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TECHNICAL MEMORANDUM

DATE: November 30, 2021

Project No.: 941-80-21-62
SENT VIA: EMAIL

TO: Ground Level Monitoring Committee

FROM: Eric Chiang, PhD

REVIEWED BY: Andy Malone, PG

SUBJECT: DRAFT - Construction and Calibration of One-Dimensional Compaction Models in the Northwest MZ-1 Area

BACKGROUND AND OBJECTIVES

The Watermaster's Subsidence Management Plan (SMP)[1] states that if data from existing monitoring efforts in the Areas of Subsidence Concern indicate the potential for adverse impacts due to subsidence, Watermaster will revise the SMP to avoid those adverse impacts. Watermaster has been monitoring vertical ground motion in Northwest MZ-1 via InSAR since the development of its original SMP (WEI, 2007).

In 2015, the Watermaster's Engineer developed the *Work Plan to Develop a Subsidence Management Plan for the Northwest MZ-1 Area* (Work Plan).[2] The Work Plan is characterized as an ongoing Watermaster effort and includes a description of a multi-year scope-of-work, a cost estimate, and an implementation schedule. The Work Plan was included in the 2015 SMP as Appendix B. Implementation of the Work Plan began in July 2015. On an annual basis, the GLMC analyzes the data and information generated by the implementation of the Work Plan. The results and interpretations generated from the analysis are documented in the annual report of the GLMC and used to prepare recommendations for future activities.

The Work Plan includes various tasks that involve the construction, calibration, and use one-dimensional aquifer-system compaction models in the Northwest MZ-1 Area (1D Model):

- Tasks 3 and 4 included the construction and calibration of a 1D Model at the location of Monte Vista Water District Well 28 (MVWD-28). This 1D Model was used to explore preliminary methods

[1] Wildermuth Environmental, Inc. 2015. Chino Basin Subsidence Management Plan. Prepared for the Chino Basin Watermaster. July 23, 2015.
[2] Wildermuth Environmental, Inc. 2015. Work Plan to Develop a Subsidence-Management Plan for Northwest MZ-1. Prepared for the Chino Basin Watermaster. July 23, 2015.

to manage pumping and recharge to avoid the future occurrence of land subsidence in Northwest MZ-1.

- Task 7 calls for the construction and calibration of a 1D Model at the location of Pomona Extensometer (PX), which is based on the detailed lithologic information collected at the PX.

This technical memorandum describes the methods and results for the construction and calibration of both 1D Models. The main objective is to describe the subsidence mechanisms and the pre-consolidation head[3] by aquifer-system layer in Northwest MZ-1.

The knowledge of the subsidence mechanisms and pre-consolidation stresses can provide guidance for the Chino Basin parties in the development of "subsidence-management alternatives" (i.e., managed pumping and/or recharge) to avoid the future occurrence of land subsidence in Northwest MZ-1. Subsequent tasks in the Work Plan will utilize the 1D Models described herein to evaluate the effectiveness of the subsidence-management alternatives.

MODELING APPROACH AND MODEL CONFIGURATION

Model Codes

The USGS has developed a wide range of computer models to simulate saturated and unsaturated subsurface flow, solute transport, and chemical reactions in groundwater systems. The most widely used of these models is MODFLOW, which simulates three-dimensional (3D) groundwater flow using the finite-difference method. Although it was conceived solely as a groundwater flow model in 1984 and released in 1988 (McDonald, et al., 1988), MODFLOW's modular structure has provided a robust framework for the integration of additional simulation capabilities that build on and enhance its original scope. The family of MODFLOW-related models now includes capabilities for simulating coupled groundwater/surface water systems and solute transport.

MODFLOW-NWT (Niswonger, et al., 2011) was chosen for this project because: 1) it has extensive publicly available documentation, 2) it has sustained rigorous USGS and academic peer review, 3) it has a long history of development and use, 4) it is widely used around the world in public and private sectors, 5) it can easily operate with additional simulation tools published by others, and 6) it has been used by the Watermaster in the Chino Valley Model (CVM) for the latest Safe Yield Recalculation (Wildermuth Environmental, Inc., 2020).

The Interbed Storage Package (Leake and others, 1991) of MODFLOW-NWT was chosen to simulate the aquifer-system deformation that is caused by elastic and/or inelastic deformation of the fine-grained interbeds in an aquifer-system due to changes in the effective stress on the soil skeleton because of changing groundwater levels.

[3] The pre-consolidation head is the lowest piezometric level that an aquifer system has ever experienced. When piezometric levels are below the pre-consolidation head, permanent subsidence is caused.

Method for Calculating Aquifer-System Deformation

How MODFLOW works

In a MODFLOW model, an aquifer system is represented by a discretized domain consisting of an array of finite difference blocks (model cells) and nodes at the cell centers. Figure 1 shows the spatial discretization scheme of an aquifer system with a mesh of model cells and nodes at which hydraulic heads are calculated. Hydrostratigraphic units can be represented by one or more model layers and the layer thickness may vary from cell to cell. The nodal grid forms the framework of a finite-difference numerical model.

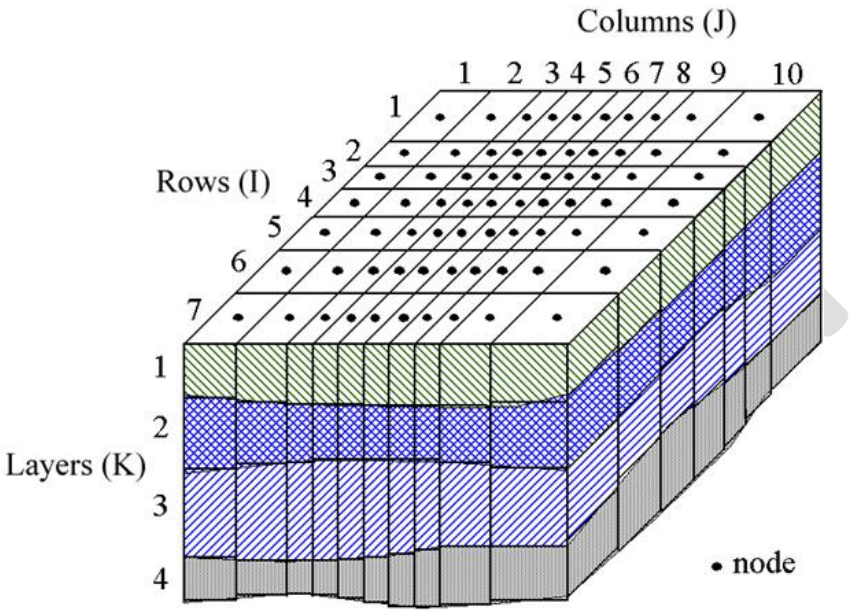

Figure 1. Spatial discretization scheme of MODFLOW

To calculate the hydraulic heads at the nodes (i.e., centers of model cells), a water balance equation is formulated for each model cell:

$$\Sigma Q = S_s \cdot \frac{\Delta h}{\Delta t} \cdot V + S' \cdot \frac{\Delta h}{\Delta t} \quad (1)$$

The left-hand side of the equation (ΣQ) is the sum of all flows to/from neighboring cells, pumping, and recharge occurring within the model cell. The right-hand side represent the storage change within a time-interval of the length Δt, where Ss is the specific storage (that accounts for compressibility of water), S' is the Skeletal storage coefficient (that accounts for compressibility of soil skeleton) of the model cell, V is the volume of the model cell, and Δh is the head change in the model cell over the time interval Δt. The flows to/from neighboring cells can be expressed with the hydraulic heads of the model cell and its neighbors through the Darcy's law that describes the relationship between the flow, hydraulic conductivity, and hydraulic gradient. In summary, equation (1) can be rewritten to an equation containing unknown hydraulic head values at the cell and its neighboring cells with other aquifer property terms.

MODFLOW formulates such an equation for each of the active model cells (where the heads are unknown and need to be solved). Once all equations are formulated, the system of equations are solved together for the unknown head values. Once the head values are computed, they are used to back-calculate the

cell-by-cell flow terms. The calculated head values and flow terms are the basis for water budget calculation, particle tracking simulations, transport models, and visualization, such as flow vectors and water level contours, etc.

Computing the vertical aquifer-system deformation in a model cell

The vertical deformation of a model cell (Δb) over a time interval Δt is calculated as:

$$\Delta \mathrm{b} = \mathrm{S}' \cdot \Delta h \tag{2}$$

Soil skeleton deformation behavior is non-linear and is dependent on the current hydraulic head and the lowest hydraulic head (i.e., highest effective stress) that has ever been applied to the soil skeleton. To better approximate the non-linear behavior, equation (2) is further refined as follows.

$$\Delta \mathrm{b}_e = S_{fe} \cdot \Delta h \qquad if\ h > h_c \tag{3a}$$

$$\Delta \mathrm{b}_v = S_{fv} \cdot \Delta h \qquad if\ h \leq h_c \tag{3b}$$

The variable h_c is the pre-consolidation head (also referred to as critical head, or the previous lowest hydraulic head) of the model cell; $\Delta \mathrm{b}_e$ is the elastic deformation; S_{fe} is the elastic storage coefficient; $\Delta \mathrm{b}_v$ is the inelastic deformation; and S_{fv} is the inelastic storage coefficient. Equation (3a) applies when the hydraulic head is greater than the pre-consolidation head. Equation (3b) applies when the hydraulic head is equal or less than the pre-consolidation head.

If the hydraulic head remains greater than the pre-consolidation head, a further decrease in hydraulic head (i.e., increase in effective stress) causes a small elastic compression in both the coarse- and fine-grained sediments. This compression is recoverable if the head returns to its initial value. If the hydraulic head falls below the pre-consolidation head, the fine-grained sediments can compact inelastically. Inelastic compaction is explained by a physical rearrangement of the sediment grains and is largely permanent (Meade, 1964). Inelastic compaction of coarse-grained sediments is generally negligible compared to that of fine-grained sediments. For the same magnitude of changes in effective stress, inelastic compaction can be one to two orders of magnitude larger than elastic compression (Riley, 1969; Riley 1998).

Time delays of compaction

Because of the characteristically low vertical hydraulic conductivity of fine-grained interbeds, the equilibration of hydraulic heads in the interbeds of an aquifer system typically lags behind the head changes in the bounding aquifers (Hoffmann and others, 2003). In the context of interbed compaction and land subsidence, the time delay caused by slow dissipation of transient overpressures in fine-grained interbed sediments is often given in terms of the time constant τ_0

$$\tau_0 = \left(\frac{b_0}{2}\right)^2 / D' \tag{4}$$

The time constant τ_0 is the time during which about 93 percent of the ultimate compaction for a given decrease in head occurs (Hoffmann and others, 2003) if the overpressures dissipate vertically in two directions into the bounding aquifers. The variable b_0 is the thickness of the interbed within a model cell and $D' = S_s'/VK_v'$ is the ratio of the specific storage (S_s') and the vertical hydraulic conductivity (VK_v') of the interbed. If the time constant τ_0 is significantly greater than the model time steps, the process of slow

dissipation of the heads in the interbed must be explicitly simulated (Hoffmann and others, 2003). For most regional 3D groundwater models with large interbed thickness within model layers (such as CVM), the time constant τ_0 is often much greater than the model time steps. The Subsidence and Aquifer Compaction (SUB) Package introduces an approximation method to simulate the slow dissipation of heads in such models, where all interbeds within a model cell (of greater thickness) are lumped together and their root mean square of the thicknesses is used in the simulation. While this method is theoretically sound, it is impractical to accurately collect details of all interbed data for deep aquifers of a 3D model.

To address this challenge, this work used a combination of 3D and 1D models. In this approach, a 3D model is used to simulate regional groundwater head without the skeleton compression (i.e., compaction) terms. A vertical 1D model at a desired location with detailed lithological log is constructed with much higher vertical resolution, where thickness of each model cell is much smaller than the 3D model to obtain a proper time constant τ_0 for given time step lengths. The simulated heads from the 3D model are then assigned as the prescribed heads for the 1D model cells with coarse-grained sediments, and the 1D model run is executed to calculate the vertical aquifer-system deformation within the model cells of fine-grained sediments. The detailed steps of this approach are given below.

Steps to simulate vertical aquifer-system deformation

The following steps were used to simulate vertical aquifer-system deformation at specific locations.

1. A 3D MODFLOW groundwater-flow model is developed without the SUB package. This is the Chino Valley Model (CVM).
2. Within the 3D model domain, a borehole site with a detailed lithology log is chosen as the site for a 1D model.
3. A 1D model with a vertical stack of cells is constructed. The thickness of the model cells is chosen to ensure that the time constant τ_0 is smaller than model time steps. The model cells are categorized into either “Sand” for coarse-grained sediments or “Clay” for fine-grained sediments based on the lithology log (see Borehole Lithology below for details).
4. Initial model parameters for Sand and Clay are assigned to the respective 1D model cells.
5. Simulated heads from the 3D model are assigned as prescribed heads to the corresponding Sand cells in the 1D model.
6. The 1D model simulation is executed to compute the time-series of vertical aquifer-system deformation in each 1D model cell. The sum of the calculated vertical deformation in all cells is assumed to represent the vertical ground motion at the land surface.

One-Dimensional Aquifer-System Deformation Models

Locations for 1D Models

Two 1D models were constructed and calibrated to simulate the vertical deformation of the aquifer-system sediments at selected sites in Northwest MZ-1. One of the models is located at the Pomona Extensometer facility (PX) and another is located at the MVWD-28 site. Figure 2 shows the contours of InSAR-derived vertical ground motion, locations of the PX and MVWD-28 sites and the nearby benchmarks (B-401, B-403, BM 2867, BM 4311) at which elevation survey data are available. In addition, two historical National Geodetic Survey (NGS) benchmarks (EV3052 and EV3054) with their time-range and subsidence values are shown. The PX and MVWD-28 sites were chosen because:

1. Both sites are located within the area of greatest subsidence in Northwest MZ-1 as estimated by InSAR from 1992-2016.
2. The boreholes were drilled to total depths of 1,290 and 1,317 ft-bgs for PX and MVWD-28, respectively. These depths are deeper than most production wells in the area and penetrate all five model layers as currently conceptualized in the CVM.
3. The borehole lithologic descriptions are consistent with the borehole resistivity logs. This is important because the borehole lithology is the basic information used to construct and discretize the 1D models into "Sand" and "Clay" layers.

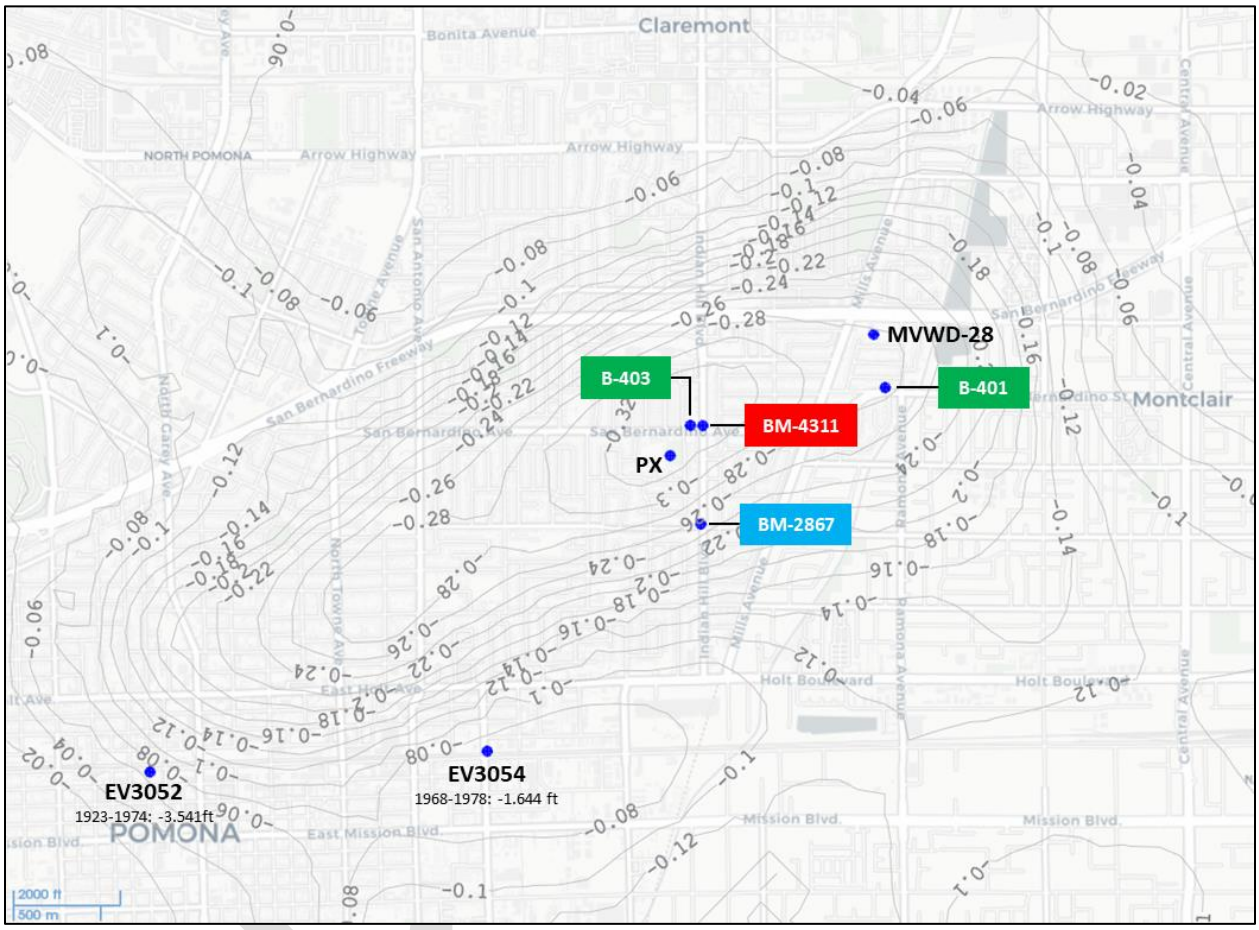

Figure 2. Locations Map. Contours of are estimates of downward ground motion (ft; 2011-2021).

Data for Calibration and Validation

Both models were calibrated based on the InSAR estimates of vertical ground motion. In addition to the InSAR estimates, the ground-level survey data at nearby benchmarks were used to validate the calibration. Table 1 shows the time range of the available InSAR and ground-level survey data, including data provided by LADPW[4] and the data acquired by the Chino Basin Watermaster as part of the Ground Level Monitoring Committee's (GLMC) Ground-Level Monitoring Program.

[4] https://dpw.lacounty.gov/sur/BenchMark/

Table 1. Time range of ground-motion data used in 1D Model calibration and validation	
Location	**Time range**
InSAR at PX and MVWD-28	1992 to 1999, and 2005 to 2020
LADPW Benchmark 2867	1990 to 2013
LADPW Benchmark 4311	1990 to 2013
Benchmarks B-401 and B-403	2013 to 2021

Borehole Lithology[5]

The lithology at PX and MVWD-28 consists of coarse-grained "Sand" comprised of silty sands, sands, and gravels, interbedded with fine-grained "Clay" comprised of silts, silty clays, and clays. Table 2 shows the mapping of USGS codes to "Sand" or "Clay" units.

Table 2. Mapping of USCS codes to Sand or Clay layers		
USCS Code	**Cell Type**	**Description**
SP-SM	Sand	Poorly graded sand with silt
SP-SC	Sand	Poorly graded sand with clay
SP	Sand	Poorly graded sand with gravel
SC	Sand	Clayey sand or Sand with clay
SM	Sand	Silty sand
CH	Clay	Fat clay
ML	Clay	Sandy silt
CL	Clay	Sandy lean clay or Clay with sand

Spatial Discretization

Figures 3 and 4 show the generalized borehole lithology for PX and MVWD-28, short-normal resistivity logs, 1D model cells (sand cells are shaded in blue; clay cells are white), and the corresponding CVM layers. CVM Layer 1 is representative of the shallow aquifer-system and is generally characterized by unconfined to semi-confined groundwater conditions. CVM Layers 2 to 5 are representative of the deep aquifer-system and are characterized by confined groundwater conditions, lower permeability sand and gravel layers (compared to Layer 1), and a greater abundance of interbedded fine-grained sediments.

For PX (Figure 3), the borehole lithology was discretized into a stacked column of 529 two-foot-thick cells starting from 234 ft-bgs to 1,292 ft-bgs. The uppermost 234 feet of sediments were not included in the 1D model because the sediment was unsaturated throughout the simulation and therefore not subject to deformation caused by changes in head. Each model cell was mapped to the borehole lithology and identified as either a "Sand" or "Clay" cell based on the mapping shown in Table 2.

[5] The well driller's logs that describe the borehole sediments are attached to this memorandum

For MVWD-28 (Figure 4), the borehole lithology was discretized into a stacked column of 510 two-foot-thick cells starting from 280 ft-bgs to 1,300 ft-bgs. The uppermost 280 feet of sediments were not included in the 1D model because the sediment was unsaturated throughout the simulation and therefore not subject to deformation caused by changes in head. Each model cell was mapped to the borehole lithology and identified as either a “Sand” or “Clay” cell based on the mapping shown in Table 2.

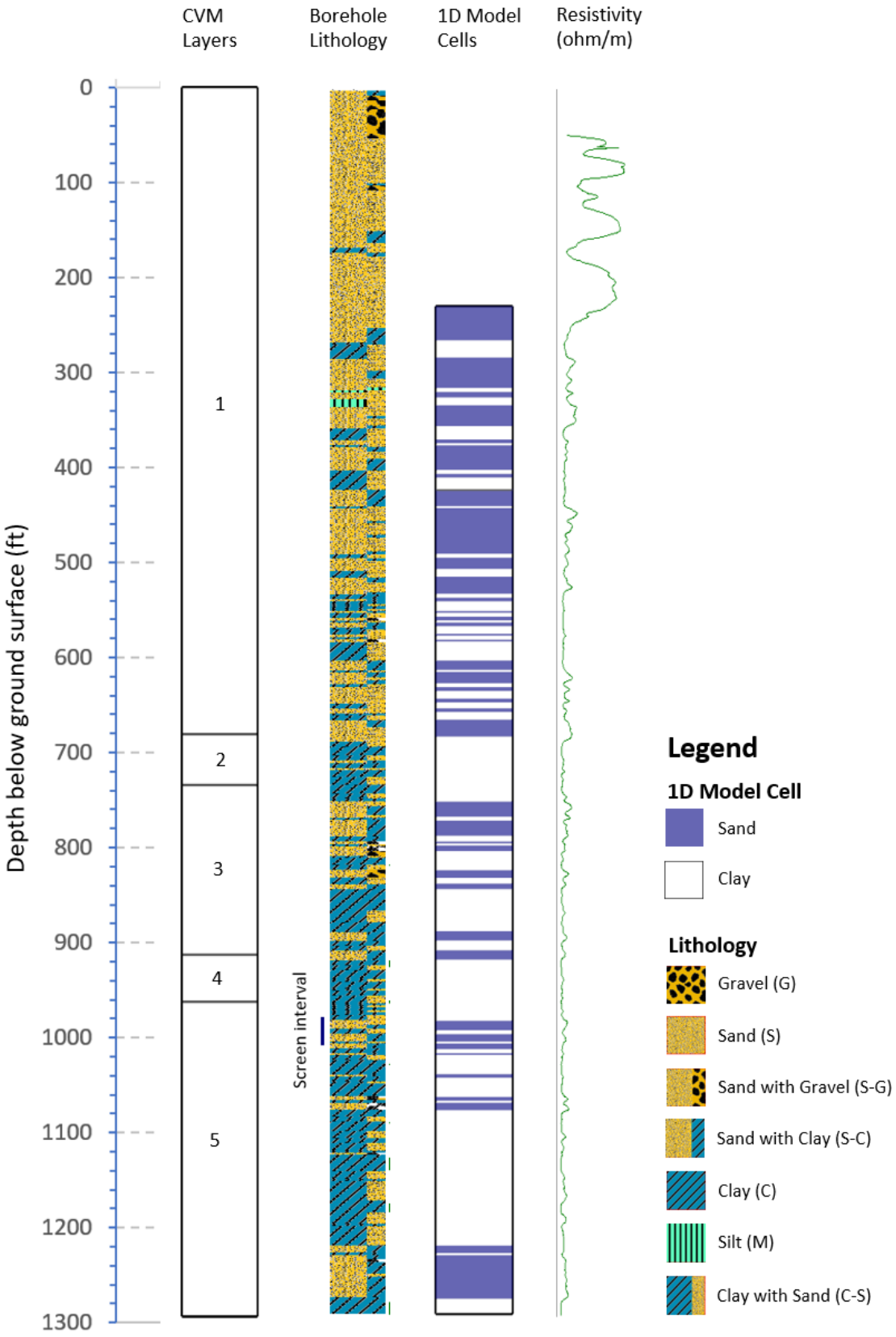

Figure 3. PX Site: CVM layers, borehole lithology, 1D model cells, and resistivity log

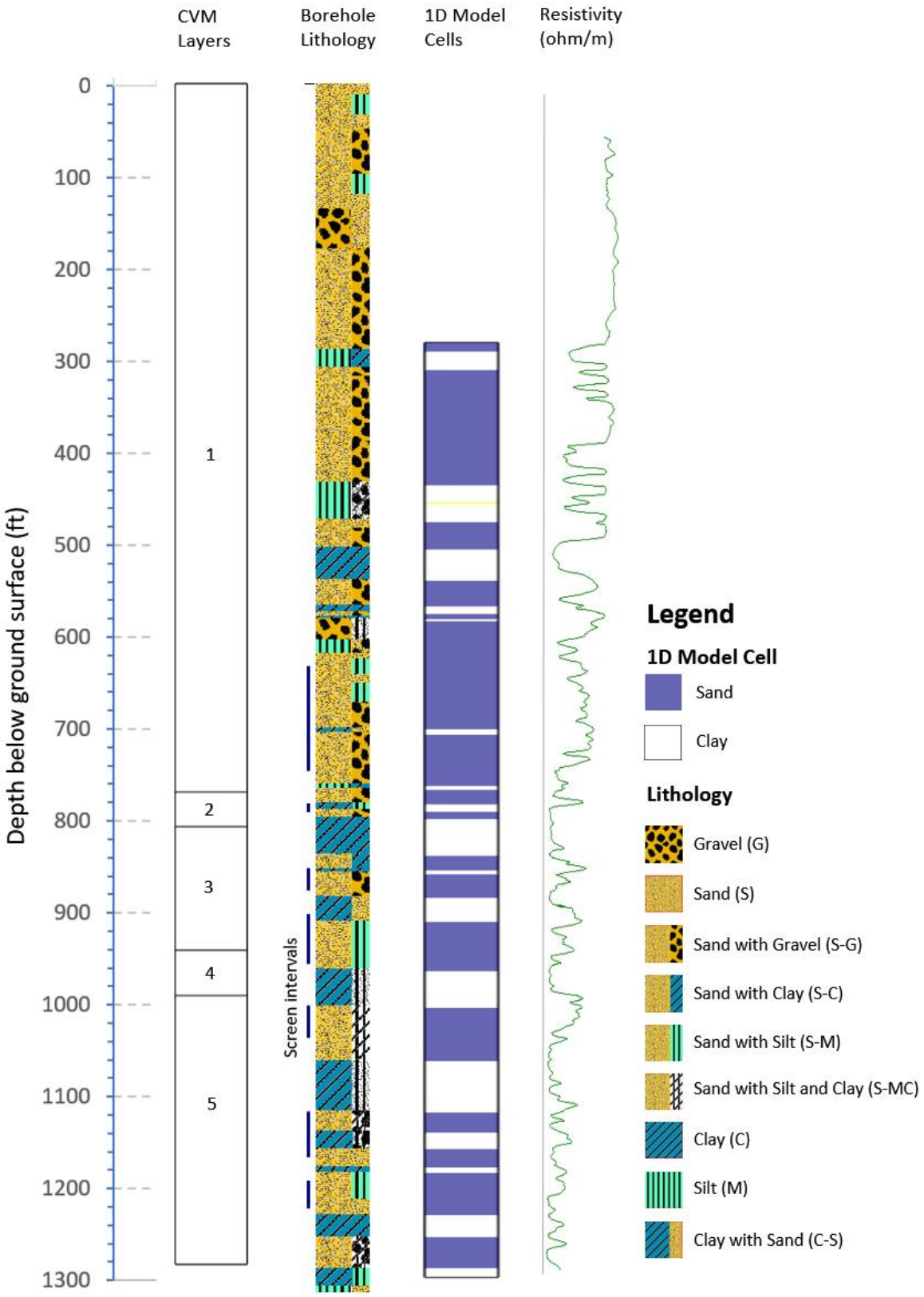

Figure 4. MVWD-28 site: CVM Layers, borehole lithology, 1D model cells, and resistivity log

Time Discretization

The 1D Models run from July 1, 1930 to June 30, 2018 on a monthly time step.

