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Appendix	Study/Report	Content and Conclusions
Appendix A	2016 Desalination Amendment Compliance Matrix	Matrix provides information demonstrating that the proposed Project operations are in compliance with all applicable provisions of the Desalination Amendment, including requirements governing receiving water salinity; use of best available site, design, technology and mitigation; and consideration of preferred technologies.
Appendix A1	ECO-M Geophysics Report dated September 1, 2013	On August 6-7, 2013, EcoSystems Management Associates, Inc. (ECO-M) conducted a high-resolution, multichannel geophysical survey offshore of Huntington Beach in the area directly offshore from the site of the proposed Huntington Beach Desalination Project (Project). The objective of the survey was to further characterize the nearshore sub-bottom geology in order to characterize the offshore alluvial basin. The survey work was prompted by the request for additional data regarding the type of alluvial deposits that exist in the offshore basin in the vicinity of the proposed Project site. This study showed that the hydrogeological characteristics offshore of the proposed Desalination plant are complicated due to: • Expected gradual decrease in grain size and permeability in the Talbert Aquifer with distance offshore, • Limited hydraulic continuity due to complex geometry and segmentation of channels in the Talbert Aquifer beneath the coastal margin, and • Abundance of fine-grained, low-permeability sediment (mud) on the sea floor (Wong et al., 2013) that limits the hydraulic connection between the ocean and underlying aquifers.
Appendix A2	ECO-M Geophysics and Geotechnical Report dated June 1, 2015	ECO-M 2015 was conducted in response to California Coastal Commission requested further characterization of the offshore subsurface, including requests for further evaluation of grain size, sediment classification, and hydraulic conductivity. In response to this request, ECO-M acquired high-resolution sub-bottom profiles (CHIRP) and vibracores to refine the sub seafloor interpretations in the shallow subsurface and to provide geological "ground-truth" regarding sediment character and hydrogeological properties. Based on the results of this supplementary data, it appears that the findings and conclusions made in the 2013 feasibility assessment are accurate. The geological and hydrogeologic characteristics of the subsurface offshore of the proposed Desal Facility cannot reliably produce the required source water for the project.
Appendix A3	Geosyntec technical memorandum on the feasibility of wells dated June 3, 2015	Subsurface intake well feasibility report requested by the CCC staff and presented to the CCC's Well Investigation team (WIT). Memo updates Geosyntec's 2013 subsurface intake well modeling with different sensitivity analysis and concludes that intake wells continue to be technically infeasible and environmentally inferior.
Appendix A4	Technical memorandum by Dr. Scott Jenkins entitled *"On the Capture Radius of Ichthyoplankton by Intake Suction at Huntington Beach Desalination Facility (HBDF)"* dated November 9, 2015	Memo includes a hydraulic analysis that concludes the existing unscreened intake with velocity cap and intake volume of 106 MGD would only have a hydraulic effect on ichthyopankton (i.e., "capture area") of 0.25 acres around the intake structure.
Appendix A5	Life Cycle Cost of the proposed seawater Intake and Outfall technologies dated March 15, 2016	The Ocean Plan Amendment requires that the regional water board shall consider a host of factors in determining feasibility of subsurface intakes, including project life cycle cost. A detailed analysis of the life-cycle cost for the intake/discharge alternatives is presented in this Appendix.
Appendix A6	ECO-M Geophysics and	Resubmitted Eco-M report (Appendix A2)

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	Geotechnical Report dated June 1, 2015	
Appendix B	AES 2014 NPDES Permit	RWQCB Order No. R8-2014-0076 (CA0001163) establishes requirements for the discharge of once-through cooling water and other discharge flows from the AES Huntington Beach Generating Station (HBGS).
Appendix C	Poseidon 2012 NPDES Permit	RWQCB Order No. R8-2012-0007 (NPDES CA8000403) presents existing NPDES requirements for the discharge of concentrated seawater, filter backwash, and subsequent rinse wastewater from the HBDP.
Appendix D	Final 2010 SEIR with Appendices	Final Draft Supplemental EIR that assesses compliance of the HBDP with requirements of the California Environmental Quality Act.
Appendix E	Alternative Sites Analysis	Potential alternative sites for constructing a 25 MGD to 50 MGD seawater desalination facility are investigated. The proposed Project site is concluded as being more suitable and available than the potential alternative sites.
Appendix F	ISTAP Phase 1 Report	Phase 1 report from an Independent Scientific and Technical Advisory Panel (ISTAP) that evaluated nine types of subsurface intake and determined that subsurface intake alternatives are not feasible at or near the Project site. The Phase 1 report recommended that seabed infiltration galleries (SIG) and beach gallery intake systems be evaluated in Phase 2.
Appendix G	ISTAP Final Phase 2 Report	Final Phase 2 ISTAP report determined that subsurface intake alternatives utilizing SIG or beach gallery intake systems are not feasible at or near the Project site.
Appendix G1	City of HB ISTAP2 Comment Letter	City of HB 2010 SEIR found SIGS to be, "infeasible and environmentally inferior to open intakes." Asked ISTAP to acknowledge this finding.
Appendix H	Intake Discharge Feasibility Report	Alden Research Laboratory report assessed intake and discharge alternatives, and determined that the HBGS wastewater intake and a discharge diffuser represented the best available site, design, technologies, and mitigation measure necessary to minimize intake and mortality for marine life.
Appendix I	2010 Executed SLC Lease Amendment	State Lands Commission (SLC) amendment of the lease for the HBDP site.
Appendix J	Huntington Beach Desalination Project 2005 REIR	Final Project REIR for the original proposed HBDP facilities and operations.
Appendix K	Offshore Subsurface Collectors	Geosyntec assesses beach wells and offshore subsurface collectors and determined that neither technology is feasible for application at the HBDF.
Appendix L	Geosyntec Model CCC Third Party Review by Dr. Detwiler	Dr. Russell Detwiler reviews the Geosyntec model for evaluating offshore subsurface collectors and determines that the model presents a reasonable representation of the flow system for assessing slant wells.
