

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
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July 3, 2017

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Dear Messrs. Pallarino, Chang and Manfredi:

Subject: Board of Water Supply (BWS) Comments on the Groundwater Modeling Working Group Meeting held June 26, 2017 for Red Hill Administrative Order on Consent (AOC) Section 6 and 7

Thank you for the opportunity to participate in the second Red Hill groundwater modeling working group meeting held on June 26, 2017. Throughout the meeting, we found the comments offered by the United States Geological Survey (USGS) and the Hawaii Department of Health (DOH) consistently agreed with those conveyed by BWS for refining the existing groundwater flow model's boundary conditions, extent, stresses, and layering. We urge the Navy and its contractors to incorporate these comments into the development of the work plan for revising the existing groundwater model. Below are the major points and discussion we found significantly important to warrant repeating.

1. As recommended by the USGS, DOH, and BWS subject matter experts (SMEs), the Navy should avoid over-constraining the groundwater flow model through the use of general head boundaries along the domain boundaries as much as possible and adopt

more defensible and conservative boundary conditions. These include extending the model seaward so that the ocean water column can be represented with specified head and concentration boundary conditions per Dr. Oki's recommendations, representing areal recharge and flux from the dike-intruded basalts, and using no-flow boundary conditions along the Kalihi and Waimalu domain boundaries wherever possible. The effects of all boundary condition choices should be tested through a thorough model sensitivity analysis.

2. The Navy did not present their approach for using the SWI2 package (Bakker et al., 2013) and there was no discussion about how the Navy is representing the bottom boundary. The Navy has also not discussed how areal recharge will be represented. We request that these two boundary conditions be included in the agenda for the third modeling group meeting so that all major boundary conditions are understood by the entire modeling group, including the SMEs.
3. To save time, the Navy should consider adopting the caprock and basalt hydrogeologic framework units found in Oki (2005) rather than developing a new framework. Valley fill should not be included in Moanalua and Halawa Valleys without defensible supporting evidence and thus the valleys should comprise Ko'olau basalt and perhaps caprock.
4. Pumping stresses from all production wells should be included in the groundwater flow model. Prior to the next meeting, the Navy should contact the Hawaii Department of Land and Natural Resources (DLNR) Commission on Water Resources (CWRM) and request a complete list of production wells in the model domain and their pumping rates over the time periods of interest.
5. The Navy has not yet informed the modeling group about the hydrogeologic framework, the calibration targets to be used, and all pumping centers. Given their importance to defining the model domain discretization, it is premature to discuss model layering.
6. Based on its importance to assessing the modeling approach, we request that the Navy present the calibration targets and the calibration approach at the next modeling group meeting.
7. Based on the feedback from the SMEs to date, it appears that substantial changes to the 2007 groundwater flow model (DON, 2007) are required even before the Navy has completed its presentations about the modeling approach. These changes go beyond the AOC's stated objective of "refining the groundwater flow model". Shouldn't the AOC Parties revise the AOC Statement of Work to reflect this understanding? The most efficient and realistic approach given all the work needed to develop a defensible model is to create a new groundwater flow model and not update the 2007 groundwater flow model.

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Thank you for the opportunity to comment. If you have any questions, please contact Erwin Kawata at (808) 748-5080.

Very truly yours,



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References

Bakker, M., Schaars, F., Hughes, J., Langevin, C., Dausman, A. 2013. Documentation of the seawater intrusion (SWI2) package for MODFLOW. Techniques and Methods 6-A46. USGS Groundwater Resources Program. 47 p.

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Oki, D. 2005. Numerical Simulation of the Effects of Low-Permeability Valley-Fill Barriers and the Redistribution of Ground-Water Withdrawals in the Pearl Harbor Area, Oahu, Hawaii. USGS Scientific Investigations Report 2005-5223.