Initial Conditions

The 1D Models require assignment of initial conditions for head, pre-consolidation head, and compaction for each model cell. An initial head of 750.5 ft-amsl for July 1, 1930 was assigned to all model cells based on the estimated heads shown in Figure 6 of the TM for Task 3 and Task 4 (Wildermuth Environmental, Inc., 2017). Assuming that 1930 was a time before significant head declines and compaction of the aquifer-system sediments in Northwest MZ-1, the initial pre-consolidation head was also set at 750.5 ft-amsl, and the initial compaction was set to zero for all model cells.

Boundary Conditions

The Sand cells in the 1D Models were modelled as a specified-head boundary with the Flow and Head Boundary Package (Leake and others, 1997). Figures 5 and 6 show the time-series of groundwater elevations by CVM Layer used in the 1D Models for the PX and MVWD-28 sites, respectively. Historical measured heads at the wells near PX and MVWD-28 were inspected and charted on Figures 5 and 6 to construct a long-term time-series of heads that are representative of the shallow (CVM Layer 1) and deep (Layers 2 to 5) aquifer-systems. The measured heads varied greatly due to groundwater pumping conditions. From 1930 to 1978, head data were only available from wells screened across CVM Layer 1, which showed a gradual decline of about 175 to 200 feet. Heads in CVM Layer 1 increased by about 25-50 feet after 1978. Beginning in the early 1980s, new production wells were drilled deeper and began producing from the deep confined aquifers, which caused lowering of heads in CVM Layers 2 and 5 to elevations lower than heads in CVM Layer 1.

Initial Aquifer/Aquitard Properties

Table 3 lists the initial estimates in both 1D Models for vertical hydraulic conductivity, specific storage, inelastic and elastic storage coefficient that were assigned to all Sand and Clay cells. These initial estimates were obtained based on literature reviews and were adjusted during calibration.

Table 3. Initial estimates of model parameters

Cell Type	Parameter	Value
Sand	Vertical hydraulic conductivity VK	5.00E-01 [ft/day]
Sand	Specific storage Ss	1.83E-06 [1/ft]
Sand	Inelastic storage coefficient Sfv	1.00E-06 [-]
Sand	Elastic storage coefficient Sfe	1.00E-06 [-]
Clay	Vertical hydraulic conductivity VK	2.50E-05 [ft/day]
Clay	Specific storage Ss	1.14E-05 [1/ft]
Clay	Inelastic storage coefficient Sfv	1.65E-04[-]
Clay	Elastic storage coefficient Sfe	4.50E-06 [-]

Calibration of the 1D Models

1D Model calibration was performed in a manual and iterative manner in the following steps. The compaction in the Sand cells was considered negligible and was not included in the calibration process. The parameter values for the Sand cells were set to their initial values given in Table 3 and were not adjusted during the calibration.

1. The estimated parameter values for the Clay cells were assigned to the model.

2. The model was executed from 1930 to 2018.

3. The simulated compaction values relative to a given date were compared with the InSAR-derived estimates of vertical ground motion, and the goodness of fit (in terms of R2) was determined.

4. A new set of parameter values for the Clay cells were determined based on the results of step 3, and steps 1 to 3 were repeated for a new calibration iteration.

The iterative calibration process described above was repeated until a good match between model-simulated aquifer-system deformation and the InSAR-derived estimates of vertical ground motion was obtained within the reasonable bounds. Table 4 shows a list of calibration iterations (v1 to v21) with their estimated parameter values. The initial parameter values were used in calibration iteration v1, and then adjusted in the subsequent iterations. Figures 7 and 8 show the time series of the simulated and observed values of aquifer-system deformation and ground motion for selected calibration iterations for the PX and MVWD-28 sites, respectively. The time-series of the benchmarks near the sites are also displayed in these figures to validate the calibration results. These figures reveal different trends in InSAR data between the periods 1992 to 1999 and 2005 to 2020. The calibration process was focused on matching model results with the recent InSAR data (i.e., 2005 to 2020). For the PX-site, the parameters of the calibration iterations V13 and V21 provided the best match between the modeled and InSAR-derived values. For the MVWD-28 site, the parameters of the calibration iterations V7 and V21 provided the best match between the modeled and InSAR-derived values. For both sites, V21 matches the InSAR data from 1992 to 1999 better. V21 also results in less total subsidence compared to V7 and V13, which is more consistent with no reported observations of ground fissuring or subsidence-related impacts to overlying infrastructure.

Figures 9 through 12 are scatter plots that quantify the goodness of fit of the calibration iterations and were developed to compare the modeled deformation with the observed counterparts, including InSAR estimates and benchmark survey data. On these charts, the X-axis represents measured ground motion, and the Y-axis represents the modeled aquifer-system deformation. The orange diagonal line represents the line of perfect fit. If the measured and modeled values match perfectly, all dots lie on the line of perfect fit.

For the PX site, the scatter plots for the calibration iterations V13 and V21 are shown in Figure 9 and 10, respectively. Both plots indicate a good fit, while V21 shows a slightly higher value of the coefficient of determination (R^2 = 0.9655 for V13; R^2 = 0.9831 for V21), which is a statistical measure of how well the predictions approximate the measured data points. An R^2 of 1 indicates that the modeled results perfectly fit the measured data.

For the MVWD-28 site, the scatter plots for the calibration iterations V7 and V21 are shown in Figure 11 and 12, respectively. Both plots indicate a good fit, while V21 shows a slightly higher value of the

coefficient of determination (R^2 = 0.9923 for V7; R^2 = 0.9936 for V21). There are no historical leveling data near the PX and MVWD-28 sites to confirm the model results of V21. However, Figure 2 shows that 3.5 feet of subsidence occurred between 1923 and 1974 at benchmark EV3052 and 1.64 feet of subsidence occurred between 1968 and 1978 at benchmark EV3054, which are both consistent with the timing and magnitude of the compaction that was estimated by the 1D Model at the MVWD-28 site over the historical simulation period.

It is concluded that the parameters of V21 are the best fit. Table 5 shows the final calibrated parameters for the PX and MVWD-28 sites.

Table 4. Parameter values of calibration iterations

Iteration	VK [ft/day]	Ss [1/ft]	Sfv [-]	Sfe [-]
V1	2.00E-05	1.14E-05	1.65E-04	4.50E-06
V2	1.00E-05	1.14E-05	1.65E-04	4.50E-06
V3	1.00E-06	1.14E-05	1.65E-04	4.50E-06
V3a	1.00E-06	5.00E-06	1.65E-04	4.50E-06
V3b	1.00E-06	7.00E-06	1.65E-04	4.50E-06
V4	2.00E-05	1.14E-05	1.00E-04	4.50E-06
V5	2.00E-05	1.14E-05	2.00E-04	4.50E-06
V6	1.00E-06	1.14E-05	2.00E-04	4.50E-06
V7	1.00E-06	1.14E-05	3.00E-04	8.00E-06
V8	1.00E-06	1.14E-05	5.00E-04	8.00E-06
V9	1.00E-06	1.14E-05	4.50E-04	4.50E-06
V10	5.00E-06	1.14E-05	4.50E-04	8.00E-06
V11	5.00E-06	5.00E-05	4.50E-04	8.00E-06
V12	2.00E-06	1.14E-05	4.50E-04	4.50E-06
V13	1.00E-06	1.14E-05	4.00E-04	4.50E-06
V14	1.00E-06	7.00E-06	4.00E-04	4.50E-06
V15	6.00E-07	1.14E-05	4.50E-04	4.50E-06
V16	8.00E-07	1.14E-05	4.50E-04	4.50E-06
V17	1.00E-06	1.14E-05	3.50E-04	8.00E-06
V18	1.00E-06	1.14E-05	4.00E-04	2.00E-06
V19	4.00E-05	1.14E-05	1.00E-04	4.50E-06
V20	1.00E-06	1.14E-05	3.50E-04	4.50E-06
V21	2.00E-07	1.14E-05	4.50E-04	4.50E-06

Table 5. Calibrated parameter values for the PX and MVWD-28 sites				
Iteration	**VK [ft/day]**	**Ss [1/ft]**	**Sfv [-]**	**Sfe [-]**
V21	2.00E-07	1.14E-05	4.50E-04	4.50E-06

Historical Subsidence Simulation

For the PX site, the final calibration run for the 1D Model indicated a total of about 9.6 feet of aquifer-system compaction from 1930 to 2018. The time-series of the simulated subsidence of V21 in Figure 7 indicates that most of the historical subsidence (about 6.4 feet) occurred between 1930 and 1978—the period of gradual and persistent lowering of groundwater levels by about 190 feet in Northwest MZ-1.

For the MVWD-28 site, the final calibration run for the 1D Model indicated a total of about 5.5 feet of aquifer-system compaction from 1930 to 2018. The time-series of the simulated subsidence of V21 in Figure 8 indicates that about three feet of subsidence occurred between 1930 and 1978—the period of gradual and persistent lowering of groundwater levels by about 190 feet in Northwest MZ-1.

The final calibration run also generated end-of-calibration (2018) estimates of the compaction and critical head in the 1D model cells, which are displayed on Figures 13 and 14 for the PX and MVWD-28 sites, respectively. The higher critical head and lower compaction in the center of thicker fine-grained sediments indicates that the pore pressures there have not yet dissipated and, therefore, these sediment layers are more susceptible to compaction should these pore pressures decline in the future. As thicker fine-grained sediments are primarily located in the deep aquifer-system, they are more susceptible to compaction compared to the shallow aquifer-system.

Model Errors and Limitations

In general, a groundwater model is a simplified mathematical representation of a complex hydrogeologic system. Because of this, there are limits to the accuracy of the model and the use and interpretation of the model results. There are various sources of error and uncertainty. Model error commonly stems from the conceptual model, practical limitations of grid cell size and time discretization, parameter structure, insufficient calibration data, and the effects of processes not simulated by the model. These factors, along with error in observations, result in uncertainty in model results.

The potential errors and limitations associated with the 1D Models and their calibration include:

- The 1D Models were based on the limited resolution, depth, and accuracy of the description of the aquifer-system sediments as documented on the driller's logs of PX and MVWD-28 boreholes.
    - The resolution by depth interval of the lithologic descriptions in this log are typically greater than five feet, which may not be a fine enough resolution to characterize any thinner interbedding of aquifer and aquitard layers that are an important control on aquifer-system deformation.

  - The boreholes did not penetrate the full thickness of the semi-consolidated bedrock formations; there may be deforming sediments at depths below the borehole bottom that are responsible for some of the vertical ground motion estimated by InSAR.

- Most wells in Northwest MZ-1 have well screens that only penetrate the shallow aquifer-system or penetrate both the shallow and deep aquifer-systems. There are no wells that are screened only across the deep aquifer-system, meaning that there are no historical measured water-level data for only the deep aquifer-system. As such, there is some uncertainty in the long-term time-series of heads for Layers 2 and 3 that were used as the boundary conditions for the 1D Model calibration, which adds uncertainty to the model results.

- Water-level data at wells is scarce in Northwest MZ-1 prior to the 1930s. This 1D modeling effort assumes that the significant lowering of heads in Northwest MZ-1 began after 1930, which may not be an accurate assumption. If head declines began before 1930, then this could impact the calibration of the 1D models and add uncertainty to the model results.

- The 1D models used InSAR-derived estimates of vertical ground motion as calibration targets for aquifer-system compaction. The limitations of using InSAR-derived estimates as calibration targets are: (1) the InSAR record is from 1992 to 2020, which limits the length of the calibration period; (2) there are multiple data gaps in the InSAR record because of satellite malfunctions and satellite replacement; and (3) InSAR produces an aggregate estimate of aquifer-system deformation and therefore provides no depth-specific calibration targets. Due to the lack of depth-specific calibration there is greater uncertainty in the depth-specific estimates for the aquifer and aquitard properties, and hence, the model results.

Continued monitoring and enhanced understanding of hydrogeologic conditions is crucial to minimizing model error and uncertainty, especially the monitoring of the PX in Northwest MZ-1. Future monitoring and data analysis can identify local anomalies associated with geologic complexity that are not currently represented in the model. Model error and uncertainty can be reduced by incorporating new monitoring information into future model updates, if recommended by the GLMC.

NEXT STEPS

Figure 15 is a schedule of activities for the *Development of a Subsidence Management Plan for the Northwest MZ-1 Area* for FY 2021/22. The next steps are as follows:

1. Members of the GLMC are asked to review this draft technical memorandum and provide comments and suggestions to Michael Blazevic (mblazevic@westyost.com) and Edgar Tellez-Foster (etellezfoster@cbwm.org) by January 3, 2022. Specifically, Watermaster staff and Engineer ask that the GLMC members answer the following question in their comments: Are the 1D Models as described in this technical memorandum sufficiently calibrated for to estimate the potential for future subsidence under the Baseline Management Alternative (BMA)? The BMA is planning scenario used in the Watermaster's most recent redetermination of the Safe Yield of the Chino Basin (WEI, 2020).

2. The 1D Models are used to characterize the mechanical response of the aquifer-system to a BMA. A draft technical memorandum will be prepared that summarizes the evaluation of the BMA, particularly, the ability of the BMA to manage piezometric levels in Northwest MZ-1 so that future

subsidence is minimized or abated. The draft technical memorandum may also include a recommendation for the Initial Subsidence Management Alternative (ISMA) if the BMA is not successful at managing future subsidence. The assumptions of the ISMA, including the groundwater production and replenishment plans of the Chino Basin parties, will be described in the technical memorandum, and must be agreed upon by the GLMC. A GLMC meeting will be held to review the technical memorandum and the recommended ISMA.

3. After the recommended ISMA is agreed upon by the GLMC, the Watermaster's MODFLOW model will be updated to run the ISMA and will be used to estimate the hydraulic head response to the ISMA at the MVWD-28 and PX locations. The projected hydraulic heads generated from the MODFLOW model using the ISMA will be extracted from the MODFLOW model results at the MVWD-28 and PX locations and will be used as input files for both 1D Models. The 1D Models will then be run to characterize the mechanical response of the aquifer-system to the ISMA at both the MVWD-28 and PX locations.

4. A draft technical memorandum will be prepared that summarizes the evaluation of the ISMA, particularly, the ability of the ISMA to manage piezometric levels in Northwest MZ-1 so that future subsidence is minimized or abated. The draft technical memorandum may also include a recommendation for a second Subsidence-Management Alternative (SMA-2), if the ISMA is not successful at managing future subsidence. The assumptions of the SMA-2, including the groundwater production and replenishment plans of the Chino Basin parties, will be described, and must be agreed upon by the GLMC. A GLMC meeting will be held to review the technical memorandum and the recommended SMA-2.

5. If necessary and recommended by the GLMC, additional subsidence management alternative scenarios may be run in FY 2022/23. It is currently envisioned that, based on the results of the 1D Model results, the GLMC may recommend an update to the Watermaster's Subsidence Management Plan in FY 2022/23 to minimize or abate the future occurrence of land subsidence in Northwest MZ-1.

REFERENCES

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Figure 5 Time Series of Groundwater Elevations by Model Layer Used to Calibrate the 1D Model at the PX site

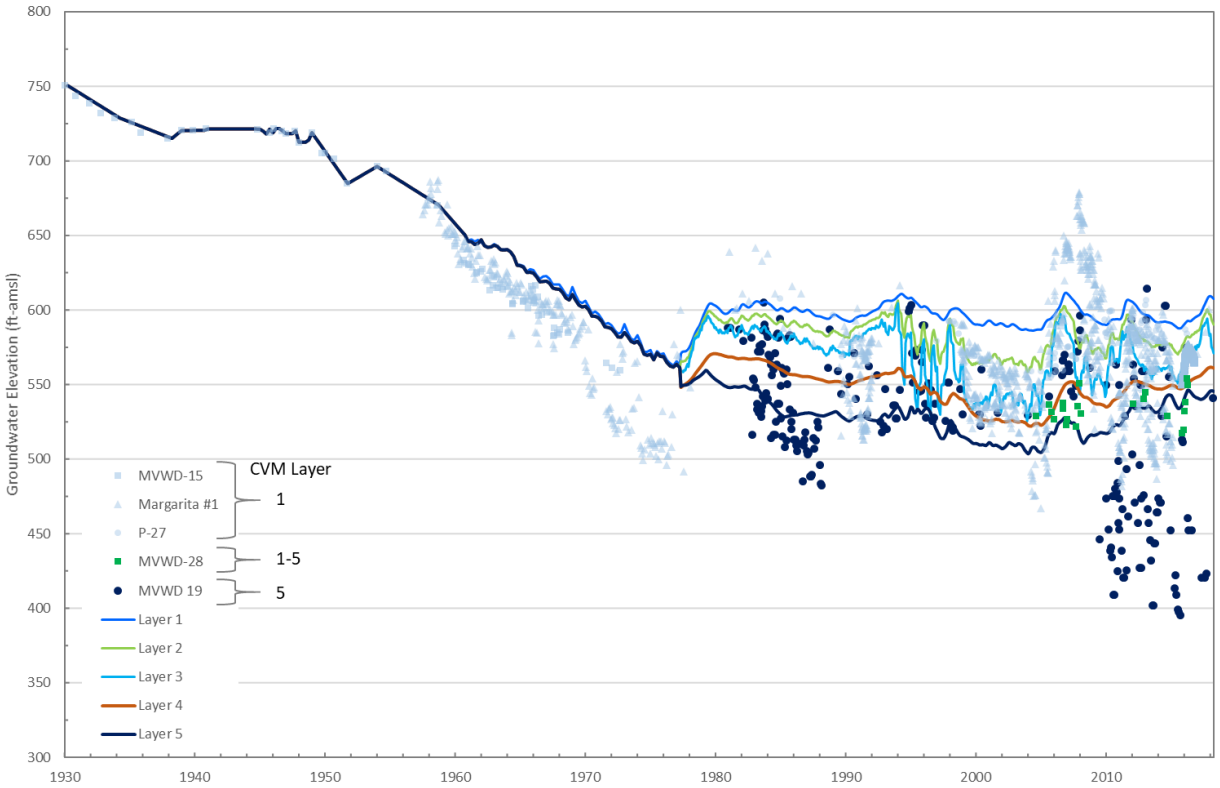

Figure 5. Time Series of Groundwater Elevations by Model Layer Used in the 1D Model at the PX-Site

Figure 6 Time Series of Groundwater Elevations by Model Layer Used to Calibrate the 1D Model at the MVWD-28 site

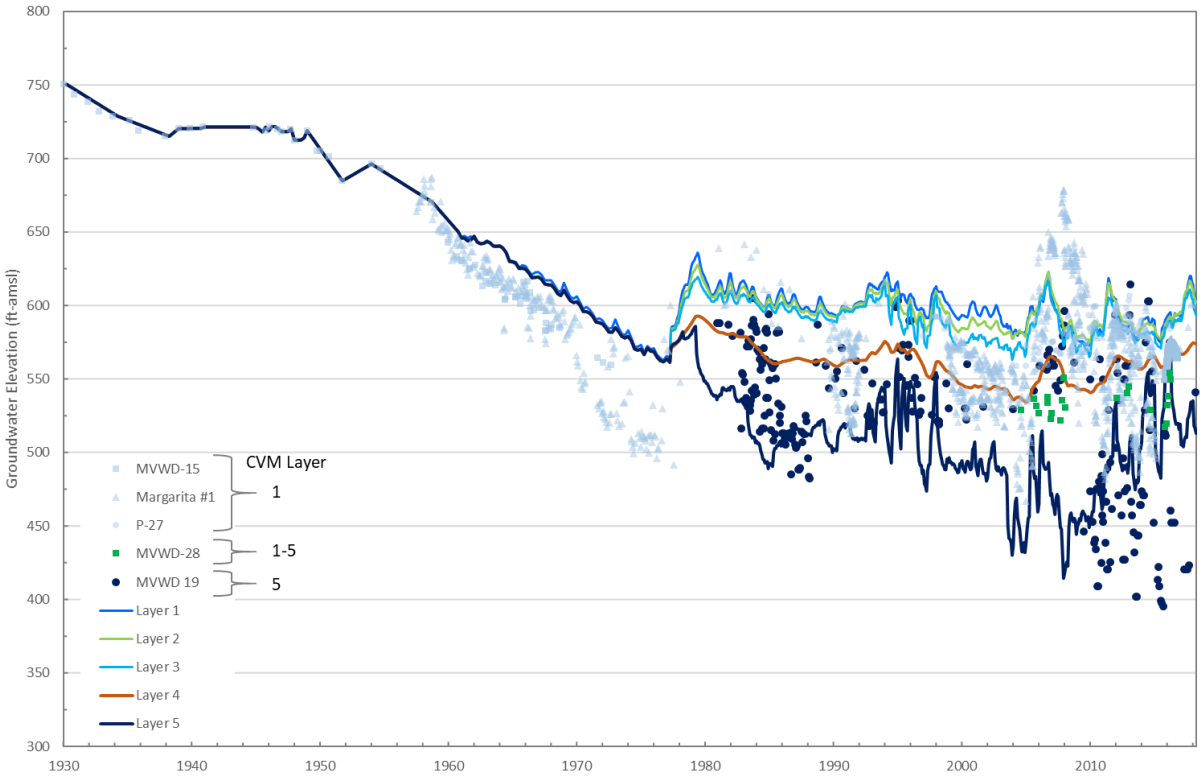

Figure 6. Time Series of Groundwater Elevations by Model Layer Used in the 1D Model at MVWD-28

Figure 7 Time series of the simulated and observed subsidence values of selected calibration iterations for the PX site

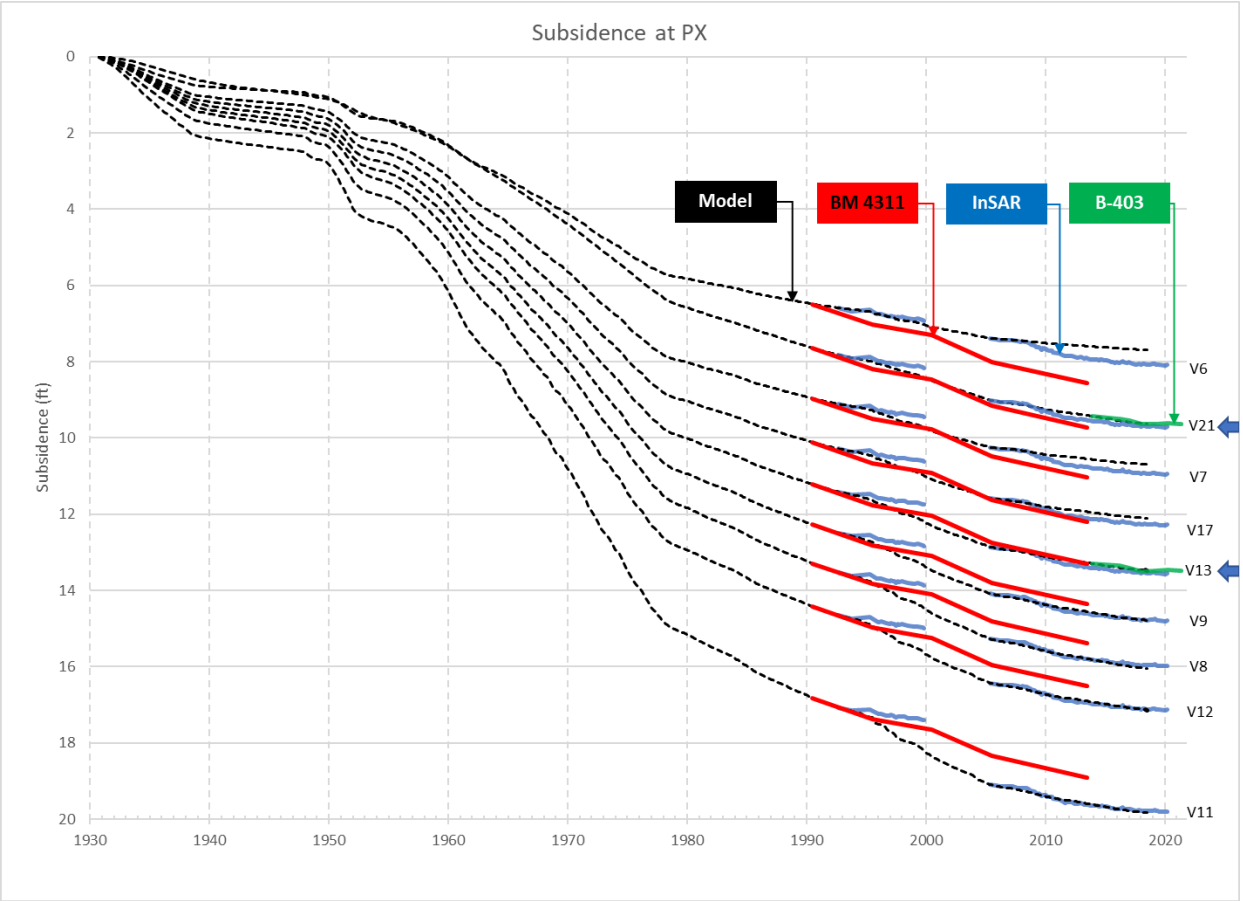

Figure 8 Time series of the simulated and observed subsidence values of selected calibration iterations for the MVWD-28 site

