

## ***RECOMMENDATIONS***

The water level data, water quality data, sampling frequency, use of data by the USGS, ABCWUA, and other Bernalillo County departments has been reviewed to evaluate usefulness and practicality of the existing monitoring programs. The following recommendations are made with the intent of revising and expanding the existing programs to be protective of the groundwater quality and quantity, to provide data needed to evaluate the effectiveness of related programs, and to provide aquifer characteristic and baseline data for use in conceptual and computer modeling.

### ***1.15 General Recommendations and Guidelines***

1. Critical long-term monitoring well locations should utilize County-owned wells and property to minimize potential future loss of monitoring points. Monitoring well easements for future locations also should be solicited during master planning activities and during the subdivision process. Where feasible, existing long term monitoring locations should be shifted from domestic and privately owned wells to monitoring wells installed on publicly owned properties. Where shifting the locations is not feasible, access agreements should be implemented to assure continued access.

2. While use of domestic wells does provide monitoring points at little or no cost for property acquisition and well installation, there is the inherent issue of long-term accessibility, reliability of water level data, and liability for damage to the well. The loss of the 98<sup>th</sup> Street piezometer was due to change in land ownership and the lack of written access agreements. Some domestic well owners are considering withdrawing their wells from the USGS monitoring program.

3. The installation of wells and collection of water quality data should be targeted to address a specific concern or answer a defined question or issue and for a defined time period. Once the initial purpose of the well or monitoring has been satisfied, the monitoring program should be reviewed and modified as needed to meet the objective or address new objectives. For example, monitoring wells installed to investigate septic contamination may not need to be sampled annually for volatiles, but should be sampled at least annually for nitrate, chlorides, iron, manganese, and should be

sampled every few years for “emerging contaminants” that are present in wastewater. In other instances, such as 9 Mile Hill, the landfill represents a potential long-term risk and on-going periodic monitoring for an extensive list of groundwater contaminants is justified. In other wells, such as the Rio Bravo Park piezometers, baseline water quality has been established, additional water quality data is of limited use to others, and water level monitoring is the primary interest.

4. Annual water quality sampling of existing monitoring of wells has typically been conducted in the summer months. Future sampling should attempt to sample in varying seasons of the year to ensure that any seasonal variability is captured within the baseline dataset. However, quarterly or continuous water level monitoring is also needed to ensure that seasonal variations in water levels are captured.

5. Where possible, inter-departmental and interagency cooperation should be emphasized to prevent the duplication of sample collection. For instance, water sample analyses routinely submitted to Bernalillo County Environmental Health as part of the well permitting process are a source of inorganic data that may be useful for “filling the gap” between established monitoring points, or may be useful for identifying where long term monitoring points should be established.

6. Changes in groundwater-related ordinances (e.g., individual well ordinance and wastewater ordinance, master planning criteria) and the introduction of San Juan–Chama water represent a potential change in conditions that can be monitored to determine effectiveness of existing ordinances. As part of ordinance review, additional monitoring needs and opportunities need to be identified by the initiating and reviewing departments.

7. The Bernalillo County Water Resources program webpage can be better utilized and routinely updated to keep area residents apprised of water levels in “index” monitoring wells once those wells are established, spring flows, and general geologic/hydrogeologic information

8. As part of the webpage accessibility to the general public, the Water Resources staff should solicit voluntary submittal of routinely measured water levels and precipitation data from local residents with the information to be posted to the website. Where feasible, staff should solicit access

agreements to these wells for future use. Potentially, access to the county's water quality database on private domestic wells could also be incorporated, though privacy issues for non-voluntary submissions would need to be addressed.

### **1.16 East Mountain Area**

1. To support planning and zoning considerations, the EMA groundwater supply should be addressed on a subarea basis due to the geographic and geologic factors that control the availability and distribution of the groundwater resource. The following recommendations presume acceptance of a subarea approach.

2. Existing monitoring wells should be continuously monitored for water levels, particularly for correlating data to precipitation events. Hand measurements should be conducted at least quarterly to verify the measurements and maintain the continuous recorders. Such data is fundamental for determining recharge potential for the East Mountain area and impacts from existing groundwater pumping.

3. Water flow monitoring and routine sampling activities at springs along the east side of the Sandia Mountains are being conducted by the USGS and should be continued. The flow monitoring is necessary to quantify the amount and variability of discharge from the springs. Water quality sampling assists in determining recharge areas and rates, particularly when coupled with precipitation data. This information is fundamental in establishing a water balance model for the portions of the EMA north of I-40 and west of the Gutierrez Fault.

4. In cooperation with the USGS and the U.S. Forest Service, and as feasible, establish permanent flow gauging stations at the various springs to provide data for correlation of precipitation and snowfall to spring flow.

