Modified Stage 1 Abatement Plan Proposal for the Mosaic Potash Mine

Mosaic Potash Carlsbad, New Mexico

Submitted to:

Haskins Hobson, PE
Senior Environmental Engineer
Mosaic Potash Carlsbad
1361 Potash Mines Road
Carlsbad, New Mexico 88221

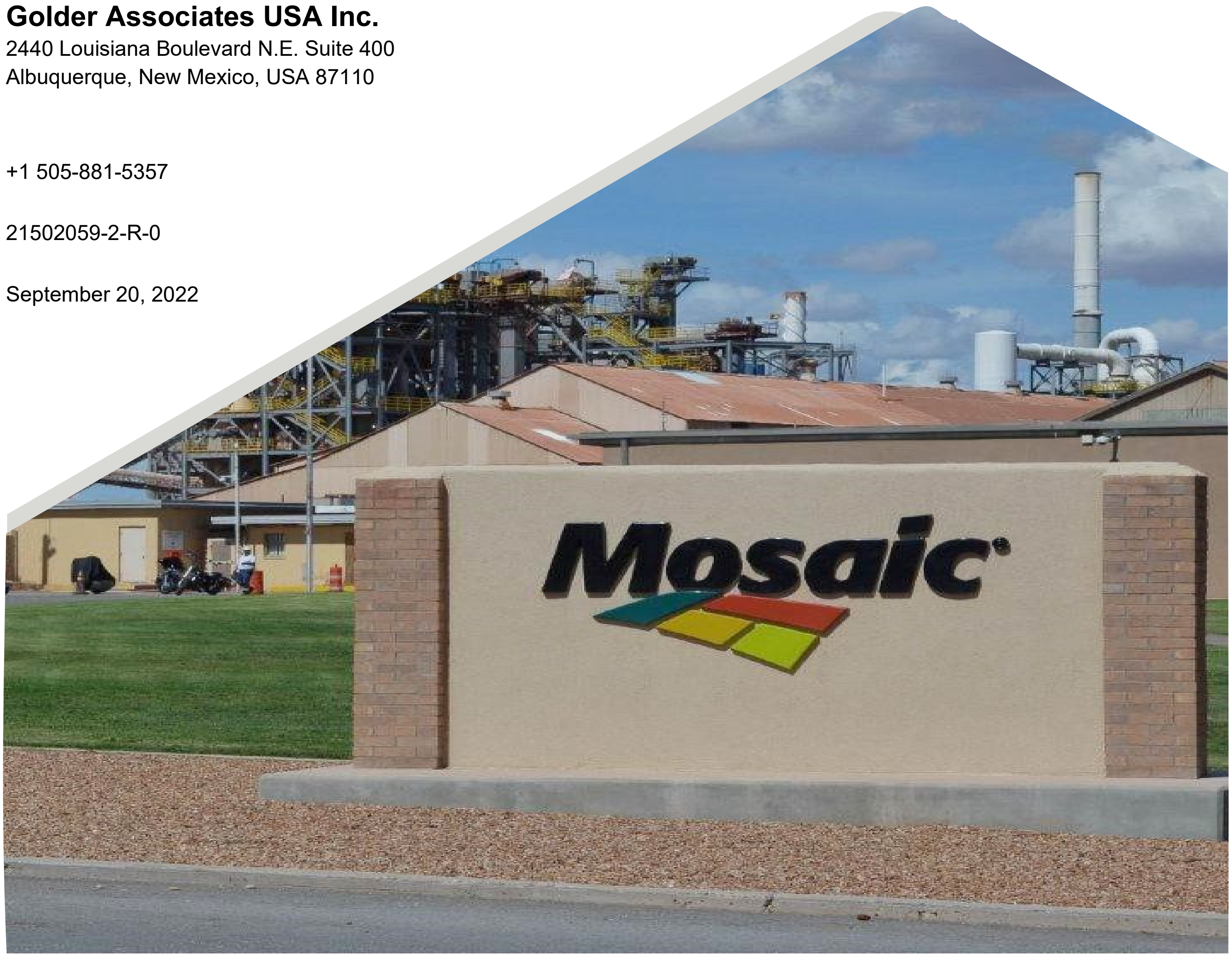
Submitted by:

Golder Associates USA Inc.
2440 Louisiana Boulevard N.E. Suite 400
Albuquerque, New Mexico, USA 87110

+1 505-881-5357

21502059-2-R-0

September 20, 2022



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1.0 INTRODUCTION

Mosaic Potash Carlsbad Inc. (Mosaic) received a notification from the New Mexico Environment Department (NMED) Water Protection Division dated October 20, 2021, requiring Mosaic to submit a Stage 1 Abatement Plan (S1AP) Proposal for the Mosaic Potash Mine (Site) pursuant to 20.6.2.4106 New Mexico Administrative Code (NMAC) of the Ground Water and Surface Water Protection Regulations. In the notification letter, the NMED requested that Mosaic submit a S1AP Proposal to investigate total dissolved solids (TDS), chloride and sulfate concentrations in groundwater downgradient of the Site. The S1AP Proposal was submitted to the NMED on March 21, 2022 (Golder 2022a), and the NMED sent a letter to Mosaic dated May 23, 2022, requesting modification of the S1AP Proposal to address additional technical information that was acquired during the agency's review of the S1AP Proposal. Mosaic and NMED subsequently communicated about the modification request in two virtual meetings on June 1 and July 18, and an exchange of letters from Mosaic to NMED dated June 15, and from NMED to Mosaic dated July 7. On July 18, Mosaic, Golder Associates USA Inc. (Golder), and HRS Water Consultants, Inc. (HRS) shared with NMED our proposed scope of work for this Modified S1AP Proposal, and Mosaic subsequently formally requested an additional 60 days to the original response period (a total of 120 days) for the submittal of the Modified S1AP Proposal, which would extend the submittal deadline from July 22 to September 20, 2022. The extension request was formally approved by the NMED on August 3, 2022. All of the letters referenced above are included in Attachment 1.

This Modified S1AP Proposal for Mosaic's site in Carlsbad, New Mexico, has been prepared by Golder, a member of WSP, in accordance with 20.6.2.4106.C NMAC, which states that the purpose of a S1AP is to design and conduct a site investigation that adequately defines site conditions and provides the necessary data to select and design "if necessary" (as provided in 20.6.2.4106.E NMAC), an effective abatement option. 20.6.2.4106.C NMAC has six mandatory S1AP elements. The NMED originally requested five additional elements to be included in the S1AP to further enhance the site investigation, and an additional two elements were requested as part of the NMED's request for a Modified S1AP Proposal.

During the S1AP process, Mosaic will attempt to separate correlated monitoring data from causation monitoring data to determine whether discharges from the Site have resulted in any water pollution in excess of applicable water quality standards. Correlated data means that when one variable changes, so does the other variable (e.g., brine discharge increases and TDS in monitoring wells increase at the same time); however, this covariance is not necessarily due to a direct or indirect causal link between variables. Causation data means that the changes in one variable bring about the changes in the other variable (e.g., increasing groundwater pumping rates may cause TDS in monitoring wells to increase).