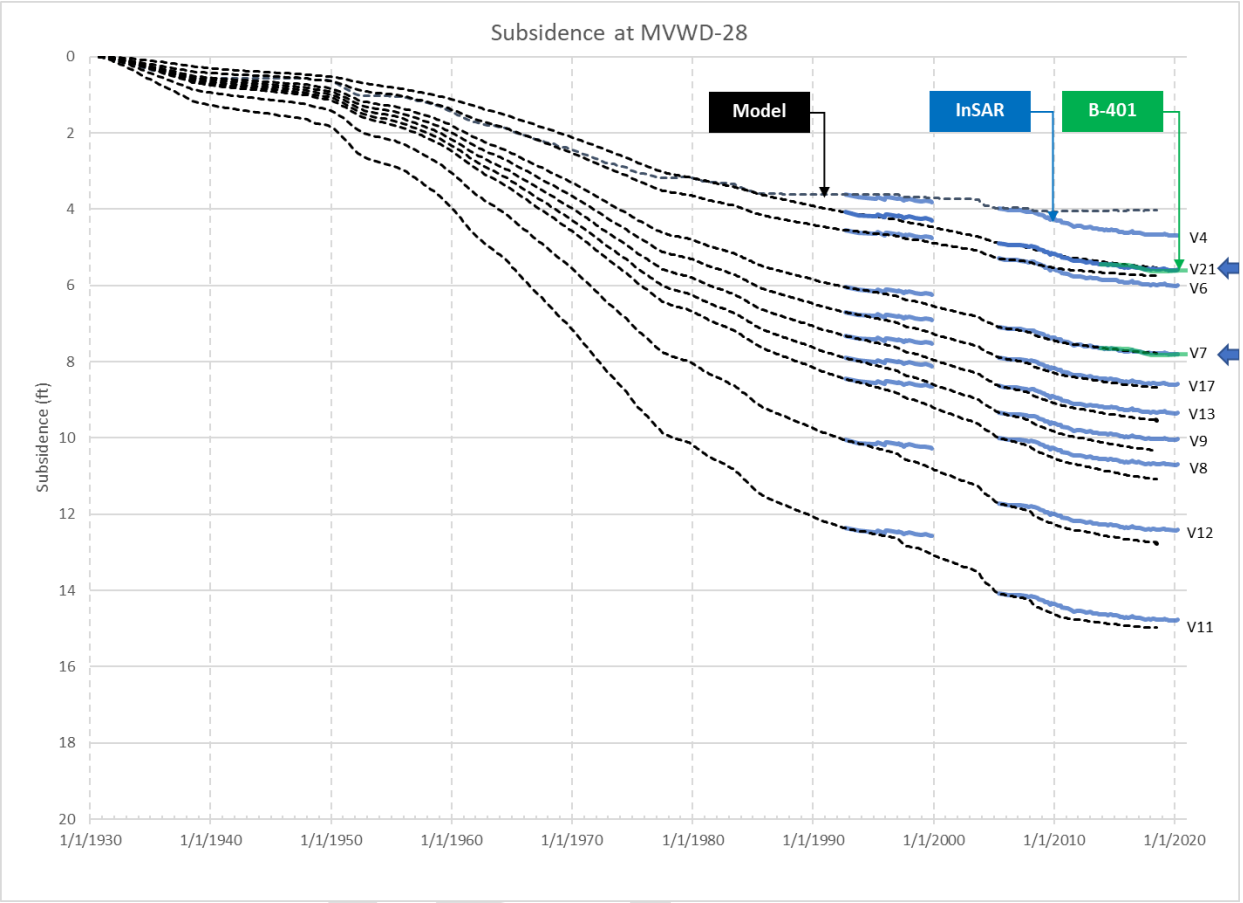

Figure 9 Scatter plot of the simulated and observed subsidence values of calibration iteration V13 for the PX site

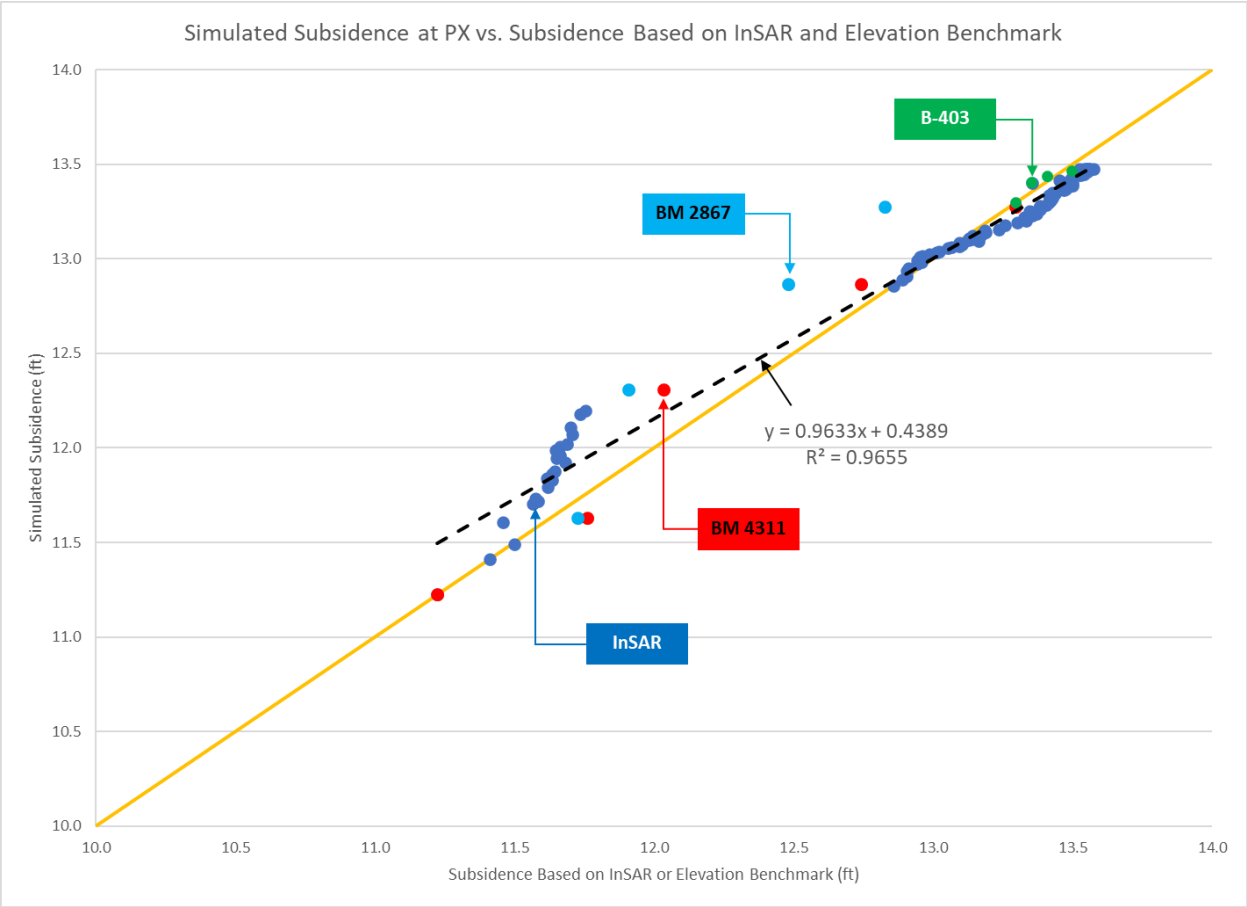

Figure 10 Scatter plot of the simulated and observed subsidence values of calibration iteration V21 for the PX site

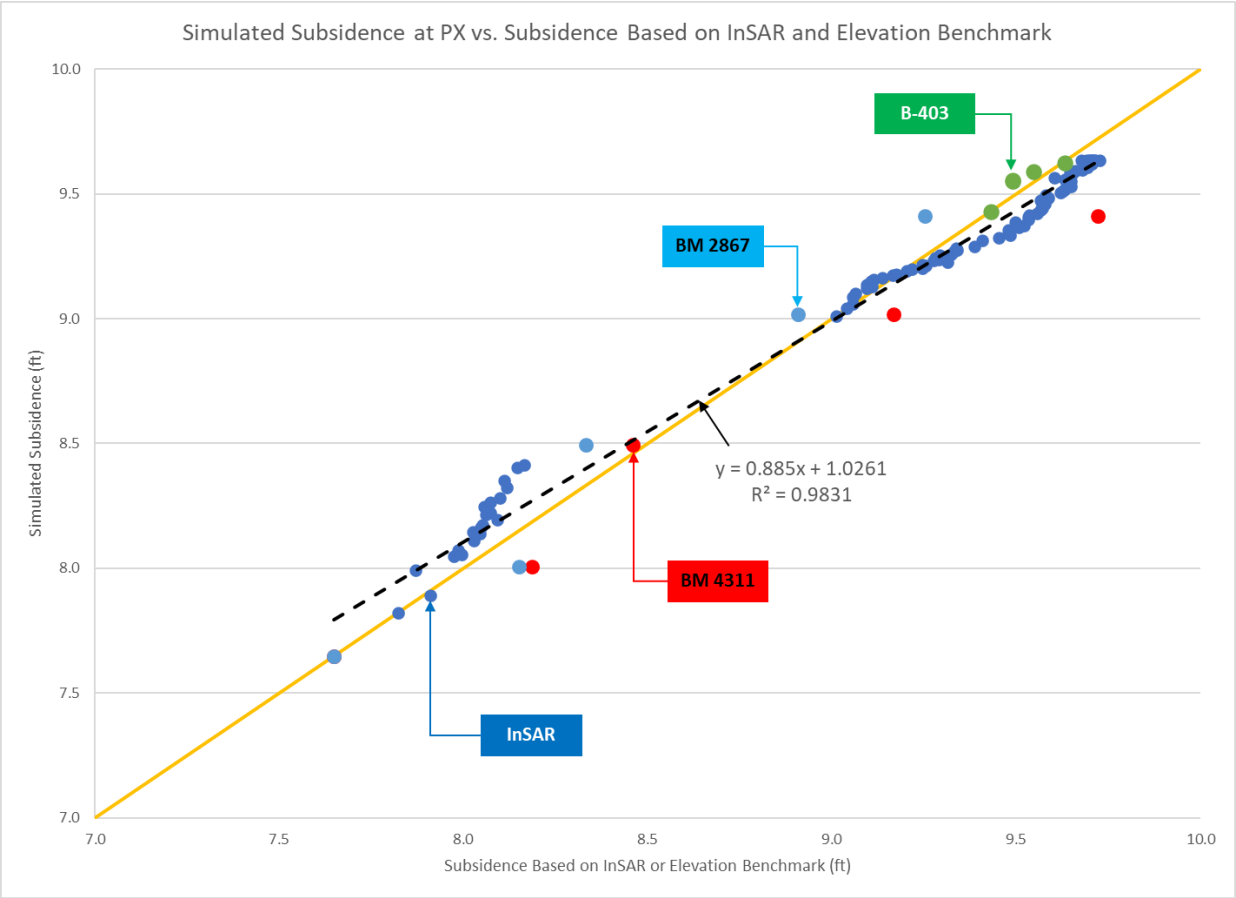

Figure 11 Scatter plot of the simulated and observed subsidence values of calibration iteration V7 for the MVWD-28 site

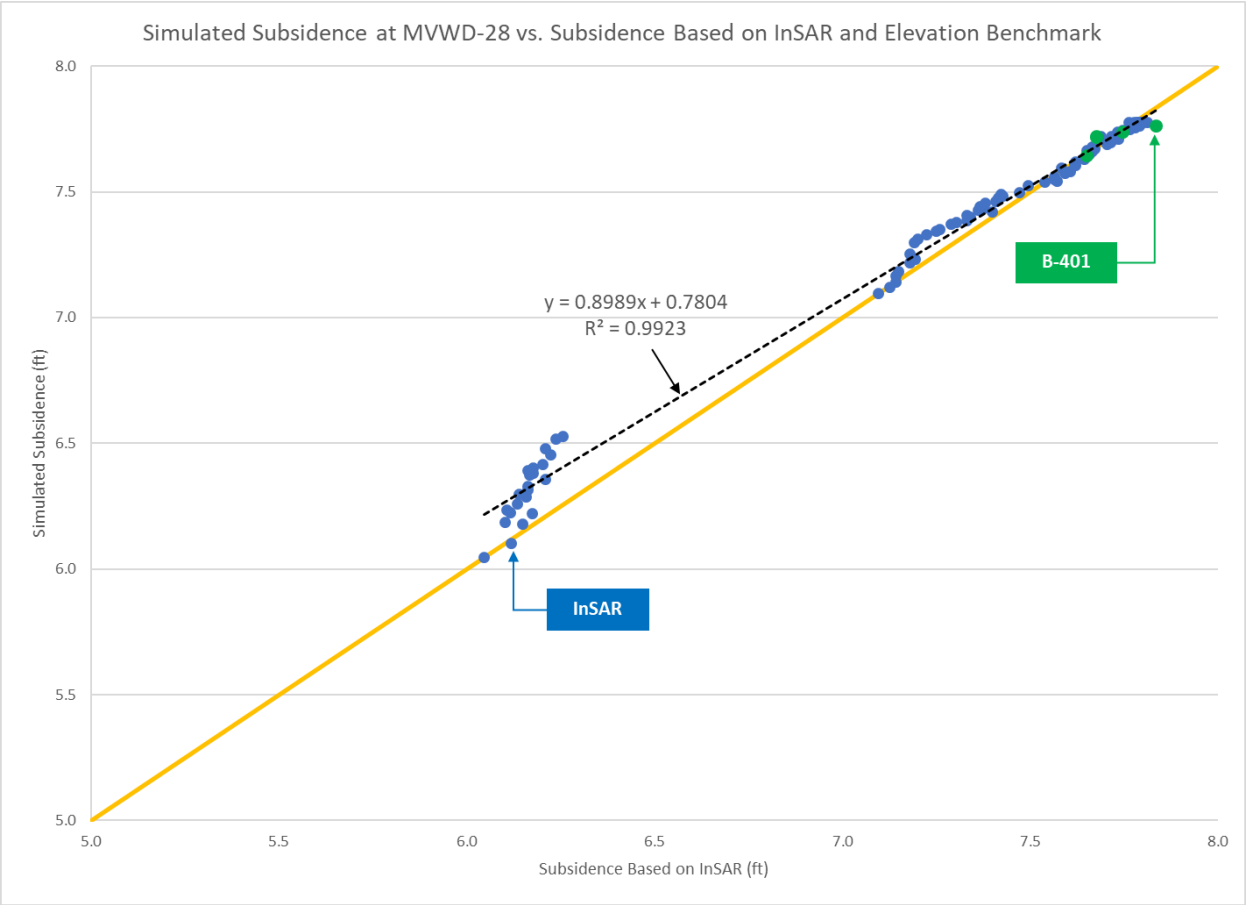

Figure 12 Scatter plot of the simulated and observed subsidence values of calibration iteration V21 for the MVWD-28 site

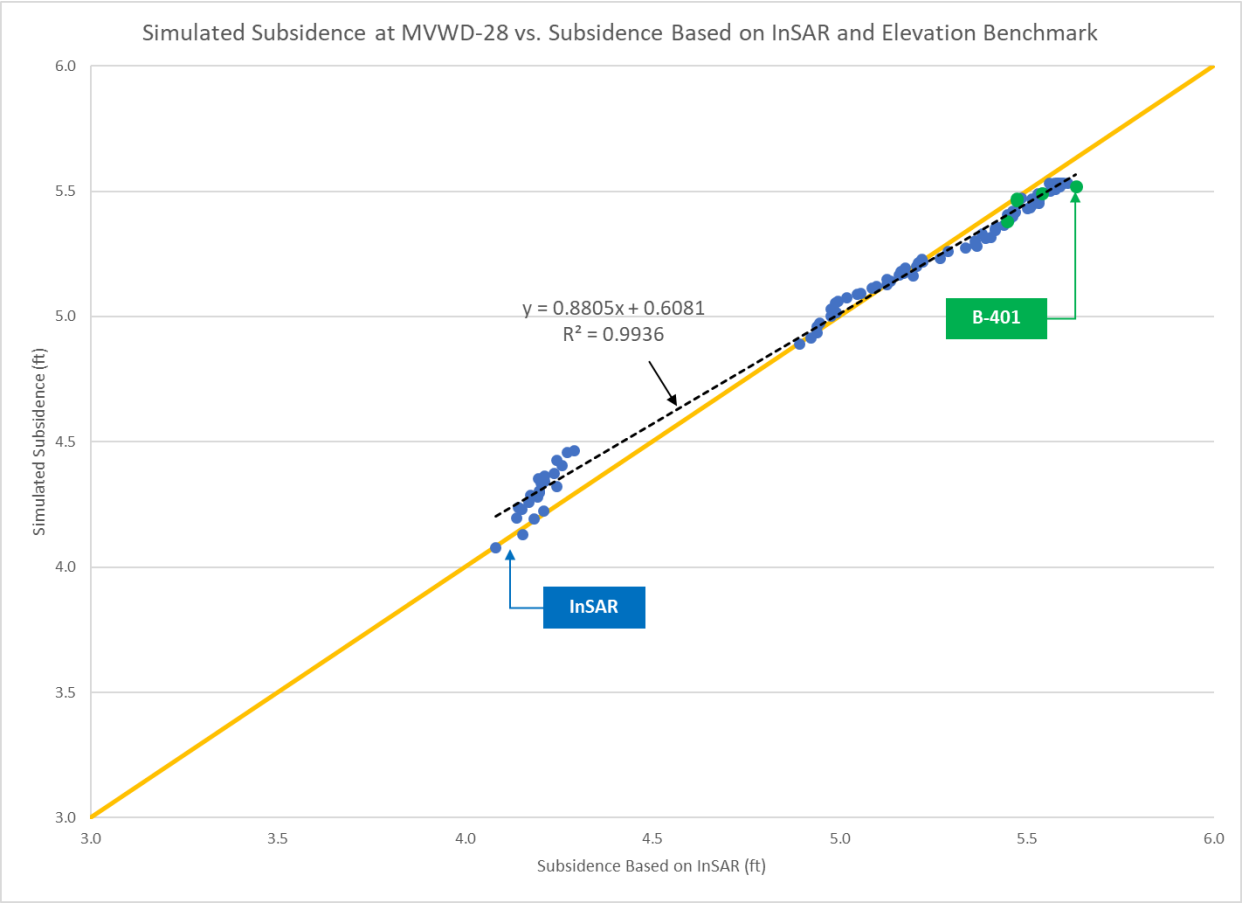

Figure 13 simulated compaction and critical head on 6/30/2018 for the PX site

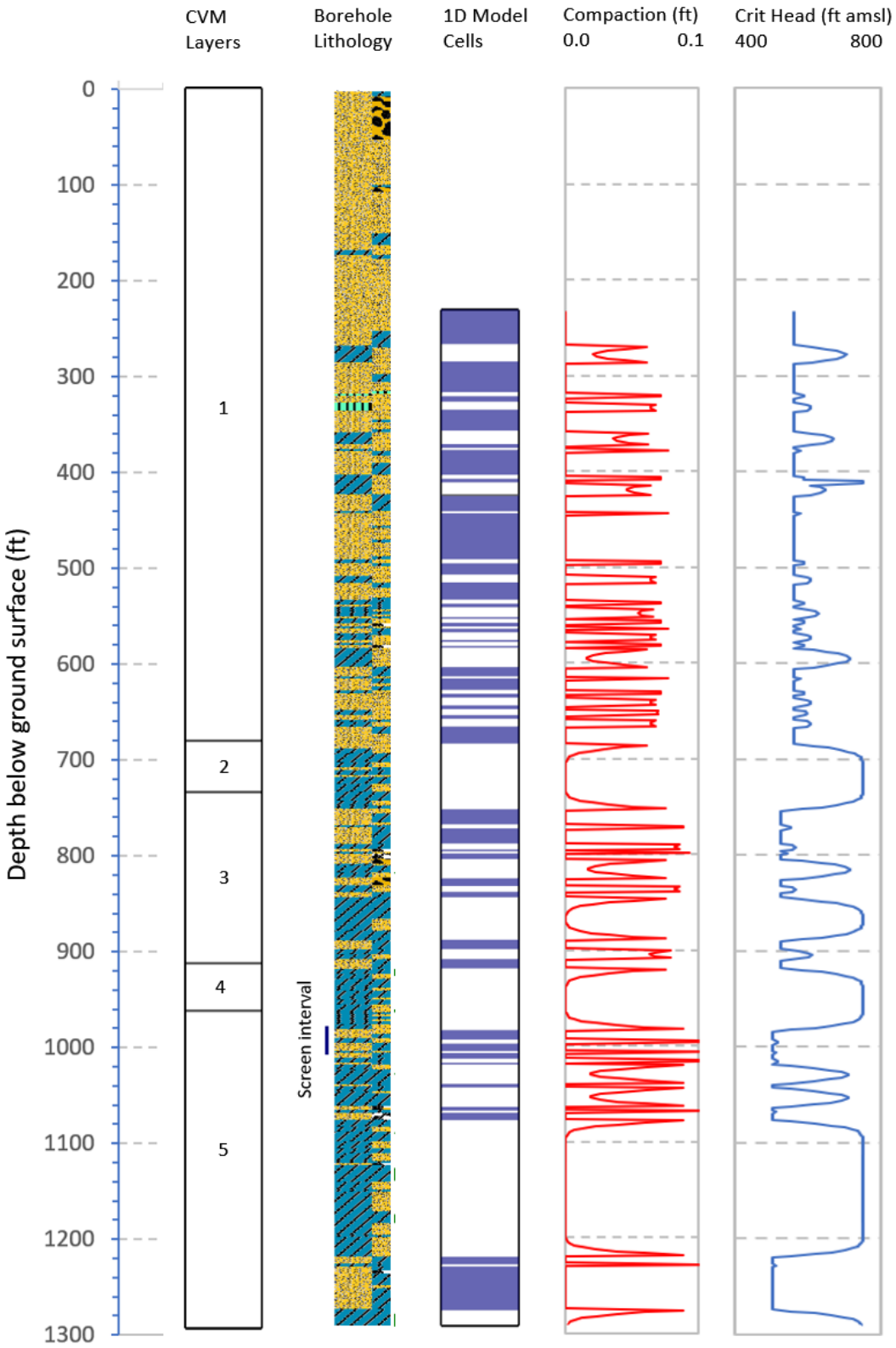

Figure 14 simulated compaction and critical head on 6/30/2018 for the MVWD-28 site

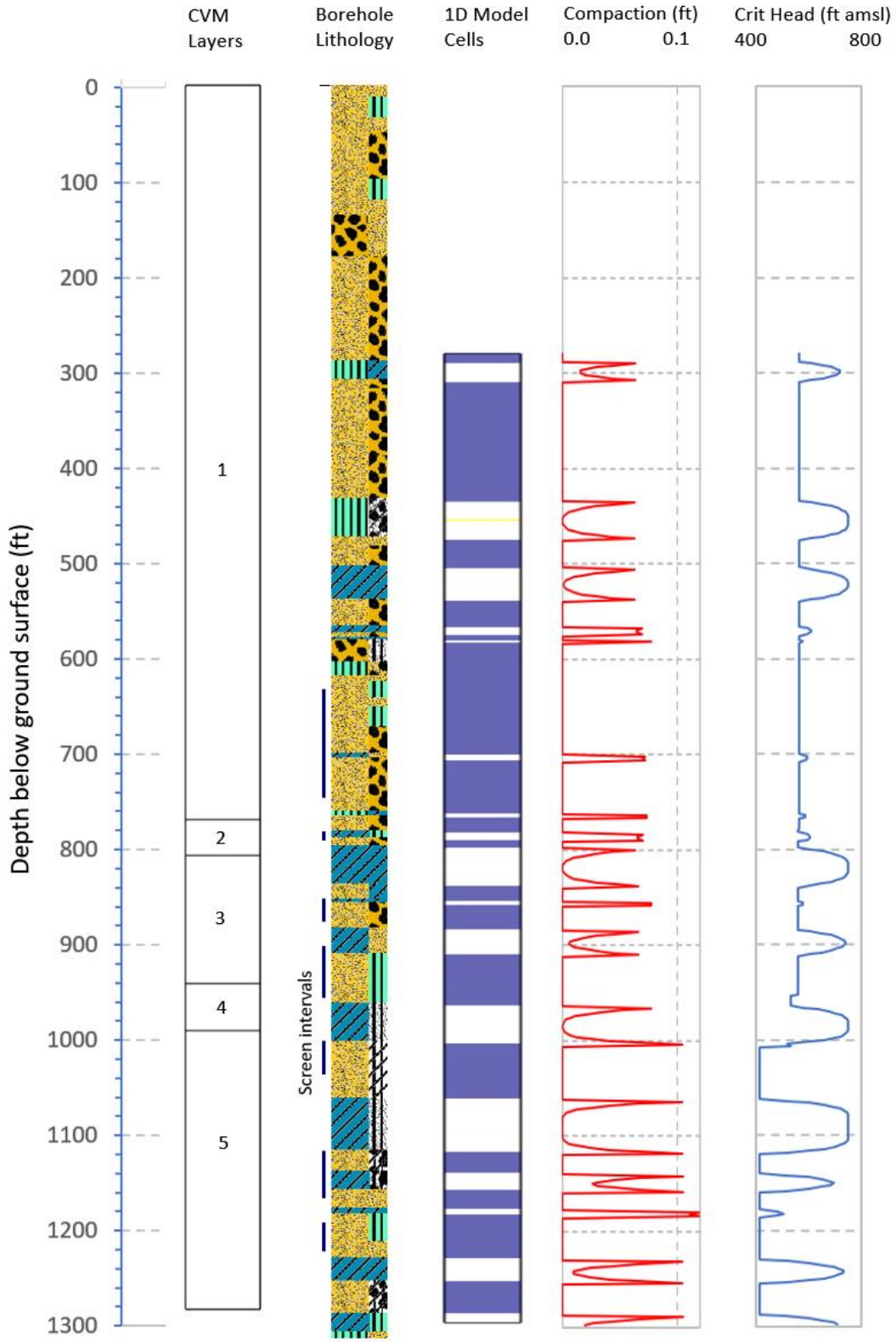

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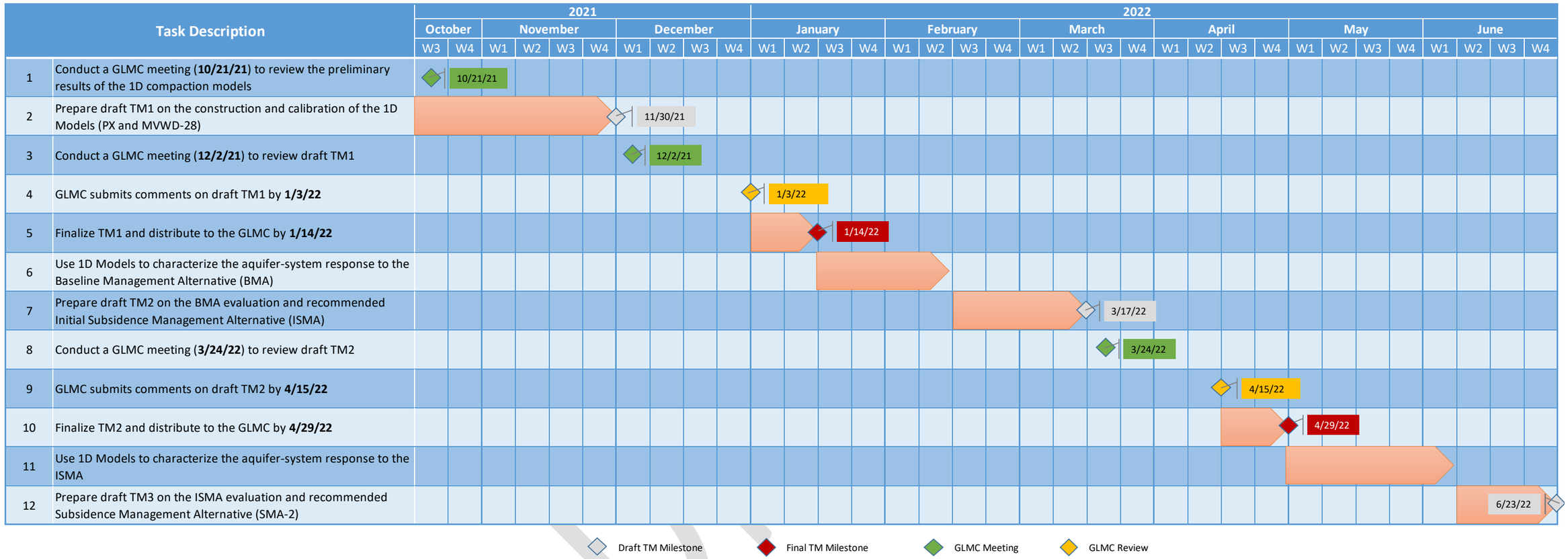
Figure 15 Schedule for the Development of a Subsidence Management Plan for Northwest MZ-1 (FY2021/22)

