

February 5, 2019

**BY EMAIL**

Hope A. Smythe  
Executive Officer  
Santa Ana Regional Water Quality Control Board  
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***Re: Appendix PFFFF – Geosyntec Inc., Fifth Generation of Modeling of Coastal Margin Slant Wells for the Huntington Beach Seawater Desalination Project***

Dear Ms. Smythe:

Enclosed please find a copy of the Geosyntec Consultants' 5<sup>th</sup> Generation groundwater model report requested by the Regional and State Water Board staff ("Water Board Staff") on January 16, 2019.

As part of the ongoing process for evaluating the feasibility of a hybrid slant well and 1-mm screened ocean seawater intake for the proposed Huntington Beach Desalination Project ("Project"), Water Board staff have requested that Poseidon conduct a 5<sup>th</sup> Generation sensitivity analysis utilizing Geosyntec's 2013 groundwater model that incorporates a range of updated hydrogeological conductivity values assigned to the local Huntington Beach Wetlands Complex. Water Board Staff hydrogeologists and Poseidon agreed that the base case conductivity values assigned to the local Huntington Beach Wetland's Complex are to be founded on currently available data characterizing the wetlands' geologic and hydrogeologic conditions, and these values were provided to Water Board staff by Geosyntec in advance of conducting the 5<sup>th</sup> Generation groundwater model sensitivity analysis.

Based on local geological and hydrogeological conditions and peer-reviewed modeling values, the Geosyntec 5<sup>th</sup> Generation groundwater model report finds that the Orange County Water District's 1,000-acre-feet-per-year threshold impact to the managed groundwater basin<sup>1</sup> limits the maximum slant well source water capacity to 3.8 MGD (1.9 MGD of drinking water). Various Project permitting agencies including the Regional Board previously determined that an alternative beach well seawater intake system operating at various capacities would impact the local wetlands. The 5<sup>th</sup> Generation sensitivity analysis assesses the extent of the wetlands impacts when confining the slant well total source water intake to a small-scale pumping operation of 3.8 MGD.

**Historical Assessment of Beach Well Impacts on Local Wetlands**

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<sup>1</sup> Orange County Water District May 18, 2018 letter to the Santa Ana Regional Water Quality Control Board

Since 2006, local and state permitting agencies including the City of Huntington Beach, Santa Ana Regional Water Quality Control Board, State Lands Commission and Coastal Commission's Independent Scientific & Technical Advisory Panel ("ISTAP") have found subsurface intakes (i.e., slant wells) to be infeasible at the Project site for various environmental, technical, social and economic reasons including potential hydrogeological impacts to local wetlands.

The impact to local wetlands from the operation of subsurface seawater intake wells was first identified in the City of Huntington Beach's 2010 Final Substitute Environmental Impact Report ("FSEIR"), which found *"Any one of the site-specific conditions would render subsurface intakes more impactful to the environment than the project because it would result in either irreversible damage to the Talbert Marsh, Brookhurst Marsh, and the Magnolia Marsh and negate years of restoration measures, result in a number of negative environmental impacts and human health risks, including the following: (1) detrimental environmental impact of intake well operations on the adjacent Talbert Marsh, Brookhurst Marsh, and the Magnolia Marsh due to dewatering ..."* (FSIR Findings Page 77)

The City of Huntington Beach's FSEIR conclusions were based in part of the 2007 PSOMAS report entitled "Feasibility of Alternative Seawater Intakes for the Huntington Beach Desalination Project" that found the *"Talbert, Newland, Magnolia and Brookhurst marshes are a delicate ecosystem that relies on the hydrologic interaction of surface water with the ocean as well as with the underlying groundwater system ... dewatering in the vicinity of the marshes would potentially have an adverse impact on the ecological system including loss/alteration of vegetation, changes in fauna visiting/inhabiting the system, and overall water quality of the near surface water and groundwater quality in the marshes."* (P-4-2)

The PSOMAS study also concluded that *"operation of the slant wells at a total capacity of 100 MGD or more would cause the water level in the vicinity of the wells to drop from 5 to 60 feet below ground surface and the water table in 4,000-foot-wide zone located parallel to the shore and perpendicular to the well field line ... such a system may result in collection of up to a total of 7,517 gpm (10.8 MGD) of water from the adjacent Talbert, Newland, Magnolia, and Brookhurst marshes. The Psomas study further determined that approximately 30% of that total (approximately 3.2 MGD) would come from the marshes, resulting in detrimental effects on the wetland systems."* (FSEIR Section 6-17-18).