Appendix L2	September 28, 2015 OCWD letter from staff hydrogeologist Roy Herndon to the Concur, Inc, the ISTAP and WIT facilitator	OCWD letter from staff hydrogeologist Roy Herndon provides peer review of Geosyntec model and validates that a portion of the water pumped by the SSIs would come from the inland aquifers and the Talbert Barrier Injection wells. Reduction of the effectiveness of aquifer replenishment by the Talbert Barrier Injection wells is unacceptable to the OCWD. Moreover, extraction by subsurface intakes of groundwater from inland aquifers in Orange County would be subject to a replenishment assessment by the OCWD.
Appendix L3	February 12, 2016 OCWD letter to Coastal Commission staff re: Dr.	OCWD letter states that district hydrogeologist Roy Herndon agrees with CCC third party reviewer Dr. Detwiler that the Geosyntec groundwater model underestimates the potential fresh water drawdown.

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Appendix	Study/Report	Content and Conclusions
	Detwiler's 3rd party review of groundwater model	
Appendix M	Seabed Infiltration Galleries Assessment	A hydrodynamic model is used to assess potential seabed infiltration galleries (SIG) sites and sediment transport effects.
Appendix N	MWDOC 2010 RUWMP	Chapter 7 of the 2020 Metropolitan Water District of Orange County (MWDOC) describes the application of desalination technology to meet the region's future water needs, and three proposed desalination projects (including the HBDP) that could provide additional supply.
Appendix O	OCWD Long Term Facilities Plan 2014 Update	The *Orange County Water District (OCWD) Long Term Facilities Plan, 2014 Update* addresses the importance of the Project in reducing reliance on imported water and improving water supply reliability.
Appendix P	OCWD/Poseidon Water Reliability Agreement	OCWD and Poseidon have entered into a 56,000 AF/year water purchase agreement to decrease reliance on imported water and improve supply reliability.
Appendix P2	OCWD/Poseidon 2018 amended Water Reliability Agreement	In July 2018 OCWD and Poseidon amended the 2015 56,000-acre feet per year water purchase agreement.
Appendix P3	May 21, 2015 OCWD letter to Concur, Inc., ISTAP and WIT facilitator	OCWD letter states that subsurface intakes would increase the cost of water beyond OCWD's willingness to pay and require unproven and unreliable seawater intake technology. The letter concludes that a smaller plant would not meet OCWD water planning objectives.
Appendix P4	December 7, 2011 OCWD letter to the Regional Board	The December 2011 OCWD letter states that OCWD has signed a Memorandum of Agreement to consider the purchase of water from the desalination plant and urges the Regional Board to approve the NPDES permit and water Code Compliance Determination.
Appendix P5	January 28, 2015 OCWD letter to the Coastal Commission	OCWD Letter to the Coastal Commission informing the Commission that OCWD and Poseidon have entered into negotiations for the purchase of 56,000 acre feet of water from the HB plant.
Appendix Q	HB Entrainment Data Summary	Detailed study of larval fish communities in the vicinity of the HBGS intake site, including assessment of data for the periods 2003-2004 and 2014-2015.
Appendix R	Diffuser Analysis	Hydrodynamic model is used to assess the proposed 6-jet radial diffuser retrofit and demonstrate compliance with Desalination Amendment receiving water salinity requirements.
Appendix S	Conventional Diffuser Analysis	Hydrodynamic model is used to assess a 4-jet conventional diffuser retrofit and demonstrate compliance with Desalination Amendment receiving water salinity requirements.
Appendix T	Diffuser APF	Assesses shear stress from multiport diffuser discharge, and computes Area of Production Foregone (APF) for both temporary commingled and permanent stand-alone conditions.
Appendix U	2013 Marne Life Mitigation Plan	A Marine Life Mitigation Plan (MLMP) addresses potential intake and discharge entrainment effects associated with the operation of the proposed Project assesses the quantity of required coastal wetlands restoration.
Appendix V	APF Calculations	Based on requirements within the Desalination Amendment, the final estimate of APF for the Project is computed using a 95% confidence interval at 16.9 acres of wetland habitat.
Appendix W	Entrainment Effects on MPAs	Entrainment study concludes that an extremely low potential exists that larval fish entrainment losses due to HBDP operation will affect the Southern California network of Marine Protected Areas (MPAs).

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Appendix	Study/Report	Content and Conclusions
Appendix X	2016 Marine Life Mitigation Plan	Submitted as Appendix SS (Newland Marsh MLMP) and TT (Bolsa Chica MLMP)
Appendix Y	MLMP Condition Compliance	California Coastal Commission (CCC) requirements for the phased implementation of Poseidon's MLMP.
Appendix Z	2017 Monitoring and Reporting Plan	Proposed Monitoring and Reporting Program (MRP) incorporates enhanced receiving water sediment, benthic, and water column monitoring in order to comply with monitoring provisions established within the Desalination Amendment.
Appendix AA	Intake Feasibility: TWS vs. WWS	Analysis of intake technologies concludes that offshore cylindrical wedgewire screen (WWS) intake technology is biologically superior in performance (less impingement) than the use of onshore travelling water screens and a fish return system.
Appendix BB	Offshore Intake Feasibility	Long-distance offshore intake alternatives are assessed and are determined to not be feasible due to construction-related environmental impacts and minimal differences in larval densities nearshore and offshore.
Appendix CC	Brine Discharge Evaluation	Regional wastewater outfall discharges and facilities are evaluated, and commingling the Project concentrated seawater into the wastewater outfalls is determined to not be feasible.
Appendix DD	OCSD Ocean Outfall Capacity Correspondence	2016 correspondence from the Orange County Sanitation District concludes that insufficient future wastewater flows will be available to meet Ocean Plan receiving water limitations for either partial or full discharge of the Project flows.
Appendix EE	Water Demand White Paper	Issues paper summarizes the local need for 50 mgd of desalinated ocean water for the Project planned design capacity.
