TO: Deborah Martinez
FROM: Darrel Dunn, Ph.D., PG, Hydrogeologist
DATE: March 5, 2020
SUBJECT: Water Resource Permanency, Martinez Property.

This report addresses the permanency of water resources on 160 acres comprising the N/2-NW/4 Section 28, NE/4-NE/4 Section 29, and SW/4-SW/4 Section 21, T15S, R12E, Otero County, New Mexico. The report is based on information in the list of references presented below. The water resources on the property have been developed via water wells and natural springs. I found records on four wells located on the property[1]. They were declared to have original capacities of 80, 20, 200, and 100 gallons per minute. T-2042-S[1] states that 281 acre-feet per year was beneficially used from from all wells combined. T-2042[1] states that water from wells commingled with water from springs and was piped to tanks used for commercial water sales, fish, and irrigation. Regarding the permanency of water resources from wells on the property, it is my opinion that wells could be managed to provide a substantial amount of water indefinitely.

I found no information on the rate of discharge from the springs. However, the springs discharge may be substantial due to their geologic location. The springs are located in the NE/4-NW/4 Section28 in a straight segment of Devils Canyon[2], which suggests that they are on a major NW-SE trending bedrock fracture. Furthermore, the springs are aligned with a possible bedrock fault[3] that trends NE-SW. The intersection of two such features at the location of the springs would tend to focus discharge of groundwater to the surface resulting in abnormally strong springs. Another beneficial geologic condition is that the springs are issuing from the Yeso Formation[4]. The Yeso Formation contains limestone and dolomite beds which are known to have developed goundwater conduits due to solution enlarging fractures. These fractures easily transmit water[5].

Regarding the permanency of water supplies from the springs, they will likely continue to flow long into the future at about the rate they have in the past. The groundwater that flows to the spring originates as snowmelt and rainfall percolating to the water table at higher elevations. The springs will continue to flow as long as this groundwater recharge rate continues, unless they are disturbed by some unlikely event. Unlikely disturbances of springs include nearby construction activity and earthquakes. The property owner controls construction, and the property is in an area of only moderate earthquake hazard that extends along the Rocky Mountains. Spring flow can be reduced by extracting groundwater from nearby water wells. However, water well effects can be controlled by the property owner, because the property is surrounded by national forest where wells will not be constructed.

The spring flow may be expected to fluctuate seasonally due to fluctuations in snowmelt, rainfall, and soil moisture extraction by trees in the recharge area. Spring flow may also have longer-term cycles due to climate variation. Drought is likely to decrease flow of springs, and periods of exceptionally high precipitation rates are likely to increase the spring flow. Such fluctuations may be expected for nearly any groundwater spring. Forest management can impact the flow of springs. There has been research on improving groundwater recharge by thinning trees at the higher elevations in the Sacramento Mountains[6]. If this thinning were actually done in the recharge area serving the springs, it would tend to increase their flow.

To summarize, available documents indicate that the property has a substantial groundwater resource that will be available for an unlimited time into the future.

REFERENCES

[1]New Mexico State Engineer Office (1991): Declaration of Owner of Underground Water Right T-2042, T-2042-S, T-2042-S-2, T-2042-S-3.

[2]United States Geological Survey (2020): High Rolls Quadrangle 7.5 Minute Topographic Map.

[3]Pray, Lloyd C. (1961): Geology of the Sacramento Mountains Escarpment; New Mexico Bureau of Mines and Mineral Resources, Bulletin 35.

[4]Rawling, Geoffrey (2012): Generalized Geologic Map of the Southern Sacramento Mountains, Otero and Chavez Counties, New Mexico; New Mexico Bureau of Geology and Mineral Resources, Open-file Report 537.

[5]Newton, B. T., G. C. Rawling, and others (2012): Sacramento Mountains Hydrogeology Study; New Mexico Bureau of Geology and Mineral Resources, Open-file Report 543.

[6]Newton, B T., and others (2015): Sacramento Mountains Watershed Study - The Effects of Tree Thinning on the Hydrologic System; New Mexico Bureau of Geology and Mineral Resources, Open-file Report 576.