5. Precipitation and snowfall stations at Sandia Crest and at Sandia Park should be maintained in conjunction with the USGS. Existing stations may need to be augmented to include snow gauging devices, soil moisture profiling, and telemetry capabilities. Additional precipitation stations need to

be established in the eastern portions of the County to provide baseline data for recharge studies in areas east of the Gutierrez Fault, south of I-40, and at margins of the Estancia Basin. The additional data is needed to define spatial and elevation-dependent variation in storm and snowfall events. It is preferable to house these additional stations at appropriately located County-owned properties or Open Space properties. Housing these locations at Fire Stations and substations might facilitate use of real time information by the Bernalillo County Fire Department, particularly during fire season.

6. The number of dedicated monitoring wells in the East Mountains should be expanded, particularly south of I-40. The USGS staff has indicated that at least eight subareas exist within the northern portion of the East Mountains. At a minimum, one or two dedicated monitoring wells should be constructed within each area to define and monitor flow regimes and gradients and to correlate water level changes to response to significant precipitation events. Additional monitoring wells and/or nested piezometers are needed to monitor flow conditions into the Estancia Basin and along known fault and fracture zones.

7. Bernalillo County Water Resources staff need to identify existing wells on County-owned property and incorporate such wells into the East Mountain water level monitoring network.

8. Additional geohydrologic studies are needed throughout the East Mountains to address various elements of a water budget analysis. In addition to the precipitation and springflow studies previously mentioned, additional studies are needed to evaluate the range in conditions affecting evapotranspiration throughout the East Mountain. Such studies are needed to support use of remote sensing to model these losses from the system. Lineament and fracture density analysis coupled to well productivity studies are needed to delineate whether overlay zoning or additional restrictions on development or well densities may be warranted based on water resource availability.

9. Large-scale subdivisions (e.g. Richland Heights, Paa-Ko, and Las Leyendes) exist or are planned for the East Mountain area, with waste disposal using individual waste water systems or alternative treatment systems. Monitoring wells should be installed in the central and hydraulically downgradient portions of such subdivisions to monitor for wastewater disposal impacts and to quantify recharge from septic systems. Isotopic analysis should be conducted on a periodic basis to

help determine the water source and rates of recharge from the septic systems. Site-specific studies may be needed to quantify recharge occurring from the septic systems.

10. Water quality monitoring in existing wells, particularly in Sandia Park Wells 1 and 2, should continue on an annual basis for key inorganic constituents including major anions and cations, and for nitrates. In addition to tracking septic tank impacts, changes in these parameters can be correlated to significant precipitation events. Annual monitoring for a limited list of organic compounds (e.g., key gasoline components) in Sandia Park Well 1 is warranted due to nearby presence of gasoline stations and contractors yards. Sampling for trace metals and organic compounds (volatiles and semi-volatiles) can be reduced to a three-year to five-year cycle in the Sandia Park wells, and eliminated for the Pinon Ridge and Sierra Vista wells as there are no known or suspected sources for these compounds.

### **1.17 Far Northeast Heights**

The issues to be addressed for the Far Northeast Heights are related to continued growth and use of domestic wells and septic tanks in the area. Accordingly, recommendations are as follows:

1. The two existing monitoring wells should be equipped with continuous water level monitoring devices to track on-going declines in water levels, and hand measurements should be taken at least quarterly. Additionally, continuous water level monitors should be installed in existing wells at County-owned facilities located throughout the Far Northeast Heights. In particular, both the domestic and irrigation wells at Alta Monte Little League Field should be so equipped because the wells are used only on a seasonal basis and differing well depths provide a vertical profile of water level conditions.

2. Existing monitoring wells are located east of North Albuquerque Acres. Two to four additional monitoring wells should be installed along an east-west transect and across the various geologic faults to monitor water levels and septic tank impacts. At least one of the locations should likely be a nested piezometer location similar to the Nor Este piezometer.

3. The County should initiate discussions with non-ABCWUA community supply well owners (e.g., Sandia Peak Utilities) to allow water level monitoring in the privately-owned production wells. Access to the wells along with production records should be part of the agreement, with the option of incorporating the information into ABCWUA monitoring and modeling efforts.
4. Bernalillo County should initiate discussion with the USGS regarding incorporation of the Far Northeast Heights into the USGS groundwater flow models to facilitate consideration of domestic well pumping and determine projected groundwater decline in the area.
5. Annual sampling for inorganic constituents should be continued in the existing monitoring wells. If a rise in nitrate concentrations is seen, additional sampling for anthropogenic contaminants should be conducted and compared against concentrations detected during the initial sampling events. Sampling for organic and semivolatile organic compounds at the existing locations can be reduced to a three- to five-year basis. Annual sampling for petroleum hydrocarbons is prudent given the upgradient location of existing service stations.
6. At least one monitoring well should be installed prior to 2010 in the middle portions of the Sandia Heights neighborhood. The purpose of the well would be to monitor for septic-related contaminants and related changes as septic system updates are initiated in 2015. Water level monitoring should also be conducted to assess water level decline and recharge in the foothills areas.