Appendix FF	2015 MWDOC UWMP	Final version of the 2015 MWDOC Urban Water Management Plan addresses the need for desalination supplies
Appendix GG	OCWD Groundwater Management Plan 2015 Update	OCWD Groundwater Management Plan 2015 update identifies the 50 mgd capacity of the Project as providing a benefit to the Orange County Groundwater Basin and includes the project under recommendations for 2015-2020.
Appendix HH	Wedgewire Screen Intake Environmental Analysis	Environmental analysis concludes that the proposed wedgewire intake modifications and multi-jet diffuser will reduce environmental impacts compared to components evaluated in the 2020 Final SEIR.
Appendix II	Wedgewire Screen Maintenance Plan	Maintenance plan for designing, operating and maintaining the proposed wedgewire screen (WWS) intake structure.
Appendix JJ	Project Description Wedgewire Screen and Diffuser	A WWS intake system is proposed under long-term stand-alone operations to comply with the Desalination Amendment. Under co-located operations, a wastewater commingling/diffuser combination will be used to comply with the Desalination Amendment.
Appendix KK	2015 MWD Integrated Resource Plan	The 2015 Integrated Resources Plan (IRP) of the Metropolitan Water District of Southern California identifies seawater desalination as an important element of the Southern California water supply portfolio.
Appendices Submitted in Response to July 29, 2016 Notice of Incomplete Application ("NOIA")		
Appendix LL1 and LL2	Water Demand White Paper May 2, 2016 and July 26, 2016 Addendum	Paper summarizes the local need for 50 mgd of desalinated ocean water for the Project planned design capacity. And explains why OCWD planning documents call for "up to 50 MGD" from Huntington Beach Project.

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Appendix	Study/Report	Content and Conclusions
Appendix MM (Identified as Attachment 1)	August 3, 2016 OCWD Letter to Regional Board	Letter expressing OCWD's intent to purchase 56,000 acre feet per year from the project and stating that project complied with OPA Chapter III.M.2.b(2) as meeting an identified need for desalinated water.
Appendix NN (Identified as Attachment 2)	August 31, 2016 Poseidon memo entitled "Water Resources Loading Order"	Determining the need for the Huntington Beach Desalination Project on the basis of a "desal as the last resort" approach is contrary to the Desalination Amendment.
Appendix OO1 and OO2 (Identified as Attachment 3A and 3B)	Analysis of Alternative Sites part 1 and part 2	Populated alternative sites matrix [Attachments #3A #3B of the submittal] that the Water Board staff attached to its July 29, 2016 Notice of Incomplete Application.
Appendix PP (Identified as Attachment 4)	August 8, 2016 HDR/MBC technical memorandum entitled "Comparison of Existing Offshore Ichthyoplankton Data for the Huntington Beach Desalination Plant"	This report includes entrainment sampling data and analysis and concludes that the area offshore of Huntington Beach with the lowest concentrations of fish larvae is the existing seawater intake location and that moving the proposed 1 mm screened intake farther offshore will not reduce the intake and mortality of all forms of marine life or reduce the intake and mortality of marine life associated with Marine Life Protected Areas ("MPAs").
Appendix QQ (Identified as Attachment 5)	August 8, 2016 Poseidon White Paper entitled "ISTAP Economic Analysis"	Paper documents how the ISTAP's economic feasibility evaluation meets or exceeds the requirements of Chapter III.M.2.(a) of the Desalination Amendment. Poseidon believes that further independent analysis of an independent analysis done by an independent panel sanctioned and jointly selected by the Coastal Commission is unnecessary and unjustified.
Appendix RR (Identified as Attachment 6)	July 2016 Marine Life Mitigation Plan ("MLMP") alternative site evaluation conducted by WRA	WRA memorandum relying on the guidance found in the Desalination Amendment evaluating ten (10) different sites in Southern California suitable to mitigate for the project's unavoidable marine life impacts.
Appendix SS (Identified as Attachment 7)	Newland Marsh MLMP	One of two MLMP options presented to the Regional Board, both MLMP include Marine Life Mortality Reports that conclude either site would sufficiently mitigate for the Project's unavoidable operational impacts to all forms of marine life.
Appendix TT (Identified as Attachment 8)	Bolsa Chica MLMP	One of two MLMP options presented to the Regional Board, both MLMP include Marine Life Mortality Reports that conclude either site would sufficiently mitigate for the Project's unavoidable operational impacts to all forms of marine life.
Appendix TT2	Bolsa Chica MLMP REVISED February 2018	The Bolsa Chica Marine Life Mitigation Plan was revised as requested by the RWB staff to address impacts from Sea Level Rise; other restoration opportunities as well as further analysis of the proposed plans compliance with the OPA
Appendix UU (Identified as Attachment 9)	August 29, 2016 technical memorandum from Michael Baker International entitled "Initial Dilution in a Quiescent Ocean Due to Discharges of Concentrated Seawater from the Huntington	Memo is an update of the previous hydraulic model provided to the Regional Board on June 29, 2016. This updated model was requested by the State Water Board staff to assess the discharge of the concentrated seawater plume under quiescent ocean conditions. The report concludes that even under these extremely conservative assumptions of quiescent ocean conditions that the discharge from the desalination plant will meet or exceed the Desalination Amendment's receiving water quality standards.

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	Beach Desalination Facility (HBDF)"	
Appendix VV	July 8, 2016 OCWD Letter to Regional Board regarding Distribution of desalinated water	Letter states that OCWD is still evaluating options for integrating desalinated water into distribution system. Board voted to sell water to coastal cities and integrate water into basin. OCWD will not execute water purchase agreement until the permitting process has been concluded.
Appendix WW	July 7, 2016 MWDOC Letter to Regional Board	MWDOC letter identifies 56,000 acre feet capacity Huntington Beach Desalination project in 2015 UWMP Update as planned future water supply project; letter states that project complies with Chapter III.M.2.(a) of the Desalination Amendment.