Whether a Stage 2 abatement process is necessary will also be contingent on the feasibility and economic costs of the maximum use of commercially accepted abatement technology as specified in 20.6.2.4103.E(1)(a) and (1)(b) NMAC, the reasonable relationship between the economic and social costs and benefits of attainment of the standard as specified in 20.6.2.4103.E(1)(c) NMAC, and/or the statistically valid extrapolated-over-20 years technical infeasibility of the maximum use of commercially accepted abatement technology as specified in 20.6.2.4103.E(1)(d) NMAC.

As summarized below, numerous hydrogeologic studies have been conducted in and around the Site that have provided detailed information on the groundwater and surface water conditions at the Site and the nature of permitted discharges. Utilization of these existing studies and ongoing data collected as part of Mosaic's Discharge Permit 1399 (DP-1399) will form key components of the S1AP. The draft DP-1399 permit was issued by the NMED on June 4, 2021, and a public notice was issued by the NMED on June 29, 2021, proposing approval of the draft DP-1399 permit. Additional studies and investigations are identified in the draft DP-1399 permit that will be implemented once the final DP-1399 permit is issued. Pertinent information obtained from these additional studies will be integrated into the S1AP as time permits.

2.0 DESCRIPTION OF THE MOSAIC POTASH SITE [20.6.2.4106.C(1) NMAC]

The following sections provide an overview of the Site, including a site map and history, and the nature of historical and current discharges. The discussion also includes an overview of previous investigations and studies conducted in and around the Site.

2.1 History of Potash Mining, Salt Harvesting, and Oilfield Brine Disposal in Nash Draw

Potash Mining

Potassium is one of three essential fertilizers in the agriculture industry, along with phosphate and nitrogen. Potash is the common name for several types of potassium salts found in the earth in water-soluble form. Potash is typically mined from deep ore beds below the earth's surface. Potash ore beds were first discovered in 1925 in Nash Draw (Figures 1 and 19), a naturally occurring depression located east of Carlsbad in southern Eddy County, New Mexico. According to the United States (US) Department of Energy, Nash Draw is approximately five miles wide, 200 to 300 feet deep, 14 miles long and open to the southwest. The draw was caused in part by subsurface dissolution and subsidence of the overlying sediments. Nash Draw ends topographically at the Pecos River, but the surface drainage in the draw terminates in Laguna Grande de la Sal (Laguna Grande).

There are a series of nine distinctly named natural playas that exist within Nash Draw. A playa is a flat desert basin or sunken dry lakebed from which surface water evaporates quickly. Most playa basins are underlined with clay soils that swell when wet to form a seal that holds water. Playas are ephemeral, going through natural wet and dry cycles, depending on the occurrence of rainfall near the playas. The only natural mitigation of salinity in the playas is natural rainfall, both from direct precipitation on the playa surfaces and stormwater run-on into the playas. Average annual precipitation in the Nash Draw area is approximately 13 inches, with over 75 percent of the precipitation normally falling between May and October. Precipitation during these months is typically derived from convection storms fed by summer monsoon flows of moisture that enter southern New Mexico from the Gulf of Mexico. Winter precipitation is generally of little consequence, averaging one-half inch per month or less for the period of November through March. Snowfall in the area is generally quite low, averaging approximately 3.25 inches per year for the Carlsbad area station, little of which remains on the ground for any length of time. Evaporation is significant in the region, with over 100 inches of Class A pan evaporation per year, which is nearly 8 times the amount of annual precipitation. Monthly evaporation ranges from approximately 4 inches per month during the winter months to 15 to 20 inches per month during the summer.

The first mine shaft to the potash deposits in the area was completed in 1930, and the first commercial shipment took place in March 1931. A 20-mile railroad spur was built from Carlsbad to the mine and later to other potash operations. A now defunct refinery, owned by the US Potash Company, located west of Laguna Grande, was the first potash refinery in the basin (Table 1 and Figure 1). The refinery began operations in September 1932 and used Laguna Grande as a disposal area for brine and tailings from their potash refining operations (Robinson and Lang 1938, Powers 2006).

By 1934, 11 companies were exploring for potash in southeast New Mexico. In 1936, Union Potash & Chemical, Texas Potash, Independent Potash & Chemical, New Mexico Potash, and Carlsbad Potash merged into a predecessor of Mosaic and began producing mainly sylvite- and langbeinite-based products in 1940 (Barker and Gundiler 2008). Over the next 30 years, mining development and production advanced steadily as an increasing number of companies grew and then merged. By the 1960s, southeastern New Mexico was the largest potash producing region in the US, supplying 85 percent of the country's consumption.

Due to the national importance of high-quality potash reserves in Eddy and Lea Counties, New Mexico, there is a standing order of the US Secretary of the Interior, first issued in 1939 and amended in 1951, 1965, 1975, 1986, and 2012, which designates the 497,000-acre Carlsbad Potash District as reserved for potash production. This federal order is further supported by the New Mexico Energy, Minerals and Natural Resources Department, Oil Conservation Commission’s 1988 Order No. R-111-P, which defined the boundaries of the Known Potash Leasing Area and established that the potash deposits are “life-of-mine-reserves” permanently protected from oil and gas drilling activities.

The potash industry has generated millions of dollars of mineral rights revenues for the State of New Mexico over the past 90 years and created thousands of mining-related jobs for multiple generations of New Mexicans. The locations of past and present potash mining operations in and around Eddy and Lea Counties, as presented by mindat.org (https://www.mindat.org/feature-5490702.html), are summarized in Table 1 and shown in Figure 1.

Salt Harvesting

There are two companies that actively harvest salt from Nash Draw for human consumption, water softeners, swimming pools, road deicing and other purposes. United Salt Carlsbad, LLC (United Salt) and New Mexico Salt & Minerals Company (New Mexico Salt) collect salt deposits from the surface of Laguna Grande after the brine that Mosaic discharges to Laguna Grande has evaporated. A third company, Southwest Salt Company (Southwest Salt), located southeast of Laguna Grande just outside Nash Draw, pumps millions of gallons of brine from groundwater sources near Malaga Bend into large evaporation ponds that use the power of the sun to concentrate the salt that is harvested for water softeners and pool salts. The three companies are shown in Figures 2 and 19.

Oilfield Brine Disposal

During the 1980s, both Laguna Tres and Laguna Quatro playas (Figures 3, 11, 19, and 20) were used for oilfield-produced brine disposal. Order No. R-7031 issued by the New Mexico Oil Conservation Commission (NMOCC) in July 1982 granted B&E, Inc. permission to discharge 7,500 barrels of brine per day to each of the playas. Subsequent NMOCC Order No. R-7031-A in March 1986 granted B&E, Inc. permission to discharge 15,000 barrels of brine per day to Laguna Quatro. Available records indicate that brine disposal by B&E, Inc. occurred between 1982 and January 1992.

2.2 Overview of the Mosaic Potash Mine Facility

The Site is located approximately 16 miles east of Carlsbad in Eddy County, New Mexico (Figure 1). The Site has an underground potash mine and a surface mill that produces potash products including fertilizers used for plant growth and products for animal feed. Facilities associated with the mine include underground workings from which potash ore is mechanically extracted, hoists to bring the ore to the surface, the Plant where the ore is separated from the unusable salts and clay, the Salt Stack consisting of tailings discharged from the Plant, the Clay Settling

Pond, the Laguna Uno and Laguna Grande Brine Management Areas, pipelines, and associated containment dikes. Figure 2 shows the locations of these major facilities at the Site.

