that report to include recommended measures to respond to the identified hazards. Proposed **Condition GEN-1** requires AES to design and construct its facility consistent with the requirements of the state's Building Codes, and proposed **Condition GEN-5** requires AES to use licensed engineers, engineering geologists, and other similarly accredited personnel to review the various geotechnical analyses, design the facility plans, and consult as needed during construction. This approach is largely consistent with relevant Coastal Act and LCP policies listed above. However, we are recommending several modifications to these proposed conditions to allow fuller conformity to those policies.

Coastal Commission Recommended Specific Provision

As noted above, it is not yet clear whether the upcoming geotechnical investigations and the resulting proposed mitigation measures will require substantial changes to the facility and cause additional and as-of-yet unknown and unquantified adverse effects on coastal resources. For example, if conditions beneath the HBEP footprint are similar to those beneath the adjacent AES tank farm site, the project could require significant dewatering,

[43] See SEIR, Appendix C – *Updated Preliminary Review of Geological Constraints and Geologic Hazards*, page 13.

[44] See Magorian, D. Scott, *Preliminary Review of Geotechnical Constraints and Geologic Hazards Poseidon Resources Orange County Desalination Project – North and West Tank Options*, September 7, 2002, and Magorien, D. Scott, *Updated Preliminary Review of Geotechnical Constraints and Geologic Hazards, Poseidon Resources Seawater Desalination Project, Huntington Beach, California*, February 2, 2010.

construction of stone columns or buttresses, placement of sheet piles, excavation, as well as other measures, any of which could change the project's anticipated coastal resource effects and its conformity to Coastal Act and LCP policies. Placement of buttress walls, for instance, could alter or reduce groundwater flow beneath the site and affect nearby wetlands, while extensive excavation could require significantly increased truck traffic and adversely affect public access to the shoreline. Additionally, given the site's potential for relatively severe ground motion, results of the upcoming studies could show that the facility will require extraordinary means of construction to ensure its stability. We are therefore recommending the following modifications, as shown in strikethrough/bold underline below:

- In recognition that hazards to the site and proposed facility are not yet fully identified, the Commission expects that some of the current evaluation regarding project effects on coastal resources may be understated and may require additional review to determine the project's conformity to relevant Coastal Act and LCP provisions. We recommend that project changes resulting from the upcoming studies undergo additional public review, if those changes are likely to increase adverse coastal resource effects or reduce the project's conformity to relevant Coastal Act and LCP provisions. We recommend the following modification to the FSA's proposed Condition GEO-1:

  "A Soils Engineering Report as required by Section 1803 of the California Building Code (CBC 2013), shall specifically include laboratory test data, associated geotechnical engineering analyses, and a thorough discussion of seismicity; liquefaction; dynamic compaction; compressible soils; corrosive soils; and tsunami. In accordance with CBC 2013, the report should also include recommendations for ground improvement and/or foundation systems necessary to mitigate these potential geologic hazards, if present. **If the analyses or recommendations show that the project will cause greater or more significant adverse effects to coastal resources than identified and evaluated in the Presiding Member's Final Decision for this AFC, the project owner shall submit the analyses and recommendations for additional public review to be conducted by the CEC staff.**

  Verification: The project owner shall include in the application for a grading permit a copy of the Soils Engineering Report which addresses the potential for strong seismic shaking; liquefaction; dynamic compaction; settlement due to compressible soils; corrosive soils; and tsunami, and a summary of how the results of the analyses were incorporated into the project foundation and grading plan design for review and comment by the Chief Building Official (CBO). A copy of the Soils Engineering Report, application for grading permit and any comments by the CBO are to be provided to the CPM at least 30 days prior to grading."

Site Seismic Hazards – Coastal and Geologic Hazards and Risks to a Critical Facility

LCP Environmental Hazards Policy 1.1.4 requires evaluating the risk to the proposed project from the above-described hazards. It also requires evaluating the risk of human, property, and social structure damage resulting from these hazards, identifying a level of "acceptable" risk, and comparing the risks to the costs of corrective measures to mitigate or prevent these damages. These analyses are particularly important for this proposed critical facility that, despite its location on a relatively hazardous site, is meant to support regional electrical grid reliability.

The City has not conducted a facility-specific risk assessment for the project; however, it has developed several hazard mitigation plans that address hazards and risks to critical infrastructure in the City. The findings of these hazard mitigation plans can be applied to the proposed project to determine the project's consistency with the hazard planning and risk assessment required pursuant to the above LCP policies.

Pursuant to state and federal requirements, local jurisdictions prepare Hazard Mitigation Plans to identify the suite of natural hazards known or expected to affect a community, identify actions that will reduce losses from those hazards, and establish a coordinated process for implementing the plan and these actions.[45] These requirements also require the Plans be in place for local jurisdictions to be eligible for certain disaster recovery funding. The above-cited FEMA guidance states that these Plans are to describe how a local government will integrate the mitigation elements identified in its Plan into that government's local land use decisions.

The Plans are to include:

- A risk assessment of the type, location, and extent of all natural hazards that can affect the local jurisdiction, along with a description of previous occurrences and the probability of future occurrences.
- A description of the local jurisdiction's vulnerability to these hazards, including the type and number of critical facilities and infrastructure located in hazard areas and an estimate of potential costs should these facilities be lost or damaged due to these hazards.
- Mitigation measures needed to avoid or reduce hazards and potential effects of the loss of critical facilities.
- A description of land uses and development in the local jurisdiction to allow the Plan's mitigation options to be considered as part of land use decisions.

The City has prepared three plans that address these concerns – the aforementioned Flood Management Plan, prepared pursuant to FEMA requirements and meant to help implement the City's Environmental Hazards Element of its LCP, a 2012 Hazard Mitigation Plan, and a Multi-Hazard Mitigation Plan [n.d.] prepared with the neighboring City of Fountain Valley. The Plans identify a number of hazards at the project site, including those described above – flooding, tsunami, seismic events, and others.

[45] See guidance from the California Emergency Management Agency regarding compliance with AB 2140 at http://hazardmitigation.calema.ca.gov/docs/AB2140_Letter_to_Local_Government.pdf , and Federal Emergency Management Agency, pursuant to 44 CFR 201 *et. seq*. regarding Federal Emergency Management Agency requirements.