Appendices Submitted In Response October 31, 2016 Notice of Incomplete Application ("NOIA")		
Appendix XX	Poseidon memo responding to Water Board Staff's October 31, 2016 Notice of Incomplete Application, RCF #18 and #23	Response to Water Boards staff's proposal to narrow the focus to a smaller number of alternative sites for which a more comprehensive analysis of best available design feasible may better serve the needs of both Poseidon and the Regional Water Board, and meet the requirements of the Desalination Amendment.
Appendix YY	January 26, 2017 WRA Letter in response to RCF #59b, 61, 65	WRA letter responded to Regional Board staff's request for additional information regarding Poseidon's proposed Bolsa Chica and Newland Marsh MLMP compliance with the Desalination Amendment.
Appendix ZZ	January 5, 2017 Poseidon memo entitled *"Addendum Responding to Water Boards Staff Consideration of Narrowing the Focus to a Smaller Number of Alternative Sites."*	Update to Appendix XX - Response to Water Boards staff's proposal to narrow the focus to a smaller number of alternative sites for which a more comprehensive analysis of best available design feasible may better serve the needs of both Poseidon and the Regional Water Board, and meet the requirements of the Desalination Amendment.
Appendix AAA	March 8, 2017: Poseidon draft matrix entitled *"Narrowing the Number of Alternative Sites for the Proposed Huntington Beach Desalination Project (HBDP) Subject to Additional Analysis under the California Ocean Plan Desalination Amendment."*	Matrix prepared by Water Board staff populated by Poseidon with requested data. Matrix concludes alternative sites are either unavailable or infeasible.
Appendix BBB	April 20, 2017: Poseidon matrix entitled "Huntington Beach Desalination Plant Alternative Sites Analysis – Expanded Analysis."	Update to Appendix AAA with expanded analysis and additional data and information pertaining to alternative sites 1D, 1E, 1H and 2A identified by Water Board staff for further analysis. Submittal includes cover letter, matrix, matrix summary and matrix attachments. Matrix concludes alternative sites are either unavailable or infeasible.
Appendix CCC	January 2017 Dudek Technical memorandum entitled *"Huntington Beach Desalination Plant Brine Discharge and Wastewater Commingling Feasibility Assessment"*	Memo included comprehensive review of feasibility of comingling Project brine with an existing wastewater outfall and concluded it to be infeasible.

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Appendix	Study/Report	Content and Conclusions
Appendix DDD	November 21, 2016 OCSD Letter to Regional Board	Letter from Orange County Sanitation District to Regional Board opining that comingling Project brine with wastewater at OCWD Plant #2 is infeasible.
Appendix EEE	November 18, 2016 HDR/Michael Baker International and technical memorandum entitled *"Sensitivity of Sweeping Velocities to Ocean Water Depth for Wedge-Wire Intake Screens at the Huntington Beach Desalination Facility (HBDF)"*	Memo in response to Water Board staff's request to evaluate feasibility of moving wedgewire screens farther offshore. Hydraulic analysis concludes that moving location of wedgewire screens to 1.2 miles offshore would reduce sweeping velocities by up to 75%.
Appendix FFF	February 7, 2017 HDR/Michael Baker International and technical memorandum entitled *"Sensitivity of Sweeping Velocities to Ocean Water Depth for Wedge-Wire Intake Screens at the Huntington Beach Desalination Facility (HBDF)"*	Update the Appendix EEE to address data analysis requested by Water Board staff related to waves and currents. Report's conclusions remain the same.
Appendix GGG	March 20, 2017 letter from OCWD to Regional Board regarding distribution system CEQA	OCWD informs Regional Board that it will not conduct any additional CEQA evaluation of the desalinated water distribution system that may be necessary until after the project has received all of its discretional permits.
Appendix HHH	November 18, 2016 Geosyntec technical memorandum entitled *"Additional Sensitivity Analyses Of Slant Well SSI Model Feasibility Modeling: Variation In The Location And Length Of The Slant Wells Has Very Little Influence On The Portions Of Source Water Pumped By The Slant Wells"*	At the request of the Water Board staff Geosyntec updated the Hydraulic model to evaluate the technical feasibility of moving slant wells farther offshore. The updated Hydraulic model concludes that variation in the location and length of the slant wells by a several hundred feet has very little influence on the portions of source water pumped by the slant wells. Based on the documented muddy nature of the sea floor off of Huntington Beach, the actual vertical hydraulic conductivity of the shallow strata is likely lower than an assigned both for the original modeling and the simulations of pumping from longer slant wells. As documented by the previous sensitivity analyses (Geosyntec, 2015), lower hydraulic conductivity of the strata overlying the Talbert Aquifer, which is likely more realistic, reduces the portion of water drawn from the ocean by the hypothetical slant wells and increases the impact on inland aquifers and the Talbert Injection Barrier.
Appendix III	January 18, 2017 Geosyntec updated Technical Memorandum	Update to Appendix HHH. Geosyntec provided updated Hydraulic model requested by Water Board staff with assumptions for different well lengths and angles. Conclusions remain changed, slant wells are technical infeasible.
Appendix JJJ	HDR Technical Memo entitled *"Brine Discharge Mortality Calculations for the Huntington Beach and Carlsbad Desalination Projects"* dated January 30, 2017	HDR memo provides overview of OPA's requirements discharge impacts that require mitigation are associated with the construction and operation of the discharge structures after having first minimized intake and mortality of all forms of marine life through best available site, design, and technology. This memo describes Poseidon's methods for calculating mortality associated with the brine discharge approach for their projects. The three individual components to each discharge mortality calculation include construction-related impacts, impacts

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		associated with the BMZ, and impacts associated with high shearing stress at the point of discharge.