Tailings from the Plant are discharged as a brine slurry onto the Salt Stack where coarse salt and clay settle on the Salt Stack. Brine and residual clay flowing off the Salt Stack are typically discharged to the Clay Settling Pond but can be diverted to Laguna Uno during plant maintenance periods described in the permit as upset conditions. Following discharge to the Clay Settling Pond, the brine is then conveyed through a 24-inch diameter pipeline (Brine Pipeline) approximately six miles to the bottom of Nash Draw and discharged into the northern end of Laguna Grande. The brine in Laguna Grande is diverted into a series of evaporation cells operated by United Salt and New Mexico Salt for chloride salt harvesting. Prior to construction of the Clay Settling Pond in 2005, the brine and residual clay was discharged directly to Laguna Uno where residual clay settled out in the Laguna Uno Clay Settling Area. The brine would flow overland to the Laguna Uno Brine Management Area.

Specific details about the Site and corresponding surface land ownership information are provided in Figure 3. The Plant is located in Sections 1 and 12, T22S, R29E; the Salt Stack is located in Sections 1, 12 and 13, T22S, R29E and Sections 6, 7 and 18, T22S, R30E; and the Clay Settling Pond and Laguna Uno are located in Sections 13, 24 and 25, T22S, R29E and Sections 19 and 30, T22S, R30E. The Brine Pipeline is located in Sections 23, 24, 26, and 35, T22S, R29E, and Sections 2 and 3, T23S, R29E; Laguna Grande is located in Sections 3, 4, 5, 7, 8, 9, 10, 15, 16, 17, 18, 19, 20, 21, 22, and 28 T23S, R29E, and Sections 13 and 24, T23S, R28E.

2.3 Mine Units

- Mine units specified in the draft DP-1399 permit are shown in Figures 2 and 3 and include the following:
- *Plant* – The Plant occupies approximately 120 acres located north of the other mine units discussed below. Major ore processing facilities include ore bins, a crusher, granulation plant, sizing screens, wash screens, a thickener, dryers, and a belt filter. Support facilities include offices, storage and loading facilities, maintenance shops, several warehouses, and a laboratory. The primary product produced at the Plant is a fertilizer sold commercially around the world under the product name K-Mag®.
- *Tailings Management Area* – The Tailings Management Area includes the Salt Stack, the Clay Settling Pond (CSP), the Brine Pipeline, the Laguna Grande and Laguna Uno Brine Management Areas, and associated containment dikes as described below.

    1) *Salt Stack* – The Salt Stack currently covers an area of approximately 1,000 acres. Tailings that are deposited on the Salt Stack originate as two separate streams from the Plant. The first stream originates at the tailings wash screen and is primarily comprised of coarse salt tailings. The second stream originates at the thickener underflow pump and is comprised of fine salt tailings and insoluble fine particles (mostly clay). Deposition and growth of the Salt Stack is managed with a series of internal berms. Brine and residual clay flowing off the Salt Stack is discharged to the Clay Settling Pond except during upset conditions when the brine and residual clay is discharged to Laguna Uno. Upset conditions may include operational conditions that prohibit discharge into and from the Clay Settling Pond, and during times of preapproved maintenance as necessary. Several dikes have been constructed on the east and south margins of the Salt Stack to prevent stormwater originating on the Salt Stack from flowing east into natural drainages and Laguna Uno. The current DP-1399 groundwater monitoring network is shown in Figure 2 and includes three piezometers (P-Central, P-East, and P-West) located in the vicinity of the Salt Stack (P-East) and the Clay Settling Pond (P-West and P-Center) (Figure 12). A piezometer is an instrument placed in boreholes to monitor the pressure or depth of groundwater.

2) *Salt Dike 1 and Salt Stack Contingency Dike* – The southern edge of the Salt Stack is bounded by Salt Dike 1 (SD1) and the Salt Stack Contingency Dike (SSCD). SD1 and the SSCD were designed and constructed in 2010 to divert brine flow away from Laguna Uno and into the Clay Settling Pond (see Figure 2).

3) *Clay Settling Pond* – The CSP was first built in 2005 and currently covers an area of approximately 150 acres. The eastern and southern extents of the CSP are defined by the CSP Dike. The western extent of the CSP is defined by natural terrain features. Some of the clay particles settle out of the brine in the CSP and the partially clarified brine is then decanted into the Brine Pipeline. The CSP Dike was raised five feet in 2019 to increase the brine and clay holding capacity of the CSP (Figure 2).

4) *Brine Pipeline* – The Brine Pipeline conveys partially clarified brine from the CSP by gravity approximately six miles south to the Laguna Grande Brine Management Area. The maximum design flow capacity of the pipeline is 4,880 gallons per minute. Construction of the pipeline was completed in December 2010 (Figures 2 and 3).

5) *Laguna Uno Brine Management Area* – Laguna Uno is an approximately 1,000-acre playa located south of the Salt Stack. Laguna Uno is one of the nine named natural playas in Nash Draw. See Table 3 and Figures 2, 3 and 12 for more information about the Nash Draw playas. The Southeast and Southwest Laguna Uno Dikes were constructed as a preventative measure to prevent possible stormwater releases from Laguna Uno.

6) *Laguna Grande Brine Management Area* – Laguna Grande is the largest natural playa in Nash Draw and covers an area of approximately 4,500 acres. The northeast portion of Laguna Grande includes the Laguna Grande Brine Management Area, also identified as Pond 4, which was created by construction of the Pond 4 Dike (see Figures 2, 3, 24 and 26). The southwest portion of Laguna Grande includes several salt harvesting ponds divided by internal dikes described as Ponds 1, 1A, 2A, 2B, 3A and 3B.

7) *Southwest Laguna Grande Dike* – Southwest of the southern edge of Laguna Grande, this dike stands between the salt harvesting evaporation ponds in Laguna Grande and the southern extent of Nash Draw at the Nash Draw saddle. Mosaic constructed the Southwest Laguna Grande Dike (SWLGD) in 2009. The purpose of the SWLGD is to minimize brackish surface flows released from the playa from reaching the Pecos River. Under normal weather patterns, there is no water impounded behind this dike. The only water that has accumulated behind the dike since 2018 was associated with direct precipitation on the footprint of the dike structure. The current DP-1399 monitoring network includes three staff gauges within Laguna Grande and one staff gauge immediately upgradient of the SWLGD (see Figures 2, 24 and 26).

8) *Other Ancillary Facilities and Structures* – In addition to the major mine units, there are several support facilities and structures dispersed across the mine. These include haul and access roads, mine shafts, and headframes.

The area between Laguna Grande and the Pecos River has been the primary focus of ongoing hydrogeologic investigations conducted in association with DP-1399. The current DP-1399 groundwater monitoring network is shown in Figures 2, 15, 16, 18, 24, and 26 and includes 15 monitoring wells (LG-1, LG-5, LG-23, LG-25, LG-26, LG-28, LG 29, LG-30, LG-31, LG-32, LG-34, LG-35, LG-36, LG-37, LG-38) located north and east of the Pecos River and one monitoring well (LG-33) located on the west side of the Pecos River. The DP-1399 monitoring network also includes four Pecos River sampling points (River 1 through River 4) and three Pecos River staff gauges (Pecos River Staff Gauge #1 through #3).

At the request of the NMED, Mosaic also included the area immediately west of the Pecos River in the S1AP study area as shown inside the green boundaries in Figure 24 to evaluate the hydrogeologic conditions west of the Pecos River and rule out any possibility that there may be impacted groundwater in this area from discharges from the Site. A number of the wells west of the Pecos River, indicated by green dots in the figure, are privately owned, and gathering data from these wells will depend on the well owners granting access to Mosaic to collect groundwater samples.