	Task Description	2021										2022																			
		October		November				December				January				February				March				April				May				June			
		W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4
1	Conduct a GLMC meeting (**10/21/21**) to review the preliminary results of the 1D compaction models																														
2	Prepare draft TM1 on the construction and calibration of the 1D Models (PX and MVWD-28)																														
3	Conduct a GLMC meeting (**12/2/21**) to review draft TM1																														
4	GLMC submits comments on draft TM1 by **1/3/22**																														
5	Finalize TM1 and distribute to the GLMC by **1/14/22**																														
6	Use 1D Models to characterize the aquifer-system response to the Baseline Management Alternative (BMA)																														
7	Prepare draft TM2 on the BMA evaluation and recommended Initial Subsidence Management Alternative (ISMA)																														
8	Conduct a GLMC meeting (**3/24/22**) to review draft TM2																														
9	GLMC submits comments on draft TM2 by **4/15/22**																														
10	Finalize TM2 and distribute to the GLMC by **4/29/22**																														
11	Use 1D Models to characterize the aquifer-system response to the ISMA																														
12	Prepare draft TM3 on the ISMA evaluation and recommended Subsidence Management Alternative (SMA-2)																														



Attachment A

Lithologic Logs: PX2 and MVWD-28

Project Name:	**Pomona Extensometer Facility**	**Boring Log / PX2**	
Project Location:	**Montvue Park - Pomona, CA**		
Project Number:	**007-018-762**	Sheet 1 of 38	
Client:	**Chino Basin Watermaster**		

Date Started	**1/4/19**	Date Finished	**1/29/19**	Borehole Depth	**1305.0 feet**	Drilling Contractor	**Cascade**
Lat.	**34° 4' 28.7934"**	Long.	**-117° 43' 17.2554"**	Drill Bit Size/Type	**17 1/2 in**	Driller	**J. Saldera; J. Martinez**
Ground Surface Elevation	**984.7**			Screened Interval(s)	**980-1,010; 1,235-1,275**	Drill Rig Type	**Foremost DR-24**
Top of Casing Elevation				Depth to Groundwater	**N/A**	Drilling Method	**Flooded Reverse Circulation**
Logged By	**N. Seles, PG; R. Thacker**			Reviewed By	**M. Blazevic, PG, CHG**	Sampling Method	**Grab**

Elevation, feet-msl	Depth, feet-bgs	Sample Interval	Sample Time	Graphic Log	MATERIAL DESCRIPTION	WELL SCHEMATIC AND CONSTRUCTION DETAILS	FIELD NOTES
	0				Poorly graded SAND with silt (SP-SM); 85% fine-coarse, subangular-subrounded sand; 10% fines (few silt); 5% fine-coarse, subangular gravel; very loose, brown (10YR 4/3), dry, top soil		
980	5				Poorly graded SAND with clay (SP-SC); 80% fine-coarse, subangular-subrounded sand; 10% fine-coarse, subangular-subrounded gravel; 10% fines (few silt, few clay); loose, dark brown (10YR 3/3), dry		
975	10				Poorly graded SAND with silt and gravel (SP-SM); 65% fine-coarse, subangular-subrounded sand; 25% fine-coarse, angular-subangular gravel; 10% fines (few silt); very loose, olive brown (2.5Y 4/3), dry		
970	15				Poorly graded SAND with gravel (SP); 80% fine-coarse, angular-subangular sand; 20% fine-coarse, subangular-subrounded gravel; very loose, dark grayish brown (2.5Y 4/2), moist		
965	20				Poorly graded SAND with gravel (SP); 55% fine-coarse, subangular-subrounded sand; 40% fine-coarse, subangular-subrounded gravel; 5% fines (trace silt); loose, light olive brown (2.5Y 5/3), moist		
960	25				Poorly graded SAND with silt and gravel (SP-SM); 75% fine-coarse, subangular-subrounded sand; 15% fine-coarse, subangular-subrounded gravel; 10% fines (few silt); very loose, dark yellowish brown (10YR 4/4), moist		
955	30						

Project Name:	**Pomona Extensometer Facility**
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Project Number:	**007-018-762**
Client:	**Chino Basin Watermaster**

Boring Log / PX2

Elevation, feet-msl	Depth, feet-bgs	Sample Interval	Sample Time	Graphic Log	MATERIAL DESCRIPTION	WELL SCHEMATIC AND CONSTRUCTION DETAILS	FIELD NOTES
	30				Poorly graded SAND with silt and gravel (SP-SM); 55% fine-coarse, subangular-subrounded sand; 35% fine-coarse, subangular-subrounded gravel; 10% fines (few silt); loose, dark yellowish brown (10YR 4/4), moist		
950	35				As Above		
945	40				As Above		
940	45		21:15		As Above		
935	50		[0.0]		As Above		
930	55				Poorly graded SAND (SP); 100% fine-coarse, subangular-subrounded sand; loose, grayish brown (2.5Y 5/2)		
925	60		03:15 03:15		As Above		
			[0.0]				
920	65		06:07				

Project Name:	**Pomona Extensometer Facility**
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Project Number:	**007-018-762**
Client:	**Chino Basin Watermaster**

Boring Log / PX2

Elevation, feet-msl	Depth, feet-bgs	Sample Interval	Sample Time	Graphic Log	MATERIAL DESCRIPTION	WELL SCHEMATIC AND CONSTRUCTION DETAILS	FIELD NOTES
	65		06:07		As Above		
			[0.0]				
915	70		08:02				
			08:02		As Above		
			[0.5]				
910	75		08:12				
			08:12		As Above		
			[0.1]				
905	80		08:50				
			08:50		As Above		
			[0.0]				
900	85		11:06				
			11:06		As Above		
			[0.0]				
895	90		12:58				
			12:58		As Above		
			[0.0]				
890	95		14:43				
			14:43		As Above		
			[0.1]				
885	100		15:30				

Project Name:	**Pomona Extensometer Facility**
Project Location:	**Montvue Park - Pomona, CA**
Project Number:	**007-018-762**
Client:	**Chino Basin Watermaster**

Boring Log / PX2

Elevation, feet-msl	Depth, feet-bgs	Sample Interval	Sample Time	Graphic Log	MATERIAL DESCRIPTION	WELL SCHEMATIC AND CONSTRUCTION DETAILS	FIELD NOTES
	100		15:30		As Above		
			[0.2]				
			15:43				
			15:43		CLAYEY SAND (SC); 70% medium-coarse, angular-subangular sand; 20% fines (mostly clay, trace silt); 10% fine, angular-subangular gravel; very loose, light yellowish brown (2.5Y 6/3)		
880	105				Poorly graded SAND with gravel (SP); 80% medium-coarse sand; 20% fine-coarse gravel; grayish brown (2.5Y 5/2)		
			[0.1]				
875	110		18:13				
			18:13		Poorly graded SAND (SP); 100% fine-coarse, angular-subangular sand; trace fine, angular-subangular gravel; loose, grayish brown (2.5Y 5/2)		
870	115				As Above		
865	120		[0.1]		As Above		
860	125				As Above		
855	130		20:50				
			20:50		As Above		
850	135						

Project Name:	**Pomona Extensometer Facility**
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Project Number:	**007-018-762**
Client:	**Chino Basin Watermaster**

Boring Log / PX2

Elevation, feet-msl	Depth, feet-bgs	Sample Interval	Sample Time	Graphic Log	MATERIAL DESCRIPTION	WELL SCHEMATIC AND CONSTRUCTION DETAILS	FIELD NOTES
	135				As Above		
845	140		[0.0]		As Above		
840	145				As Above		
835	150		06:05 06:05 [0.0]		As Above		
					Poorly graded SAND with clay (SP-SC); 90% medium-coarse, subangular-subrounded sand; 10% fines (mostly clay, trace silt); loose, light yellowish brown (2.5Y 6/3)		
830	155		09:50 09:50 [0.1] 10:15		As Above		
825	160		10:15 [0.1]		As Above		
			11:14 11:14 [0.0]				
820	165		12:20 12:20 [0.1]		Poorly graded SAND (SP); 100% medium-coarse, subangular-subrounded sand; loose, pale yellow (2.5Y 7/4), particles slightly more rounded; slight color change (more K feldspar)		
815	170		13:15				

Project Name:	**Pomona Extensometer Facility**
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Project Number:	**007-018-762**
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Boring Log / PX2

Elevation, feet-msl	Depth, feet-bgs	Sample Interval	Sample Time	Graphic Log	MATERIAL DESCRIPTION	WELL SCHEMATIC AND CONSTRUCTION DETAILS	FIELD NOTES
	170		13:15		Sandy LEAN CLAY (CL); 50% medium-coarse, subangular-subrounded sand; 50% fines (mostly clay, trace silt); soft, strong brown (7.5YR 5/8)		
			[0.0]				
810	175		15:13				
			15:13		CLAYEY SAND (SC); 60% medium-coarse, subangular-subrounded sand; 40% fines (mostly clay, trace silt); medium dense, strong brown (7.5YR 4/6), trace organics (leaves and roots)		
			[0.5]				
805	180		15:23				
			15:23		Poorly graded SAND (SP); 95% medium-coarse, subangular sand; 5% fines (mostly clay); medium dense, pale yellow (2.5Y 7/4), trace clay		
			[0.8]				
			15:26				
			15:26				
			[0.1]				
800	185		15:45				
			15:45		Poorly graded SAND (SP); 100% medium-coarse, subangular sand; loose, pale yellow (2.5Y 7/4)		
			[0.1]				
795	190		16:50				
			16:50		As Above		
			[0.1]				
790	195		17:45				
			17:45		As Above		
			[0.1]				
785	200		18:38				
			18:38		Poorly graded SAND (SP); 100% medium-coarse, subangular sand; trace fine, angular-subangular gravel; loose, pale yellow (2.5Y 7/4)		
780	205		18:38				

Project Name:	**Pomona Extensometer Facility**
Project Location:	**Montvue Park - Pomona, CA**
Project Number:	**007-018-762**
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Boring Log / PX2

Elevation, feet-msl	Depth, feet-bgs	Sample Interval	Sample Time	Graphic Log	MATERIAL DESCRIPTION	WELL SCHEMATIC AND CONSTRUCTION DETAILS	FIELD NOTES
	205		18:38		As Above		
			[0.0]				
775	210		23:28				
			23:28		As Above		
			[0.0]				
770	215		00:14				
			00:14		As Above		
			[0.1]				
765	220		01:13				
			01:13		As Above		
			[0.1]				
760	225		02:15				
			02:15		As Above		
			[0.1]				
755	230		03:20				
			03:20		Poorly graded SAND (SP); 95% medium-coarse, subangular-subrounded sand; 5% fine, angular-subangular gravel; loose, pale yellow (2.5Y 7/4), organic material present (roots, grass)		
			[0.1]				
750	235		04:15				
			04:15		Poorly graded SAND (SP); 100% medium-coarse, subangular sand; trace fine, angular-subangular gravel; loose, pale yellow (2.5Y 7/4), visible organic material (roots, grass)		
			[0.1]				
745	240		05:16				

Project Name:	**Pomona Extensometer Facility**
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Client:	**Chino Basin Watermaster**

Boring Log / PX2

Elevation, feet-msl	Depth, feet-bgs	Sample Interval	Sample Time	Graphic Log	MATERIAL DESCRIPTION	WELL SCHEMATIC AND CONSTRUCTION DETAILS	FIELD NOTES
	240		05:16		As Above		
			[0.1]				
740	245		05:50				
			05:50		As Above		
			[0.1]				
735	250		06:45				
			06:45		As Above		
730	255						
			[0.2]		CLAYEY SAND (SC); 70% medium-coarse, subangular-subrounded sand; 30% fines (mostly clay, trace silt); medium dense, yellowish brown (10YR 5/8), clay balls (1/4 inch)		
725	260				CLAYEY SAND (SC); 65% medium sand; 35% fines (mostly clay, trace silt); loose, yellowish brown (10YR 5/8)		
			07:48				
			07:48		CLAYEY SAND (SC); 60% medium sand; 40% fines (mostly clay, trace silt); medium dense, yellowish brown (10YR 5/8)		
			[0.5]				
720	265		07:53				
			07:53		CLAYEY SAND (SC); 75% medium sand; 25% fines (mostly clay, trace silt); loose, yellowish brown (10YR 5/6)		
			[0.1]				
			08:32				
			08:32		CLAYEY SAND (SC); 85% medium sand; 15% fines (mostly clay, trace silt); loose, yellowish brown (10YR 5/6)		
			[0.3]				
715	270		08:42				
			08:42		LEAN CLAY (CL); 95% fines (mostly clay, trace silt); 5% medium sand; medium-stiff, strong brown (7.5YR 4/6)		
			[1.0]				
					LEAN CLAY with sand (CL); 80% fines (mostly clay, trace silt); 20% medium sand; soft, strong brown (7.5YR 4/6)		
710	275		08:47				

Project Name:	**Pomona Extensometer Facility**
Project Location:	**Montvue Park - Pomona, CA**
Project Number:	**007-018-762**
Client:	**Chino Basin Watermaster**

Boring Log / PX2

Elevation, feet-msl	Depth, feet-bgs	Sample Interval	Sample Time	Graphic Log	MATERIAL DESCRIPTION	WELL SCHEMATIC AND CONSTRUCTION DETAILS	FIELD NOTES
	275		08:47		As Above		
			[0.3]				
					LEAN CLAY with sand (CL); 75% fines (mostly clay, trace silt); 25% medium-coarse, subangular-subrounded sand; soft, strong brown (7.5YR 4/6)		
705			09:03				
	280		09:03		Sandy LEAN CLAY (CL); 60% fines (mostly clay, trace silt); 40% medium-coarse, subangular-subrounded sand; soft, dark yellowish brown (10YR 4/6)		
			[0.2]				
700			09:28				
	285		09:28		Sandy LEAN CLAY (CL); 65% fines (mostly clay, trace silt); 35% medium-coarse, subangular-subrounded sand; medium-stiff, dark yellowish brown (10YR 4/6), trace fine gravel		
			[0.1]				
			10:05				
			10:05		Poorly graded SAND (SP); 100% medium sand; loose, yellow (10YR 7/6), trace organics		
			[0.1]				
695			10:30				
	290		10:30		Poorly graded SAND (SP); 100% medium-coarse, subangular sand; trace fines; loose, yellow (10YR 7/6), trace organics		
			[0.1]				
690			11:26				
	295		11:26		Poorly graded SAND (SP); 100% medium sand; loose, yellow (10YR 7/6), trace fine-sand, trace organic material		
			[0.2]				
685			11:58				
	300		11:58		CLAYEY SAND (SC); 85% medium sand; 15% fines (mostly clay, trace silt); loose, yellowish brown (10YR 5/8), trace organics		
			[0.3]				
680			12:17				
	305		12:17		CLAYEY SAND (SC); 70% medium sand; 30% fines (mostly clay, trace silt); loose, yellowish brown (10YR 5/6)		
			[0.0]				
			01:30				
			01:30		Poorly graded SAND (SP); 95% medium-coarse, subangular-subrounded sand; 5% fine, angular-subangular gravel; loose, light yellowish brown (2.5Y 6/3), trace organics		
			[0.1]				
675	310		02:00				

Project Name:	**Pomona Extensometer Facility**
Project Location:	**Montvue Park - Pomona, CA**
Project Number:	**007-018-762**
Client:	**Chino Basin Watermaster**

Boring Log / PX2

Elevation, feet-msl	Depth, feet-bgs	Sample Interval	Sample Time	Graphic Log	MATERIAL DESCRIPTION	WELL SCHEMATIC AND CONSTRUCTION DETAILS	FIELD NOTES
	310		02:00		As Above		
			[0.1]				
670			02:50				
	315		02:50		As Above		
			[0.2]				
			03:05				
			03:05		SILTY SAND (SM); 60% medium-coarse, subangular-subrounded sand; 40% fines (mostly silt, little clay); trace fine, angular-subangular gravel; loose, brown (10YR 4/3)		
			[0.3]				
665			03:13				
	320		03:13		Sandy SILT (ML); 70% fines (mostly silt, little clay); 30% medium-coarse, subangular-subrounded sand; trace fine, angular-subangular gravel; very soft, brown (10YR 4/3)		
			[0.1]				
			03:32				
			03:32		Poorly graded SAND (SP); 95% medium-coarse, subangular-subrounded sand; 5% fine, angular-subangular gravel; loose, light yellowish brown (2.5Y 6/3)		
			[0.1]				
660			03:58				
	325		03:58		Poorly graded SAND (SP); 90% medium-coarse, subangular-subrounded sand; 10% fine, angular-subangular gravel; loose, light yellowish brown (2.5Y 6/3)		
			[0.1]				
655			04:35				
	330		04:35		SILT with sand (ML); 80% fines (mostly silt, some clay); 20% medium-coarse, subangular-subrounded sand; very soft, yellowish brown (10YR 5/4), trace organics		
			[0.2]				
			04:47				
			04:47		Sandy SILT (ML); 60% fines (mostly silt, little clay); 40% medium-coarse, subangular-subrounded sand; very soft, yellowish brown (10YR 5/6), trace organics		
			[0.1]				
650			05:05				
	335		05:05		As Above		
			[0.1]				
			05:28				
			05:28		Poorly graded SAND (SP); 95% medium-coarse, subangular-subrounded sand; 5% fine, angular-subangular gravel; loose, light yellowish brown (2.5Y 6/3), trace organics		
			[0.0]				
645			06:30				
	340		06:30		As Above		
			[0.2]				
			06:45				
			06:45				
			[0.2]				
640			07:00				
	345						

Project Name:	**Pomona Extensometer Facility**
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Boring Log / PX2

Elevation, feet-msl	Depth, feet-bgs	Sample Interval	Sample Time	Graphic Log	MATERIAL DESCRIPTION	WELL SCHEMATIC AND CONSTRUCTION DETAILS	FIELD NOTES
	345		07:00		As Above		
			[0.1]				
			07:45				
			07:45		CLAYEY SAND (SC); 80% medium sand; 20% fines (mostly clay, few silt); loose, yellowish brown (10YR 5/8)		
			[0.1]				
635	350		08:03				
			08:03		Poorly graded SAND (SP); 95% medium sand; 5% fine, subangular gravel; loose, very pale brown (10YR 7/4)		
			[0.1]				
630	355		09:15				
			09:15		As Above		
			[0.1]				
			09:49				
			09:49		CLAYEY SAND (SC); 85% medium sand; 15% fines (mostly clay, trace silt); medium dense, reddish yellow (7.5YR 6/6)		
			[0.3]				
625	360		09:57				
			09:57		Sandy LEAN CLAY (CL); 60% fines (mostly clay, trace silt); 40% medium sand; medium-stiff, strong brown (7.5YR 4/6)		
			[0.4]				
620	365		10:10				
			10:10		Sandy LEAN CLAY (CL); 70% fines (mostly clay, trace silt); 30% medium sand; medium-stiff, strong brown (7.5YR 4/6)		
			[0.1]				
615	370				LEAN CLAY with sand (CL); 85% fines (mostly clay, trace silt); 15% medium sand; medium-stiff, strong brown (7.5YR 4/6)		
			11:30				
			11:30		Poorly graded SAND (SP); 100% medium-coarse, subangular-subrounded sand; loose, very pale brown (10YR 7/4)		
610	375		[0.1]		As Above		
			12:08				
			12:08		Sandy LEAN CLAY (CL); 60% fines (mostly clay, trace silt); 40% medium-coarse, subangular sand; trace fine, subangular gravel; medium-stiff, strong brown (7.5YR 4/6)		
			[0.4]				
605	380		12:14				

Project Name:	**Pomona Extensometer Facility**
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Client:	**Chino Basin Watermaster**

Boring Log / PX2

Elevation, feet-msl	Depth, feet-bgs	Sample Interval	Sample Time	Graphic Log	MATERIAL DESCRIPTION	WELL SCHEMATIC AND CONSTRUCTION DETAILS	FIELD NOTES
	380		12:14		CLAYEY SAND (SC); 60% medium sand; 40% fines (mostly clay, trace silt); loose, strong brown (7.5YR 5/6)		
			[0.2]				
-600	385		12:41				
			12:41		Poorly graded SAND (SP); 95% medium-coarse, subangular-subrounded sand; 5% fines (mostly clay, trace silt); loose, very pale brown (10YR 7/4)		
			[0.1]				
-595	390		14:00				
			14:00		Poorly graded SAND (SP); 100% medium-coarse, subangular-subrounded sand; loose, very pale brown (10YR 7/4)		
			[0.1]				
			14:20				
			14:20		CLAYEY SAND (SC); 65% medium-coarse, subangular-subrounded sand; 35% fines (mostly clay, trace silt); medium dense, very pale brown (10YR 7/4)		
			[0.1]				
-590	395		14:38				
			14:38		CLAYEY SAND (SC); 60% medium-coarse, subangular-subrounded sand; 40% fines (mostly clay, trace silt); loose, strong brown (7.5YR 5/6)		
			[0.3]				
-585	400		14:54				
			14:54				
			[0.2]		As Above		
-580	405		15:18				
			15:18		LEAN CLAY with sand (CL); 80% fines (mostly clay, trace silt); 20% medium sand; medium-stiff, strong brown (7.5YR 5/6)		
			[0.2]				
			15:30				
			15:30		Sandy LEAN CLAY (CL); 60% fines (mostly clay, trace silt); 40% medium sand; medium-stiff, reddish yellow (7.5YR 7/6)		
			[0.0]				
-575	410		22:35				
			22:35		CLAYEY SAND (SC); 60% medium-coarse, subangular-subrounded sand; 40% fines (mostly clay, little silt); medium dense, yellowish brown (10YR 5/6)		
			[0.1]				
			23:15				
			23:15		LEAN CLAY with sand (CL); 75% fines (little silt, trace clay); 25% medium-coarse, subangular-subrounded sand; medium-stiff, dark yellowish brown (10YR 4/4), clay balls		
			[0.5]				
-570	415		23:20				

Report: WELL LOG; File: PX.GPJ; 1/30/2020

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Boring Log / PX2

Elevation, feet-msl	Depth, feet-bgs	Sample Interval	Sample Time	Graphic Log	MATERIAL DESCRIPTION	WELL SCHEMATIC AND CONSTRUCTION DETAILS	FIELD NOTES
	415		23:20		As Above		
			[0.2]				
			23:35				
			23:35		Sandy LEAN CLAY (CL); 60% fines (mostly clay, few silt); 40% medium-coarse, subangular-subrounded sand; soft, yellowish brown (10YR 5/6), clay balls		
			[0.2]				
565			23:50				
	420		23:50		As Above		
			[0.0]				
			00:15				
			00:15		As Above		
			[0.1]				
560			00:45				
	425		00:45		CLAYEY SAND (SC); 70% medium-coarse, subangular-subrounded sand; 30% fines (mostly clay, trace silt); trace fine, angular gravel; loose, yellowish brown (10YR 5/4), clay balls		
			[0.2]				
			00:56				
			00:56		As Above		
			[0.1]				
555			01:43				
	430		01:43		As Above		
			[0.2]				
			01:55				
			01:55		CLAYEY SAND (SC); 60% medium-coarse, subangular-subrounded sand; 40% fines (mostly clay, trace silt); trace fine, angular gravel; loose, yellowish brown (10YR 5/4), clay balls		
			[0.3]				
550			02:05				
	435		02:05		CLAYEY SAND (SC); 70% medium-coarse, subangular-subrounded sand; 30% fines (mostly clay, trace silt); trace fine, angular gravel; loose, yellowish brown (10YR 5/4), clays balls		
			[0.3]				
			02:15				
			02:15		As Above		
			[0.3]				
545			02:25				
	440		02:25		As Above		
			[0.3]				
			02:35				
			02:35		Sandy LEAN CLAY (CL); 60% fines (mostly clay, trace silt); 40% medium-coarse, subangular-subrounded sand; soft, yellowish brown (10YR 5/4), clay balls, trace organic material		
			[0.1]				
540			03:15				
	445		03:15		Poorly graded SAND (SP); 95% medium-coarse, subangular-subrounded sand; 5% fine, angular gravel; loose, light yellowish brown (2.5Y 6/3), trace organic material		
			[0.0]				
			04:30				
			04:30		As Above		
			[0.0]				
535			05:50				
	450						

Project Name:	**Pomona Extensometer Facility**
Project Location:	**Montvue Park - Pomona, CA**
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Boring Log / PX2

Elevation, feet-msl	Depth, feet-bgs	Sample Interval	Sample Time	Graphic Log	MATERIAL DESCRIPTION	WELL SCHEMATIC AND CONSTRUCTION DETAILS	FIELD NOTES
	450		05:50		As Above		
			[0.1]				
530			06:48				
	455		06:48		As Above		
			[0.1]				
			07:24				
			07:24		CLAYEY SAND (SC); 70% medium-coarse, subangular-subrounded sand; 30% fines (mostly clay, trace silt); trace fine, angular gravel; loose, yellowish brown (10YR 5/4)		
			[0.1]				
525			07:49				
	460		07:49		Poorly graded SAND (SP); 100% medium-coarse, subangular sand; trace fines; loose, yellow (10YR 7/6)		
			[0.1]				
			08:27				
			08:27		Poorly graded SAND (SP); 100% medium-coarse, subangular sand; trace undefined gravel; trace fines; loose, yellow (10YR 7/6)		
			[0.1]				
520			09:06				
	465		09:06		Poorly graded SAND (SP); 100% medium-coarse, subangular sand; trace fines; loose, yellow (10YR 7/6)		
			[0.0]				
			10:06				
			10:06				
			[0.2]				
515			10:22				
	470		10:22		As Above		
			[0.1]				
			10:45				
			10:45		CLAYEY SAND (SC); 85% medium sand; 15% fines (mostly clay, trace silt); loose, yellowish brown (10YR 5/4), trace fine sand		
			[0.3]				
510			10:53				
	475		10:53		Poorly graded SAND (SP); 95% medium sand; 5% fines (mostly clay, trace silt); loose, yellow (10YR 7/6), trace fine sand		
			[0.1]		Poorly graded SAND (SP); 100% medium-coarse, subangular sand; trace fines; loose, yellow (10YR 7/6)		
505			11:38				
	480		11:38		CLAYEY SAND (SC); 70% medium-coarse, subangular-subrounded sand; 30% fines (mostly clay, trace silt); trace fine, angular gravel; loose, yellowish brown (10YR 5/4)		
			[0.2]				
			11:53				
			11:53		CLAYEY SAND (SC); 85% medium sand; 15% fines (mostly clay, trace silt); loose, yellowish brown (10YR 5/4)		
			[0.2]				
500			12:09				
	485						

Project Name:	**Pomona Extensometer Facility**
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Project Number:	**007-018-762**
Client:	**Chino Basin Watermaster**