Appendix KKK	WRA memorandum entitled, "Comparison of entrained fish species at Huntington Beach and species found at Bolsa Chica Wetlands" dated January 26, 2017	WRA memo provided along with WRA Letter in response to RCF #59b, 61, 65 (Appendix YY). Memo provides marine biological data and analysis supporting the continued inlet maintenance at Bolsa Chica would assure high productivity for marine and coastal organisms in the vicinity. Further, results of ocean current models suggest that entrained larvae are most likely to originate from the Los Angeles/Long Beach Harbor, which is not a Marine Protected Area. This makes inlet maintenance at Bolsa Chica particularly suitable as a mitigation strategy for potential entrainment at the proposed Poseidon desalination facility.
Appendix LLL	PowerPoint Presentation regarding Discharge Mortality Calculations dated February 1, 2017	Presentation provided information for why ETM/APF is appropriate model for assessing mortality of organisms in entrained ambient flow. Presentation included Marine Life mortality calculations for intake and discharge operating effects of HB project.
Appendix MMM	PowerPoint Presentation from Geosyntec on slant well modeling and feasibility dated November 22, 2016	Presentation provides modeling data and analysis that concludes variation of the location and length of hypothetical slant wells has very little influence of the portions of source water pumped from the aquifer.
Appendix NNN	Poseidon Response to Regional Board request regarding entrainment data and Area of Production Foregone (APF) mitigation calculation. (RCF 52, 54, 55)	Memo provides justification for the use of the 2003-04 entrainment sampling data for the calculation of ETM/APF. Memo summarizes calculation that the operational impacts (i.e., intake and discharge) of the HB project result in a total APF of 40.4 acres based on the guidance for calculating APF in the OPA.
Appendix OOO	MBC memo entitled "Intake Location Entrainment Analysis" dated November 17, 2016	MBC memo in response to the Water Board staff's request for information about larval densities at the proposed site compared to farther offshore. Presentation concludes that proposed location has lowest concentrations of fish larvae.
Appendix PPP	MBC memo entitled "Intake Location Entrainment Analysis" dated February 6, 2017	Revised and updated version of MBC's November 17, 2016 report that responds to request from Coastal Commission and Water Board staff for additional statistical analysis of offshore larval densities.
Appendix QQQ	PowerPoint Presentation on Seawater intake location dated January 10, 2017	PowerPoint Presentation from HDR in response to the Water Board staff's request for information about larval densities at the proposed site compared to farther offshore. Presentation concludes that proposed location has lowest concentrations of fish larvae.
Appendix RRR	PowerPoint Presentation on seawater intake location dated February 1, 2017	Revised PowerPoint Presentation from HDR in response to the Water Board staff's request for additional information about larval densities at the proposed site compared to farther offshore. Presentation continues to conclude that proposed location has lowest concentrations of fish larvae and larvae found farther offshore are associated with MPAs
Appendix SSS	HDR memorandum entitled, "Utilization of 2003-04 Huntington Beach Generating Station Entrainment Data" dated April 17, 2017.	Relying on guidance in the OPA, the memo provides justification for the plankton data collected in support of the Huntington Beach Generating Station Retool Project in 2003-2004 (MBC and Tenera 2005) as representing the most robust and informative data set available for evaluating desalination project impacts and mitigation.
Appendix TTT	HDR memorandum entitled, "Huntington Beach Desalination Plant:	Memorandum concludes that the habitats expected to be impacted by the operation of the HBDP 1-mm wedgewire screened intake and diffuser discharge include the sandy bottom (substrate) and the water column. Available

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Appendix	Study/Report	Content and Conclusions
	Mitigation Habitat Assessment." Dated April 14, 2017.	information comparing habitat productivity provides scientific justification that a 10:1 mitigation ratio is appropriate for the soft-bottom sandy habitat and water column habitat impacted by the HBDP intake and discharge operations, if not conservative. This means 10 acres of impacted habitat would be fully mitigated by the restoration/creation of one acre of wetland/estuarine habitat.
Appendix UUU	TWB technical memorandum entitled *"Sweeping Velocity for Wedgewire Screen Cleaning"* dated April 26, 2017.	TWB memo prepared in response to the request for additional information from the Water Board staff regarding desired minimum sweeping velocities. Based on the literature available, the minimum recommended ambient sweeping velocity should be the same as the through-slot velocity (i.e., a target ratio of one). The design through-slot velocity for the HBDP WWS intake is 0.5 ft/sec or less in order to comply with the requirements of the Ocean Plan Amendment. Memo concludes sufficient sweeping velocities will occur at the proposed site but not farther offshore
Appendix VVV	HDR memorandum entitled "Water Quality outside the Huntington Beach Desalination Plant Brine Mixing Zone." Dated May 2, 2017	This memo provides a response the October 31, 2016 request for additional information from the water Board staff related to documentation whether the brine discharge would result in hypoxic conditions outside of the BMZ. The memorandum describes why the proposed discharge is not expected to result in hypoxic conditions outside of the BMZ.
Appendix WWW	November 10, 2016 email from Scott Maloni to Milasol Gaslan. Topic: Brine discharge technology	Email includes information from the Orange County Sanitation District related to the feasibility of comingling HB project brine with wastewater ay OCSD Plant #2. Specific information responded to RCF 24 from the October 31, 2016 NOIA.
Appendix XXX	November 18, 2016 email from Scott Maloni to Milasol Gaslan. Topic: slant well feasibility	In response to RCF 19 from the October 31, 2016 NOIA, the email included a draft copy, and summary conclusions, of the November 18, 2016 Geosyntec memo on the technical feasibility of extending slant wells farther offshore of Huntington Beach.
Appendix YYY	Report, Geology of the Orange County Region, Southern California.	Copy of the Orange County Geology report authored by Orange County Water District Chief Hydrogeologist Roy Herdon.
Appendix ZZZ	Spreadsheet entitled ISTAP Final Capital Costs	In response to RCF 33a and 33b from the October 31, 2016 NOIA, Poseidon provided via a December 5, 2016 email to Milasol Gaslan.
Appendix AAAA	Poseidon report entitled, *"ISTAP Project and Life Cycle Cost Analyses were Consistent with the OPA"* dated December 5, 2016.	In response to RCF 33a and 33b from the October 31, 2016 NOIA, Poseidon provided via a December 5, 2016 email to Milasol Gaslan.