2.4 Summary of Previous Groundwater Investigations and Monitoring [20.6.2.4106.C(7) NMAC]

There have been numerous groundwater investigations and studies conducted that have provided detailed information on the hydrogeologic conditions in and around the Site. Several of the earliest studies in the area were conducted to support permitting of the US Department of Energy's Waste Isolation Pilot Project (WIPP) (see Figures 1 and 19) (Bachman 1981, 1985; Beauheim and Ruskauff 1998; Chapman 1988; Department of Energy 2017; Hill 1999; Hillesheim et. Al. 2006; Kuhlman and Barnhart 2011; Land and Veni 2012; Lorenz 2006; Mercer 1983; Powers 2006), to characterize the Gnome project area (Department of Energy 2017; Cooper and Glanzman 1971), and to study water quality impacts observed at Malaga Bend (Cox and Havens 1965; Hale et. al 1954; Robinson and Lang 1938). Multiple studies have also been conducted at the Site throughout the years to investigate potential impacts to groundwater from Site discharges (Golder 2002a; Vail 2014).

A table summarizing the key investigations and studies conducted in and around the Site is provided in Table 2. Information from these investigations and studies will be compiled and evaluated as part of the data gap analysis included as Task 1 of the Modified S1AP Proposal, and pertinent information gleaned from them will be used to support the individual tasks associated with the S1AP. A description of the key hydrology studies in the Nash Draw area that have been performed over the last 90 years is provided below.

Robinson and Lang (1938)

Results of the earliest studies indicated that TDS concentrations within Laguna Grande were naturally elevated, prior to any potash mining tailings brine being discharged into the playa. In the 1930s, Thomas Robinson and Walter Lang surveyed the geology and hydrology of Nash Draw on behalf of the US Geological Survey (USGS) at the request of the State Engineer of New Mexico to study the ground water conditions in the Pecos River Valley. Robinson and Lang discovered and reported the presence of brine underlying the main axis of Nash Draw and proposed that solution of upper Salado halite created the draw and the brine aquifer. The gradient of the brine aquifer, corrected for salinity differences, indicated flow down Nash Draw toward the Pecos River, with upwelling saline water in springs along the Pecos River considered the outflow. Details of the work by Robinson and Lang (1938) indicated that:

1) the salinity of water encountered in the zone was quite variable;
2) it was unlikely brine from Laguna Grande was infiltrating downward to the brine aquifer in view of the fact that much fresher water was encountered below Laguna Grande;
3) brine flow in the aquifer beneath Nash Draw was from north to south-southwest; and
4) brine from the brine aquifer was being discharged into the Pecos River.

According to Robinson and Lang's analyses of USGS representative samples collected in July 1924 from the west side of Laguna Grande, TDS concentrations were 162,300 and 239,000 parts per million (ppm), respectively. For water, 1 ppm = approximately 1 milligram per liter (mg/L), so the 1924 TDS concentrations near Laguna Grande were at least ten times greater than the protectable groundwater quality standard of 10,000 mg/L. The USGS also collected a sample of salt from the bottom of Laguna Grande near the point where the most concentrated water sample was collected. This sample of salt consisted chiefly of sodium chloride. In addition, persons who settled in this area as early as 1875 reported to the USGS that, at that time, travelers "came to the lake and picked off chunks of salt from the bottom, which they carried off in sacks while traveling up the Pecos Valley."

Robinson and Lang further identified three sources of water in Laguna Grande including:

1) surface drainage during periods of rainfall;
2) spring discharge and groundwater inflow; and
3) the effluent from the US Potash Refinery, located on the present-day site of New Mexico Salt's operations on the western edge of Laguna Grande (see Figures 1 and 2). As indicated in Table 1, US Potash was a predecessor of Intrepid Potash.

Hendrickson and Jones (1952)

Fourteen years later, in 1952, GE Hendrickson and RS Jones, geologists for the USGS, published a report on the geology and ground water resources of Eddy County for the New Mexico Bureau of Mines and Mineral Resources and the State Engineer of New Mexico. The authors visited more than 400 wells during their investigation and collected water samples for chemical analyses from representative wells and springs. The report's abstract indicates that:

1) in the Carlsbad area, ground water occurs in the Carlsbad Limestone, gypsiferous Castile and Rustler formations, and in the alluvium [near the Pecos River];
2) the water in the Castile and Rustler formations and in the alluvium is impotable [not drinkable] in most places within the Carlsbad area;
3) ground water from the alluvium near the Guadalupe Mountains is generally good quality, but farther east toward Carlsbad, as the water moves through gypsiferous rocks, the sulfate content increases and the water is unfit for domestic use; and
4) water of poor quality is obtained from most wells in Nash Draw and just east of the Pecos River from Malaga Bend southward.

In the report's Topography and Drainage section, the authors found that "East of the Pecos, drainage is chiefly to enclosed basins, and the Pecos has no important tributaries from the east." In the report's Stratigraphy section, they also found that:

1) the Castile formation yields water to many stock and domestic wells. The water is high in sulfate and is undesirable for human consumption;

2) the Salado formation occurs in most of the county east of the Pecos. Potash ore is mined in this formation. No wells in the county take water from this formation. In the potash mines area, the Salado contains no pore spaces capable of transmitting any great quantity of water. The brine contaminating the Pecos River water at Malaga Bend is derived from solution at the top of the Salado formation (quoting Robinson and Lang [1938]);

3) the Rustler [formation] yields water to many stock wells and some domestic wells. It also furnishes some of the water used by the International Minerals and Chemical Co. (a predecessor of Mosaic Potash), and the Potash Co. of America for refining potash (see Table 1 and Figure 1). The water from the Rustler generally is not desirable for domestic use because of its high chloride and sulfate content. In certain areas, wells penetrating the lower part of the Rustler yield concentrated brine derived from the underlying Salado formation which cannot be used even for livestock. This brine aquifer at the base of the Rustler discharges salt water into the Pecos River in the vicinity of Malaga Bend (quoting Robinson and Lang [1938]); and

4) the many small, closed shallow depressions east of the Pecos contain silt and clay washed in from the surrounding areas. Some of the depressions contain shallow lakes, such as Salt Lake (Laguna Grande de la Sal). Water wells in and near these depressions generally yield highly mineralized water which can be used, if at all, only for stock.

In the report's Ground Water section, the authors found that:

1) west of the Pecos River ground water moves generally eastward to discharge into the river. East of the Pecos ground water moves southward and south-westward into the river, but the rate of movement and the amount of water discharged into the Pecos from the east are comparatively small;

2) in the area south of Carlsbad ground water containing as much as 5,000 ppm [5,000 mg/L] of dissolved solids is used for irrigation;

3) water having more than 1,000 ppm [1,000 mg/L] is commonly used in parts of Eddy County, especially south of the Black River and east of the Pecos (for domestic use);

4) many of the stock wells in the south and east parts of (Eddy) county produce water containing more than 5,000 ppm [5,000 mg/L] of total dissolved solids (TDS); and

5) the potash refineries are the only industries using large quantities of ground water in Eddy County. One of the potash refineries uses water with TDS concentrations of about 3,500 ppm [3,500 mg/L] from the Pecos River; one uses water suitable for domestic uses from wells on the High Plains in Lea County together with rather highly mineralized water from wells penetrating the limestone of the Rustler formation at the Plant; and the third, which was used by Mosaic's predecessor, IMC Potash Carlsbad Inc., uses water similar to Carlsbad city water from wells in the Carlsbad limestone in La Huerta and highly mineralized water from wells in the limestone of the Rustler formation at the Plant.