Boring Log / PX2

Elevation, feet-msl	Depth, feet-bgs	Sample Interval	Sample Time	Graphic Log	MATERIAL DESCRIPTION	WELL SCHEMATIC AND CONSTRUCTION DETAILS	FIELD NOTES
	485		12:09		Poorly graded SAND (SP); 95% medium sand; 5% fines (mostly clay, trace silt); loose, yellow (10YR 7/6), trace fine sand		
			[0.0]				
			13:09				
			13:09				
			[0.1]				
-495	490		13:30				
			13:30		CLAYEY SAND (SC); 85% medium sand; 15% fines (mostly clay, trace silt); loose, yellow (10YR 7/6), trace fine sand; trace organics		
			[0.1]				
			14:04				
			14:04		LEAN CLAY with sand (CL); 85% fines (mostly clay, trace silt); 15% medium sand; medium-stiff, yellowish brown (10YR 5/4)		
			[0.4]				
-490			14:10				
	495		14:10		Sandy LEAN CLAY (CL); 60% fines (mostly clay, trace silt); 40% medium sand; medium-stiff, brownish yellow (10YR 6/6)		
			[0.1]				
			14:30				
			14:30		CLAYEY SAND (SC); 70% medium sand; 30% fines (mostly clay, trace silt); medium dense, yellow (10YR 7/6)		
			[0.1]				
-485			14:48				
	500		14:48		Poorly graded SAND (SP); 95% medium-coarse, subangular sand; 5% fines (mostly clay, trace silt); loose, yellow (10YR 7/6)		
			[0.1]				
-480			15:30				
	505		15:30		As Above		
			[0.0]				
			17:32				
-475	510		17:32		Sandy LEAN CLAY (CL); 60% fines (mostly clay, trace silt); 40% medium-coarse, subangular-subrounded sand; soft, dark yellowish brown (10YR 4/4), clay balls		
			[0.1]				
			18:15		As Above		
			18:15				
			[0.1]				
-470	515		18:36				
			18:36		As Above		
			[0.3]				
			18:45				
			18:45		CLAYEY SAND (SC); 70% medium-coarse, subangular-subrounded sand; 30% fines (mostly clay, trace silt); loose, yellowish brown (10YR 5/4), clay balls		
			[0.1]				
-465	520		19:30				

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Boring Log / PX2

Elevation, feet-msl	Depth, feet-bgs	Sample Interval	Sample Time	Graphic Log	MATERIAL DESCRIPTION	WELL SCHEMATIC AND CONSTRUCTION DETAILS	FIELD NOTES
	520		19:30 [0.1] 19:54		As Above		
			19:54 [0.1] 20:15		Poorly graded SAND (SP); 100% medium-coarse, subangular-subrounded sand; trace fine, angular-subangular gravel; loose, pale brown (10YR 6/3), trace fines		
460	525		20:15 [0.0] 21:44		Poorly graded SAND (SP); 90% medium-coarse, subangular-subrounded sand; 5% fine, angular-subangular gravel; 5% fines (mostly clay); loose, light yellowish brown (10YR 6/4), very small clay balls, trace fines		
			21:44 [0.0] 22:39		Poorly graded SAND (SP); 95% medium-coarse, subangular-subrounded sand; 5% fine, angular-subangular gravel; loose, light yellowish brown (10YR 6/4), trace fines		
455	530		22:39 [0.1] 22:58		Poorly graded SAND (SP); 90% medium-coarse, subangular-subrounded sand; 10% fine, angular-subangular gravel; loose, light yellowish brown (10YR 6/4), trace fines		
			22:58 [0.3] 23:08		CLAYEY SAND (SC); 60% fine-coarse, subangular-subrounded sand; 40% fines (mostly clay, trace silt); medium dense, olive brown (2.5Y 4/4), clay balls		
450	535		23:08 [0.2] 23:20		LEAN CLAY (CL); 90% fines (mostly clay, trace silt); 10% fine-coarse, subangular-subrounded sand; medium-stiff, brown (10YR 5/3), clay balls		
			23:20 [0.3] 23:30		As Above		
445	540		23:30 [0.2] 23:45		CLAYEY SAND (SC); 65% medium-coarse, subangular-subrounded sand; 35% fines (mostly clay, trace silt); loose, light olive brown (2.5Y 5/4), clay balls		
			23:45 [0.2] 23:58		LEAN CLAY (CL); 90% fines (mostly clay, trace silt); 10% fine-coarse, subangular-subrounded sand; medium-stiff, brown (10YR 5/3), clay balls		
440	545		23:58 [0.0] 00:05		Sandy LEAN CLAY (CL); 65% fines (mostly clay, trace silt); 35% fine-coarse, subangular-subrounded sand; soft, brown (10YR 5/3), clay balls		
			00:05 [0.1] 00:55		LEAN CLAY (CL); 90% fines (mostly clay, trace silt); 10% fine-coarse, subangular-subrounded sand; medium-stiff, brown (10YR 5/3), clay balls		
435	550		00:55 [0.1] 01:34		Sandy LEAN CLAY (CL); 60% fines (mostly clay, trace silt); 40% fine-coarse, subangular-subrounded sand; soft, brown (10YR 5/3), clay balls		
			01:34 [0.2] 01:48		CLAYEY SAND (SC); 60% medium-coarse, subangular-subrounded sand; 40% fines (mostly clay, trace silt); loose, brown (10YR 5/3), clay balls		
430	555						

Project Name:	**Pomona Extensometer Facility**
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Boring Log / PX2

Elevation, feet-msl	Depth, feet-bgs	Sample Interval	Sample Time	Graphic Log	MATERIAL DESCRIPTION	WELL SCHEMATIC AND CONSTRUCTION DETAILS	FIELD NOTES
	555		01:48		Sandy LEAN CLAY (CL); 60% fines (mostly clay, trace silt); 40% medium-coarse, subangular-subrounded sand; trace fine, angular-subangular gravel; soft, brown (10YR 4/3), clay balls		
			[0.4]				
			01:55				
			01:55		As Above		
			[0.3]				
-425			02:05				
	560		02:05		CLAYEY SAND with gravel (SC); 60% medium-coarse, subangular-subrounded sand; 20% fine, angular-subangular gravel; 20% fines (mostly clay, trace silt); loose, light olive brown (2.5Y 5/4), clay balls		
			[0.3]				
			02:15				
			02:15		Sandy LEAN CLAY (CL); 60% fines (mostly clay, trace silt); 40% medium-coarse, subangular-subrounded sand; soft, olive brown (2.5Y 4/4), clay balls		
			[0.2]				
-420			02:30				
	565		02:30		CLAYEY SAND (SC); 60% medium-coarse, subangular-subrounded sand; 40% fines (mostly clay, trace silt); loose, light olive brown (2.5Y 5/4), clay balls		
			[0.2]				
			02:44				
			02:44		CLAYEY SAND (SC); 70% medium-coarse, subangular-subrounded sand; 30% fines (mostly clay, trace silt); loose, light olive brown (2.5Y 5/4), clay balls		
			[0.0]				
-415			03:45				
	570		03:45		LEAN CLAY (CL); 90% fines (mostly clay, trace silt); 10% fine-medium sand; soft, brown (10YR 5/3), clay balls		
			[0.2]				
			04:00				
			04:00		Sandy LEAN CLAY (CL); 70% fines (mostly clay, trace silt); 30% fine-coarse, subangular-subrounded sand; soft, brown (10YR 5/3)		
			[0.0]				
-410			04:53				
	575		04:53		As Above		
			[0.1]				
			05:23				
			05:23		Poorly graded SAND (SP); 95% fine-coarse, subangular-subrounded sand; 5% fine, angular-subangular gravel; loose, light olive brown (2.5Y 5/3)		
			[0.0]				
-405			06:58				
	580		06:58		Sandy LEAN CLAY (CL); 70% fines (mostly clay, trace silt); 30% fine-coarse, subangular-subrounded sand; soft, brown (10YR 5/3)		
			[0.1]				
			07:20				
			07:20		CLAYEY SAND with gravel (SC); 60% medium-coarse, subangular-subrounded sand; 20% fine, angular-subangular gravel; 20% fines (mostly clay, trace silt); loose, light olive brown (2.5Y 5/4)		
			[0.3]				
-400			07:28				
	585		07:28		Sandy LEAN CLAY (CL); 70% fines (mostly clay, trace silt); 30% fine-coarse, subangular-subrounded sand; soft, brown (10YR 5/3)		
			[0.1]		Sandy LEAN CLAY (CL); 60% fines (mostly clay, trace silt); 40% fine-coarse, subangular-subrounded sand; soft, brown (10YR 5/3)		
-395	590		08:20				

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Elevation, feet-msl	Depth, feet-bgs	Sample Interval	Sample Time	Graphic Log	MATERIAL DESCRIPTION	WELL SCHEMATIC AND CONSTRUCTION DETAILS	FIELD NOTES
	590		08:20		Sandy LEAN CLAY (CL); 70% fines (mostly clay, trace silt); 30% fine-coarse, subangular-subrounded sand; soft, brown (10YR 5/3), trace fine cobbles		
			[0.3]				
-390	595		08:38				
			08:38		Sandy LEAN CLAY (CL); 60% fines (mostly clay, trace silt); 40% medium-coarse, subangular-subrounded sand; trace fine, angular-subangular gravel; soft, brown (10YR 4/3)		
			[0.2]				
-385	600		09:00				
			09:00		Sandy LEAN CLAY (CL); 70% fines (mostly clay, trace silt); 30% fine-medium sand; soft, strong brown (7.5YR 5/8)	← High-Solids Bentonite Grout	
			[0.1]				
-380	605		10:15				
			10:15		CLAYEY SAND (SC); 60% medium-coarse, subangular-subrounded sand; 40% fines (mostly clay, trace silt); loose, strong brown (7.5YR 5/8)		
			[0.2]				
-375	610		10:40				
			10:40		CLAYEY SAND (SC); 70% fine-coarse, subangular-subrounded sand; 30% fines (mostly clay, trace silt); loose, light olive brown (2.5Y 5/3)		
			[0.3]				
-370	615		11:00				
			11:00		Sandy LEAN CLAY (CL); 55% fines (mostly clay, trace silt); 45% medium sand; trace coarse, subrounded gravel; soft, reddish yellow (7.5YR 6/6), trace coarse gravel		
			[0.1]				
			11:40				
			11:40		CLAYEY SAND (SC); 65% fine-medium sand; 35% fines (mostly clay, trace silt); loose, light olive brown (2.5Y 5/6)		
			[0.1]				
-365	620		12:25				
			12:25		CLAYEY SAND (SC); 85% medium-coarse, subangular-subrounded sand; 15% fines (mostly clay, trace silt); loose, light olive brown (2.5Y 5/4)		
			[0.0]				
			13:26				
			13:26		Poorly graded SAND (SP); 95% fine-medium sand; 5% fines (mostly clay, trace silt); loose, olive gray (5Y 5/2)		
			[0.1]				
-360	625		13:50				

Project Name:	**Pomona Extensometer Facility**
Project Location:	**Montvue Park - Pomona, CA**
Project Number:	**007-018-762**
Client:	**Chino Basin Watermaster**

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Elevation, feet-msl	Depth, feet-bgs	Sample Interval	Sample Time	Graphic Log	MATERIAL DESCRIPTION	WELL SCHEMATIC AND CONSTRUCTION DETAILS	FIELD NOTES
	625		13:50		CLAYEY SAND (SC); 60% fine-medium sand; 40% fines (mostly clay, trace silt); loose, light yellowish brown (10YR 6/4)		
			[0.1]				
-355			14:30				
	630		14:30		Sandy LEAN CLAY (CL); 60% fines (mostly clay, trace silt); 40% fine-medium sand; medium-stiff, light yellowish brown (10YR 6/4)		
			[0.1]				
			15:15				
			15:15		Poorly graded SAND (SP); 95% fine-medium sand; 5% fines (mostly clay, trace silt); loose, olive gray (5Y 5/2)		
			[0.1]				
-350			15:53				
	635		15:53		Poorly graded SAND (SP); 95% fine-coarse, subangular-subrounded sand; 5% fine, subrounded gravel; trace fines (mostly clay, trace silt); loose, olive gray (5Y 5/2)		
			[0.1]				
			16:30				
			16:30		LEAN CLAY (CL); 90% fines (mostly clay, trace silt); 10% fine-medium sand; soft, light olive brown (2.5Y 5/6)		
			[0.3]				
-345			16:40				
	640		16:40		LEAN CLAY (CL); 100% fines (mostly clay, trace silt); trace fine sand; soft, light olive brown (2.5Y 5/6)		
			[0.2]				
			16:54				
			16:54		As Above		
			[0.1]				
-340			17:19				
	645		17:19		Poorly graded SAND (SP); 95% medium-coarse, subangular-subrounded sand; 5% fines (mostly clay, trace silt); loose, light olive brown (2.5Y 5/4)		
			[0.0]				
			18:50				
			18:50		Poorly graded SAND (SP); 95% medium-coarse, subangular-subrounded sand; 5% fine, angular-subangular gravel; loose, light olive brown (2.5Y 5/4)		
			[0.2]				
-335			19:05				
	650		19:05		LEAN CLAY with sand (CL); 80% fines (mostly clay, trace silt); 20% medium-coarse, subangular-subrounded sand; trace fine, angular gravel; soft, brown (10YR 4/3), clay balls		
			[0.1]				
			19:30				
			19:30		Sandy LEAN CLAY (CL); 70% fines (mostly clay, trace silt); 30% fine-coarse, subangular-subrounded sand; soft, light olive brown (2.5Y 5/3), clay balls		
			[0.1]				
-330			20:05				
	655		20:05		Poorly graded SAND (SP); 95% medium-coarse, subangular-subrounded sand; 5% fine, angular-subangular gravel; trace fines (mostly clay, trace silt); loose, light olive brown (2.5Y 5/4), dry, trace clay balls		
			[0.0]				
-325	660		22:10				

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Elevation, feet-msl	Depth, feet-bgs	Sample Interval	Sample Time	Graphic Log	MATERIAL DESCRIPTION	WELL SCHEMATIC AND CONSTRUCTION DETAILS	FIELD NOTES
	660		22:10 [0.1] 22:30		LEAN CLAY (CL); 95% fines (mostly clay, trace silt); 5% fine-coarse, subangular-subrounded sand; soft, light brownish gray (2.5Y 6/2), clay balls		
			22:30 [0.1] 22:50		Sandy LEAN CLAY (CL); 60% fines (mostly clay, trace silt); 40% fine-coarse, subangular-subrounded sand; soft, light brownish gray (2.5Y 6/2)		
-320	665		22:50 [0.2] 23:04		LEAN CLAY with sand (CL); 80% fines (mostly clay, trace silt); 20% medium-coarse, subangular-subrounded sand; soft, olive brown (2.5Y 4/3), clay balls		
			23:04 [0.0] 00:40		CLAYEY SAND (SC); 60% medium-coarse, subangular-subrounded sand; 30% fines (mostly clay, trace silt); 10% fine, angular-subangular gravel; loose, light yellowish brown (2.5Y 6/3), trace fine-grained sand.		
-315	670		00:40 [0.1] 01:55		CLAYEY SAND (SC); 75% medium-coarse, subangular-subrounded sand; 15% fines (mostly clay, trace silt); 10% fine, angular-subangular gravel; loose, light yellowish brown (2.5Y 6/3) As Above		
-310	675		01:55 [0.1] 03:27		Poorly graded SAND (SP); 90% medium-coarse, subangular-subrounded sand; 10% fine, angular-subangular gravel; trace fines (mostly clay, trace silt); loose, light yellowish brown (2.5Y 6/3)		
-305	680		03:27 [0.0] 05:10		Poorly graded SAND (SP); 85% medium-coarse, subangular-subrounded sand; 10% fine, angular-subangular gravel; 5% fines (mostly clay, trace silt); loose, light yellowish brown (2.5Y 6/3)		
-300	685		05:10 [0.1] 06:30		As Above		
-295	690		06:30 [0.4] 06:43		LEAN CLAY with sand (CL); 80% fines (mostly clay, trace silt); 20% fine-coarse sand; soft, olive yellow (2.5Y 6/6)		
-290	695						

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Elevation, feet-msl	Depth, feet-bgs	Sample Interval	Sample Time	Graphic Log	MATERIAL DESCRIPTION	WELL SCHEMATIC AND CONSTRUCTION DETAILS	FIELD NOTES
	695		06:43		LEAN CLAY (CL); 90% fines (mostly clay, trace silt); 10% fine-medium sand; medium-stiff, light yellowish brown (2.5Y 6/4)		
			[0.3]				
-285			07:00				
	700		07:00		As Above		
			[0.5]				
-280			07:10				
	705		07:10		LEAN CLAY with sand (CL); 80% fines (mostly clay, trace silt); 20% fine-coarse sand; soft, olive yellow (2.5Y 6/6)		
			[0.0]				
-275			10:15				
	710		10:15		Poorly graded SAND with clay (SP-SC); 90% fine-medium sand; 10% fines (mostly clay, trace silt); loose, light yellowish brown (2.5Y 6/3)		
			[0.1]				
			10:40				
			10:40		LEAN CLAY (CL); 90% fines (mostly clay, trace silt); 10% fine-coarse sand; soft, olive yellow (2.5Y 6/6)		
			[0.3]				
-270			10:48				
	715		10:48		As Above		
			[0.1]				
					Poorly graded SAND (SP); 85% medium-coarse, subangular-subrounded sand; 10% fine, angular-subangular gravel; 5% fines (mostly clay, trace silt); loose, light yellowish brown (2.5Y 6/3)		
-265			11:40				
	720		11:40		LEAN CLAY (CL); 90% fines (mostly clay, trace silt); 10% fine-coarse sand; soft, olive yellow (2.5Y 6/6)		
			[0.3]				
			11:49				
			11:49				
-260			[0.1]				
	725				As Above		
			12:43				
			12:43		LEAN CLAY with sand (CL); 80% fines (mostly clay, trace silt); 20% fine-coarse sand; soft, olive yellow (2.5Y 6/6)		
			[0.5]				
-255			12:48				
	730						

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Elevation, feet-msl	Depth, feet-bgs	Sample Interval	Sample Time	Graphic Log	MATERIAL DESCRIPTION	WELL SCHEMATIC AND CONSTRUCTION DETAILS	FIELD NOTES
	730		12:48		As Above		
			[0.5]				
-250	735		12:58				
			12:58		LEAN CLAY (CL); 90% fines (mostly clay, trace silt); 10% fine-coarse sand; soft, olive yellow (2.5Y 6/6)		
			[0.3]				
-245	740		13:15				
			13:15		As Above		
			[0.3]				
-240	745		13:35				
			13:35		LEAN CLAY with sand (CL); 80% fines (mostly clay, trace silt); 20% fine-coarse sand; soft, olive yellow (2.5Y 6/6)		
			[0.1]				
-235	750		14:30				
			14:30		LEAN CLAY (CL); 90% fines (mostly clay, trace silt); 10% fine-coarse sand; soft, olive yellow (2.5Y 6/6)		
			[0.1]				
			15:10				
			15:10		Poorly graded SAND (SP); 85% medium-coarse, subangular-subrounded sand; 10% fine, angular-subangular gravel; 5% fines (mostly clay, trace silt); loose, light yellowish brown (2.5Y 6/3)		
			[0.5]				
-230	755		15:15				
			15:15		Poorly graded SAND (SP); 100% fine-medium sand; loose, dark greenish gray (5GY 4/1), broken sand by drilled - looks pulzerized		
			[0.0]				
			16:55				
			16:55		Poorly graded SAND with clay (SP-SC); 90% medium-coarse, subangular-subrounded sand; 10% fines (mostly clay, trace silt); trace fine, angular-subangular gravel; loose, light yellowish brown (2.5Y 6/3)		
-225	760		[0.1]				
			17:45				
			17:45		As Above		
			[0.1]				
-220	765		18:02				

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Elevation, feet-msl	Depth, feet-bgs	Sample Interval	Sample Time	Graphic Log	MATERIAL DESCRIPTION	WELL SCHEMATIC AND CONSTRUCTION DETAILS	FIELD NOTES
	765		18:02		CLAYEY SAND (SC); 60% medium-coarse, subangular-subrounded sand; 40% fines (mostly clay, trace silt); loose, light olive brown (2.5Y 5/3)		
			[0.1]				
			18:47				
			18:47		Poorly graded SAND (SP); 100% medium-coarse, subangular-subrounded sand; trace fine, angular-subangular gravel; trace fines (mostly clay, trace silt); very loose, light yellowish brown (2.5Y 6/3)		
			[0.8]				
215	770		18:50				
			18:50		LEAN CLAY (CL); 100% fines (mostly clay, trace silt); trace medium-coarse sand; medium-stiff, olive brown (2.5Y 4/4), clay balls		
			[0.2]				
			19:05				
			19:05		CLAYEY SAND (SC); 65% medium-coarse, subangular-subrounded sand; 30% fines (mostly clay, trace silt); 5% fine, angular-subangular gravel; very loose, light yellowish brown (2.5Y 6/4)		
			[0.2]				
210			19:20				
	775		19:20		Poorly graded SAND with clay (SP-SC); 80% medium-coarse, subangular-subrounded sand; 10% fine, subangular-subrounded gravel; 10% fines (mostly clay, trace silt); very loose, light yellowish brown (2.5Y 6/3)		
			[0.1]				
			19:38				
			19:38		CLAYEY SAND (SC); 70% medium-coarse, subangular-subrounded sand; 30% fines (mostly clay); trace fine, angular-subangular gravel; loose, olive brown (2.5Y 4/4)		
			[0.4]				
205			19:45				
	780		19:45		CLAYEY SAND (SC); 75% medium-coarse, subangular-subrounded sand; 15% fines (mostly clay, trace silt); 10% fine, angular-subangular gravel; very loose, light yellowish brown (2.5Y 6/3)		
			[0.2]		As Above		
200			20:10				
	785		20:10		As Above		
			[0.1]		As Above		
			21:30				
195	790		21:30		FAT CLAY (CH); 100% fines (mostly clay); medium-stiff, olive brown (2.5Y 4/3)		
			[0.1]				
			22:06				
190	795		22:06		CLAYEY SAND with gravel (SC); 60% medium-coarse, subangular-subrounded sand; 25% fine, angular-subangular gravel; 15% fines (mostly clay, trace silt); very loose, light olive brown (2.5Y 5/3)		
			[0.2]				
			22:20				
			22:20		Sandy LEAN CLAY (CL); 70% fines (mostly clay, trace silt); 25% medium-coarse, subangular-subrounded sand; 5% fine, angular gravel; medium-stiff, light olive brown (2.5Y 5/3)		
185	800						

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Elevation, feet-msl	Depth, feet-bgs	Sample Interval	Sample Time	Graphic Log	MATERIAL DESCRIPTION	WELL SCHEMATIC AND CONSTRUCTION DETAILS	FIELD NOTES
	800		[0.1]		Poorly graded SAND with clay and gravel (SP-SC); 70% medium-coarse, subangular-subrounded sand; 20% fine, angular-subangular gravel; 10% fines (mostly clay, trace silt); very loose, light yellowish brown (2.5Y 6/3)		
-180	805		23:11				
			23:11 [0.0] 03:26		FAT CLAY (CH); 100% fines (mostly clay); trace medium-coarse, subangular-subrounded sand; medium-stiff, olive brown (2.5Y 4/3)		
			03:26 [0.2] 03:38		LEAN CLAY (CL); 90% fines (mostly clay); 10% medium-coarse, subangular-subrounded sand; medium-stiff, olive brown (2.5Y 4/3)		
-175	810		03:38 [0.1] 03:56		LEAN CLAY with sand (CL); 80% fines (mostly clay); 20% fine-medium sand; medium-stiff, olive brown (2.5Y 4/3)		
			03:56 [0.3] 04:05		FAT CLAY (CH); 100% fines (mostly clay); medium-stiff, olive brown (2.5Y 4/3)		
-170	815		04:05 [0.3] 04:13		LEAN CLAY (CL); 100% fines (mostly clay); trace medium-coarse, subangular-subrounded sand; medium-stiff, olive brown (2.5Y 4/3)		
			04:13 [0.2] 04:24		As Above		
-165	820		04:24 [0.1] 04:41		LEAN CLAY with sand (CL); 80% fines (mostly clay); 20% fine-medium sand; medium-stiff, olive brown (2.5Y 4/3)		
			04:41 [0.1] 05:07		Sandy LEAN CLAY (CL); 65% fines (mostly clay); 35% fine-medium sand; medium-stiff, olive brown (2.5Y 4/3)		
-160	825		05:07 [0.0] 09:19		Poorly graded SAND with gravel (SP); 80% medium-coarse, subangular-subrounded sand; 15% fine, angular-subangular gravel; 5% fines (mostly clay, trace silt); very loose, light yellowish brown (2.5Y 6/4)		
-155	830		09:19 [0.1] 09:39		As Above		
			09:39 [0.6] 09:43		Sandy LEAN CLAY (CL); 65% fines (mostly clay, some silt); 35% fine-medium sand; trace fine gravel; medium-stiff, light yellowish brown (2.5Y 6/4)		
-150	835						

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Elevation, feet-msl	Depth, feet-bgs	Sample Interval	Sample Time	Graphic Log	MATERIAL DESCRIPTION	WELL SCHEMATIC AND CONSTRUCTION DETAILS	FIELD NOTES
	835		09:43		Sandy LEAN CLAY (CL); 60% fines (mostly clay, some silt); 40% fine-medium sand; trace fine gravel; soft, light yellowish brown (2.5Y 6/4)		
			[0.1]		Sandy LEAN CLAY (CL); 50% medium sand; 50% fines (mostly clay, little silt); soft, olive yellow (2.5Y 6/6)		
-145	840		10:17				
			10:17		CLAYEY SAND (SC); 70% medium sand; 30% fines (mostly clay, little silt); soft, olive yellow (2.5Y 6/6)		
			[0.2]				
-140	845		10:40				
			10:40		LEAN CLAY (CL); 95% fines (mostly clay, trace silt); 5% fine sand; soft, olive yellow (2.5Y 6/8)		
			[0.2]				
-135	850		11:05				
			11:05		LEAN CLAY (CL); 95% fines (mostly clay, some silt); 5% fine sand; soft, light yellowish brown (2.5Y 6/3)		
			[0.2]				
-130	855		11:30				
			11:30				
			[0.6]				
-125	860		11:38				
			11:38				
			[0.3]				
-120	865		11:53				
			11:53		As Above		
			[0.1]				
					LEAN CLAY with sand (CL); 80% fines (mostly clay, some silt); 20% fine sand; soft, light yellowish brown (2.5Y 6/3)		
-115	870		12:42				

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Elevation, feet-msl	Depth, feet-bgs	Sample Interval	Sample Time	Graphic Log	MATERIAL DESCRIPTION	WELL SCHEMATIC AND CONSTRUCTION DETAILS	FIELD NOTES
	870		12:42				
			[0.5]				
110	875		12:52				
			12:52		As Above		
			[0.7]				
105	880		12:59				
			12:59		LEAN CLAY (CL); 100% fines (mostly clay, some silt); trace fine sand; soft, light yellowish brown (2.5Y 6/3)		
			[0.4]				
100	885		13:13				
			13:13		LEAN CLAY (CL); 100% fines (mostly clay, some silt); trace fine sand; soft, light yellowish brown (2.5Y 6/3)		
			[0.2]				
95	890		13:40				
			13:40		CLAYEY SAND (SC); 70% medium sand; 30% fines (mostly clay, little silt); soft, olive yellow (2.5Y 6/6)		
			[0.2]				
90	895		14:08				
			14:08		CLAYEY SAND (SC); 60% medium sand; 40% fines (mostly clay, little silt); soft, olive yellow (2.5Y 6/6)		
			[0.1]		CLAYEY SAND (SC); 45% fine-medium sand; 45% fines (mostly clay, trace silt); 10% fine, angular gravel; loose, grayish brown (2.5Y 5/2), gravel appears to be broken by drilling		
85	900		14:43				
			14:43		LEAN CLAY (CL); 100% fines (mostly clay, some silt); trace fine sand; soft, light yellowish brown (2.5Y 6/3)		
			[0.7]				
80	905		14:50				