Appendix BBBB	May 12, 2017 Alden memo entitled, *"Diffuser Discharge Vertical Angle Selection for Poseidon Huntington Beach Desalination Plant."*	In response to RCF 31, the Alden memo explains the use of a 47 degree angle for the diffuser at the proposed site based on jet trajectory to ensure there is no surface boil.
Appendix CCCC	February 28, 2017 Michael Baker International Technical memo entitled, *"Dilution Analysis Alden 3-Jet Duckbill Diffuser Retrofit at Huntington Beach*	Technical memorandum provides the hydrodynamic analysis of the revised 3-jet duckbill diffuser.

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Appendix	Study/Report	Content and Conclusions
	Desalination Facility (HBDF)"	
Appendix DDDD	February 23, 2017 Alden technical memo entitled *"Huntington Beach Desalination Facility Discharge Diffuser Design"*	Technical memorandum provides the details of an update 3-jet duckbill diffuser design that will achieve the objectives of the State Water Board's Ocean Plan Amendment ("OPA"). Specifically, the revised diffuser design will maximize dilution, minimize the size of the brine mixing zone, minimize the suspension of benthic sediments, and minimize mortality of all forms of marine life due to Project construction and operation.
Appendix EEEE	Calculation of Huntington Beach Desalination Project Potential Benthic Impact Area Estimate dated April 25, 2017.	Document provides a calculation of the benthic footprint of the proposed brine diffuser and wedgewire screen intake.
Appendix FFFF	Huntington Beach Desalination Plan Process Flow Diagram	The Huntington Beach Desalination Project Process Flow Diagram identified as Figure 6 in the June 2016 ROWD application.
Appendix GGGG	RO Process Chemical List	May 19, 2017 Microsoft Excel file that identifies the chemicals to be used in the desalination process.
Appendix HHHH	June 7, 2017 Michael Baker International Technical memorandum entitled, *"Sensitivity of Sweeping Velocities to Ocean Water Depth for Wedge-Wire Intake Screens at the Huntington Beach Desalination Facility (HBDF)."*	Memo responds to RCF 27 in the Regional Board's May 23, 2017 letter. Specifically, Perform an updated analysis for Appendix FFF: Sensitivity of sweeping velocities to ocean water depth for wedgewire intake screens at HBDF (2/7/17), using data from Acoustic Doppler Current Profilers at stations 02 and 04 instead of at the proposed site. Additionally, the report claims that a sweeping velocity of 1 ft/sec is required. However, Appendix VVV: Sweeping Velocity for Wedgewire Screen Cleaning (4/16/17) indicates that a sweeping velocity equal to the through-screen velocity may be sufficient. Accordingly, revise the analysis in Appendix FFF to reflect that a sweeping velocity of 0.5 ft/swill be sufficient. Furthermore, Appendix FFF uses only linear wave theory to calculate currents. Update Appendix FFF to reflect other physical mechanisms that contribute to current speed, including internal tides, internal waves, wind-driven currents, and tidal effects.
Appendix IIII	TWB May 9. 2017 Technical Memorandum entitled *"Response to SLC Request for Additional Turbulence Mortality Calculation."*	The memo concludes that the shearing turbulence mortality method developed by Dr. Phil Roberts is inconsistent with State regulatory policy in the Ocean Plan Amendment and contains several formulation errors which render it inappropriate for use. The Robert's method, known to the State Water Board at the time the OPA was developed, has never been peer reviewed and is unworkable for the Huntington Beach Project.
Appendix JJJJ	June 7, 2017 HDR letter entitled, *"Ocean Plan Desalination Amendment Shearing Mortality Guidelines Represents the Best Available Science."*	Letter concludes that the shearing mortality assessment guidance contained in the OPA and its supporting documents in the administrative record represents the best available and vetted science.
Appendix KKKK	June 11, 2017 Michael Baker International technical memorandum entitled, *"Dilution Analysis Alden 3-Jet Duckbill Diffuser Retrofit at Huntington Beach Desalination Facility (HBDF)."*	Appendix KKKK is an updated to previous technical memorandum including Appendices R, UU and CCCC. Appendix KKKK responds to RCF 30 and 31 in the Regional Board May 23, 2017 letter.

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Appendix KKKK2	July 27, 2017 Michael Baker International technical memorandum entitled, "Alternative Hydrodynamic Model Analysis Alden 3-Jet Duckbill Diffuser Retrofit at HBDF**."**	Appendix KKKK2 was prepared in response to comments on Appendix KKKK received from the Santa Ana Regional Water Quality Control Board on June 9, 2017. Per the Regional Board's request, Appendix KKKK2 implements an alternative EPA-certified CORMIX dilution model and increases brine discharge rates to maximum daily worst-case scenarios. The report concludes the 2ppt BMZ boundary ranges from 12-15 feet from the point of discharge, much smaller than the 79-foot 2 ppt boundary using the *COSMOS/ FLowWorks* model in Appendix KKKK.
Appendix KKKK3	November 29, 2017 Michael Baker International technical memorandum entitled "*Alternative Hydrodynamic Model Analysis of the Alden Designed 3-Port Duckbill Diffuser Retrofit at Huntington Beach Desalination Facility (HBDF)-Version 2"*	Revised Appendix KKKK2 with CORMIX Model "bugs". Report determines worst case monthly BMZ boundary is between 69.9 meters and 91.8 meters, comparable to conclusions in Appendix KKKK based *COSMOS/FlowWorks* model.
Appendix LLLL	May 24, 2017 memorandum from Dr. Peter Raimondi entitled, *"Review of Applicant-provided information on operational effects of the Huntington Beach Desalination Plant Lease Modifications to marine biology."*	Appendix LLLL was submitted to the CA State Lands Commission as part of the independent review of Poseidon marine life impacts data and analysis. The memo evaluates the impacts of the currently proposed project compared to the 2010 project that included 152 MGD of source water and no advanced a screening and brine diffuser. The memo verifies the ETM/APF calculations provided by Poseidon.