Additionally, and given the number of site hazards, it is highly probable that the facility will experience one or more of the identified hazards during its operating life. Considering only those hazards with an expected recurrence interval or return period – e.g., a "100-year flood" – the site and facility have the following probabilities of any one of these hazards occurring during the project's expected 30-year operating life:

Hazard:	**Probability:**[46]
100-year flood:	**26%** (approximately 1 in 4 chance).
100-year tsunami:	**26%** (approximately 1 in 4 chance).
500-year tsunami:	**6%** (approximately 1 in 14 chance).
500-year flood:	**6%** (approximately 1 in 14 chance).

However, because the site and the proposed facility are subject to multiple hazards, the probability is much greater that they will experience not just one hazard – i.e., just a 100-year flood – but any one of the several hazards. For example, the probability that the site will experience either a 100-year tsunami or a 100-year flood is about twice as high than if the site was subject to just one or the other of those events. Looking at just the above four events, there is a greater than even chance that the site would experience at least any one of them during its operating life – that is, the probability that the site will experience a 100-year flood or a 500-year flood or a 100-year tsunami or a 500-year tsunami is somewhat greater than 50%.[47] The actual probability is somewhat higher, as the list above does not include all the site hazards for which recurrence intervals can be developed – for example, any damaging seismic events resulting from the above-referenced regional faults for which recurrence intervals have been calculated. Risks from damage to the facility that result from these hazards include short- or long-term disruption of electrical power from the facility, loss of grid support provided by the facility, release of chemicals or structural debris to nearby properties and habitats, and others.

While the FSA's proposed conditions reduce the facility's risk, the site's hazards still make the facility highly vulnerable to damage and result in risks that must be addressed pursuant to Environmental Hazards Policy 1.1.4. Additionally, addressing the risks associated with some of the hazards will require coordination with multiple nearby landowners and local governments – for example, the site's flood protection relies on levees and sheet piles constructed and managed by the Orange County Flood Control District; however, as noted above, those structures are not designed to withstand the area's seismic forces, so the facility's reliability is dependent on ongoing system improvements made by the Flood Control District.

[46] The calculation used is $r = 1-(1- 1/T)^N$, with T = the return period (e.g., a 100-year event), N = the expected operating life of the facility (i.e., 30 years), and r = the probability that the event will occur at least once in N years.

[47] This combined probability is the sum of the individual probabilities minus the probabilities of the site experiencing more than one of the hazards during its operating life. The calculation is ((0.26 + 0.26 + 0.06 + 0.06 - (0.26 * 0.26) – (0.26 – 0.06) – (0.26 * 0.06) - (0.06 * 0.06)) = .5376, or just over 50% probability.

Coastal Commission Recommended Specific Provision

To allow conformity to the LCP's Environmental Hazards Policy 1.1.4, the Commission recommends the following additional condition:

"**Condition GEO-4: Prior to issuance of the project grading permit, the project owner shall provide to the CPM documentation from the City of Huntington Beach showing that the project is consistent with the City's most recent Flood Management Plan, Hazard Mitigation Plan, and Multi-Hazard Mitigation Plan prepared pursuant to California Government Code Sections 8685.9 and 65302.6 and 44 CFR 201.6 et seq.**"

Conclusion

The Commission finds that the CEC's implementation of the above-recommended Specific Provisions would allow the proposed project to be consistent to the extent feasible with relevant policies of the Coastal Act and LCP.

G. PUBLIC ACCESS

LCP Policy C 2.5 states:

> *Maintain and enhance, where feasible, existing shoreline and coastal resource access sites.*

Coastal Act Section 30211 states:

> *Development shall not interfere with the public's right of access to the sea where acquired through use or legislative authorization, including, but not limited to, the use of dry sand and rocky coastal beaches to the first line of terrestrial vegetation.*

The proposed facility is to be built within an industrial site about one-half mile from the shoreline where public access is not available and not warranted. However, the project, as proposed, would cause two main types of adverse effects on public access. First, AES proposes to use over 200 parking spaces near the shoreline that are typically used for public access to the beach. Second, it would increase and interrupt traffic on streets used for public access to the shoreline in this area of Huntington Beach and along about 15 miles of the Pacific Coast Highway between the HBEP site and AES's Alamitos Power Plant site. These two adverse effects and the Commission's proposed mitigation measures are described below.

Beach Access Parking

AES expects a maximum of 331 workers on-site during the peak construction period. AES has proposed using one onsite and four offsite parking areas, and is planning to provide shuttle service to transport workers between the offsite areas and the project site (see **Exhibit 13 – Proposed HBEP Construction Parking**). The proposed parking areas, which are listed below, would provide more than three times the expected parking needed for the project.

Parking Area Location	Parking Area Size	Number of Spaces (approximate)
Onsite at HBEP	1.5 acres	130
Plains All-American Tank Farm, adjacent to HBEP	1.9 acres	170
Graded area west of HBEP on Newland Street	3 acres	300
Graded area at PCH and Beach Street	2.5 acres	215
Huntington Beach City Parking Area at PCH and Beach Street	N/A	225
Total Number of Spaces:		**1040**

The Huntington Beach City Parking Area described in the AES proposal is located about one-half mile from the power plant site and is used extensively by beachgoers. The 225 spaces AES proposes to use at this location would reduce parking that is meant to provide public access to the shoreline along this stretch of the coast.

The FSA's proposed **Condition TRANS-3** would require AES to prepare a Traffic Control Plan to address the project's traffic- and parking-related impacts. The required Plan would include a Parking/Staging Plan that is to ensure all project-related parking during construction and operation be either on-site or in the designated off-site parking areas. However, **Condition TRANS-3** does not yet ensure conformity to the City's LCP to the extent feasible.

Coastal Commission Recommended Specific Provision:
As noted above, LCP Policy C2.5 requires that existing shoreline access sites be maintained and enhanced, where feasible. The Commission therefore recommends that **Condition TRANS-3** be modified to delete the Huntington Beach City Parking Area from the project's parking plans. This feasible modification ensures continued availability of beach parking, allows AES to still have more than three times the expected parking needed, and would allow conformity to LCP Policy C 2.5.[48]

Additionally, and as described above in the Land Use and Alternatives section of this report, the Commission recommends the CEC evaluate whether additional space is available for short- or long-term use at the on-site AES Tank Farm or at the adjacent Plains America Tank Farms. Each of these tank farm areas is larger than the total of all five of AES's currently proposed parking area, and using all or some of the tank farm space could further reduce the project's cumulative and off-site impacts.