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	905		14:50		LEAN CLAY with sand (CL); 85% fines (mostly clay, some silt); 15% medium sand; soft, light yellowish brown (2.5Y 6/3)		
			[0.1]				
-75	910		15:53				
			15:53		CLAYEY SAND (SC); 60% medium sand; 40% fines (mostly clay, some silt); trace undefined gravel; soft, light yellowish brown (2.5Y 6/3)		
			[0.1]				
			16:20				
			16:20				
			[0.2]				
-70	915		16:34				
			16:34		As Above		
			[0.6]				
-65	920		16:42				
			16:42		LEAN CLAY (CL); 100% fines (mostly clay, some silt); trace fine sand; soft, light yellowish brown (2.5Y 6/3)		
			[0.4]				
-60	925		16:55				
			16:55		LEAN CLAY with sand (CL); 85% fines (mostly clay, some silt); 15% medium sand; soft, light yellowish brown (2.5Y 6/3)		
			[0.1]				
			17:32				
			17:32		LEAN CLAY with sand (CL); 85% fines (mostly clay, some silt); 15% medium sand; soft, light yellowish brown (2.5Y 6/3)		
			[0.3]				
-55	930		17:40				
			17:40		LEAN CLAY (CL); 100% fines (mostly clay, some silt); trace fine sand; soft, light yellowish brown (2.5Y 6/3)		
			[0.3]				
-50	935		17:55				
			17:55		LEAN CLAY (CL); 90% fines (mostly clay, trace silt); 10% fine-medium sand; soft, light olive brown (2.5Y 5/3)		
			[0.1]				
					As Above		
-45	940		18:43				

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	940		18:43 [0.4] 18:50		Sandy LEAN CLAY (CL); 60% fines (mostly clay, trace silt); 40% fine-coarse, subangular-subrounded sand; soft, light olive brown (2.5Y 5/3)		
			18:50 [0.3] 18:58		FAT CLAY (CH); 100% fines (mostly clay); soft, light olive brown (2.5Y 5/3)		
-40	945		18:58 [0.1] 19:20		LEAN CLAY (CL); 100% fines (mostly clay); trace medium-coarse sand; soft, light olive brown (2.5Y 5/3)		
			19:20 [0.3] 19:29		LEAN CLAY (CL); 90% fines (mostly clay); 10% fine-medium sand; soft, light olive brown (2.5Y 5/3)		
-35	950		19:29 [0.2] 19:40		LEAN CLAY with sand (CL); 80% fines (mostly clay); 20% fine-medium sand; medium-stiff, light olive brown (2.5Y 5/3)		
			19:40 [0.3] 19:48		LEAN CLAY (CL); 95% fines (mostly clay); 5% fine-medium sand; medium-stiff, light olive brown (2.5Y 5/3)		
-30	955		19:48 [0.3] 19:58		As Above		
			19:58 [0.1] 20:16		LEAN CLAY with sand (CL); 80% fines (mostly clay, trace silt); 20% fine-medium sand; medium-stiff, light olive brown (2.5Y 5/3), contains think pockets of fine-grained sand		
-25	960		20:16 [0.2] 20:28		As Above		
			20:28 [0.3] 20:36		LEAN CLAY with sand (CL); 80% fines (mostly clay, trace silt); 20% fine-coarse, subangular-subrounded sand; medium-stiff, olive brown (2.5Y 4/3)		
-20	965		20:36 [0.1] 20:53		LEAN CLAY (CL); 90% fines (mostly clay, trace silt); 10% fine-coarse, subangular-subrounded sand; stiff, olive brown (2.5Y 4/3)	←Transition Bentonite Seal	
			20:53 [0.4] 21:00		LEAN CLAY with sand (CL); 80% fines (mostly clay, trace silt); 20% fine-coarse, subangular-subrounded sand; medium-stiff, olive brown (2.5Y 4/3)		
-15	970		21:00 [0.5] 21:05		LEAN CLAY (CL); 90% fines (mostly clay, trace silt); 10% fine-medium sand; soft, light olive brown (2.5Y 5/3)	←Transition Sand Seal	
			21:05 [0.2] 21:16		LEAN CLAY with sand (CL); 75% fines (mostly clay, trace silt); 25% medium-coarse, subangular-subrounded sand; trace fine, angular-subangular gravel; soft, olive brown (2.5Y 4/3)		
-10	975						

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Boring Log / PX2

Elevation, feet-msl	Depth, feet-bgs	Sample Interval	Sample Time	Graphic Log	MATERIAL DESCRIPTION
	975		21:16 [0.6] 21:20		FAT CLAY (CH); 100% fines (mostly clay, trace silt); trace fine, angular-subangular gravel; trace medium-coarse, angular-subangular sand; soft, olive brown (2.5Y 4/3)
			21:20 [0.5] 21:25		LEAN CLAY with sand (CL); 75% fines (mostly clay, trace silt); 25% medium-coarse, subangular-subrounded sand; trace fine, angular-subangular gravel; soft, olive brown (2.5Y 4/3)
-5	980		21:25 [0.5] 21:30		Sandy LEAN CLAY (CL); 65% fines (mostly clay, trace silt); 35% medium-coarse, subangular-subrounded sand; trace fine, angular-subangular gravel; soft, olive brown (2.5Y 4/3)
			21:30 [0.1] 22:20		Poorly graded SAND (SP); 85% medium-coarse, subangular-subrounded sand; 10% fine, angular-subangular gravel; 5% fines (mostly clay, trace silt); very loose, light yellowish brown (2.5Y 6/3)
0	985		22:20 [0.1] 23:04		As Above
			23:04 [0.1] 23:27		CLAYEY SAND (SC); 55% medium-coarse, angular-subangular sand; 40% fines (mostly clay, trace silt); 5% fine, angular-subangular gravel; loose, light olive brown (2.5Y 5/3)
-5	990		23:27 [0.2] 23:38		CLAYEY SAND (SC); 75% medium-coarse, angular-subangular sand; 20% fines (mostly clay, trace silt); 5% fine, angular-subangular gravel; loose, light yellowish brown (2.5Y 6/3)
			23:38 [0.4] 23:45		LEAN CLAY with sand (CL); 75% fines (mostly clay, trace silt); 25% fine-coarse, angular-subangular sand; medium-stiff, dark yellowish brown (10YR 3/6)
-10	995		23:45 [0.2] 23:58		As Above
			23:58 [0.0] 00:30		CLAYEY SAND (SC); 60% medium-coarse, subangular-subrounded sand; 40% fines (mostly clay, trace silt); trace fine, angular-subangular gravel; loose, light olive brown (2.5Y 5/3)
-15	1000		00:30 [0.1] 00:55		As Above
			00:55 [0.1] 01:12		CLAYEY SAND (SC); 70% medium-coarse, angular-subangular sand; 20% fines (mostly clay, trace silt); 10% fine, angular-subangular gravel; very loose, light yellowish brown (2.5Y 6/3)
-20	1005		01:12 [0.0] 03:05		LEAN CLAY with sand (CL); 75% fines (mostly clay, trace silt); 25% fine-coarse, angular-subangular sand; soft, light olive brown (2.5Y 5/3)
			03:05 [0.2] 03:17		CLAYEY SAND (SC); 65% medium-coarse, subangular-subrounded sand; 35% fines (mostly clay, trace silt); trace fine, angular-subangular gravel; loose, light olive brown (2.5Y 5/3)
-25	1010				

WELL SCHEMATIC AND CONSTRUCTION DETAILS

Filter Pack

Screen

FIELD NOTES

Project Name:	**Pomona Extensometer Facility**
Project Location:	**Montvue Park - Pomona, CA**
Project Number:	**007-018-762**
Client:	**Chino Basin Watermaster**

Boring Log / PX2

Elevation, feet-msl	Depth, feet-bgs	Sample Interval	Sample Time	Graphic Log	MATERIAL DESCRIPTION	WELL SCHEMATIC AND CONSTRUCTION DETAILS	FIELD NOTES
	1010		03:17		CLAYEY SAND (SC); 70% medium-coarse, subangular-subrounded sand; 30% fines (mostly clay, trace silt); trace fine, angular-subangular gravel; loose, light olive brown (2.5Y 5/3)		
			[0.4]				
			03:23				
			03:23		LEAN CLAY (CL); 95% fines (mostly clay, trace silt); 5% fine-medium sand; medium-stiff, brown (10YR 5/3)		
			[0.5]				
-30			03:28				
	1015		03:28		LEAN CLAY (CL); 95% fines (mostly clay, trace silt); 5% fine-medium sand; medium-stiff, light olive brown (2.5Y 5/3)		
			[0.1]				
			03:49				
			03:49		Poorly graded SAND with clay (SP-SC); 80% medium-coarse, subangular-subrounded sand; 10% fine, angular-subangular gravel; 10% fines (mostly clay, trace silt); very loose, light yellowish brown (2.5Y 6/3)		
			[0.3]				
-35			03:58				
	1020		03:58		Sandy LEAN CLAY (CL); 65% fines (mostly clay, trace silt); 35% fine-coarse, subangular-subrounded sand; medium-stiff, light olive brown (2.5Y 5/3)	Blank Casing with Sump	
			[0.5]				
			04:03				
			04:03		Sandy LEAN CLAY (CL); 60% fines (mostly clay, trace silt); 40% fine-coarse, subangular-subrounded sand; soft, light olive brown (2.5Y 5/3)		
			[0.2]				
-40			04:15				
	1025		04:15		LEAN CLAY (CL); 95% fines (mostly clay, trace silt); 5% fine-medium sand; medium-stiff, brown (10YR 5/3)		
			[0.0]				
			05:33				
			05:33		LEAN CLAY (CL); 100% fines (mostly clay, trace silt); trace fine-medium sand; medium-stiff, brown (10YR 5/3)		
			[0.4]				
-45			05:40				
	1030		05:40		As Above		
			[0.3]				
			05:49				
			05:49		LEAN CLAY (CL); 95% fines (mostly clay, trace silt); 5% fine-medium sand; medium-stiff, brown (10YR 4/3)		
			[0.2]				
-50			06:00				
	1035		06:00		As Above		
			[0.3]				
-55			06:18				
	1040		06:18		CLAYEY SAND (SC); 75% medium-coarse, subangular-subrounded sand; 15% fines (mostly clay, trace silt); 10% fine, angular-subangular gravel; loose, light yellowish brown (2.5Y 6/3)		
			[0.2]				
			06:32				
			06:32		LEAN CLAY (CL); 95% fines (mostly clay, some silt); 5% fine-medium sand; soft, light yellowish brown (2.5Y 6/4)		
			[0.3]				
-60			06:42				
	1045						

Project Name:	**Pomona Extensometer Facility**
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Project Number:	**007-018-762**
Client:	**Chino Basin Watermaster**

Boring Log / PX2

Elevation, feet-msl	Depth, feet-bgs	Sample Interval	Sample Time	Graphic Log	MATERIAL DESCRIPTION	WELL SCHEMATIC AND CONSTRUCTION DETAILS	FIELD NOTES
	1045		06:42		LEAN CLAY (CL); 100% fines (mostly clay, few silt); trace fine-medium sand; soft, light yellowish brown (2.5Y 6/4)		
			[0.2]		LEAN CLAY with sand (CL); 85% fines (mostly clay, few silt); 15% fine-medium sand; soft, light yellowish brown (2.5Y 6/4)		
-65	1050		07:08		LEAN CLAY (CL); 100% fines (mostly clay, few silt); trace fine-medium sand; soft, light yellowish brown (2.5Y 6/4)		
			[0.4]		LEAN CLAY (CL); 100% fines (mostly clay, few silt); trace fine-medium sand; soft, reddish yellow (7.5YR 6/6), iron oxide staining		
-70	1055		07:20		As Above		
			[0.2]		LEAN CLAY (CL); 95% fines (mostly clay, some silt); 5% fine-medium sand; soft, light yellowish brown (2.5Y 6/4)		
-75	1060		07:43		As Above		
			[0.1]		CLAYEY SAND with gravel (SC); 70% medium-coarse, subangular sand; 15% fine-coarse, subangular gravel; 15% fines (mostly clay, little silt); loose, grayish brown (2.5Y 5/2), coarse gravel fragments		
-80	1065		08:30		Poorly graded SAND with gravel (SP); 80% medium-coarse, subangular sand; 15% fine-coarse, subangular gravel; 5% fines (mostly clay, little silt); loose, grayish brown (2.5Y 5/2)		
			[0.1]		LEAN CLAY (CL); 95% fines (mostly clay, trace silt); 5% fine-medium sand; soft, olive yellow (2.5Y 6/6)		
-85	1070		09:56		CLAYEY SAND with gravel (SC); 70% medium-coarse, subangular sand; 15% fine-coarse, subangular gravel; 15% fines (mostly clay, little silt); loose, grayish brown (2.5Y 5/2)		
			[0.1]				
			10:30				
			10:30				
			[0.1]				
-90	1075		10:53		As Above		
			10:53				
			[0.1]				
			11:30				
			11:30		LEAN CLAY (CL); 90% fines (mostly clay, some silt); 10% medium sand; soft, brownish yellow (10YR 6/6)		
			[0.4]				
-95	1080		11:36				

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Boring Log / PX2

Elevation, feet-msl	Depth, feet-bgs	Sample Interval	Sample Time	Graphic Log	MATERIAL DESCRIPTION	WELL SCHEMATIC AND CONSTRUCTION DETAILS	FIELD NOTES
	1080		11:36		LEAN CLAY (CL); 100% fines (mostly clay, trace silt); trace fine-medium sand; stiff, light yellowish brown (10YR 6/4)		
			[0.4]				
-100	1085		11:50		LEAN CLAY (CL); 100% fines (mostly clay, some silt); trace fine-medium sand; stiff, yellowish brown (10YR 5/8)		
			11:50		LEAN CLAY with sand (CL); 80% fines (mostly clay, some silt); 15% fine-medium sand; 5% fine gravel; soft, olive yellow (2.5Y 6/6)		
			[0.2]				
-105	1090		12:16				
			12:16		LEAN CLAY (CL); 90% fines (mostly clay, some silt); 10% medium sand; soft, brownish yellow (10YR 6/6)		
			[0.4]				
-110	1095		12:30				
			12:30		LEAN CLAY (CL); 95% fines (mostly clay, some silt); 5% fine-medium sand; stiff, olive yellow (2.5Y 6/6)		
			[0.3]				
-115	1100		12:45				
			12:45		LEAN CLAY with sand (CL); 80% fines (mostly silt, some clay); 20% fine sand; medium-stiff, light yellowish brown (2.5Y 6/4)		Silty-fine sand cemented with clay
			[0.1]				
			13:02				
			13:02				
			[0.1]				
-120	1105		13:30				
			13:30		As Above		
			[0.0]				
			15:41				
			15:41		LEAN CLAY (CL); 100% fines (mostly clay, trace silt); trace fine-medium sand; soft, brownish yellow (10YR 6/6), rich iron oxides		
			[0.3]				
-125	1110		15:50				
			15:50		LEAN CLAY (CL); 90% fines (mostly clay, trace silt); 10% fine-medium sand; soft, brownish yellow (10YR 6/6)		
			[0.2]				
					Sandy LEAN CLAY (CL); 70% fines (mostly silt, some clay); 20% fine sand; 10% fine-coarse, subangular gravel; medium-stiff, light yellowish brown (2.5Y 6/4)		
-130	1115		16:18				

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Boring Log / PX2

Elevation, feet-msl	Depth, feet-bgs	Sample Interval	Sample Time	Graphic Log	MATERIAL DESCRIPTION	WELL SCHEMATIC AND CONSTRUCTION DETAILS	FIELD NOTES
	1115		16:18		LEAN CLAY with sand (CL); 75% fines (mostly clay, some silt); 25% fine-medium sand; soft, olive yellow (2.5Y 6/6)		
			[0.2]				
-135	1120		16:48				
			16:48		LEAN CLAY (CL); 90% fines (mostly clay, some silt); 10% fine-medium sand; soft, olive yellow (2.5Y 6/6)		
			[0.3]				
					CLAYEY SAND with gravel (SC); 70% fine-medium sand; 15% fine, angular gravel; 15% fines (mostly clay, some silt); loose, light yellowish brown (2.5Y 6/3)		
-140			17:08				
	1125		17:08		LEAN CLAY (CL); 100% fines (mostly clay, few silt); trace fine sand; stiff, brownish yellow (10YR 6/6)	← Sand:Bentonite Mixture	
			[0.2]				
-145			17:34				
	1130		17:34		As Above		
			[0.2]				
			17:45				
			17:45				
			[0.3]				
-150			17:54				
	1135		17:54		As Above		
			[0.2]				
-155			18:15				
	1140		18:15		As Above		
			[0.3]				
			18:25				
			18:25		Sandy LEAN CLAY (CL); 60% fines (mostly clay, trace silt); 40% medium-coarse, subangular-subrounded sand; trace fine, angular-subangular gravel; soft, light olive brown (2.5Y 5/3)		
			[0.2]				
-160			18:38				
	1145		18:38		As Above		
			[0.0]				
-165	1150		08:00				

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Boring Log / PX2

Elevation, feet-msl	Depth, feet-bgs	Sample Interval	Sample Time	Graphic Log	MATERIAL DESCRIPTION	WELL SCHEMATIC AND CONSTRUCTION DETAILS	FIELD NOTES
	1150		08:00		LEAN CLAY (CL); 90% fines (mostly clay, some silt); 10% medium sand; medium-stiff, light brown (7.5YR 6/4)		
			[0.2]				
			08:12				
			08:12		Sandy LEAN CLAY (CL); 65% fines (mostly clay, little silt); 35% fine-medium sand; soft, light yellowish brown (2.5Y 6/4)		
			[0.1]				
-170	1155		08:32				
			08:32				
			[0.1]				
			08:55				
			08:55				
			[0.2]				
-175	1160		09:10				
			09:10		As Above		
			[0.1]				
			09:29				
			09:29		Sandy LEAN CLAY (CL); 60% fines (mostly clay, little silt); 35% fine-medium sand; 5% fine gravel; soft, light yellowish brown (2.5Y 6/4)		
			[0.1]				
-180	1165		09:55				
			09:55		Sandy LEAN CLAY (CL); 65% fines (mostly clay, little silt); 35% fine-medium sand; soft, light yellowish brown (2.5Y 6/4)		
			[0.0]				
			10:52				
			10:52		Sandy LEAN CLAY (CL); 50% fine-medium sand; 50% fines (mostly clay, little silt); soft, light yellowish brown (2.5Y 6/4)		
			[0.2]				
-185	1170		11:04				
			11:04		As Above		
			[0.2]				
					LEAN CLAY (CL); 100% fines (mostly clay, trace silt); trace fine-medium sand; medium-stiff, reddish yellow (7.5YR 6/6)		
-190	1175		11:34				
			11:34				
			[0.3]				
-195	1180		11:50				
			11:50		As Above		
			[0.3]				
-200	1185		12:07				

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Boring Log / PX2

Elevation, feet-msl	Depth, feet-bgs	Sample Interval	Sample Time	Graphic Log	MATERIAL DESCRIPTION	WELL SCHEMATIC AND CONSTRUCTION DETAILS	FIELD NOTES
	1185		12:07		Sandy LEAN CLAY (CL); 65% fines (mostly clay, little silt); 35% fine-medium sand; soft, light yellowish brown (2.5Y 6/4)		
			[0.1]				
			12:53				
			12:53				
			[0.1]				
-205			13:10				
	1190		13:10		As Above		
			[0.1]				
			13:47				
			13:47				
-210							
	1195		[0.2]		As Above		
			14:20				
			14:20		LEAN CLAY (CL); 95% fines (mostly clay, some silt); 5% fine-medium sand; soft, reddish yellow (7.5YR 7/8)		
			[0.2]				
-215			14:32				
	1200		14:32		LEAN CLAY with sand (CL); 80% fines (mostly clay, some silt); 20% fine-medium sand; soft, light yellowish brown (2.5Y 6/4)		
			[0.1]				
			14:54				
			14:54				
			[0.1]				
-220			15:11				
	1205		15:11		As Above		
			[0.0]				
-225			17:00				
	1210		17:00		Sandy LEAN CLAY (CL); 65% fines (mostly clay, little silt); 35% fine-medium sand; soft, light yellowish brown (2.5Y 6/4)		
			[0.0]				
			17:58				
			17:58				
			[0.1]				
-230			18:20				
	1215		18:20		Sandy LEAN CLAY (CL); 60% fines (mostly clay, trace silt); 40% fine-coarse, subangular-subrounded sand; very soft, light olive brown (2.5Y 5/3)		
			[0.2]				
			18:35				
			18:35		As Above		
			[0.0]				
-235			19:44				
	1220						

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Boring Log / PX2

Elevation, feet-msl	Depth, feet-bgs	Sample Interval	Sample Time	Graphic Log	MATERIAL DESCRIPTION	WELL SCHEMATIC AND CONSTRUCTION DETAILS	FIELD NOTES
	1220		19:44		CLAYEY SAND (SC); 55% fine-coarse, subangular-subrounded sand; 45% fines (mostly clay, few silt); loose, light olive brown (2.5Y 5/3)		
			[0.1]				
			20:15			← Transition Bentonite Seal	
			20:15		As Above		
			[0.1]				
-240			20:43				
	1225		20:43		As Above		
			[0.0]				
			22:05			← Transition Sand Seal	
			22:05		LEAN CLAY (CL); 100% fines (mostly clay, trace silt); trace medium-coarse, subangular-subrounded sand; soft, olive brown (2.5Y 4/4)		
			[0.2]				
-245			22:20				
	1230		22:20		CLAYEY SAND (SC); 60% fine-coarse, subangular-subrounded sand; 40% fines (mostly clay, few silt); trace fine, angular-subangular gravel; loose, light olive brown (2.5Y 5/3)		
			[0.1]				
			22:55				
			22:55		As Above		
			[0.0]				
-250			00:04				
	1235		00:04		CLAYEY SAND with gravel (SC); 50% medium-coarse, subangular-subrounded sand; 30% fines (mostly clay, trace silt); 20% fine-coarse, angular gravel; very loose, light yellowish brown (2.5Y 6/3)		Very slow drilling, possibly drilling through a granitic boulder; odor
			[0.0]				
			01:46				
			01:46		CLAYEY SAND (SC); 60% fine-coarse, subangular-subrounded sand; 40% fines (mostly clay, few silt); trace fine, subangular-subrounded gravel; very loose, light olive brown (2.5Y 5/3)		Possibly cemented bed between 1,237 and 1,253 ft-bgs
			[0.1]				
-255			02:26				
	1240		02:26			← Filter Pack	
					CLAYEY SAND (SC); 70% medium-coarse, subangular-subrounded sand; 30% fines (mostly clay, trace silt); very loose, light yellowish brown (2.5Y 6/3)		
			[0.1]				
			02:59				
			02:59		CLAYEY SAND (SC); 80% medium-coarse, subangular-subrounded sand; 15% fines (mostly clay, trace silt); 5% fine, angular gravel; very loose, light yellowish brown (2.5Y 6/3)		
			[0.1]				
-260			03:40				
	1245		03:40		Poorly graded SAND with clay (SP-SC); 90% medium-coarse, subangular-subrounded sand; 10% fines (mostly clay, little silt); trace fine, angular gravel; very loose, light yellowish brown (2.5Y 6/3)		
			[0.0]				
			04:35				
			04:35		As Above		
			[0.1]				
-265			05:09				
	1250		05:09		Poorly graded SAND (SP); 95% medium-coarse, subangular-subrounded sand; 5% fines (mostly clay, trace silt); loose, light yellowish brown (2.5Y 6/3)		
			[0.0]				
			06:49				
			06:49		Poorly graded SAND with clay (SP-SC); 90% medium-coarse, subangular-subrounded sand; 10% fines (mostly clay, trace silt); loose, light yellowish brown (2.5Y 6/3)		
			[0.1]				
-270			07:25				
	1255						

Project Name:	**Pomona Extensometer Facility**
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Boring Log / PX2

Elevation, feet-msl	Depth, feet-bgs	Sample Interval	Sample Time	Graphic Log	MATERIAL DESCRIPTION	WELL SCHEMATIC AND CONSTRUCTION DETAILS	FIELD NOTES
	1255		07:25				
			[0.1]				
			08:05				
			08:05				
			[0.1]				
-275	1260		08:28			Screen	
			08:28				
			[0.1]				
			08:56				
			08:56				
			[0.2]				
-280	1265		09:12				
			09:12				
			[0.1]				
			10:35				
-285	1270		10:35		As Above		
			[0.0]				
			23:07				
-290	1275		23:07		FAT CLAY (CH); 100% fines (mostly clay); soft, brown (10YR 4/3)		
			[0.0]			Blank Casing with Sump	
			03:01				
-295	1280		03:01		As Above		
			[0.0]				
			06:37				
			06:37		As Above		
			[0.0]				
			16:34				
-300	1285		16:34		As Above		
			[0.0]				
			17:34				
			17:34				
			[0.0]				
			00:22				
-305	1290						

Report: WELL LOG; File: PX.GPJ; 1/30/2020

Project Name:	**Pomona Extensometer Facility**
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Boring Log / PX2

Elevation, feet-msl	Depth, feet-bgs	Sample Interval	Sample Time	Graphic Log	MATERIAL DESCRIPTION	WELL SCHEMATIC AND CONSTRUCTION DETAILS	FIELD NOTES
	1290		00:22		As Above		
			[0.0]				
			03:42				
-310	1295						
-315	1300						
-320	1305						
-325	1310						
-330	1315						
-335	1320						
-340	1325						

Camp Dresser & McKee, Inc.
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(949) 752-5452
(949) 752-1307 (FAX)

BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER	10490-21966-WELL28.DRILL	**BORING/WELL NUMBER**	Well #28
PROJECT NAME	Monte Vista Water District	**DATE DRILLED**	1/25/01-2/23/01
LOCATION	Montclair, CA	**CASING TYPE/DIAMETER**	3/8" CB Steel & 5/16" S. Steel/18"
DRILLING METHOD	Reverse Circulation	**SCREEN TYPE/SLOT**	Ful Flo Shutter/0.070"
SAMPLING METHOD	Grab	**GRAVEL PACK TYPE**	Colorado Silica 6 x 16
GROUND ELEVATION		**GROUT TYPE/QUANTITY**	10.3-sack slurry / 55 yds^3
TOP OF CASING		**DEPTH TO WATER (feet bgs)**	540.00
LOGGED BY	M. Hoffman, S. Coffey, K. Williams	**GROUND WATER ELEVATION**	
REMARKS			