Appendix MMMM	TWB memo dated June 20, 2017 entitled "Technical Memorandum: Use of Density Versus Abundance"	Memo provides scientific rationale for why the effects of the Huntington Beach Project's potential entrainment impacts should be based on larval density and not abundance, specifically as it relates to identifying the intake location with the least entrainment impacts.
Appendix NNNN	HDR Memo dated June 26, 2017 entitled, *"Estimated Area of Production Foregone for each Station Sampled in 2003-2004."*	In response to RCF 22 from the Regional Board's May 23, 2017 letter, the HDR memo provides APF calculations for each of the sampling locations from the 2003-04 entrainment studies and identified which alternative sites the various sampling locations, and APF calculations, would apply.
Appendix OOOO	Moffatt & Nichol July 10, 2017 technical memorandum entitled "Response to RCF 21 and 61" from the Regional Board's May 23, 2017 letter	The technical memorandum evaluates the operational impacts from surface intakes at each alternative site (i.e., Property 1A-1D, 1G, 1H, Segment 2) to sensitive habitats and Marine Protected Areas and accounts for impacts to estuaries, tidal embayments, and the Seal Beach National Wildlife Refuge (e.g., Regional Ocean Modeling System). The technical memorandum also provides the modeling to assess how and to what extent the source water body for the proposed surface intake overlaps with the proposed mitigation project's production area.
Appendix PPPP	Poseidon response dated July 21, 2017 to RCF 19 from the Regional Board's May 23, 2017 letter	Response to RCF 19 Provides a project timeline for construction of subsurface intakes and surface intakes at each of the alternative sites. Response concludes it would take a minimum of 6 times longer to build a project at one of the alternative sites compared to the proposed site.

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Appendix QQQQ	Geosyntec technical memorandum dated July 24, 2017 entitled *"Groundwater Modeling to Evaluate Feasibility of Subsurface Seawater Intakes in Bolsa, Sunset, and Alamitos Gaps, Water Board Request RCF 23 Alternative Sites Evaluation for the Proposed Desalination Project at Huntington Beach."*	Geosyntec report provides a detailed response to RCF 23 from the Regional Board's May 23, 2017 letter. Geosyntec report concludes that slant wells at alternative sites could not provide the source water required by the desalination plant and that subsurface intake at alternatives sites would negatively impact nearby wetlands and fresh groundwater supplies.
Appendix RRRR	Dudek memorandum dated July 24, 2017 responding to RCF 18 and 23 from the Regional Board's May 23, 2017 letter	For the remaining alternative sites (Property 1A-1D, 1E-F, and 1H and Segment 2), the memo provides a description that in sufficient land is available to accommodate the Project. The memo also includes a narrative describing, for each alternative site, proposed designs of intakes, discharges, and other infrastructure, including the treatment facilities.
Appendix SSSS	August 15, 2017 HDR technical memorandum entitled *"Review of the California Coastal Commission Staff's August 3, 2017, Review of Poseidon's Entrainment Effects Analysis."*	HDR Technical memorandum prepared in response to Coastal Commission staff's entrainment analysis. HDR concludes: Commission Staff's Area of Production Foregone estimates are incorrect and based on anomalous values contained in only one of a library of reports developed using the 2003–2004 entrainment data; Commission Staff's use of the mean concentration without accounting for variability in comparing the various sampling sites is not supported by sound scientific principles or established regulatory practice; Commission Staff's concerns regarding the application of statistical analyses to determine differences among sampling sites is unfounded; Commission Staff's assertion that when statistics are used, the 95 percent confidence level is unnecessary for the statistical analysis to determine significance is unfounded; Commission Staff's conclusion that sites other than Station E represent the best site to minimize impacts to all forms of marine life is incorrect.
Appendix TTTT	August 16, 2017 HDR technical memorandum entitled *"Inclusion of Mole Crab (Emerita analoga) in the Huntington Beach Desalination Plant Environmental Analysis."*	Memo provides scientific and regulatory justification for excluding Emerita in the environmental assessment of plankton impacts resulting from the operation of the Huntington Beach Desalination Plant. Poseidon requests the memo be provided to the Regional Board's Neutral Third Party Reviewers.
Appendix UUUU	August 17, 2017 TWB technical memorandum entitled *"Technical Memorandum: Response to Phil Roberts July 26, 2017 Comment Letter on the CA State Lands Commission Draft Supplemental Environmental Impact Report for the Huntington Beach Desalination Plant."*	TWB memorandum concludes: - Dr. Roberts employs a fundamentally different calculation approach from that which was provided as regulatory guidance by the SWRCB in the SED (i.e., the 23% approach). We believe that the 23% approach remains a valid method for estimating shear-related mortality at the HBDP. - The angle of the diffuser is not an explicit assumption in the SED's general guidance language on the topic of shear-related mortality at the diffuser. In addition, since the diffuser angle is immaterial to the 23% calculation approach, we believe that the 23% approach remains a valid method for estimating shear-related mortality at the HBDP. Poseidon's diffuser ports are angled at 47º to account for the higher elevation of the diffuser above the seafloor. This angle is intended to prevent a surface boil. - The SLC's analysis in the DSEIR correctly relied on the 23% approach to be conservative. Though Dr. Roberts calculation approach for the CalAm project assumes 100% of the entrained dilution water is subject to lethal shear, other assumptions in his model used to derive the mortality estimate are decidedly less conservative.

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		- Dr. Raimondi (who was retained by the SLC to review information submitted by Poseidon relative to the operational effects of the Huntington Beach Desalination Plant on marine life) also relied on the 23% approach to reach a conclusion that shear-related mortality "would not lead to populations falling below self-sustaining levels" even when using the most conservative assumption of 100% mortality in 100% of the dilution water entrained.