The authors also found that:

1) the ground water used in the Carlsbad area is from three sources: the alluvium, the gypsiferous Rustler and Castile formations, and the Carlsbad limestone. The alluvium consists of clay, silt, sand, gravel, caliche, and conglomerate, and the component materials are irregularly distributed both horizontally and vertically. Locally, the conglomerate is so well cemented that it is reported as limestone by well drillers (Hale 1945);

2) south of Carlsbad, within the alluvium unit eastward from Dark Canyon, the ground water becomes more highly mineralized as it mixes with water returned from irrigation and leaking from the Southern Canal (Figure 19). Near the canal, ground water generally contains more than 1,000 ppm [1,000 mg/L] of sulfate and from 400 to 900 ppm [400 to 900 mg/L] of chloride (Hale 1945). This water generally is nearly impotable (not drinkable) east of the Southern Canal (in the direction of the Pecos River) as the water generally contains more than 1,000 ppm [1,000 mg/L] of chloride and 2,000 ppm [2,000 mg/L] of sulfate. [NMED groundwater quality standards for Domestic Water Supply established in 20.6.2.3103.B NMAC are 250.0 mg/L for chloride and 600.0 mg/L for sulfate, so all the 1952 sample values exceeded the NMED standards.]; and

3) the water from the Castile-Rustler aquifer is generally high in sulfate and moderately high in chloride. Water from nearly all wells in this aquifer has an unpleasant taste and is generally considered unsuitable for drinking. The water from all wells probably is suitable for stock, although dairymen report greater milk production when the water of better quality from the Carlsbad limestone is used.

Finally, the authors offered several conclusions based on their findings, including:

1) an apparent long-term correlation exists between precipitation and the chloride content of water from wells and springs. Increased precipitation provides a greater recharge to the “good-quality” ground water. Increased precipitation also provides more “good-quality” water as surface runoff to bodies of water; and

2) it is quite possible that the effects of pumping (in the Carlsbad Limestone) may materially change the quality of water in time. Pumping of wells drawing water of good quality from conduits in the limestone cause a temporary lowering of the head of the water in these conduits. While the head is lowered in the conduits containing water of good quality, water of poor quality from other conduits in the limestone or from the overlying beds can enter the conduits that produce the water of good quality. Mixing can take place in wells not properly cased to shut off the water of poor quality or where the separation between the waters of different quality is imperfect. This mixing can take place while wells are being pumped, even though static water levels in the limestone do not decline. Although the possible changes in chloride content of the water in the Carlsbad limestone induced by heavy pumping of wells in the limestone are largely masked by changes due to other factors, the effects of pumping may be the most significant of all the factors influencing the future supply of water of good quality. If the chloride content increases in future years of normal precipitation beyond the high point reached in early 1941, it may be assumed that part of this increase is probably due to pumping.

Geohydrology Associates (1978-1979)

Some of the more recent site-wide investigations were conducted by Geohydrology Associates, Inc. (1978 and 1979) for the US Department of Interior Bureau of Land Management (BLM) and involved hydrogeologic studies and water resources evaluations related to proposed expansion of potash operations in the area. The 1978 study used a review of previous studies in the area to create a high-level water balance study of the Carlsbad area. Findings from this study include:

1) overuse of wells (Hood 1963) and phreatophytes (a deep-rooted plant drawing its water supply from the phreatic zone), along the river (Mower and others 1964; Thomas1963) have been implicated as causes of damage to water quality in the Pecos River entirely unrelated to the potash industry;

2) it has been shown in other areas of the country that leaking brine-disposal pits can cause significant damage to groundwater supplies (Lehr 1969); whereas in the Carlsbad potash area, the ground water quality before the presence of the potash industry was questionable because of abundant natural salt deposits near the surface. Data obtained during this study indicated that water in the topographic and water-table troughs would not be potable even if mining had not occurred. Most of the potash refineries are in these troughs and all of the refineries discharge brine to natural depressions, many of which are at or near the water table;

3) the Salado Formation appears to be free of circulating ground water; thus, it serves as a barrier between deeper, fresher water in the Capitan Limestone and shallower, saturated brine occurring in the brine aquifer in the base of the Rustler Formation. Most water-use activities in the potash area do not affect the lower (Capitan Limestone) aquifer;

4) data show water quality is better in areas where the water table is high and poorer toward water-table troughs. The lower part of the aquifer in the Rustler Formation is known to contain brine. Water-quality data demonstrate that water-quality zones are stratified in the aquifer, where potable water is present at the top of the aquifer, floating on the more-dense brine; and

5) the water quality from a spring east and up-gradient from the IMC Potash Carlsbad discharge at Laguna Uno is distinctly different from that of the industrial brine. Most notable, the spring-water content of calcium and silica is higher than the plant discharge. The spring water is not potable, suggesting that water quality changes near Tamarisk Flat would occur even if mining had not taken place.

Contents of the 1979 Geohydrology Associates report include a preliminary study which helped define the regional hydrologic conditions in Nash Draw through drilling and aquifer testing. Findings from this study include:

1) the Dewey Lake Redbeds and the Triassic shales offer the greatest potential for retention of fluids. The coefficients of transmissivity measured in wells screened within these deposits indicate that the flow rates through the deposits are generally less than 17 feet per year (which is a relatively low flow rate);

2) although the potash refining operations have increased the mineral ionization of ground water in the vicinity of the plants, earlier studies indicate that there was no potable water in these areas prior to the beginning of potash development;

3) aquifer tests performed on the wells within Nash Draw provided estimates of the aquifer transmissivities. Transmissivity is the flow rate under a unit hydraulic gradient through a unit width of aquifer of given saturated thickness. The transmissivity estimates were as follows: Quaternary sands and gravel deposits (mean: 255 square feet per day [ft^2/day]); Triassic shales and sandstone (mean: 9.8 ft^2/day); siltstone and shales of the Dewey Lake Redbeds (mean: 4.9 ft^2/day); and gypsum, siltstone, and dolomites of the Rustler Formation (mean: 136 ft^2/day). These results show that the hydraulic properties of the individual aquifers are highly variable and related to both the thickness of the individual water-bearing formations and the material making up the formations (e.g., sand, silt, clay); and

4) results of the drilling program indicated that Laguna Grande may discharge into the Pecos River via the ground water. However, because of the high natural salinity of Salt Lake (Laguna Grande) and the high evaporation rate for Laguna Uno and the other lakes below IMC, it cannot be documented that refinery waste has an adverse effect on the Pecos River.

Golder Associates (2002a, 2002b. and 2002c)

The first extensive study conducted by Golder at the Site was the Hydrogeology Baseline Study between 2000 and 2001 (Golder 2002a, 2002b, and 2002c) and included a detailed investigation of the hydrogeology, surface water hydrology, and discharges at the Site. The Hydrogeology Baseline Study included the drilling and logging of 32 boreholes to depths of between approximately 26 and 213 feet below ground surface (ft bgs), installation of 28 groundwater monitoring wells to depths of between 17 and 75 ft bgs, hydraulic testing, geophysical surveys, and chemical analysis of groundwater, surface water, and brines. Of the 28 wells drilled, only six wells (LG-1, LG-3, LG-4, LG-5, LG-23, and LG-25) were retained. The remaining 22 temporary wells were plugged and abandoned following completion of the Hydrogeology Baseline Study. The results of this 2002 study provided a detailed assessment of the hydrogeology and potential impacts to groundwater at the Site.