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
					0			ASPHALT is 6 inches thick.	0.5
						SM		SILTY SAND: very dark grayish brown (10YR3/2); 60% poorly graded sand, fine, angular to rounded, low to high sphericity; 20% silt in matrix; 10% well graded gravel, fine to coarse, subangular to subrounded, moderate sphericity; 10% cobbles, 12-inch maximum diameter, subangular to subrounded, moderate sphericity; slightly moist.	3.0
					5	SP		POORLY GRADED SAND: brown (10YR4/3); 80% sand, fine to medium, trace coarse, angular to subrounded, low to moderate sphericity; 10% well graded gravel, fine to coarse, subangular to subrounded, low to moderate sphericity; 10% cobbles, 12-inch maximum diameter, subangular to subrounded, moderate sphericity; slightly moist.	
					10				
					13.0				13.0
					15	SM		SILTY SAND: dark yellowish brown (10YR4/4); 70% poorly graded sand, fine, subangular to subrounded, moderate sphericity; 20% silt in matrix; 10% cobbles, 12-inch maximum diameter, subangular to subrounded, moderate sphericity; slightly moist.	
					20				
					23.0				23.0
					25	SM		SILTY SAND: dark yellowish brown (10YR4/4); 70% poorly graded sand, fine, subangular to subrounded, moderate sphericity; 20% silt in matrix; 10% cobbles, 12-inch maximum diameter, subangular to subrounded, moderate sphericity; slightly moist.	
					30				

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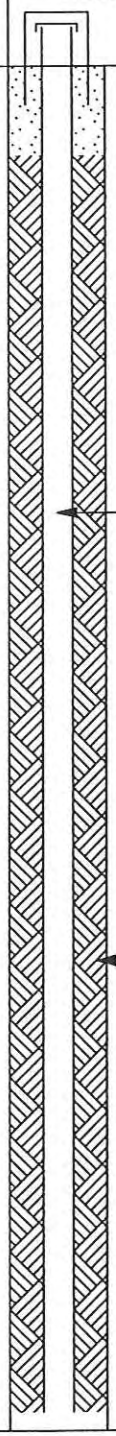
WELL DIAGRAM



NEWGINT MVWD.GPJ NEWGINT.GDT 4/3/01

Camp Dresser & McKee, Inc.
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(949) 752-5452
(949) 752-1307 (FAX)

BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10490-21966-WELL28.DRILL
BORING/WELL NUMBER Well #28
PROJECT NAME Monte Vista Water District
DATE DRILLED 1/25/01-2/23/01

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PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					35	SM		SILTY SAND: dark yellowish brown (10YR4/4); 70% poorly graded sand, fine, subangular to subrounded, moderate sphericity; 20% silt in matrix; 10% cobbles, 12-inch maximum diameter, subangular to subrounded, moderate sphericity; slightly moist.	33.0	
					40	SP		POORLY GRADED SAND: brown (7.5YR4/4); 80% sand, fine to medium, trace coarse, subangular to subrounded, moderate sphericity; 20% cobbles, 12-inch maximum diameter, subangular to subrounded, low to moderate sphericity; trace poorly graded gravel, fine, 1/2-inch maximum diameter, angular to subrounded, low sphericity; slightly moist.	35.0	18" x 3/8" CB Steel Blank (0 - 584.77 ft bgs)
					45	SP		POORLY GRADED SAND: brown (7.5YR4/4); 80% sand, fine to medium, trace coarse, subangular to subrounded, moderate sphericity; 20% cobbles, 12-inch maximum diameter, subangular to subrounded, low to moderate sphericity; trace poorly graded gravel, fine, 1/2-inch maximum diameter, angular to subrounded, low sphericity; slightly moist.	45.0	10.3-sack sand slurry (2 - 530 ft bgs)
					50				51.0	34" Mild Steel Conductor (0-51 ft bgs)
					55	SP		POORLY GRADED SAND WITH GRAVEL: brown (10YR5/4); 90% sand, fine to medium; 10% poorly graded gravel, fine, trace coarse, angular to subangular; trace silt.		
					60			POORLY GRADED SAND WITH GRAVEL: brown (10YR5/4); 90% sand, fine to medium; 10% poorly graded gravel, fine, trace coarse, angular to subangular; trace silt.	60.0	

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PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					65	SP				
					70			POORLY GRADED SAND WITH GRAVEL: brown (10YR5/4); 90% sand, fine to medium; 10% poorly graded gravel, fine, trace coarse, angular to subangular; trace silt.	70.0	18" x 3/8" CB Steel Blank (0 - 584.77 ft bgs)
					75	SP				
					80			WELL GRADED SAND WITH GRAVEL: brown (10YR5/4); 80% sand, fine to coarse, 20% well graded gravel, fine to coarse.	80.0	10.3-sack sand slurry (2 - 530 ft bgs)
					85	SW				
					90			WELL GRADED SAND WITH GRAVEL: brown (10YR5/4); 80% sand, fine to coarse, 20% well graded gravel, fine to coarse.	90.0	
					95	SW				

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PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					100			SILTY SAND: yellowish brown (10YR5/6); 85% sand, fine to medium; 15% silt; trace poorly graded gravel, fine, subangular to subrounded.	100.0	
					105	SM				18" x 3/8" CB Steel Blank (0 - 584.77 ft bgs)
					110			SILTY SAND: yellowish brown (10YR5/6); 85% sand, fine to medium; 15% silt; trace poorly graded gravel, fine, subangular to subrounded.	110.0	
					115	SM				10.3-sack sand slurry (2 - 530 ft bgs)
					120	SM		SILTY SAND: yellowish brown (10YR5/6); 85% sand, fine to medium; 15% silt; trace poorly graded gravel, fine, subangular to subrounded.	120.0	
					125	SP		POORLY GRADED SAND: yellowish brown (10YR5/6); 90% sand fine to medium; 5% poorly graded gravel, fine, subangular to subrounded; 5% silt.	123.0	
					130					

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PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					135	SP		POORLY GRADED SAND: yellowish brown (10YR5/6); 90% sand fine to medium; 5% poorly graded gravel, fine, subangular to subrounded; 5% silt.	133.0	
									137.0	
					140	SW		WELL GRADED SAND WITH GRAVEL: brown (10YR5/4); 90% sand, fine to coarse, 10% well graded gravel, fine to coarse; subangular to subrounded.		18" x 3/8" CB Steel Blank (0 - 584.77 ft bgs)
									144.0	
					145			WELL GRADED GRAVEL WITH SAND: grayish brown (10YR5/2); 60% gravel, fine to coarse, subrounded; 40% poorly graded sand, medium to coarse.		
					150	GW				10.3-sack sand slurry (2 - 530 ft bgs)
									154.0	
					155			WELL GRADED GRAVEL WITH SAND: grayish brown (10YR5/2); 60% gravel, fine to coarse, subrounded; 40% poorly graded sand, medium to coarse.		
						GW				
					160					
									164.0	
					165			WELL GRADED GRAVEL WITH SAND: grayish brown (10YR5/2); 60% gravel, fine to coarse, subrounded; 40% poorly graded sand, medium to coarse.		

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PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					170	GW				
					175	GW		WELL GRADED GRAVEL WITH SAND: grayish brown (10YR5/2); 60% gravel, fine to coarse, subrounded; 40% poorly graded sand, medium to coarse.	174.0	18" x 3/8" CB Steel Blank (0 - 584.77 ft bgs)
					180			POORLY GRADED SAND WITH GRAVEL: yellowish brown (10YR5/4); 90% sand, fine to medium, some coarse; 10% poorly graded gravel, coarse, subangular to subrounded.	181.0	
					185	SP				10.3-sack sand slurry (2 - 530 ft bgs)
					190	SP		POORLY GRADED SAND WITH GRAVEL: yellowish brown (10YR5/4); 90% sand, fine to medium, some coarse (increasing downward); 10% poorly graded gravel, coarse, subangular to subrounded.	190.0	
					195	SP				
					200			POORLY GRADED SAND WITH GRAVEL: pale brown (10YR6/3); 90% sand, medium to coarse; 10% well	200.0	

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PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
								graded gravel, fine to coarse.		
					205	SP				
					210			POORLY GRADED SAND WITH SILT AND GRAVEL: dark yellowish brown (10YR4/4); 80% sand, fine to medium; 10% well graded gravel, fine to coarse, subrounded; 10% silt as oxidized balls with gravel.	210.0	18" x 3/8" CB Steel Blank (0 - 584.77 ft bgs)
					215	SP SM				
					220			POORLY GRADED SAND WITH GRAVEL: light yellowish brown (10YR6/4); 80% sand, medium to coarse; 15% well graded gravel, fine to coarse; 5% silt.	220.0	10.3-sack sand slurry (2 - 530 ft bgs)
					225	SP				
					230			POORLY GRADED SAND WITH SILT AND GRAVEL: dark yellowish brown (10YR4/4); 80% sand, fine to medium; 10% well graded gravel, fine to coarse, subrounded; 10% silt as oxidized balls with gravel.	230.0	
					235	SP				

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PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					240	SM		WELL GRADED SAND WITH GRAVEL: pale brown (10YR6/3); 80% sand, fine to coarse, 20% well graded gravel, fine to coarse; subangular to subrounded; trace cobbles.	240.0	
					245	SW				18" x 3/8" CB Steel Blank (0 - 584.77 ft bgs)
					250			WELL GRADED SAND WITH GRAVEL: pale brown (10YR6/3); 80% sand, fine to coarse, 20% well graded gravel, fine to coarse; subangular to subrounded; trace cobbles; coarsening downward.	249.0	
					255	SW				10.3-sack sand slurry (2 - 530 ft bgs)
					260			WELL GRADED SAND WITH GRAVEL: pale brown (10YR6/3); 80% sand, fine to coarse, 20% well graded gravel, fine to coarse; subangular to subrounded.	260.0	
					265	SW				
					270				270.0	

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PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					275	SW		WELL GRADED SAND WITH GRAVEL: pale brown (10YR6/3); 80% sand, fine to coarse, 20% well graded gravel, fine to coarse; subangular to subrounded.		
					280			WELL GRADED SAND WITH SILT AND GRAVEL: yellowish brown (10YR5/4); 70% sand, fine to coarse; 20% well graded gravel, fine to coarse; 10% silt; trace clay.	280.0	18" x 3/8" CB Steel Blank (0 - 584.77 ft bgs)
					285	SW SM				
					290			CLAYEY SILT: strong brown (7.5YR5/6); 70% silt, inelastic, soft; 20% clay, nonplastic, soft; 10% poorly graded sand, fine to medium.	290.0	10.3-sack sand slurry (2 - 530 ft bgs)
					295	ML				
					300			SANDY SILT WITH CLAY: yellowish brown (10YR5/8); 60% silt, inelastic, soft; 30% poorly graded sand, medium; 10% clay, nonplastic, soft.	300.0	

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					305	ML				
					310			WELL GRADED SAND WITH GRAVEL: light yellowish brown 910YR6/4); 70% sand, fine to coarse; 25% poorly graded gravel, fine, trace coarse, subrounded; 5% silt.	310.0	
					315	SW				18" x 3/8" CB Steel Blank (0 - 584.77 ft bgs)
					320			SILTY SAND WITH GRAVEL: brownish yellow (10YR 6/6); 75% sand, fine to coarse; 15% silt; 10% well graded gravel, fine to coarse, subangular to subrounded; trace clay.	320.0	
					325	SM				10.3-sack sand slurry (2 - 530 ft bgs)
					330			SILTY SAND WITH GRAVEL: brownish yellow (10YR 6/6); 75% sand, fine to coarse; 15% silt; 10% well graded gravel, fine to coarse, subangular to subrounded; trace clay.	330.0	
					335	SM				

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					340			SILTY SAND WITH GRAVEL: brownish yellow (10YR 6/6); 75% sand, fine to coarse; 15% silt; 10% well graded gravel, fine to coarse, subangular to subrounded; trace clay.	340.0	
					345	SM				18" x 3/8" CB Steel Blank (0 - 584.77 ft bgs)
					350			SILTY SAND WITH GRAVEL: brownish yellow (10YR 6/6); 80% sand, fine to coarse; 10% silt; 10% well graded gravel, fine to coarse, subangular to subrounded; trace clay.	350.0	
					355	SM				10.3-sack sand slurry (2 - 530 ft bgs)
					360			WELL GRADED SAND WITH SILT AND GRAVEL: brownish yellow (10YR6/6); 75% sand, fine to coarse; 15% well graded gravel, fine to coarse, subangular to subrounded; 10% silt; trace clay.	360.0	
					365	SW SM				
					370			WELL GRADED SAND WITH GRAVEL: pale brown (10YR6/3); 80% sand, fine to coarse; 20% well graded gravel, fine to coarse, subangular to subrounded.	370.0	

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					375	SW				
					380			WELL GRADED SAND WITH GRAVEL: pale brown (10YR6/3); 80% sand, fine to coarse; 20% well graded gravel, fine to coarse, subangular to subrounded.	380.0	18" x 3/8" CB Steel Blank (0 - 584.77 ft bgs)
					385	SW				
					390			WELL GRADED SAND WITH SILT AND GRAVEL: light yellowish brown (10YR6/4); 70% sand, fine to coarse; 20% well graded gravel, fine to coarse; 10% silt as balls, yellowish brown; trace clay.	390.0	10.3-sack sand slurry (2 - 530 ft bgs)
					395	SW SM				
					400			SILTY SAND WITH GRAVEL: brownish yellow (10YR 6/6); 50% sand, fine to coarse; 35% silt, inelastic; 10% poorly graded gravel, subrounded; 5% clay.	400.0	
					405	SM				

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					410			SILTY SAND WITH GRAVEL: brownish yellow (10YR 6/8); 50% sand, fine to coarse; 35% silt, inelastic; 10% poorly graded gravel, subrounded; 5% clay.	410.0	
					415	SM				18" x 3/8" CB Steel Blank (0 - 584.77 ft bgs)
					420			SILTY SAND WITH GRAVEL: brownish yellow (10YR 6/8); 50% sand, fine to coarse; 35% silt, inelastic; 10% poorly graded gravel, subrounded; 5% clay.	420.0	
					425	SM				10.3-sack sand slurry (2 - 530 ft bgs)
					430			SILTY SAND WITH GRAVEL: brownish yellow (10YR 6/8); 50% sand, fine to coarse; 35% silt, inelastic; 10% poorly graded gravel, subrounded; 5% clay.	430.0	
						SM				
					435			CLAYEY SILT WITH SAND: yellowish red (5YR5/6); 70% silt, moderately elastic, medium stiffness; 20% poorly graded sand, fine to medium; 10% clay, moderately plastic, medium stiffness.	436.0	
					440					

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					445	ML				
					448.0			CLAYEY SILT WITH SAND AND GRAVEL: yellowish red (5YR4/6); 60% silt, dark reddish brown (5YR3/4), oxidized; 20% poorly graded sand, fine to medium; 15% poorly graded gravel, fine, subrounded; 5% clay.		18" x 3/8" CB Steel Blank (0 - 584.77 ft bgs)
					450					
						ML				
					455					
					458.0			CLAYEY SILT WITH SAND AND GRAVEL: yellowish red (5YR4/6); 60% silt, dark reddish brown (5YR3/4), oxidized; 20% poorly graded sand, fine to medium; 15% poorly graded gravel, fine, subrounded; 5% clay.		10.3-sack sand slurry (2 - 530 ft bgs)
					460					
						ML				
					465				465.0	
								CLAYEY SILT WITH SAND: yellowish brown (10YR5/8); 70% silt, inelastic, soft; 20% poorly graded sand, medium, subrounded; 10% clay, nonplastic, soft.		
					470	ML				
					474.0			POORLY GRADED SAND: fine sand. No sample was collected due to faulty splitter box gate. The drillers shut down and fixed the problem.		
					475					

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					480	SP				
								SILT WITH SAND: yellowish brown (10YR5/4); 85% silt as balls, inelastic, soft; 15% poorly graded sand, medium to coarse, angular to subangular, low sphericity.	484.0	
					485	ML				18" x 3/8" CB Steel Blank (0 - 584.77 ft bgs)
								POORLY GRADED SAND WITH GRAVEL: pale brown (10YR6/3); 90% sand, coarse, some fine and medium, angular to subangular, low sphericity; 10% poorly graded gravel and rock fragments, fine, 1/2-inch maximum diameter, angular to subrounded, low sphericity.	486.0	
					490	SP				
					495					10.3-sack sand slurry (2 - 530 ft bgs)
								POORLY GRADED SAND WITH GRAVEL: pale brown (10YR6/3); 90% sand, coarse, some fine and medium, angular to subangular, low sphericity; 10% poorly graded gravel and rock fragments, fine, 1/2-inch maximum diameter, angular to subrounded, low sphericity.	496.0	
					500	SP				
					505					
								CLAY: yellowish brown (10YR5/8); 100% clay, nonplastic, soft to medium stiff.	506.0	
					510					

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PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					515	CL		CLAY: yellowish brown (10YR5/8); 100% clay, nonplastic, soft to medium stiff; trace sand.	516.0	18" x 3/8" CB Steel Blank (0 - 584.77 ft bgs)
					520	CL		CLAY: yellowish brown (10YR5/8); 90% clay, nonplastic, very soft to soft; 10% sand.	523.0	10.3-sack sand slurry (2 - 530 ft bgs)
					525	CL				
					530			CLAY: yellowish brown (10YR5/8); 95% clay, nonplastic, stiff to very stiff; 5% sand.	533.0	Colorado Silica 6 x 16 Gravel Pack (530 - 1265 ft bgs)
					535	CL				
					540	SM		SILTY SAND: yellowish brown (10YR5/8); 80% well graded sand, fine to coarse, angular to subrounded, low sphericity; 20% silt.	540.0	4" CB Steel, Permanent Gravel Feed Tube (0-540 ft bgs)

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10490-21966-WELL28.DRILL **BORING/WELL NUMBER** Well #28

PROJECT NAME Monte Vista Water District **DATE DRILLED** 1/25/01-2/23/01

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PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					545	SM		SILTY SAND WITH GRAVEL: yellowish brown (10YR5/8); 60% sand, coarse, angular to subrounded, low sphericity; 20% silt; 20% gravel, angular to subrounded, low sphericity.	545.0	18" x 3/8" CB Steel Blank (0 - 584.77 ft bgs)
					550					
					555	GM		SILTY GRAVEL WITH SAND: yellowish brown (10YR5/8); 50% poorly graded gravel, fine, angular to subrounded, low sphericity; 30% poorly graded sand, coarse, angular to subrounded, low sphericity; 20% silt.	553.0
					560	SM		SILTY SAND WITH GRAVEL: yellowish brown (10YR5/8); 60% poorly graded sand, coarse, angular to subrounded, low sphericity; 20% silt; 20% gravel, angular to subrounded, low sphericity.	557.0	Colorado Silica 6 x 16 Gravel Pack (530 - 1265 ft bgs)
					565					
					570	CL		CLAY: yellowish brown (10YR5/8); 95% clay, nonplastic, stiff to very stiff; 5% sand.	568.0	
					575			SILTY SAND WITH GRAVEL: yellowish brown (10YR5/8); 65% poorly graded sand, coarse, angular to subrounded, low sphericity; 20% silt; 15% gravel, angular to subrounded, low sphericity.	576.0	

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PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					580	SM				18" x 3/8" CB Steel Blank (0 - 584.77 ft bgs)
						CL		CLAY: brownish yellow (10YR6/8); 85% clay; 10% poorly graded sand, medium to coarse; 5% poorly graded gravel, fine, subangular to subrounded.	581.0	
					585	GW GM		WELL GRADED GRAVEL WITH SAND AND SILT: brownish yellow (10YR6/6); 60% gravel, fine to coarse, angular to subrounded; 30% poorly graded sand, medium to coarse; 10% silt.	584.0	
					590					18" x 3/8" CB Steel Blank W/ 2" Sounding Tube Splice (584.77 - 622.92 ft bgs)
					595	GW		WELL GRADED GRAVEL WITH SAND: brownish yellow (10YR6/6); 60% gravel, fine to coarse, angular to subrounded; 30% poorly graded sand, medium to coarse; 5% silt.	594.0	
					600					Colorado Silica 6 x 16 Gravel Pack (530 - 1265 ft bgs)
					605	ML		SILT WITH SAND AND GRAVEL: yellowish brown (10YR5/6); 50% silt; 25% well graded gravel and rock fragments, fine to coarse, angular to subrounded; 25% poorly graded sand, medium to coarse, angular to subrounded.	606.0	
					610	SM		SILTY SAND WITH GRAVEL: brownish yellow (10YR6/6); 60% poorly graded sand, medium to coarse; 20% well graded gravel and rock fragments, fine to coarse; 20% silt.	609.0	
								SILT WITH SAND: yellowish brown (10YR5/4); 85% silt as balls, inelastic, soft; 15% poorly graded sand, medium to coarse, angular to subangular, low sphericity.	611.0	

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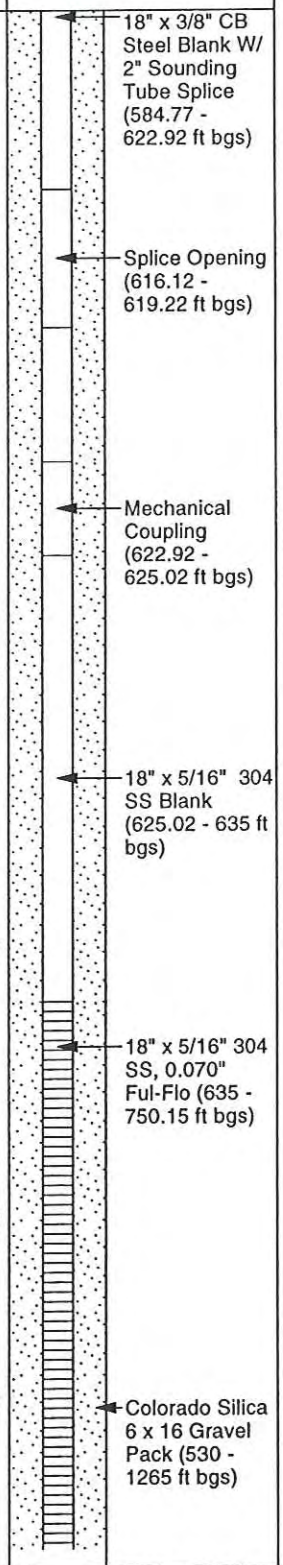
PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
					615	ML			
					620			POORLY GRADED SAND: yellowish brown (10YR5/4); 100% sand, medium to coarse, some fine, angular to subangular, low sphericity.	621.0
					625	SP			
					630	SP SM		POORLY GRADED SAND WITH SILT: yellowish brown (10YR5/4); 90% sand, medium to coarse, some fine, angular to subangular, low sphericity; 10% silt as balls, inelastic, medium stiff, sand in matrix.	628.0
					635	ML		SANDY SILT: yellowish brown (10YR5/4); 70% silt as balls, inelastic, soft to medium stiff; 30% poorly graded sand, medium to coarse, angular to subangular.	634.0
					640	SM		SILTY SAND: yellowish brown (10YR5/4); 80% poorly graded sand, medium to coarse, angular to subangular; 20% silt as balls, inelastic, soft to medium stiff.	640.0
					645			POORLY GRADED SAND: yellowish brown (10YR5/4); 90% poorly graded sand, medium to coarse, angular to subangular; 5% silt as balls, inelastic, soft to medium stiff; 5% poorly graded gravel, fine, 3/4-inch maximum diameter, angular to subrounded, low sphericity.	644.0



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PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					650	SP				
					655			POORLY GRADED SAND WITH SILT: yellowish brown (10YR5/4); 90% poorly graded sand, medium to coarse, angular to subangular; 10% silt as balls, inelastic, soft to medium stiff.	654.0	18" x 5/16" 304 SS, 0.070" Ful-Flo (635 - 750.15 ft bgs)
					660	SP SM				
					665			POORLY GRADED SAND WITH SILT: yellowish brown (10YR5/4); 85% poorly graded sand, medium to coarse, angular to subangular; 10% silt as balls, inelastic, soft to medium stiff; 5% poorly graded gravel and rock fragments, fine, 3/4-inch maximum diameter, angular to subrounded, low sphericity.	664.0	Colorado Silica 6 x 16 Gravel Pack (530 - 1265 ft bgs)
					670	SP SM				
					675			POORLY GRADED SAND WITH GRAVEL: yellowish brown (10YR5/4); 85% sand, medium to coarse; 10% poorly graded gravel and rock fragments, fine, 3/4-inch maximum diameter, angular to subangular, low sphericity; 5% silt as balls.	674.0	
					680	SP				

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PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					685				686.0	
					690	SP		POORLY GRADED SAND WITH GRAVEL: yellowish brown (10YR5/4); 80% sand, medium to coarse; 15% poorly graded gravel and rock fragments, fine, 3/4-inch maximum diameter, angular to subangular, low sphericity; 5% silt as balls.		18" x 5/16" 304 SS, 0.070" Ful-Flo (635 - 750.15 ft bgs)
					695				696.0	
					700	SP		POORLY GRADED SAND WITH GRAVEL: yellowish brown (10YR5/4); 80% sand, medium to coarse; 15% poorly graded gravel and rock fragments, fine, 3/4-inch maximum diameter, angular to subangular, low sphericity; 5% silt as balls.		Colorado Silica 6 x 16 Gravel Pack (530 - 1265 ft bgs)
						CL		CLAY WITH SAND: yellowish brown (10YR5/4); 85% clay as balls, nonplastic, soft to medium stiff; 15% well graded sand, fine to coarse, angular to subangular, low sphericity.	702.0	
					705				707.0	
					710	SP		POORLY GRADED SAND WITH GRAVEL: yellowish brown (10YR5/4); 80% sand, medium to coarse; 15% poorly graded gravel and rock fragments, fine, 3/4-inch maximum diameter, angular to subangular, low sphericity; 5% silt as balls.		
					715					

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PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					720	SP		POORLY GRADED SAND WITH GRAVEL: yellowish brown (10YR5/4); 80% sand, medium to coarse; 15% poorly graded gravel and rock fragments, fine, 3/4-inch maximum diameter, angular to subangular, low sphericity; 5% silt as balls.	717.0	
					725					18" x 5/16" 304 SS, 0.070" Ful-Flo (635 - 750.15 ft bgs)
					730	SP		POORLY GRADED SAND WITH GRAVEL: yellowish brown (10YR5/4); 80% sand, medium to coarse; 15% poorly graded gravel and rock fragments, fine, 3/4-inch maximum diameter, angular to subangular, low sphericity; 5% silt as balls.	727.0	
					735			POORLY GRADED SAND WITH GRAVEL: light yellowish brown (10YR6/4); 70% sand, medium to coarse, angular to subangular, low sphericity; 25% poorly graded gravel and rock fragments, fine, 3/4-inch maximum diameter, angular to subangular, low sphericity; 5% silt as balls.	735.0	Colorado Silica 6 x 16 Gravel Pack (530 - 1265 ft bgs)
					740	SP				
					745			POORLY GRADED SAND WITH GRAVEL: light yellowish brown (10YR6/4); 60% sand, medium to coarse, angular to subangular, low sphericity; 30% poorly graded gravel and rock fragments, fine, 3/4-inch maximum diameter, angular to subangular, low sphericity; 5% silt as balls.	745.0	
					750	SP				

