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MEMORANDUM

DATE: November 6, 2024
TO: Skyler Kershner
FROM: Michael Hartvigsen
PROJECT: Lake Rockport Well #3
PROJECT NO: 2102-041
RE: Project Background Narrative

Lake Rockport Estates Property Owners Association (POA) owns and operates a culinary water system in Summit County, Utah. The system was designed to and has been operating part-time, generally between the months of June and December. The POA currently serves an estimated 92 full-time residential connections during these months and 38 part-time homes. There are an additional 49 water meters on lots that do not have structures. The water system source is comprised of three wells. Well #1 has been abandoned due to operational failures, Well #2 currently provides the water source for the system, and Well #3 was recently drilled, but has not been equipped. Well #2 currently pumps to the mid-mountain booster station with an 8,000-gallon receiving tank where it can be disinfected (as needed) through a liquid chlorine injection system then pumped to a 300,000-gallon storage reservoir. The distribution piping consists of approximately 8 miles of 8-inch and 6-inch piping.

In 2010, the POA completed a draft master plan that identified the need for an additional 23 gpm beyond their existing source supply of 20 gpm (Well #1), to serve the demands at that time and an additional 170 gpm needed to meet the build-out demands. In 2011, a new source well was constructed (Well #2) with a yield of 90 gpm to meet the current and short-term needs and Well #1 was abandoned due to operational issues. Since 2010, the POA has grown from 77 connections to 179 connections. Based on information from the 2010 master plan and current household demands, JDE believes that the POA needs about 300 gpm to support the system at buildout.

In 2021, in response to pressure from landowners that were unable to build houses due to the limited water available, the POA began working with Jones and DeMille Engineering (JDE) and Loughlin Water Associates to procure funding for a new well (Well #3) with a target yield of 100 gpm. Loughlin conducted an extensive well siting investigation and determined the best place to drill a new well was just east of the intersection of Hollow Dr. and Rockport Blvd.

In 2023, the new well was drilled by Lang Equipment. Well #3 was designed to extend down to 1500 feet. However, as Lang reached approximately 1492 feet, the material changed from the sandstone Kelvin formation material to a clay, signifying the bottom of the formation. The casing was installed and Lang began pump testing the well. The initial pumping results indicated that the well yield was significantly lower than anticipated and so, under direction from Loughlin, Lang proceeded to attempt several well development processes to increase the yield. These included surging, evacuating, a

mud purge treatment, and several days' worth of additional pumping. The final pump test resulted in a total flow rate of 21 gpm and a safe yield rate of only 14 gpm. With Well #2 producing between 90 gpm normally and as little as 20 gpm during drought years, a safe yield of only 14 gpm at Well #3 would leave the POA with a deficit of 206 to 266 gpm. Having attempted every reasonable method to develop the well, Lang sealed the casing and the POA, JDE, & Loughlin (Team) began considering alternative methods for supplying the remaining water for the system demands. The following sections outline the alternatives explored and provide a brief explanation of the feasibility of each alternative.

Further Well Development:
The Team reevaluated each of the three wells and considered additional options, such as drilling deeper, reconstructing Well #1 & Well #2, and pumping from all three wells. Drilling deeper than 1,500 feet was not considered an advisable option due to the presence of clay found below the Kelvin formation in Well #3. Clay is generally avoided because of its low permeability, susceptibility to clogging, difficulty in installation (increasing cost and likelihood of structural problems), and for the potential to introduce fine particles and contaminates into the well water.

Well #1 and Well #2 are located along a fracture in the formation which may have contributed to the higher yields. Reconstructing one of these two wells is a viable alternative, but may be similar to the cost of drilling a new well and would likely produce only a slightly higher yield than what Well #2 is currently producing, which would not be enough to supply the amount needed for full buildout. Prior to reconstructing either of these two wells, we recommend conducting some sub-surface scanning to map the fracture and increase the potential for a higher yield.

Additional Well Construction:
The Team explored several options for acquiring additional wells to make up the remaining source capacity deficiency. The idea of acquiring wells within the Kelvin formation would likely be very costly for the yields that have been recorded. There is also a high probability that most of the currently constructed wells (private residential) were not constructed to DDW standards for public water systems and would be costly to bring them into compliance. There would also be the added expense of property easement procurement for each individual well and the piping required to route the water to the mid mountain booster station to be chlorinated and then pumped to the storage reservoir.

Well Capacity Acquisition:
Outside of the Kelvin formation there are some wells that have the potential to produce sufficient flows for the system, however, these wells are located significant distances from the existing infrastructure and a pipeline to connect to them would be costly. One potential option is a well located at the north end of the Promontory community located to the west of LRE that has potential for producing enough water to support the system. The well was drilled near the gate house on the north entry into Promontory to supply the gate house with water. The drawdown of the well during the pump testing was very low for the rate at which it was tested. This usually means that the well is capable of being pumped at a much higher rate.

The POA has also identified a well that was drilled for the Wanship Cottages community located to the north of the POA that may have additional capacity. The costs of constructing a pipeline and acquiring easements for pipelines to these wells will make this alternative difficult and costly. Further engineering will need to be conducted in order to verify the feasibility of the project.

Reservoir Diversion/Treatment Plant:
Knowing that the water rights held by the POA were originally tied to the Lake Rockport reservoir, which is operated by Weber Basin Water Conservancy District (WBWCD), the Team reached out to WBWCD to investigate the feasibility of pulling water from the reservoir, treating it, and pumping it to the system. When approached, however, WBWCD indicated that they have had a campaign going for the last decade to remove instream diversions and to transfer water rights to underground sources. They indicated that they would not allow the POA to pull water from the reservoir.

Spring Development:
The Team has investigated the potential for developing surface water in the area. There is a spring on the North side of the ridgeline, west of the existing system. The spring is an undeveloped spring, therefore no further information is available for the spring at this point. A speculative review of areal imagery from that area shows that there is some surface water and dense vegetation but lacks evidence of the higher volumes of water that would merit further investigation.

Mountain Regional Water Connection:
Just to the west of the POA is a similar community called Promontory. They receive culinary water from Mountain Regional Water Special Service District (MRW) which was set up in part to provide water to the several small communities, like the POA, that exist in that area. The Team met with MRW and discussed the options for obtaining water and the feasibility of a connection. MRW indicated that they would be willing to pursue a feasibility study to verify that a connection could be made and what steps would need to be taken in order to annex the POA into their system. They indicated that annexation would require the POA's system to meet their standards. Upgrading the POA system would be costly and take time, however, MRW may supply wholesale water to the community until it can be upgraded and annexed into their system. When asked about just providing wholesale water, MRW indicated that it might be possible, but would rather annex the system in. The Team is currently moving forward with the feasibility study for this option.

Current Progression
Having reviewed and discussed these alternatives, the POA has determined to pursue the feasibility study for a connect to MRW. Although this option is a very stable alternative, MRW has already indicated that they anticipate that the system improvements required to bring the system up to their standards will be very expensive. As such, the POA will also investigate subsurface scanning for a new well and the option to connect to the well owned by Wanship Cottages.