[48] Alternatively, Condition TRANS-3 could be modified to require that the Parking/Staging Plan specify that the Huntington Beach City Parking Area be used only if there is insufficient parking space available in the other four proposed parking areas.

Project-Related Traffic

Project-related traffic during approximately eight years of demolition, remediation, and construction activities at the facility site will occur along several thoroughfares, all of which provide access to the shoreline. These include the Pacific Coast Highway (PCH), Newland Avenue, Brookhurst Street, Magnolia Street, and Beach Boulevard. Because AES proposes to stage some of its equipment at its Alamitos Power Plant site, located about 15 miles north of Huntington Beach, the traffic effects would extend along that entire stretch of the PCH. AES also expects to require up to 112 "oversize" trips to transport the largest power plant components from the Port of Long Beach to the project site. AES expects its average daily construction traffic to include about 734 one-way trips, with most (662) due to the workers' commutes and the remainder due to deliveries (48 delivery/haul trucks and 72 cars or trucks that would accompany the deliveries).

The FSA identifies relatively minor reductions of no more than a few seconds delay in the Traffic Levels of Service (LOS) at nearby intersections during peak construction and peak traffic times.[49] However, at least two of the studied intersections are already at LOS E and LOS F, and the City's Circulation Element Policy CE2.1.1 requires a minimum LOS standard at peak hours to be no lower than LOS D. To address this issue, the FSA includes **Condition TRANS-3**, which would require AES to prepare a Traffic Control Plan in consultation with the City and with other agencies, noting that AES would need to monitor the affected intersections and use alternate routes during construction.

Coastal Commission Recommended Specific Provision

To ensure compatibility with LCP Policy C2.5, the Commission recommends that **Condition TRANS-3** be modified to require that project-related traffic needing to use any alternative routes at least maintain existing levels of public access to the shoreline.

We also recommend a modification to the traffic analysis presented in the FSA. The FSA evaluated cumulative traffic impacts expected to result from this project and 26 other projects that are proposed, under review, or approved in the area between the power plant site and the Alamitos Power Plant staging area. However, that analysis does not appear to include two projects – the proposed Poseidon desalination facility and the Ascon Landfill cleanup – that are immediately adjacent to the HBEP site and could involve significant amounts of traffic. The Poseidon project is expected to generate up to about 225 trips per day and would use the same power plant access points and several of the same roads that AES plans to use for its project. The Ascon Landfill cleanup, which the FSA analysis mentions but does not include in its traffic analysis, is expected to involve up to about 200 truck trips per day for about a year starting in 2015.[50] Traffic associated with either of these projects could substantially change the FSA's analysis and further decrease the Levels of Service on nearby roads.

[49] The Level of Service refers to a method used to quantify existing baseline traffic conditions and the level of traffic congestion that may be present at certain times of day or under certain conditions. Levels of Service range from Level A, which allows the free flow of traffic, to Level F, which produces jammed conditions and significant delays.

[50] See DTSC's Ascon Landfill Draft EIR at: http://www.dtsc.ca.gov/SiteCleanup/Projects/Ascon.cfm

To ensure the AES project and these other projects do not create unanticipated cumulative traffic impacts, we also recommend the Traffic Control Plan required pursuant to **Condition TRANS-3** incorporate traffic that may be generated by these two projects, either or both of which could occur concurrently with the AES project.

Conclusion

The Commission finds that the CEC's implementation of the above-recommended Specific Provisions would allow the proposed project to be consistent to the extent feasible with relevant policies of the Coastal Act and LCP.

ATTACHMENT A – SUBSTANTIVE FILE DOCUMENTS

Coastal Commission, *Designation of Coastal Zone Areas Where Construction of an Electric Power Plant Would Prevent Achievement of the Objectives of the California Coastal Act of 1976*, adopted September 1978, revised 1984, re-adopted December 1985, San Francisco, CA

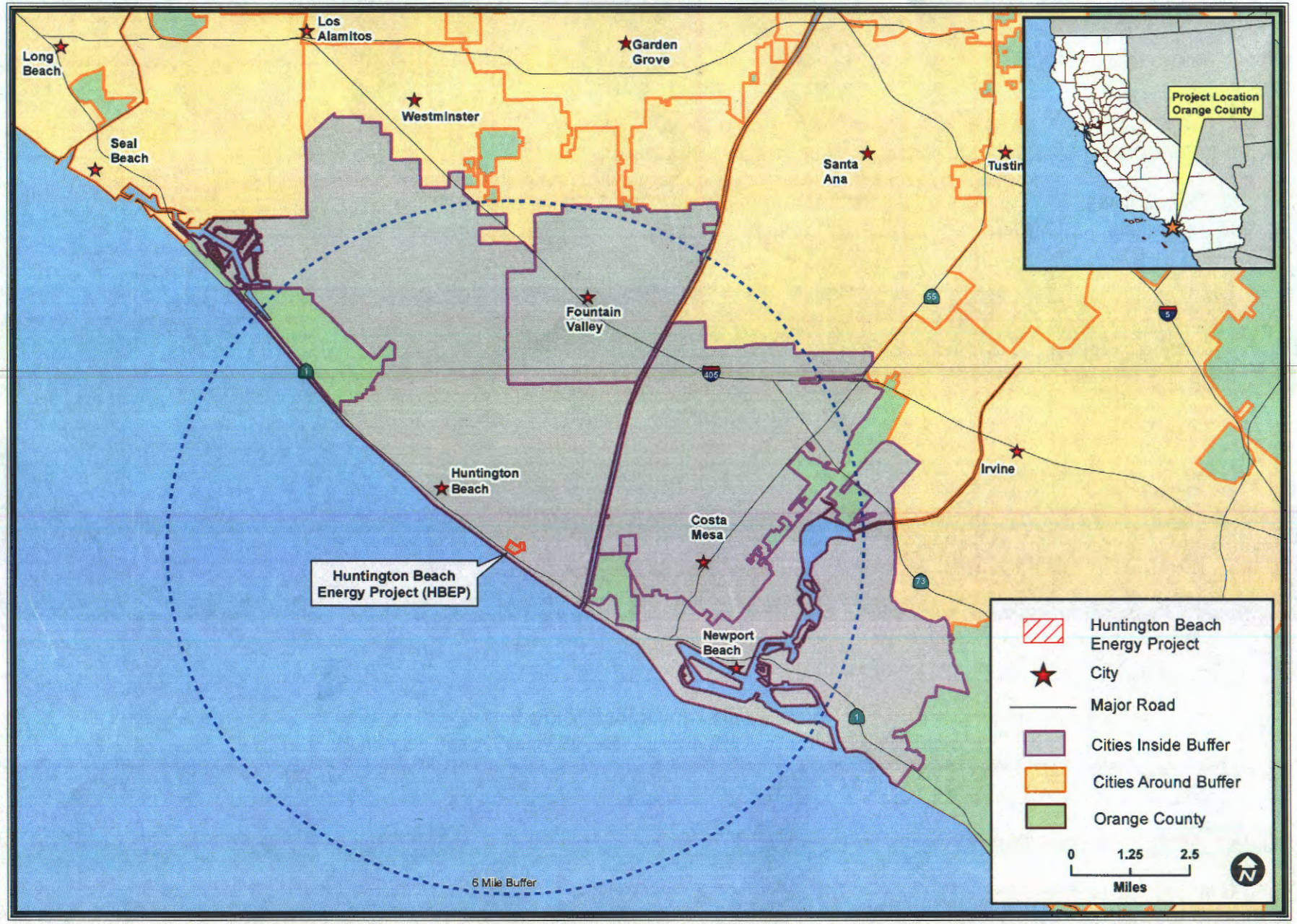
Coastal Commission, staff report for Poseidon Water Huntington Beach Desalination Facility – Appeal #A-5-HNB-10-225 and Application No.: E-06-007, November 2013, available at: http://documents.coastal.ca.gov/reports/2013/11/W19a-s-11-2013.pdf