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					755	SM		SILTY SAND WITH GRAVEL: brownish yellow (10YR6/6); 40% poorly graded sand, fine to medium, angular to subangular; 40% silt as balls; 20% poorly graded gravel, fine, subrounded.	754.0	
					760					18" x 5/16" 304 SS Blank (750.15 - 784.95 ft bgs)
					765	ML		SILT WITH CLAY: yellowish brown (10YR5/4); 80% silt, moderately elastic, medium stiff; 15% clay, moderately plastic, medium stiff; 5% poorly graded sand, fine to medium.	763.0	
					770	SM		SILTY SAND WITH GRAVEL: yellowish brown (10YR5/6); 40% poorly graded sand, fine to medium, angular to subangular; 40% silt as balls, moderate to highly inelastic, medium stiff; 20% poorly graded gravel, fine, angular to subangular.	768.0	Colorado Silica 6 x 16 Gravel Pack (530 - 1265 ft bgs)
					775					
					780	SM		SILTY SAND WITH GRAVEL: brownish yellow (10YR6/6); 60% poorly graded sand, fine to medium, angular to subangular; 30% silt as balls; 10% poorly graded gravel and rock fragments, fine, 1/4-inch maximum diameter, angular.	778.0	
						ML		CLAYEY SILT WITH SAND: light brownish yellow (10YR6/4); 60% silt as balls, inelastic, soft; 20% clay as	783.0	

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					785			balls, nonplastic soft; 20% poorly graded sand, fine, some medium.	785.0	
						CL		SILTY CLAY: yellowish brown (10YR5/8); 60% clay, moderately plastic, medium stiff; 35% silt, moderately elastic, medium stiff; 5% poorly graded sand, medium, some coarse, angular to subangular.		
					790					18" x 5/16" 304 SS, 0.070" Ful-Flo (784.95 - 794.91 ft bgs)
									791.0	
						SP		POORLY GRADED SAND WITH GRAVEL: light olive brown (2.5Y5/3); 85% sand, medium to coarse, some fine, angular to subangular, low sphericity; 15% poorly graded gravel and rock fragments, fine, 1/2-inch maximum diameter, angular to subangular, low sphericity.		
					795					
									799.0	
								CLAY: yellowish brown (10YR5/8); 100% clay as balls, nonplastic, soft; trace poorly graded sand, medium to coarse, angular to subangular, low sphericity; trace silt in clay matrix.		Colorado Silica 6 x 16 Gravel Pack (530 - 1265 ft bgs)
					800					
						CL				
					805					
									809.0	
								CLAY: light olive brown (2.5Y5/3); 90% clay as balls, nonplastic, soft; 10% well graded sand, fine to coarse, angular to subangular, low sphericity; trace silt in clay matrix.		18" x 5/16" 304 SS Blank (794.91 - 854.91 ft bgs)
					810					
						CL				
					815					

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					820	CL		CLAY: light olive brown (2.5Y5/3); 90% clay as balls, nonplastic, soft; 10% well graded sand, fine to coarse, angular to subangular, low sphericity; trace silt in clay matrix.	819.0	
					825					18" x 5/16" 304 SS Blank (794.91 - 854.91 ft bgs)
					830	CL		CLAY: light olive brown (2.5Y5/3); 90% clay as balls, nonplastic, soft; 10% well graded sand, fine to coarse, angular to subangular, low sphericity; trace silt in clay matrix.	829.0	
					835					Colorado Silica 6 x 16 Gravel Pack (530 - 1265 ft bgs)
					840	SC		CLAYEY SAND: yellowish brown (10YR5/8); 60% poorly graded sand, medium to coarse, some fine, angular to subangular, low sphericity; 35% clay as balls and coating gravel, nonplastic, soft to medium stiff; 5% poorly graded gravel and rock fragments, fine, 3/4-inch maximum diameter, angular to subangular, low sphericity.	839.0	
					845					
					850	SC		CLAYEY SAND: yellowish brown (10YR5/8); 75% poorly graded sand, medium to coarse, some fine, angular to subangular, low sphericity; 20% clay as balls and coating gravel, nonplastic, stiff to very stiff; 5% poorly graded gravel and rock fragments, fine, 3/4-inch maximum diameter, angular to subangular, low sphericity.	849.0	

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					855	CL		CLAY: light olive brown (2.5Y5/3); 90% clay as balls, nonplastic, soft; 10% well graded sand, fine to coarse, angular to subangular, low sphericity; trace silt in clay matrix.	855.0	
					860	SP		POORLY GRADED SAND WITH GRAVEL: yellowish brown (10YR5/8); 85% sand, medium to coarse, angular to subangular, low sphericity; 10% poorly graded gravel and rock fragments, fine, 1/2-inch maximum diameter, angular to subangular, low sphericity; 5% silt as balls, inelastic, soft.	859.0	
					865					
					870	SP		POORLY GRADED SAND WITH GRAVEL: yellowish brown (10YR5/8); 85% sand, medium to coarse, angular to subangular, low sphericity; 10% poorly graded gravel and rock fragments, fine, 1/2-inch maximum diameter, angular to subangular, low sphericity; 5% silt as balls, inelastic, soft.	869.0	18" x 5/16" 304 SS, 0.070" Ful-Flo (854.91 - 879.87 ft bgs)
						CL		CLAY: light yellowish brown (7.5YR5/6); 90% silty clay as balls, nonplastic, soft to medium stiff; 10% well graded sand, fine to coarse, angular to subangular, low sphericity.	873.0	
					875	SP		POORLY GRADED SAND WITH GRAVEL: yellowish brown (10YR5/8); 85% sand, medium to coarse, angular to subangular, low sphericity; 10% poorly graded gravel and rock fragments, fine, 1/2-inch maximum diameter, angular to subangular, low sphericity; 5% silt as balls, inelastic, soft.	876.0	Colorado Silica 6 x 16 Gravel Pack (530 - 1265 ft bgs)
					880					18" x 5/16" 304 SS Blank (879.87 - 904.87 ft bgs)
					885					
								CLAY: light yellowish brown (7.5YR5/6); 90% silty clay as	886.0	

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						CL		balls, nonplastic, soft to medium stiff; 10% well graded sand, fine to coarse, angular to subangular, low sphericity.		
					890					18" x 5/16" 304 SS Blank (879.87 - 904.87 ft bgs)
						SP		POORLY GRADED SAND WITH GRAVEL: yellowish brown (10YR5/8); 85% sand, medium to coarse, angular to subangular, low sphericity; 10% poorly graded gravel and rock fragments, fine, 1/2-inch maximum diameter, angular to subangular, low sphericity; 5% silt as balls, inelastic, soft.	892.0 893.0	
					895	CL		SANDY CLAY: light yellowish brown (7.5YR5/6); 70% clay as balls, nonplastic, soft to medium stiff; 25% poorly graded sand, medium to coarse, angular to subangular, low sphericity; poorly graded gravel with rock fragments, fine, 1/4-inch maximum diameter, angular to subangular, low sphericity.	897.0	
								CLAY: light yellowish brown (7.5YR5/6); 90% silty clay as balls, nonplastic, soft to medium stiff; 10% well graded sand, fine to coarse, angular to subangular, low sphericity.		
					900					Colorado Silica 6 x 16 Gravel Pack (530 - 1265 ft bgs)
						CL				
					905					
								CLAY: yellowish brown (10YR5/8); 100% clay as balls, nonplastic, soft to medium stiff; trace poorly graded sand, fine to medium, angular to subangular, low sphericity; trace silt in matrix.	906.0	
						CL				
					910					18" x 5/16" 304 SS, 0.070" Ful-Flo (904.87 - 959.79 ft bgs)
								POORLY GRADED SAND WITH GRAVEL: yellowish brown (10YR5/8); 85% sand, medium to coarse, angular to subangular, low sphericity; 10% poorly graded gravel and rock fragments, fine, 1/2-inch maximum diameter, angular to subangular, low sphericity; 5% silt as balls, inelastic, soft.	912.0	
					915	SP				
								POORLY GRADED SAND WITH GRAVEL AND SILT: brownish yellow (10YR6/6); 75% poorly graded sand, medium to coarse, angular to subangular, low sphericity; 15% poorly graded gravel and rock fragments, fine, 3/4-inch maximum diameter, angular to subrounded; 10% silt as balls, soft.	918.0	
					920	SP				

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						SM				
								POORLY GRADED SAND: brown (10YR5/3); 100% sand, medium to coarse, angular to subangular, low sphericity, clean; trace silt.	924.0	
					925	SP			926.0	
								POORLY GRADED SAND WITH GRAVEL AND SILT: yellowish brown (10YR5/4); 75% poorly graded sand, medium to coarse, angular to subangular, low sphericity; 15% poorly graded gravel and rock fragments, fine, 1/2-inch maximum diameter, angular to subrounded; 10% silt as balls.		18" x 5/16" 304 SS, 0.070" Ful-Flo (904.87 - 959.79 ft bgs)
					930	SP SM				
					935					
								SILTY CLAY: dark yellowish brown (10YR4/6); 100% silty clay, moderately to highly plastic, medium stiff to stiff.	936.0	
						CL				
					940			SILTY SAND: brownish yellow (10YR6/6); 80% poorly graded sand, fine to medium, angular to subangular, low sphericity; 20% silt as balls.	940.0	Colorado Silica 6 x 16 Gravel Pack (530 - 1265 ft bgs)
					945	SM				
					950			SILTY SAND: brownish yellow (10YR6/6); 80% poorly graded sand, fine to medium, angular to subangular, low sphericity; 20% silt as balls.	950.0	
						SM			953.0	
					955			SILTY SAND: brownish yellow (10YR6/6); 80% poorly graded sand, fine to medium, angular to subangular, low sphericity; 20% silt as balls.		

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NEWGINT MVWD.GPJ NEWGINT.GDT 4/3/01

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10490-21966-WELL28.DRILL
BORING/WELL NUMBER Well #28
PROJECT NAME Monte Vista Water District
DATE DRILLED 1/25/01-2/23/01

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PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					960	SM				18" x 5/16" 304 SS, 0.070" Ful-Flo (904.87 - 959.79 ft bgs)
						SM		SILTY SAND: brownish yellow (10YR6/6); 80% poorly graded sand, fine to medium, angular to subangular, low sphericity; 20% silt as balls.	963.0	
					965			CLAY WITH SAND: brownish yellow (10YR6/6); 60% clay, moderately plastic, medium stiff to stiff; 20% poorly graded sand, medium, subangular to subrounded; 20% silt.	965.0	Colorado Silica 6 x 16 Gravel Pack (530 - 1265 ft bgs)
						CL				
					970					
									973.0	
						SP		POORLY GRADED SAND: pale brown (10YR6/3); 100% sand, medium, some fine, subangular to subrounded; trace silt in balls.		
					975				976.0	
								SILTY CLAY WITH SAND: yellowish brown (10YR5/6); 60% clay, moderately plastic, medium stiff; 25% silt; 15% poorly graded sand, fine to medium, subangular to subrounded.		18" x 5/16" 304 SS Blank (959.79 - 1004.73 ft bgs)
					980	CL				
					985				986.0	
						CL		SILTY CLAY WITH SAND: yellowish brown (10YR5/6); 60% clay, moderately plastic, medium stiff; 25% silt; 15% poorly graded sand, fine to medium, subangular to subrounded.		
					990					

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10490-21966-WELL28.DRILL **BORING/WELL NUMBER** Well #28

PROJECT NAME Monte Vista Water District **DATE DRILLED** 1/25/01-2/23/01

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PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					995	CL		SILTY CLAY WITH SAND: dark yellowish brown (10YR4/6); 60% clay, moderately plastic, medium stiff; 25% silt; 15% poorly graded sand, fine to medium, subangular to subrounded.	993.0	
						SM		SILTY SAND: light yellowish brown (10YR6/4); 60% poorly graded sand, fine to medium, trace coarse, subangular to subrounded, low sphericity; 40% silt.	996.0	18" x 5/16" 304 SS Blank (959.79 - 1004.73 ft bgs)
					1000	CL		SILTY CLAY WITH SAND: yellowish brown (10YR5/6); 60% clay, moderately to highly plastic, very stiff; 25% silt; 15% poorly graded sand, fine to medium, subangular to subrounded.	999.0	
					1005	SP SM		POORLY GRADED SAND WITH SILT: light yellowish brown (10YR4/6); 85% sand, medium to coarse, some fine, angular to subangular, low sphericity; 10% silt as balls, inelastic, medium stiff to stiff; 5% poorly graded gravel and rock fragments, fine, 1/2-inch maximum diameter; angular to subangular, low sphericity.	1005.0	Colorado Silica 6 x 16 Gravel Pack (530 - 1265 ft bgs)
					1015	CL		CLAY: yellowish brown (10YR5/6); 100% clay, nonplastic, medium stiff.	1015.0	18" x 5/16" 304 SS, 0.070" Ful-Flo (1004.73 - 1039.62 ft bgs)
					1020	SP SM		POORLY GRADED SAND WITH SILT: light yellowish brown (10YR4/6); 85% sand, medium to coarse, some fine, angular to subangular, low sphericity; 10% silt as balls, inelastic, medium stiff to stiff; 5% poorly graded gravel and rock fragments, fine, 1/2-inch maximum diameter; angular to subangular, low sphericity.	1017.0	

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PROJECT NUMBER 10490-21966-WELL28.DRILL
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PROJECT NAME Monte Vista Water District
DATE DRILLED 1/25/01-2/23/01

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PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					1025					
								POORLY GRADED SAND: light yellowish brown (10YR4/6); 90% sand, medium to coarse, some fine, angular to subangular, low sphericity; 5% silt as balls, inelastic, medium stiff to stiff; 5% poorly graded gravel and rock fragments, fine, 1/2-inch maximum diameter; angular to subangular, low sphericity.	1027.0	
					1030	SP				18" x 5/16" 304 SS, 0.070" Ful-Flo (1004.73 - 1039.62 ft bgs)
					1035					
								POORLY GRADED SAND WITH SILT: light yellowish brown (10YR4/6); 85% sand, medium to coarse, some fine, angular to subangular, low sphericity; 10% silt as balls, inelastic, medium stiff to stiff; 5% poorly graded gravel and rock fragments, fine, 1/2-inch maximum diameter; angular to subangular, low sphericity.	1037.0	
					1040					Colorado Silica 6 x 16 Gravel Pack (530 - 1265 ft bgs)
						SP SM				
					1045					
					1050			CLAY: yellowish brown (10YR5/4); 100% clay, nonplastic, medium stiff.	1050.0	18" x 5/16" 304 SS Blank (1039.62 - 1119.74 ft bgs)
						CL				
					1055			SILTY SAND: light yellowish brown (10YR4/6); 80% poorly graded sand, medium to coarse, some fine, angular to subangular, low sphericity; 15% silt as balls, inelastic, medium stiff; 5% poorly graded gravel and rock fragments, fine, 1/2-inch maximum diameter; angular to subangular, low sphericity.	1055.0	

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10490-21966-WELL28.DRILL
BORING/WELL NUMBER Well #28
PROJECT NAME Monte Vista Water District
DATE DRILLED 1/25/01-2/23/01

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PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					1060	SM				
								CLAY AND SILT: 50% clay as balls, dark yellowish brown (10YR4/6), nonplastic, soft; 50% silt as balls, yellowish brown (10YR5/6), inelastic, medium stiff.	1064.0	18" x 5/16" 304 SS Blank (1039.62 - 1119.74 ft bgs)
					1065					
						CL				
					1070					
								CLAY: yellowish brown (10YR5/6); 100% clay, nonplastic, medium stiff; trace well graded sand, fine to coarse, angular to subangular, low sphericity.	1074.0	Colorado Silica 6 x 16 Gravel Pack (530 - 1265 ft bgs)
					1075					
						CL				
					1080					
								CLAY: yellowish brown (10YR5/4); 100% clay, plastic, medium stiff.	1080.0	
						CH				
					1085					
								CLAY: yellowish brown (10YR5/6); 100% clay, nonplastic, medium stiff; trace well graded sand, fine to coarse, angular to subangular, low sphericity.	1086.0	
						CL				
					1090					
								SILTY SAND: light yellowish brown (10YR4/6); 80%	1092.0	

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10490-21966-WELL28.DRILL **BORING/WELL NUMBER** Well #28

PROJECT NAME Monte Vista Water District **DATE DRILLED** 1/25/01-2/23/01

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PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					1095	SM		poorly graded sand, medium to coarse, some fine, angular to subangular, low sphericity; 15% silt as balls, inelastic, medium stiff; 5% poorly graded gravel and rock fragments, fine, 1/2-inch maximum diameter; angular to subangular, low sphericity.	1096.0	
					1100	CL		CLAY: yellowish brown (10YR5/6); 100% clay, nonplastic, medium stiff; trace well graded sand, fine to coarse, angular to subangular, low sphericity.		18" x 5/16" 304 SS Blank (1039.62 - 1119.74 ft bgs)
					1105	SP SM		POORLY GRADED SAND WITH SILT: light yellowish brown (10YR4/6); 85% sand, medium to coarse, some fine, angular to subangular, low sphericity; 10% silt as balls, inelastic, medium stiff to stiff; 5% poorly graded gravel and rock fragments, fine, 1/2-inch maximum diameter; angular to subangular, low sphericity.	1104.0 1106.0	
						SP		POORLY GRADED SAND: light yellowish brown (10YR4/6); 90% sand, medium to coarse, some fine, angular to subangular, low sphericity; 5% silt as balls, inelastic, medium stiff to stiff; 5% poorly graded gravel and rock fragments, fine, 1/2-inch maximum diameter; angular to subangular, low sphericity.	1109.0	
					1110			CLAY WITH SAND: brownish yellow (10YR6/6); 85% clay, nonplastic, medium stiff; 15% poorly graded sand, medium to coarse; trace rock fragments, 1/2-inch maximum diameter, angular to subangular low sphericity.		Colorado Silica 6 x 16 Gravel Pack (530 - 1265 ft bgs)
					1115	CL				
					1120	SM		SILTY SAND: light yellowish brown (10YR4/6); 80% poorly graded sand, medium to coarse, some fine, angular to subangular, low sphericity; 15% silt as balls, inelastic, medium stiff; 5% poorly graded gravel and rock fragments, fine, 1/2-inch maximum diameter; angular to subangular, low sphericity.	1119.0	18" x 5/16" 304 SS, 0.070" Ful-Flo (1119.74 - 1169.74 ft bgs)
						SM		SILTY SAND: light yellowish brown (10YR4/6); 70% poorly graded sand, medium to coarse, some fine, angular to subangular, low sphericity; 25% silt as balls, inelastic, medium stiff; 5% poorly graded gravel and rock fragments, fine, 1/4-inch maximum diameter; angular to subangular, low sphericity.	1123.0 1125.0	
					1125	CL		CLAY: yellowish brown (10YR5/6); 100% clay, nonplastic,	1126.0	

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10490-21966-WELL28.DRILL **BORING/WELL NUMBER** Well #28

PROJECT NAME Monte Vista Water District **DATE DRILLED** 1/25/01-2/23/01

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PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
						SM		medium stiff to stiff; trace well graded sand, fine to coarse, angular to subangular, low sphericity.	1128.0	
					1130	SP		SILTY SAND: light yellowish brown (10YR4/6); 80% poorly graded sand, medium to coarse, some fine, angular to subangular, low sphericity; 15% silt as balls, inelastic, soft to medium stiff; 5% poorly graded gravel and rock fragments, fine, 1/2-inch maximum diameter; angular to subangular, low sphericity. POORLY GRADED SAND: light yellowish brown (10YR4/6); 90% sand, medium to coarse, some fine, angular to subangular, low sphericity; 5% silt as balls, inelastic, medium stiff to stiff; 5% poorly graded gravel and rock fragments, fine, 1/2-inch maximum diameter; angular to subangular, low sphericity.		
					1135	ML		SILT WITH SAND: dark yellowish brown (10YR4/6); 75% silt; 15% well graded sand, fine to coarse, subrounded to rounded; 10% poorly graded gravel, fine, 3/4-inch maximum diameter.	1135.0	18" x 5/16" 304 SS, 0.070" Ful-Flo (1119.74 - 1169.74 ft bgs)
						SP		POORLY GRADED SAND WITH GRAVEL: dark grayish brown (10YR4/2); 75% sand, fine to medium, subrounded to rounded; 20% well graded gravel and rock fragments, fine to coarse, 1-inch maximum diameter, subrounded to rounded; 5% silt.	1137.0	
					1140					
						CL		SILTY CLAY: yellowish brown (10YR5/8); 100% silty clay; trace fine sand.	1141.0	
					1145					Colorado Silica 6 x 16 Gravel Pack (530 - 1265 ft bgs)
						SP		POORLY GRADED SAND WITH GRAVEL: dark grayish brown (10YR4/2); 75% sand, fine to medium, subangular to subrounded; 20% well graded gravel and rock fragments, fine to coarse, 1-inch maximum diameter, subangular to subrounded; 5% silt.	1146.0	
					1150				1150.0	
						CL		SILTY CLAY: brownish yellow (10YR6/6); 95% silty clay, moderately plastic, medium stiff; 5% medium sand, subangular to subrounded.		
					1155				1155.0	
						CL		SILTY CLAY WITH GRAVEL: yellowish brown (10YR5/6); 50% clay, moderately plastic, medium stiff; 20% silt; 20% poorly graded gravel and rock fragments, coarse, 1-inch maximum diameter, angular to subrounded.		
					1160				1160.0	
								POORLY GRADED SAND: yellowish brown (10YR5/4); 90% sand, medium to coarse, angular to subangular, low		

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10490-21966-WELL28.DRILL **BORING/WELL NUMBER** Well #28

PROJECT NAME Monte Vista Water District **DATE DRILLED** 1/25/01-2/23/01

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PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
								sphericity; 5% poorly graded gravel and rock fragments; fine, 3/4-inch maximum diameter, angular to subangular, low sphericity; 5% silt as balls, inelastic, medium stiff.		
					1165	SP				18" x 5/16" 304 SS, 0.070" Ful-Flo (1119.74 - 1169.74 ft bgs)
					1170			POORLY GRADED SAND: yellowish brown (10YR5/4); 90% sand, medium to coarse, angular to subangular, low sphericity; 5% poorly graded gravel and rock fragments; fine, 3/4-inch maximum diameter, angular to subangular, low sphericity; 5% silt as balls, inelastic, medium stiff.	1170.0	
					1175	SP				Colorado Silica 6 x 16 Gravel Pack (530 - 1265 ft bgs)
					1180	CL		CLAY: brownish yellow (10YR6/6); 100% clay, nonplastic, soft.	1179.0	
					1185			SILTY SAND: yellowish brown (10YR5/4); 60% poorly graded sand, medium to coarse, angular to subangular, low sphericity; 35% silt as balls, inelastic, soft; 5% poorly graded gravel and rock fragments, fine, 3/4-inch maximum diameter; angular to subangular, low sphericity.	1185.0	18" x 5/16" 304 SS Blank (1169.74 - 1194.68 ft bgs)
					1190	SM				
					1195			POORLY GRADED SAND WITH SILT: yellowish brown	1195.0	

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PROJECT NAME Monte Vista Water District **DATE DRILLED** 1/25/01-2/23/01

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PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					1200	SP SM		(10YR5/4); 85% poorly graded sand, medium to coarse, angular to subangular, low sphericity; 10% silt as balls, inelastic, soft; 5% poorly graded gravel and rock fragments, fine, 3/4-inch maximum diameter; angular to subangular, low sphericity.		
					1205	SP		POORLY GRADED SAND: yellowish brown (10YR5/4); 90% sand, medium to coarse, angular to subangular, low sphericity; 5% poorly graded gravel and rock fragments; fine, 3/4-inch maximum diameter, angular to subangular, low sphericity; 5% silt as balls, inelastic, medium stiff.	1205.0	18" x 5/16" 304 SS, 0.070" Ful-Flo (1194.68 - 1224.67 ft bgs)
					1210					
					1215	SM		SILTY SAND: yellowish brown (10YR5/4); 60% poorly graded sand, medium to coarse, angular to subangular, low sphericity; 35% silt as balls, inelastic, soft to medium stiff; 5% poorly graded gravel and rock fragments, fine, 1/2-inch maximum diameter; angular to subangular, low sphericity.	1212.0	Colorado Silica 6 x 16 Gravel Pack (530 - 1265 ft bgs)
					1220	SP		POORLY GRADED SAND: yellowish brown (10YR5/4); 90% sand, medium to coarse, angular to subangular, low sphericity; 5% poorly graded gravel and rock fragments; fine, 3/4-inch maximum diameter, angular to subangular, low sphericity; 5% silt as balls, inelastic, medium stiff.	1216.0	
					1225					
					1230	SP		POORLY GRADED SAND: yellowish brown (10YR5/4); 90% sand, medium to coarse, angular to subangular, low sphericity; 5% poorly graded gravel and rock fragments; fine, 3/4-inch maximum diameter, angular to subangular, low sphericity; 5% silt as balls, inelastic, medium stiff.	1226.0	18" x 5/16" 304 SS Blank W/ Shoe (1224.67 - 1244.79 ft bgs)

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PROJECT NAME Monte Vista Water District **DATE DRILLED** 1/25/01-2/23/01

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PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					1235	CL		CLAY: light reddish brown (5YR6/4); 100% clay, nonplastic, stiff to very stiff; trace well graded sand, fine to coarse, angular to subangular, low sphericity.	1232.0	18" x 5/16" 304 SS Blank W/ Shoe (1224.67 - 1244.79 ft bgs)
					1240					
					1245	CL		CLAY: brownish yellow (10YR6/6); 100% clay, nonplastic, soft to medium stiff; trace poorly graded sand, medium to coarse, angular to subangular, low sphericity.	1242.0	
					1250					Colorado Silica 6 x 16 Gravel Pack (530 - 1265 ft bgs)
					1255	CL		CLAY: brownish yellow (10YR6/6); 100% clay, nonplastic, soft to medium stiff; trace poorly graded sand, medium to coarse, angular to subangular, low sphericity.	1252.0	
					1260	SP SM		POORLY GRADED SAND WITH SILT: yellowish brown (10YR5/4); 85% sand, medium to coarse, angular to subangular, low sphericity; 10% silt as balls, inelastic, medium stiff; 5% poorly graded gravel and rock fragments; fine, 3/4-inch maximum diameter, angular to subangular, low sphericity.	1256.0	

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PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					1265				1266.0	
						SP SM		POORLY GRADED SAND WITH SILT: yellowish brown (10YR5/4); 80% sand, medium to coarse, angular to subangular, low sphericity; 15% silt as balls, inelastic, medium stiff; 5% poorly graded gravel and rock fragments; fine, 3/4-inch maximum diameter, angular to subangular, low sphericity.		Sluff (1265 - 1317 ft bgs)
					1270					
									1274.0	
					1275	ML		CLAYEY SILT: yellowish red (5YR4/6); 90% clayey silt, inelastic to moderately elastic, soft; 10% poorly graded sand, fine, trace medium, subangular to subrounded.	
					1280				1280.0	
						SM		SILTY SAND WITH GRAVEL: light yellowish brown (10YR6/4); 40% poorly graded sand, medium to coarse, subangular to subrounded; 30% silt; 20% well graded gravel and rock fragments, fine to coarse, 1-inch maximum diameter, subangular to subrounded; 10% clay, nonplastic, soft.		
					1285					
					1290				1291.0	
						CL		SILTY CLAY: yellowish brown (10YR5/8); 50% clay, moderately plastic, medium stiff; 45% silt; 5% poorly graded sand, coarse, angular to subangular.	
					1295					

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PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					1300				1301.0	
						CL		SILTY CLAY: dark yellowish brown (10YR4/6); 50% clay, moderately plastic, medium stiff; 45% silt; 5% poorly graded sand, coarse, angular to subangular.		
					1305					Sluff (1265 - 1317 ft bgs)
					1310				1310.0	
						ML		SANDY SILT: brownish yellow (10YR6/6); 50% silt; 45% poorly graded sand, medium, trace coarse, subangular to subrounded; 5% clay.		
					1315					
									1317.0	
								Total Depth of Borehole is 1,317 feet bgs.		

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