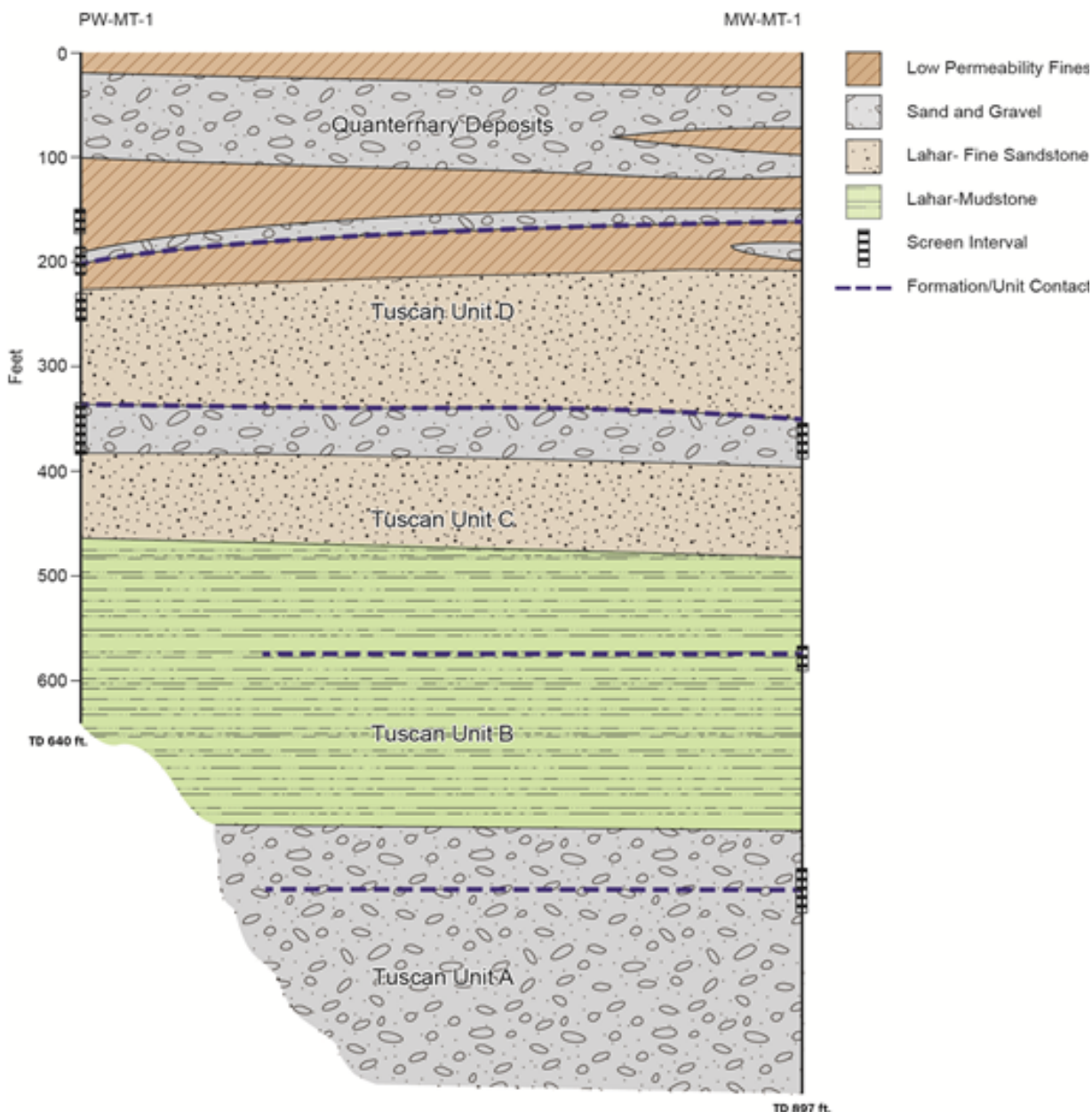


Final Report Excerpt: Aquifer Test Analysis – M&T Ranch

The aquifer test completed at the M&T Ranch was conducted in aquifers formed within the distal portion of the Lower Tuscan Aquifer (LTA) composed predominantly of unconsolidated fluvial material. The hard cemented lahar units noted in the Hackett Property area are not as prevalent in this area. Overlying the

LTA are approximately 160 feet of Quaternary deposits formed by the ancestral movement of the Sacramento River system. A generalized geologic cross section developed using the lithologic logs produced from the observation (MW-MT-1) and pumping well (PW-MT-1) for this test is presented in the following figure.



Three separate well screens were constructed within the observation well to monitor zones within both the Upper and Lower Tuscan Aquifers. The pumping well, PW-MT-1, is reported to be screened within the same sand zone of the shallow screen for the observation well between 280 and 400 feet bgs. The intermediate well screen was placed within the lower permeable fine grain aquitard units between the aquifers screened by the shallow and deep well screens. This design allowed assessment of the interaction between the aquifers and a more detailed assessment of leakage responses through the low permeability aquitard units.

Based on the response of the intermediate and deep screened intervals in the observation well (MW-MT-1), the data suggest that leakage through the overlying aquitard of fine sandstone/mudstone provides a hydraulic connection to the deep aquifer (Tuscan Unit A).

Transmissivity, represented by a “T”, is a measure of the ability of an aquifer to produce water and is equal to hydraulic conductivity (K) times the thickness of the aquifer (represented with a “b”), or $T = Kb$. As such, a T value for a 10 foot thick well-sorted sand with a K value of 100 would be the same as a 100 foot thick fine sand with a K value 10. Units of T are feet squared per day (ft²/day). Typically, T values of less than 100 ft²/day will supply only enough water for domestic wells or other low-yield purposes. In wells with T values greater than 1,300 ft²/day, the production yields are typically sufficient for industrial, municipal, or irrigation use.

Storativity, represented by an “S”, is a physical property that characterizes the capacity of an aquifer to release groundwater. Specifically, it is defined as the volume of water an aquifer releases from or takes into storage, per unit surface area per change in head and is a unitless number. The storativity of a confined aquifer typically ranges from 0.00005 to 0.005, whereas for unconfined aquifers storativity ranges from 0.1 to 0.3 (Todd, 1980).

Summary of aquifer parameters calculated for Esquon Ranch Aquifer Test			
	T (feet ² /day)	S (unitless)	K (feet/day)
M&T Ranch	11,550 to 20,540	0.0003 to 0.0005	321 to 571