Since 2002, Golder installed an additional 13 monitoring wells (LG-26 through LG-38) in the area between Laguna Grande and the Pecos River, and three piezometers (P-East, P-Central, P-West) were installed in the vicinity of the Salt Stack in association with DP-1399. Additional soil borings and test pits have been drilled in support of the various engineering design projects related to the Salt Stack, Clay Setting Dike, and Tailings Management Area that provide additional hydrogeologic information for the northern and central areas of the Site.

Department of Energy Waste Isolation Pilot Plant Characterization (U.S. Department of Energy 2004)

The 2004 Department of Energy WIPP Site Characterization report quoted a 1954 study, stating “Hale et al. (1954) believed the Rustler-Salado contact residuum discharges to the alluvium near Malaga Bend on the Pecos River. Because the confining beds in this area are probably fractured because of dissolution and collapse of the evaporites, the brine (under artesian head) moves up through these fractures into the overlying alluvium and then discharges into the Pecos River.”

The WIPP report continued: “Water in the Rustler-Salado contact residuum in Nash Draw contains the largest concentrations of dissolved solids in the WIPP area, ranging from 41,500 mg/L in borehole H-1 to 412,000 mg/L in borehole H-5c. These waters are classified as brines. The dissolved mineral constituents in the brine consist mostly of sulfates and chlorides of calcium, magnesium, sodium, and potassium; the major constituents are sodium and chloride. Water quality in the Pecos River basin is affected by mineral pollution from natural sources and from irrigation return flows. Below Brantley Reservoir (Figure 1), springs flowing into the river are usually submerged and difficult to sample; springs that could be sampled had TDS concentrations of 3,350 to 4,000 mg/L.

Concentrated brine entering at Malaga Bend (Figures 11 and 19) adds an estimated 64 metric tons/day (370 tons/day) of chloride to the Pecos River."

The WIPP report also stated: "Nash Draw, the largest surface drainage feature east of the Pecos River in the WIPP region, is a closed depression and does not provide surface flow into the Pecos. Potash mining operations in and near Nash Draw likely contribute to the flow in Nash Draw. For example, the Mississippi Potash Inc. East [Intrepid Potash East] (Table 1 and Figure 1) operation located 11 to 13 km (7 to 8 mi) due north of the WIPP site disposes of mine tailings and refining-process effluent on its property and has done so since 1965. Records obtained from the New Mexico Office of the State Engineer show that since 1973, an average of 3 × 106 m^3 (2,400 acre-feet [ac-ft]) of water per year has been pumped from local aquifers (Ogallala and Capitan) for use in the potash-refining process at that location (Sandia National Laboratories [SNL] 2003b)."

Vail (2014)

In 2014, Mosaic Environmental Manager Scott Vail, Ph.D., produced a report for the BLM that described the geology and hydrology of Nash Draw to determine the possibility of release of groundwater from under Laguna Grande into the Pecos River. After analyzing the data from over 180 boreholes drilled by multiple potash mining and oil and gas companies over several decades, Vail's report concludes:

> "It is difficult to conceive a model by which either the Culebra Dolomite or Brine Aquifer might be a hydraulic pathway connecting Nash Draw with the Pecos River, either at Malaga Bend or to the southwest. The Culebra in the Draw has the form of a trough which drains to Laguna Grande. Limited flow potential exists between Laguna Grande and the Pecos River west and southwestward through the Gatuña Formation. Nash Draw has a potential playa surface of over 5,000 acres, with an evaporation potential over 10,000 gallons per minute (gpm) on an annual basis, which is greater than the combined mining and stormwater discharges into Nash Draw."

Lipson and Renninger (2021)

In 2021, Dave Lipson, Ph.D., C.P.G. and Tamera Renninger, GISP, completed a GIS Analysis Report of Karst Depressions in Laguna Grande Watershed. This report was submitted to, reviewed, and accepted by the New Mexico Office of the State Engineer Dam Safety Bureau (NMOSE DSB). The result of this report was a GIS-based quantitative analysis method that showed that:

1) sinkholes in the gypsum karst of Nash Draw are collapse structures formed by a process of solution and fill;
2) they are not interconnected by a subsurface network of bedrock conduits; and
3) they do not rapidly transmit excess storm water to playa lakes or the Pecos River. Rather, the sinkholes of Nash Draw are filled with fine-grained soils at the bottom, and they store excess storm water during precipitation events.

2.5 Area Geology and Hydrogeology

The Site is located within the lower portion of Nash Draw and extends approximately 11 miles between the Mosaic Plant to the north and the Pecos River to the south/southwest. The southern portion of the S1AP study area also includes an area to the west of the Pecos River as previously described in Section 2.3 (Figure 2). The following sections describe the geologic, hydrogeologic, and surface water characteristics at the Site.

2.5.1 Area Geology

A surface geologic map of the southern Nash Draw, shown in Figure 4 and Figure 5, presents a shallow stratigraphic column that was developed based on individual geologic units encountered within the Mosaic monitoring well network and nearby well and soil borings. Additional descriptions of each of the geologic units are provided with the shallow stratigraphic column and are based in part on information provided in various hydrogeologic reports specific to the Nash Draw area (Vail 2012a, 2012b and 2014; Vine 1963). As shown in Figure 5, the geologic units immediately underlying the Site consist of the Permian Rustler Formation and Quaternary deposits. Geologic cross sections for the area surrounding the Site are provided in Figures 6, 7, 8, 9, and 10. The base for the groundwater system underlying Nash Draw is considered to be the top of the Salado Formation at a depth between 300 to 500 ft bgs. The salt of the Salado Formation has a very low permeability, and the weight of the overburden is sufficient to cause plastic flow of the salt and prevent the development of cracks and crevices (Hendrickson and Jones 1952), resulting in a low permeability which limits vertical communication with underlying units. In other words, Nash Draw groundwater sits on top of a salt body lying beneath Nash Draw, and groundwater quality may be naturally influenced by the presence of the salt below.

Primary components of the Rustler Formation are gypsum and/or anhydrite, with dolomitic limestone, siltstone, and halite. In the majority of Nash Draw, the upper section of the Rustler formation is eroded down to the Tamarisk Member, although the overlying Magenta Member is exposed along the lateral (eastern and western) borders of Nash Draw. Rustler Formation units underlie most of Nash Draw and are generally overlain by thin veneers of Quaternary deposits, with the exceptions of thicker alluvial accumulations in Laguna Grande and other playas formed at solution collapses. The Gatuña Formation is a late Tertiary to early Quaternary deposit of poorly consolidated sandstone and siltstone with lesser amounts of conglomerate, clay and shale that is commonly associated with a prominent caliche or calcrete caprock. The Gatuña Formation is generally not more than about five feet thick, but locally reaches a thickness of 200 feet (Hendrickson and Jones 1952). Observed precipitous lateral changes in thickness, as well as mixed lithology, have led some to conclude that the Gatuña Formation is generally associated with collapse features (Geohydrology Associates 1979). Additional descriptions of the Gatuña Formation in the area of the Site is provided below.