Energy Commission, *Opportunities to Expand Coastal Power Plants in California*, Staff Report P700-80-001, June 1980, Sacramento, CA.

Energy Commission, Final Staff Assessment and associated docketed documents for 12-AFC-02, Application for Certification for AES Southland, LLC Huntington Beach Energy Project, filed prior to June 2014.

SOCIOECONOMICS - Figure 2

Huntington Beach Energy Project - Cities In and Around the Six Mile Buffer



SOCIOECONOMICS

CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Census 2010 - PL94-171, OpenStreetMap March 2013.

EXHIBIT No. 1

Huntington Beach Energy Project

SOIL & WATER - FIGURE 1
Huntington Beach Energy Park

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

EXHIBIT No. 2
Huntington Beach Energy Project

PROJECT DESCRIPTION - FIGURE 1A

Huntington Beach Energy Project - Conceptual Drawing

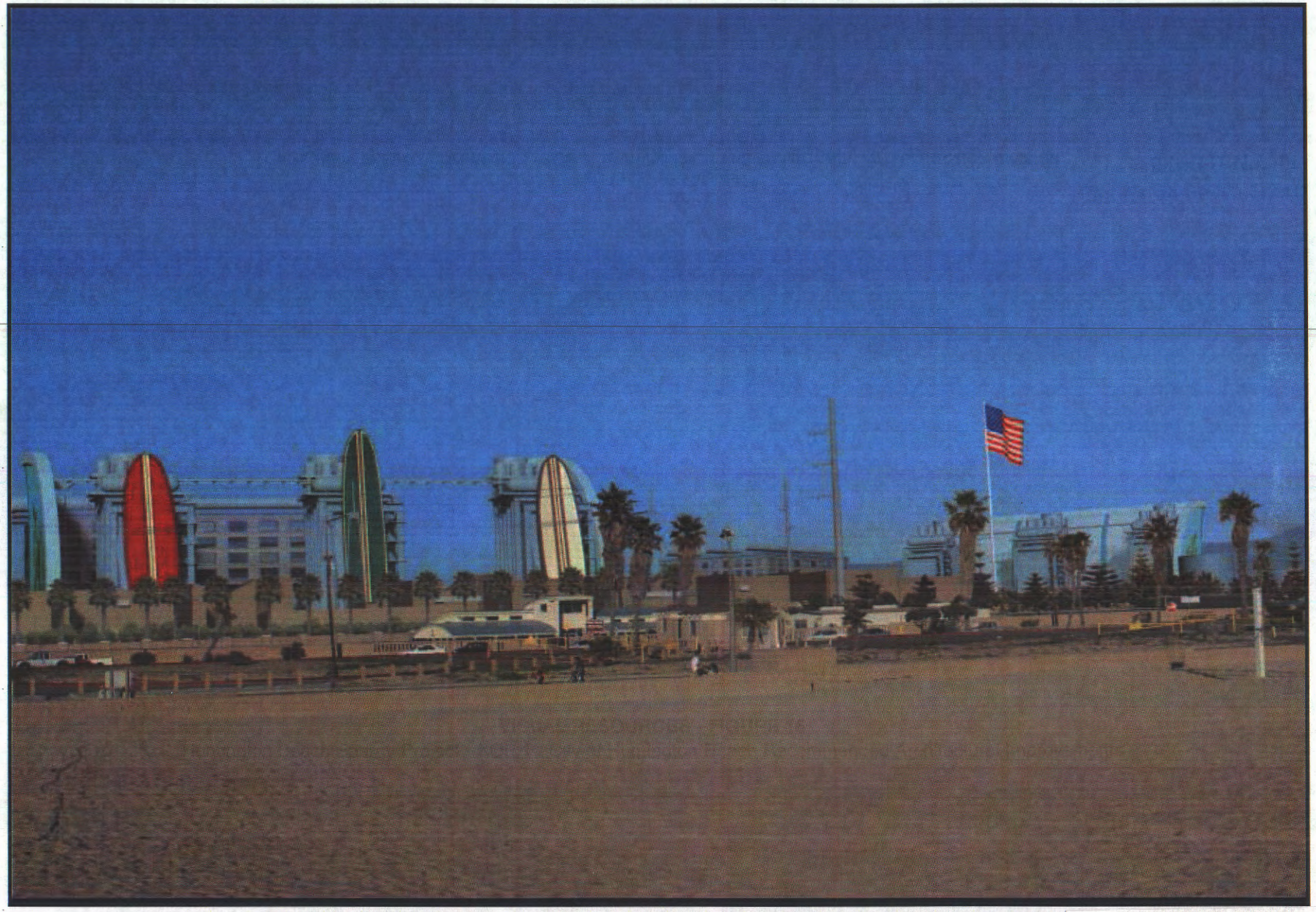
PROJECT DESCRIPTION

EXHIBIT No. 3

Huntington Beach Energy Project

VISUAL RESOURCES - FIGURE 16

Huntington Beach Energy Project - KOP 1 - City of Huntington Beach Recommended Architectural Improvements



VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: TN #202084

EXHIBIT No. 4a

Huntington Beach Energy Project

VISUAL RESOURCES - FIGURE 17

Huntington Beach Energy Project - KOP 4 – City of Huntington Beach Recommended Architectural Improvements

VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: TN #202084

EXHIBIT No. 4b

Huntington Beach Energy Project

EXHIBIT No. 5
Huntington Beach Energy Project

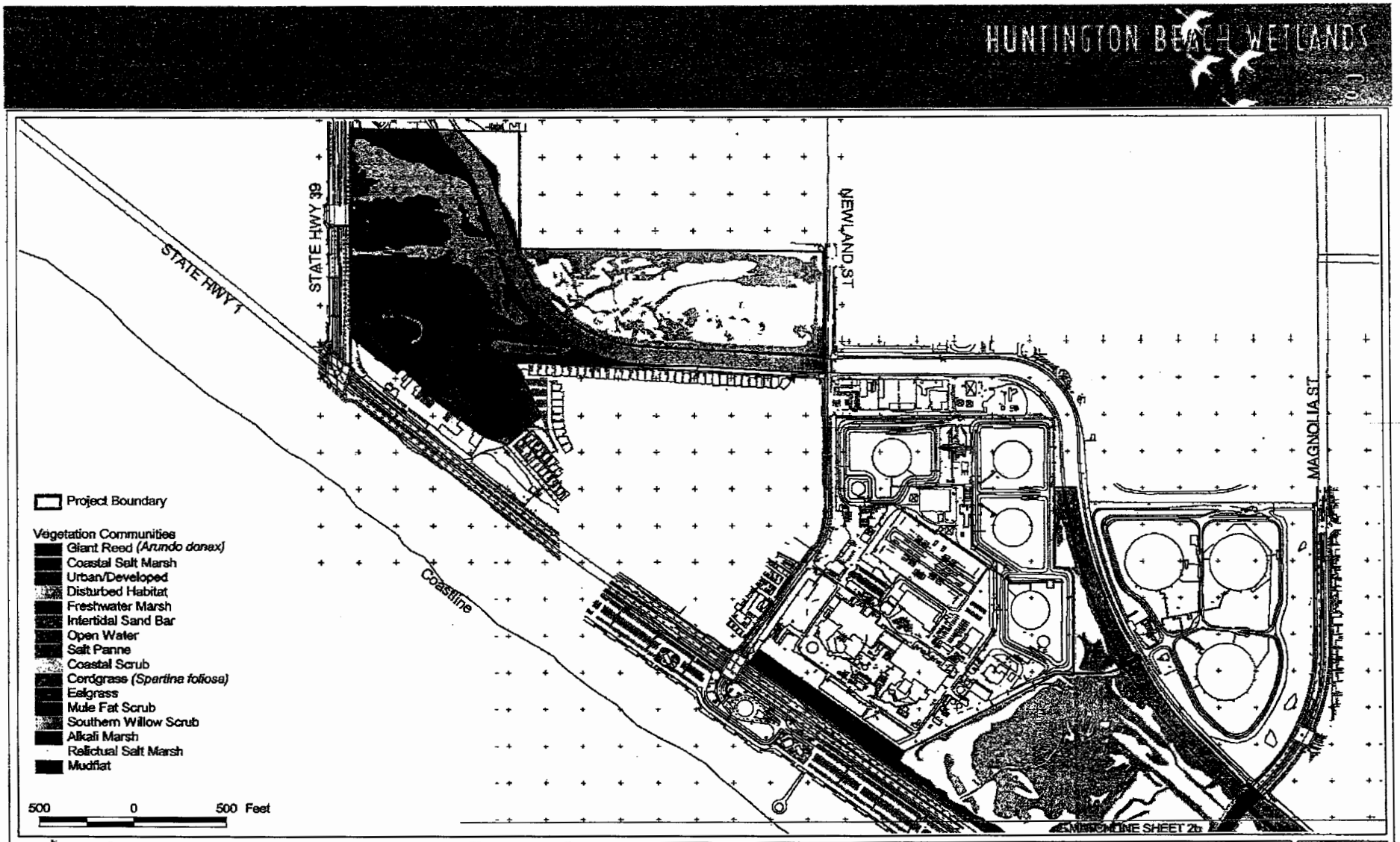
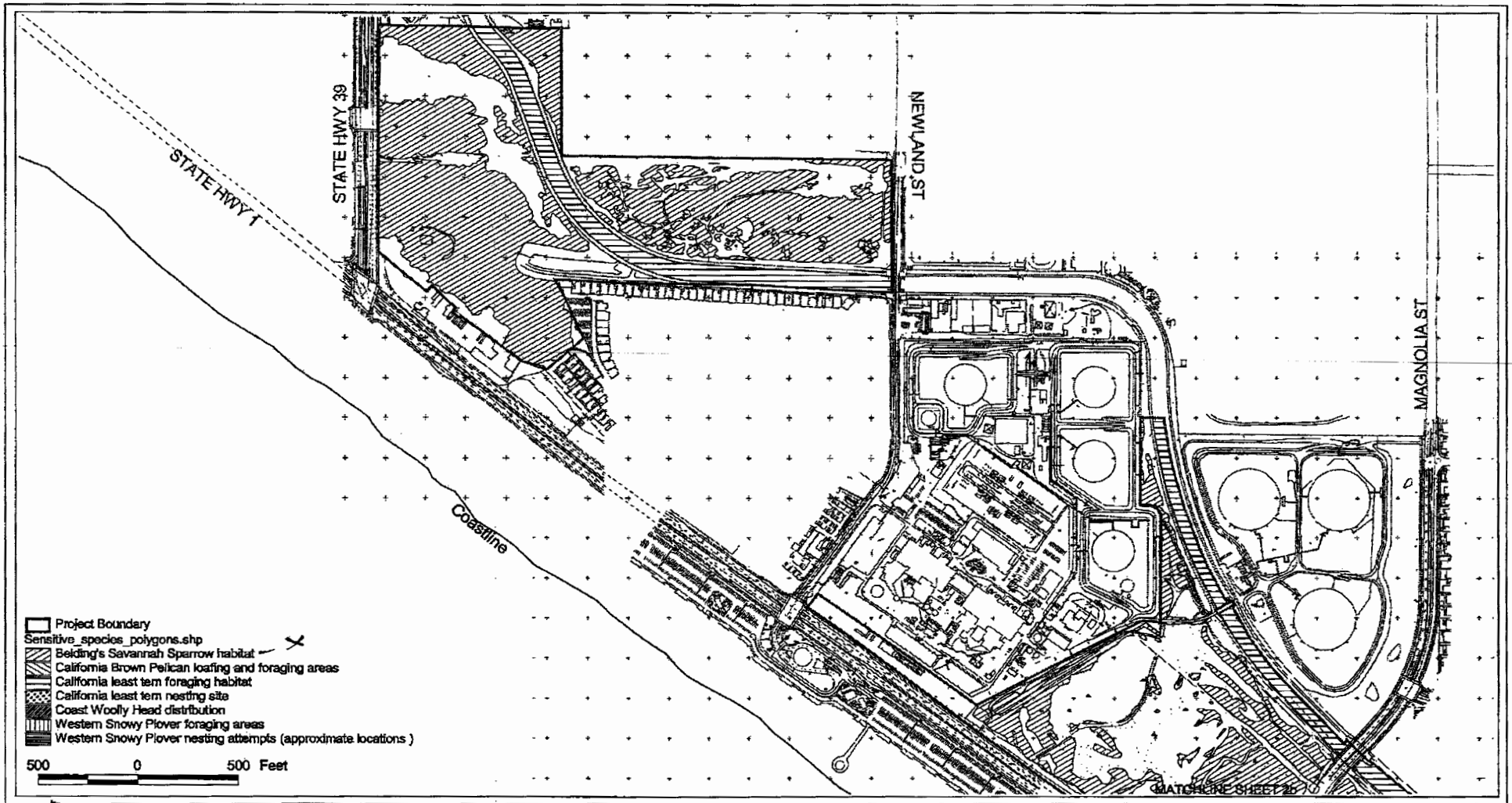