### **1.18 North Valley**

1. Due to existing monitoring programs by the ABCWUA and USGS, expansion of the regional monitoring program into the North Valley is not recommended. The focus of the regional monitoring program should be on those areas not otherwise monitored and on areas where service by the ABCWUA is problematic.
2. Targeted short-term studies focused on particular groundwater quality concerns in the North Valley may be warranted. For instance, the impact on groundwater quality from arroyo recharge or

a reconnaissance level investigation of shallow groundwater quality may be informative for area residents.

3. The sole recommendation for the North Valley is to identify existing County-owned wells and well-supplied properties and institute quarterly water level monitoring and annual sampling of such wells.

### **1.19 South Valley**

1. The Rio Grande intersects the South Valley area and depth to water is typically a few tens of feet throughout the area. Consequently, concerns with declining water levels in individual shallow wells are minimal, particularly for those that receive irrigation water via the MRGCD and those currently connected to ABCWUA supplies. There is an on-going effort to expand water services into the South Valley, yet most of the ABCWUA production comes from wells located in the northern portion of that area or further west. With respect to water quality, known contaminant sites are monitored under the auspices of the NMED. Given that set of concerns and limitations, recommendations for South Valley groundwater monitoring are focused on groundwater quality issues.

2. Continue existing groundwater level monitoring in the Rio Bravo Park and Isleta locations, and consult with USGS on the desirability of a deep piezometer installation on the Durand Open Space property located along Isleta Boulevard and in proximity to the Rio Grande.

3. Continue annual sampling of the Rio Bravo Park piezometers for inorganics and trace metals until 2010 in order to establish a statistical baseline. The sampling should include annual sampling for petroleum hydrocarbons based on the high density of UST sites along Isleta Boulevard. Volatile and semi-volatile organic compounds should be sampled again in 2007. After 2010, perform the sampling on a three-year cycle: inorganics and indicator parameters in Year 1, trace metals analysis in Year 2, and volatile and semivolatile organics in Year 3. Petroleum hydrocarbons should be analyzed on an annual basis. The reduced sampling is justified given the lack of detected

contaminants to date. However, the Rio Bravo Park piezometers are in an urbanized area and on-going periodic monitoring for organic contaminants is appropriate.

4. Continue annual sampling of the Isleta piezometers for inorganic constituents and trace metals until 2010 in order to establish a statistical basis for future analysis if needed. The wells should be sampled for volatile and semi-volatile organic compounds in 2010 as a final check on water quality. Discontinue all sampling after 2010 unless significant trends in water quality are detected. The Isleta piezometers have been monitored since 2001 and there has been no evidence of contamination or significant trends in inorganic constituent concentrations. Continued sampling for organic compounds is not justified given the lack of nearby contaminant sources. Quarterly hand measurements of water levels are also recommended to maintain the water level baseline, but this is currently done by the USGS. If USGS discontinues water monitoring, it would be appropriate for the County to resume that function.

5. Identify areas in the South Valley that will continue to be dependent on self-supplied groundwater past 2010 and identify existing community-supply wells. Based on the presence and proximity of potential, upgradient sources of contamination, install groundwater monitoring wells between the well and the source area. The primary purpose of such wells is for early detection of migrating contaminants and to prevent loss of the groundwater resource from the production well.

6. Identify existing wells on County-owned property and, after 2010, shift sampling from the Isleta piezometers to the County-owned wells and properties.

### **1.20 West Mesa**

The West Mesa is currently largely undeveloped, so sampling should focus on establishing baseline conditions and monitoring for potential impacts based on nearby facilities.

1. For the existing wells and piezometers, sampling for inorganic constituents and trace metals should continue on an annual basis through 2010. Sampling for organic compounds may be delayed

until 2007 and again in 2010 for the Niese Road piezometers and for the Paradise Road. well, as there is no nearby known source of organic contaminants.

2. The 9 Mile Hill Well is located at a landfill closed prior to implementation of RCRA Subtitle D long-term groundwater monitoring requirements. Nonetheless, the facility has been investigated and released through NMED's voluntary remedial program. Given the expansion of development in the West Mesa, the presence of well fields to the north, east, and south, and the residual uncertainty of the landfill contents, it is recommended that annual sampling of the well for inorganic and organic contaminants be continued voluntarily on an annual basis.

3. Due to the potential for future development in the immediate area, the County should initiate discussions with ABCWUA regarding long-term water level monitoring in the Campos de Suenos / Tempur-Pedic well field and either provide monitoring or ensure that County staff has ready access to water level data.