2.5.2 Area Hydrogeology

Robinson and Lang (1938) surveyed the geology and hydrology of Nash Draw in the late 1930s in support of the growing potash industry in the area. They discovered and reported the presence of brine underlying the main axis of Nash Draw and proposed that solution of upper Salado halite created the draw and the brine. They also found that this brine aquifer was upwelling locally in the nearby Pecos River. The approximate extent of the brine aquifer in the area was delineated by Cooper and Glanzman (1971) and is shown in Figure 11.

Nash Draw, a “dog-bone shaped depression,” is oriented in a northeast-southwest direction on the west side of the Laguna Grande watershed (Goodbar et al. 2020; Powers et al. 2006) (Figure 1). Bachman (1987) described Nash Draw as a complex karst valley formed during the Pleistocene. During this time, a tributary drainage system, unofficially named the Gatuña stream system, flowed southwesterly across what is now known as Nash Draw and deposited sometimes extensive deposits of alluvium unofficially named the Gatuña Formation. The paleo-Gatuña stream system eroded into bedrock where it encountered evaporites of the Rustler Formation, commencing the dissolution along strike of the beds northeast-southwest (Bachman 1987). The dissolution of the evaporites during Gatuña deposition time ultimately created collapse sinks filled with eroded sediments, and as the collapse sinks coalesced, Nash Draw continued to expand to its present-day orientation (Bachman 1987). Because streams within Nash Draw are ephemeral, “…alluvium that has been mapped over large parts of the Nash Draw quadrangle is locally derived material deposited by sheet wash on the slopes of depressions and by intermittent streams that discharge their load into the depressions as alluvial fans during rare periods of flash flooding" (Vine 1963).

The following description of the area hydrogeology is separated into three geographic areas of the Site. The general geographic areas of the Site are shown in Figure 2. The northern area of the Site extends from the Plant to the north to the headwaters of Laguna Grande to the south, and includes the Plant, Salt Stack, Laguna Uno Brine Management Area, and associated containment dikes. The central area of the Site includes Laguna Grande, the Brine Pipeline, and the SWLGD. The northeast portion of Laguna Grande includes the Laguna Grande Brine Management Area, also identified as Pond 4, which was created by construction of the Pond 4 Dike. The southwest portion of Laguna Grande includes several salt harvesting ponds divided by internal dikes described as Ponds 1, 1A, 2A, 2B, 3A and 3B. The southern area of the Site includes the area between the SWLGD and the Pecos River, and a portion of the area west of Pecos River is included in the S1AP area.

Hydrogeology in the Northern Area of the Site

Within the northern area of the Site, the Salt Stack and the playa lakes are located on top of the gypsum of the Tamarisk Member, which contains dissolution features. The Culebra underlies the Tamarisk and contains water that is interpreted to be related to the playa lakes (Lambert and Harvey 1987). The flow from the Tamarisk to the Culebra may occur vertically downward through the gypsum or it may discharge laterally through playa lake deposits in contact with the underlying Culebra in locations where the Tamarisk is not present. Three piezometers were installed at locations east and west of the Salt Stack, immediately downgradient of the Salt Stack Contingency Dike in 2013 (P-Central, P-East, and P-West), and are routinely monitored as part of the DP-1399 program (Golder 2014a). The boring logs and well construction logs for the three piezometers indicate that they are all completed within the Tamarisk Member of the Rustler Formation. The July 2022 potentiometric surface indicates a southwesterly groundwater flow direction along the axis of Nash Draw in the area (Figure 12). Available water quality data for these piezometers indicates that the TDS concentrations in this area range from approximately 200,000 mg/L (P-West) to over 300,000 mg/L (P-Central) (Figure 14). The TDS concentrations in these three piezometers have fluctuated between 150,000 and 380,000 mg/L but have consistently been greater than 10,000 mg/L, the protectable groundwater quality standard since they were installed in 2013.

Hydrogeology in the Central Area Around Laguna Grande

The direction of groundwater flow in the area of Laguna Grande has been determined from a 2001 potentiometric contour map of the area developed as part of the Hydrogeology Baseline Study (Golder 2002a) (Figure 14). In all wells tested, the water levels in the area surrounding Laguna Grande were found to be above or at the Laguna Grande stage level, indicating the potential for discharge of the groundwater to Laguna Grande. Discharges of springs and seeps to Laguna Grande are visible, particularly along the northeastern and northwestern portions of the lake. Well LG-11, drilled to the east of Laguna Grande and outside the impact of the playa lakes, contained water with comparatively low salinity (TDS value of 14,731 mg/L) and a water level lower than the Laguna Grande wells (LG-22 and LG-7A) to the west of it (Golder 2002a and 2002c).

Based on these observations, impacts from Laguna Grande is limited to the topographically low areas adjacent to the playa lake, and these waters do not communicate with water bodies in the topographically elevated areas along the eastern boundaries of Nash Draw. In well LG-10 drilled to the west of Laguna Grande as part of the Hydrogeology Baseline Study (Figure 6), the Culebra Dolomite Member was found to be dry (which most likely indicates the western edge of Nash Draw).

The nine test wells drilled in 2001 in the central area, identified as LG-7A, LG-7B, LG-8A, LG-8B, LG-8C, LG-9A, LG-9B, and LG-12 are shown in Figures 6 and 13. Available TDS data for the wells located between the Salt Stack and Laguna Grande are shown in Figure 14. The TDS concentrations observed in wells LG-8A, 8B, 8C (located on the northern perimeter of Laguna Grande), and LG-12 (located on the southeast side of Laguna Tres) in 2001 generally fell within the 228,000 to 326,000 mg/L range. For the wells located immediately east (LG-7A, 7B) and west (LG-9A, 9B) of Laguna Grande, the TDS concentrations observed in 2001 are relatively lower, ranging between approximately 53,400 and 127,000 mg/L. However, all wells had TDS concentrations above the protectable water quality standard between 53,400 and 326,000 mg/L at least 9 years before the Brine Pipeline from the Clay Settling Pond to Laguna Grande was completed in December 2010.

Hydrogeology in the Area South and West of Laguna Grande

The area south and west of Laguna Grande and adjacent to the Pecos River is underlain by alluvial river deposits, playa lake sediments, and caliche. The Gatuña Formation is the principal shallow water-bearing unit in this area. The Gatuña Formation unit is composed of locally derived fluvial sand, silt, clay, and some gravel that were generally transported short distances from outcrops of sandstone, shale, and limestone adjacent to Nash Draw. Some of the gravels within the Gatuña Formation are of mixed meta-sedimentary or igneous lithology, indicating a more distant source. The Gatuña Formation is characterized by numerous caliche development zones which are similar in texture, mineralogy and age to caliche zones that are common in the Ogallala Formation. The unit locally has high permeability where well-sorted gravelly or cobbly zones are present (Brokaw et al. 1972). Since Gatuña Formation fluvial materials were deposited over an irregular surface, thickness and texture are irregular and textural subunits are laterally discontinuous.