EXHIBIT No. 6
Huntington Beach Energy Project

04-001-01



Huntington Beach Wetlands
Sensitive Species Habitats
Western Portion

Figure 4a

Merkel & Associates, Inc.

EXHIBIT No. 7
Huntington Beach Energy Project

Sea Level Rise and Coastal Flooding Impacts

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

United States Department of Commerce | National Oceanic and Atmospheric Administration | National Ocean Service

Contact Us | Privacy Policy | Link Disclaimer | USA.gov

EXHIBIT No. 8
Huntington Beach Energy Project

Exhibit IV-D-2: City of Huntington Beach Prado Dam Inundation Map

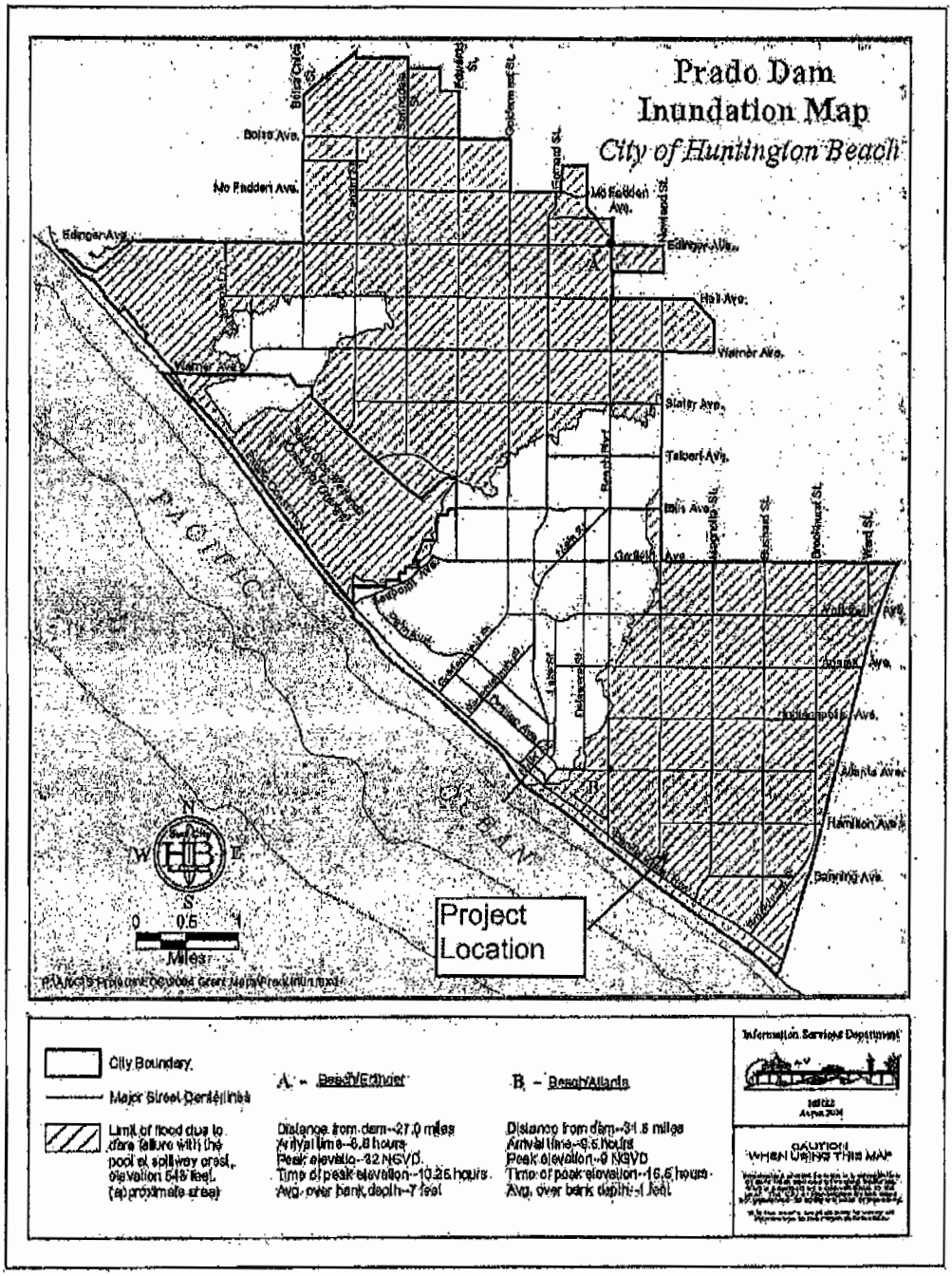
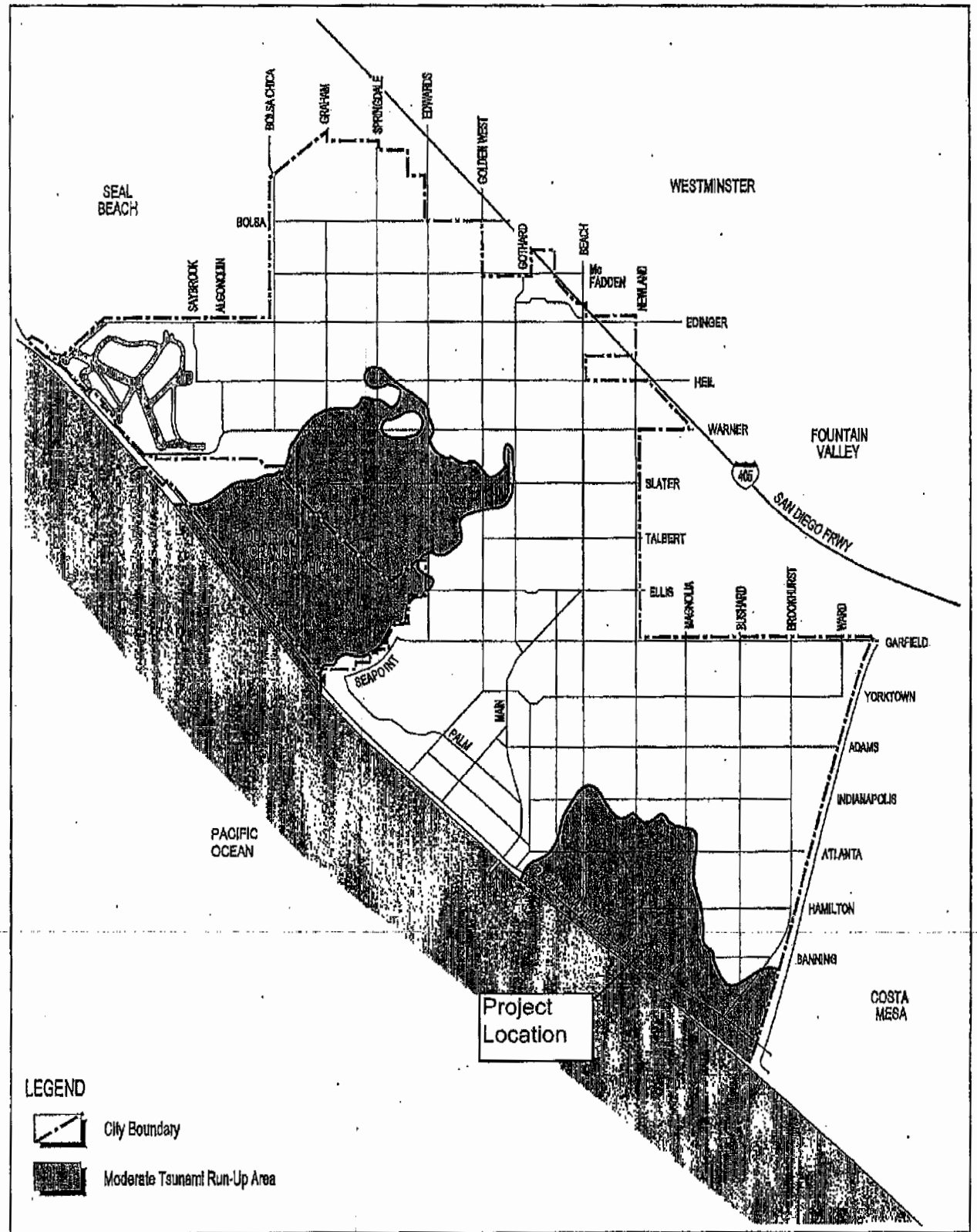


