

To: Ukiah Valley Groundwater Basin Technical Advisory Committee
From: Chris Petersen
cc: Laura Foglia, Amir Mani, Trevor Kent, Irene Ramirez
Date: May 29, 2019
Re: Status of Ukiah Basin Hydrogeologic Conceptual Model

The purpose of this memorandum is to update the status of the Hydrogeologic Conceptual Model (HCM) as of Wednesday, May 29th, 2019. While the HCM provided by LACO meets a majority of SGMA requirements, GEI review found deficiencies that require additional analysis and documentation to generate a complete HCM that properly characterizes the hydrology of the basin. **Table 1** summarizes the status of each HCM section with notes describing completed work and work in progress to address deficiencies along with how TAC comments on the LACO HCM are being incorporated. This information is summarized below along with GEI estimated schedule for completing the Draft HCM.

HCM Work Completed

- Established template for the HCM to meet SGMA requirements
- Populated outline with content copied over from previous reports, primarily LACO HCM, comprising GEI's Annotated Outline for the Ukiah HCM (**Attachment A**)
- Reviewed LACO report along with Sonoma Water and TAC comments (December 2018) and developed approach and to finalize HCM and fill gaps of information required by GSP regulations
- Coordinated with USGS to add additional well logs and borings to WCR database and to match geologic layers with USGS layering
- Generated HCM section on soils within the basin and enhanced HCM where quickly and easily done
- Updated Surficial Geology map and Hydrologic Soils Group map (general updates to figures where applicable)

Work in Progress

- Reviewing well logs against screen intervals to verify wells are properly assigned to the principal aquifer they are screened in
- Generate updated cross sections (one with geologic layers based on USGS discussion and one textural with sands and clays)
- Generate figures for stream gauge data and hydrographs to establish groundwater surface water interaction along with general hydrology of the Russian River
- Break out Terrace Deposits into principal aquifer II and establish aquifer parameters

Schedule for Completion of Remaining Work

- **July 15, 2019** Complete Analytical Work (Cross-section updates, assessment of streamflow and groundwater level data, aquifer properties, figures, tables, etc.)
- **August 15, 2019** Complete Draft HCM for Review by LWA
- **September 1, 2019** Receive Comments from LWA
- **September 15, 2019** Complete Draft for Review by TAC

Please contact me if you have questions regarding the status of GEI's work in the HCM.
Thank you,

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Hydrogeologic Conceptual Model (354.14)

HCM Section	HCM Requirements	LACO Completed?	GEI Efforts	TAC and Sonoma Water Comments (December 2018)
1.2 Subbasin Setting	B(1): Regional geologic and structural setting of the basin	X	None	None
1.3 Subbasin Boundary	B(2): Lateral basin boundaries, including major geologic features that significantly affect flow	X	None	None
1.4 Soil Characteristics	D(3): Soil characteristics as described by the appropriate NRCS soil survey or other applicable studies.		In Progress: NRCS Hydrologic group map and discussion NRCS Taxonomic soil group map and discussion	Include discussion of soils in the basin (In Progress)
1.5 Regional Geology				
1.5.1 Geologic History	B(1): Regional geologic and structural setting of the basin	X	None	None
	B(4)a: Formation names, if defined	X	Completed: Denote Franciscan formation as bottom of basin, incorporate additional gravimetric data	Franciscan is not part of the Basin, recognize as outside of basin (Completed)
1.5.2 Geologic Formations	D(2): Surficial Geology derived from a qualified map including the locations of cross-sections required		In progress: Update the surficial geology map to make units easier to discern and update legend	Legend for surficial geology is not in temporal order (In Progress) Elaborate on wells used for surficial map (doesn't appear to be 479 wells) Disconnect between surficial geology and cross-sections (In Progress)
1.5.3 Faults and Folds	B(4)c: Structural properties of the basin that restrict groundwater flow		Completed: Discussion of folds in region In Progress: Discussion of Maacama fault in relation to groundwater flow	Discussion of Maacama fault effect on groundwater flow (In Progress)
1.5.4 Geologic Cross-Sections	C: HCM represented graphically by two (2) scaled cross sections		In Progress: Discussion with USGS on additional well data and layering to match cross sections In Progress: Match surficial geology to cross sections Develop textural cross sections of sands vs clays w/aquifer delineation Elaborate in text on wells used for cross sections - most shallow domestic wells Break out terrace deposits from quaternary alluvium in cross section Overlay principal aquifer groups with geology	Rectify discrepancy between surficial geology map and cross sections Add Legend to cross sections Do not combine terrace deposits and alluvium Differentiate between geologic cross sections and aquifer extent Have cross sections show geologic units or sands and clays Include groundwater elevation data on cross sections if available Potential for north-south cross section? Acknowledge majority of wells are shallow domestic wells Elaborate on wells used for surficial map (doesn't appear to be 479 wells)
1.5.5 WCR Database Development		X		Move to Plan area?
1.6 Principal Aquifers and Aquitards	B (4)b: Physical properties of aquifers and aquitards B(4)d: General water quality of principal aquifers	X	In Progress: Review of well logs to verify pump test data is indicative of principal aquifers Remove Franciscan formation from principal aquifer discussion In Progress: Review well logs for characteristics of terrace deposits In Progress: Break terrace deposits out into Principal Aquifer II and provide hydrogeologic data on aquifer characteristics	Table of geologic properties not indicative of quaternary alluvium as terrace deposits included with quaternary alluvium Specific yield is likely low, should update based on core samples Franciscan formation should be removed from section as it is not in the basin Break out terrace deposits from alluvium Clarify discussion of Aquifer I vs. surficial geology (quaternary alluvium lumped with terrace deposits)
1.7 Beneficial Users of Principal Aquifers	B(4)e: Identification of the primary use or uses of each aquifer	X	None	None
1.8 Groundwater Recharge and Discharge Areas	D(4): Delineation of existing recharge areas that substantially contribute to the replenishment of the basin, potential recharge areas and discharge areas, including significant active springs, seeps, and wetlands within or adjacent to the basin		Map of discharge and recharge areas Delineate recharge areas inside and outside basin Delineate discharge areas inside and outside basin	Designate significant areas of recharge and discharge Map of discharge and recharge areas
1.9 Surface Water Bodies	D(5): Surface water bodies that are significant to the management of the basin		In Progress: Review stream gauge data and evaluate min, max, and average flow of the Russian River In Progress: Establish relationship between stream gauge data and groundwater levels Determine gaining and losing reaches of Russian River	Map and discussion of gaining and losing streams (In Progress) Expand upon surface water/groundwater interaction (In Progress) Identify Max and Min flow rates for Russian River, statistical analysis (flow rate exceedance)
1.10 Imported Water Supply	D(6): Source and point of imported water supplies		Expand on map and add discussion of imported water supply	Are imported water supplies needed in this report? Identify source and point of diverted water supply
1.11 Monitoring Programs		X	Move to Plan area?	Move to Plan Area of GSP Include GAMA into monitoring programs
1.12 Data Gaps	B(5): Identification of data gaps and uncertainty with the Hydrogeologic Conceptual Model		Completed: Add water quality and surface water data gaps to report Discussion of faulting as relates to groundwater flow Use of cores to establish hydrogeologic properties?	Expand discussion of data gaps