Appendix VVVV	November 13, 2017 HDR letter entitled "*Subject: Review of Revised Draft Technical Memorandum – Review and Analysis of Expected Entrainment Effects at and near Poseidon's Proposed Huntington Beach Desalination Project by Tom Luster and Laurie Koteen, Ph.D., Coastal Commission"*	The HDR letter provides a review of the revised CCC staff entrainment analysis and concludes the CCC analysis still includes incorrect marine biological data and analysis.
Appendix WWWW	December 7, 2017 Michael Baker International technical memorandum entitled *"Taylor Micro-Scale Methods for Estimating Injury and Mortality to Marine Organisms Entrained by a Diffuser at Huntington Beach Desalination Facility (HBDF)"*	Technical memorandum provides a site-specific, hydrodynamic-based, turbulence mortality analysis of the Huntington Beach Desalination Facility (HBDF) diffuser design, and determine how its turbulence impacts align with the 23% of entrainment mass-balance baseline set forth in the *Substitute Environmental Documentation* or (SED), that was adopted by the State Water Resource Control Board (SWRCB) in conjunction with the Ocean Plan Desalination Amendment. Report concludes that the Taylor micro-scale turbulence analysis gave similar final answers for harmful diffuser entrainment and *area of production foregone* (APF) as the SED 23% of entrainment mass-balance baseline assessment. The Taylor micro-scale eddy hypothesis gives harmful entrainment fluxes of 214.3 MGD, no more than 21.3 MGD greater than the SED 23% of entrainment baseline (i.e., 193 MGD) for monthly operations; equating to APF mitigation scaling that is no more than 3.22 acres greater than what would be calculated from SED guidance.
Appendix XXXX	April 13, 2018 PowerPoint Presentation for interagency workshop entitled *"ETM/APF calculations for the Proposed Huntington Beach Desalination Project"*	PowerPoint presentation provides historical context for the development of the ETM/APF calculation for the proposed desalination project based on historical precedent for the HBGS and guidance in the SED/OPA
Appendix YYYY	April 26, 2018 Letter from Miller Marine Sciences in response to additional entrainment analysis information requested by the RWB in April 18th letter	Miller Marine Sciences letter addresses four (4) additional questions from the RWB staff regarding the April 13, 2018 entrainment analysis prepared for the interagency workshop
Appendix ZZZZ1 and ZZZZ2	May 6, 2018 Miller Marine Sciences cover letter and entrainment sensitivity analysis	Miller Marine Sciences entrainment sensitivity analysis concludes that the different marine life data (i.e., current speeds, species, species' habitat classification) do not materially change the APF calculation (i.e., it's between 14-18 acres) and that station E is environmentally superior – lowest larval entrainment - to station O2 under all circumstances.
Appendix AAAAA	July 26, 2018 NTPR Meeting PowerPoint Presentation	Presentation for Neutral Third-Party Review ("NTPR") meeting with Dr. Raimondi to discuss how to evaluated the best location for the screened ocean intake to minimize the intake and mortality of all forms of marine life. Poseidon presentation concludes:

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		• Poseidon has followed OPA guidance • ETM/APF has a specific application, but it is not appropriate to use it to compare intake sites • Additional efforts to identify a novel way to use the data result in greater uncertainty in the results • The science about the existing intake location (E) can be used to determine the best intake location – Habitat homogeneity – Distance from MPAs etc. – Comparison of larval concentrations
Appendix BBBBB	August 3, 2018 Alden and Dudek reports on Revised brine diffuser design and environmental analysis	At the request of the RWB staff, Poseidon amended it brine diffuser design. Reports prepared included a technical memorandum from Alden describing the revised brine diffuser design and an accompanying environmental analysis from Dudek.
Appendix CCCCC	August 21, 2018 Poseidon response to California Coastkeeper Alliance June 21st and July 9th 2018 submittals regarding subsurface intake feasibility	The Coastkeeper contends that *"Poseidon's application materials are legally flawed and do not meet their burden of demonstrating that subsurface intakes are infeasible."* Poseidon's response included a cover letter, executive summary, legal memo from Latham & Watkins and a point by point response to the three technical reports provided by Coastkeeper. Poseidon's submittal concludes that Coastkeeper introduced no new information. Their contention is incorrect, lacks legal substantiation and appears to be based on Coastkeeper's unfamiliarity with the files in the Regional Board's administrative record and the project's permitting history.
Appendix DDDDD	September 7, 2018 submittal of the materials presented to Agency staff and Dr. Raimondi during the NTPR August 30, 2018 meeting regarding the screened intake site.	Materials from August 30th NTPR meeting include Eric Miller's Excel workbook file that provides the entrainment data calculations supporting the Multiple Lines of Evidence (MLE); Sept 7th technical memorandum that provides the detailed ecological rationale requested by Dr. Raimondi for the MLE; Eric's Miller's revised MLE PowerPoint presentation from August 30th.
Appendix EEEEE	Poseidon's September 27, 2018 PowerPoint presentation to Agency staff regarding the MLE recommended by Dr. Raimondi regarding the screened intake site.	The Sept 27th Poseidon presentation materials conclude that utilizing Dr. Raimondi's guidance on the quantitative Multiple Lines of Evidence that intake site E is environmentally superior to intake site D4, U4, O2 and 04; there is no ecologically statistical difference between the remaining intake sites: E, D2, and U2; intake site D2 is directly offshore of a sensitive habitats and/or species nursery and intake site U2 which is closer to the Bolsa Chica MPAs than intake site E, both conditions do not comply with OPA guidance. There is no scientifically defensible justification for re-locating intake site E.
Appendix FFFFF	Poseidon's October 12, 2018 submittal of its final report to Dr. Raimondi regarding his guidance on the MLE regarding the screened intake site.	Poseidon's updated final report to agency staff evaluating the MLE based on NTPR Dr. Raimondi's guidance. The report concludes that the MLE, through a detailed and holistic examination, identified no scientifically-defensible ecological benefit achieved by moving the intake site from the currently proposed site E, where the Huntington Beach Generating Station intake structure currently exists to any of the six alternative sites evaluated.