EXHIBIT No. 9
Huntington Beach Energy Project



MODERATE TSUNAMI RUN-UP AREA

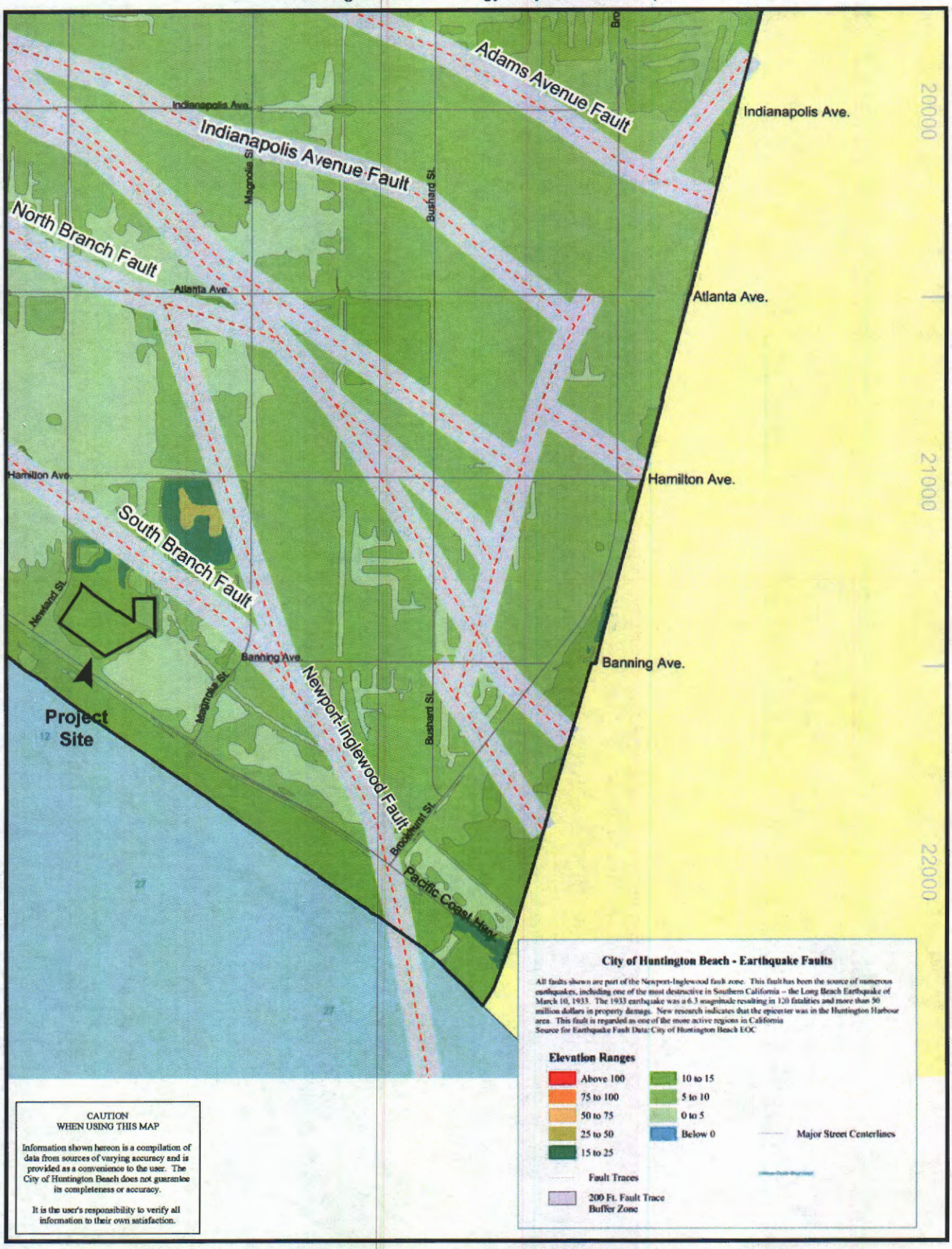
CITY OF HUNTINGTON BEACH GENERAL PLAN

FIGURE EH-8

EXHIBIT No. 10
Huntington Beach Energy Project

GEOLOGY AND PALEONTOLOGY - FIGURE 10

Huntington Beach Energy Project - Fault Map



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: City of Huntington Beach EOC

GEOLOGY AND PALEONTOLOGY