In 2012, the Santa Ana Regional Water Board amended and renewed the Project's 2006 NPDES permit and conducted a California Water Code section 13142.5(b) compliance determination that found slant wells were infeasible and would cause *"potential long-term adverse environmental impacts associated with the dewatering of the adjacent Talbert, Brookhurst, and Magnolia Marshes due to the operation of subsurface intake wells. Long-term dewatering could result in irreversible damage to the marshes and negate years of restoration measures."* (Order No. RB-2011-0046, NPDES No. CA8000403, F-28). The Regional Board's findings were based in part on City of Huntington Beach 2010 SEIR Findings, and 2011 Water Global Consulting report entitled *"Evaluation of Alternative Desalination Plant Subsurface Technologies."*

In 2014, relying on a 2013 groundwater model prepared by Geosyntec Inc., the Coastal Commission's Independent Scientific & Technical Advisory Panel ("ISTAP") Phase 1 report determined that subsurface wells were infeasible, in part, due to *"local hydrogeologic conditions that would result in adverse impacts to the environment, such as moving containments seaward and damaging local wetlands."* (ISTAP Phase 1 Report Pages 17-18).

At the conclusion of the ISTAP Phase 1 process the Coastal Commission requested an independent Well Investigation Team (“WIT”) further investigate the hydrogeologic effects of subsurface wells on the groundwater basin and local wetlands. Under guidance from the WIT, Geosyntec’s groundwater model underwent additional hydrogeological sensitivity analyses. Geosyntec modified the model grid to accommodate a more detailed representation of the wetland areas and simulate a portion of the coastal marsh and wetland areas with constant sea-level water table because some of these areas are connected to the ocean through surface water channels. Horizontal and vertical hydraulic conductivity (Kh and Kv) were reduced from 10 and 1 ft/d to 1 and 0.1 ft/d in the uppermost active model layer under the coastal margin wetland and marsh areas resulting in a projection of 0.5-2.0% of the water coming from local wetlands.

The conclusions reached by the Coastal Commission’s WIT underwent further independent 3rd party peer review by the Coastal Commission’s Dr. Detwiler and the Orange County Water District (“OCWD”) hydrogeologist Roy Herndon. Both independent experts found that the model’s sensitivity analysis accurately bounded the potential impact to the local wetlands.

In January 2017, the Geosyntec model was again revised at the request of the State and Regional Water Board staff hydrogeologists. Six additional model sensitivity analyses concluded that variation in the number, location and length of the slant wells by a several hundred feet has very little influence on the sea and inland aquifer portions of source water pumped by the slant wells. Geosyntec’s 2017 groundwater model sensitivity analysis found that a slant well intake would withdrawal between 1.9 MGD and 2.6 MGD from the local wetlands complex.

This report, Geosyntec’s 5th Generation groundwater model sensitivity analysis, finds that reduced pumping to support a small-scale slant well with a maximum sustainable intake of 3.8 MGD would still affect the local wetlands, although these ecological impacts would be lessened compared to previous findings associated with larger capacity subsurface intake pumping.

Please let us know if you would like to discuss the results of Geosyntec’s 5<sup>th</sup> Generation groundwater model. We look forward to Regional Board staff’s timely issuance of the draft Tentative Order for the amendment and renewal of Order No. R8-2012-0007, NPDES No. CA8000403 and updated California Water Code section 13142.5(b) compliance determination.

Sincerely,



Scott Maloni  
Vice President  
Poseidon Resources (Surfside) LLC

cc. Roy Herndon, Orange County Water District