EXHIBIT No. 11

Huntington Beach Energy Project

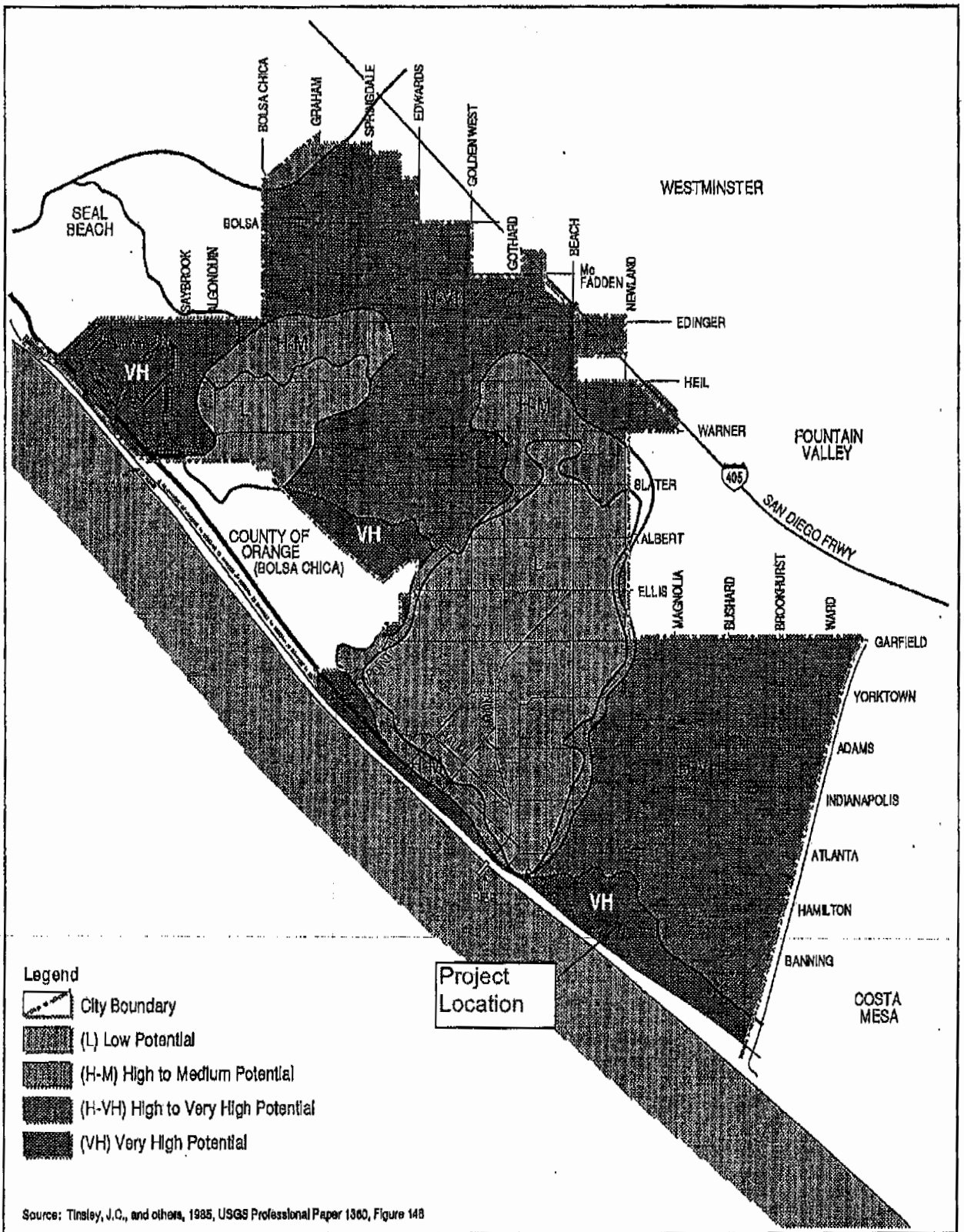


EXHIBIT No. 12
Huntington Beach Energy Project

TRAFFIC AND TRANSPORTATION - FIGURE 4
Huntington Beach Energy Project- HBEP Construction Parking Areas

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION
SOURCE: AFC - Figure 5.12 - 4

TRAFFIC AND TRANSPORTATION
EXHIBIT No. 13
Huntington Beach Energy Project