The available soil boring logs and water level and water quality data associated with the Mosaic monitoring well network, nearby wells and soil borings suggest that there is a possibility of discrete water-bearing units existing within the Gatuña Formation between Laguna Grande and the Pecos River. It is important to note that wells screened within the discontinuous conglomerate lenses within the Gatuña Formation appear to show confined or semi-confined characteristics, with water levels observed to rise several tens of feet when the formation is penetrated during drilling. These conglomerate lenses containing potentially perched groundwater appear to be discrete, disconnected zones that do not represent a single continuous hydrostratigraphic layer. In contrast, the undifferentiated silt, clay, and sand water-bearing unit within the Gatuña Formation appears to be a single continuous hydrostratigraphic layer and unconfined based on drilling logs that indicate that the static groundwater levels observed after individual wells are completed are near the levels observed during drilling.

The current DP-1399 groundwater monitoring network includes 15 monitoring wells (LG-1, LG-5, LG-23, LG-25, LG-26, LG-28, LG 29, LG-30, LG-31, LG-32, LG-34, LG-35, LG-36, LG-37, LG-38) located between Laguna Grande and the Pecos River and one monitoring well (LG-33) located on the west side of the Pecos River. (Figure 2). An October 2020 potentiometric map was developed using the DP-1399 monitoring network and a limited number of wells located on the west side of the Pecos River with available water level data during this time. The October 2020 potentiometric surface (which incorporates available water level data from wells on the west side of the Pecos River) indicates a general southwesterly groundwater flow direction in the area south of Laguna Grande that transitions to a southerly-southeasterly flow direction in the vicinity of the Pecos River (quasi-parallel to the axis of the Pecos River) (Figure 15). The July 2022 potentiometric surface indicates a southwesterly groundwater flow direction toward the Pecos River in the area of monitoring wells LG-1, LG-26, LG-28, LG-30, and LG 32, that also transitions to a southerly or south-southeasterly gradient near wells LG-25, LG-34, and LG-35 (Figure 16).

TDS concentrations observed in wells completed within the conglomerate lenses are generally high, with concentrations ranging between approximately 125,000 and 358,000 mg/L. TDS concentrations within the caliche are shown to range from approximately 65,000 to 115,000 mg/L. Groundwater within the alluvium adjacent to the Pecos River is generally of better water quality, with TDS concentrations typically below about 7,000 mg/L. The TDS concentrations within the individual DP-1399 monitoring wells are shown for the period of record (2004 to present) in Figure 17. With the exception of wells LG-2 and LG-26, the majority of the DP-1399 wells show relatively steady TDS concentrations over time. Wells LG-2 and LG-26 originally had TDS concentrations below 10,000 mg/L, but the TDS concentrations in both wells increased above 10,000 mg/L in 2005, prior to Mosaic discharging brine into Laguna Grande which started in December 2010. The most recent TDS concentration measured at well LG -2 was 109,000 mg/L in October 2020, and the most recent TDS concentration measured at well LG-26 was 177,000 mg/L in July 2022. The observed rise in concentrations of TDS and other constituents in these two wells will be further investigated as part of the S1AP.

The most recent TDS concentrations observed in monitoring wells located between Laguna Grande and the Pecos River and on the west side of the Pecos River are shown in Figure 18. As shown in the figure, there are three BLM wells located between Laguna Grande and the Pecos River that had TDS concentrations ranging between 55,876 mg/L (Well 23.29.18.14) and 283,492 mg/L (Well 23.29.28.41) dating back to 1979, approximately 31 years before Mosaic began discharging brine to Laguna Grande via the Brine Pipeline. Available water quality data for the west side of the Pecos River show TDS concentrations in groundwater wells in 2010, 2016, 2020, and 2022 generally ranged between approximately 5,400 mg/L and 8,800 mg/L.

West side wells C03965 and C04556 POD are associated with a corrective action program being conducted by Chevron Environmental Management Company and Arcadis related to the accidental discharge of produced water from a Chevron produced water pipeline on Mosaic fee land in 2014. Semi-annual groundwater monitoring is currently being conducted on these wells under New Mexico Oil Conservation Division (NMOCD) remediation permit number 2RP-2400. Two of the wells associated with this release (C03695-POD1 and C03695-POD3) show TDS concentrations in 2020 greater than 10,000 mg/L.

2.6 Area Surface Water Hydrology

The surface water features in and around the Site comprise much of the southwestern portion of Nash Draw and includes the Pecos River. As shown in Figures 1, 2, and 3, Mosaic's potash processing facility is at the northern edge of the Site. Extending southwards from the Plant is the Salt Stack, where solid-phase salt and clay tailings are deposited. The Salt Stack gradually transitions to the CSP where the heavier clay portions of the tailings settle out, and the remainder of the brine terminates in Laguna Grande. South of the tailings area is a circular chain of playa lakes. From north to south, these features are commonly called Laguna Uno, Lindsey Lake, Tamarisk Flats, Laguna Dos, Laguna Cinco, Laguna Seis, Laguna Quatro, and Laguna Tres. Laguna Grande in the southern portion of the Site, is the lowest hydrologic sink or terminus for Nash Draw. See Table 3 for more information about these playas.

2.6.1 Watershed Characteristics

The Site lies entirely within the lower portion of Nash Draw and is typical of a karstic closed basin watershed. Nash Draw is an internally drained basin with no known external surface drainage. It is delineated on the west and east sides by escarpments named Quahada Ridge and Livingston Ridge, respectively (Vine 1963). These ridges are topped by Mescalero caliche overlying the Gatuña Formation (Bachman 1987). The Maroon Cliffs delineate the north side of Nash Draw and separate it from Clayton Basin to the north (Powers et al. 2006; Bachman 1985). The southern boundary of Nash Draw (Figure 19), between the southern edge of Laguna Grande and the Pecos River, is delineated by an unnamed escarpment. The stream network is poorly defined, surface drainages are ephemeral, and connections between waters are few and temporary. Channels typically form narrow arroyos that transition rapidly to broad alluvial fans.

For the purpose of stormwater runoff analysis, partially-isolated watersheds or closed basins have been identified and delineated within Nash Draw (Figure 19). Estimation of appropriate runoff coefficients have included an assessment of the reduction in the runoff volume due to both closed basin features within the Nash Draw basin and subsurface karstic features. The most current basin delineation in 2021 (GAUSA 2022b) indicates that the total area contributing runoff to the Laguna Grande basin is approximately 368 square miles.

Golder is currently evaluating the hydrology within Nash Draw to support design improvements of the SWLGD, in coordination with the New Mexico Office of the State Engineer – Dam Safety Bureau (OSE-DSB). The Colorado-New Mexico Regional Extreme Precipitation Study (REPS) was jointly released in 2018 by the Colorado Division of Water Resources, Dam Safety Branch and NM OSE-DSB (CDWR and OSE-DSB 2018). This study is the culmination of a multi-year effort to update extreme rainfall estimates in the region. Due to the incorporation of more recent and region-specific storm datasets into this study, the NM OSE-DSB requested that Golder use the REPS for the recent hydrology evaluations (Golder Associates USA Inc. 2022b). One of the tools developed with REPS is the MetPortal tool. MetPortal is a web-based tool that can be used to develop Annual Exceedance Probability (AEP) estimates and temporal distributions using either point locations (latitude/longitude) or basin shapefiles. The 100-year, 24-hour MetPortal storm event for Nash Draw is 3.43 inches (Golder Associates USA Inc. 2022b). Initial evaluation of this storm event indicates there would be no release from Nash Draw.

2.6.2 Major Surface Water Bodies within the Area

There are nine significant depressions and playa lakes within the Site area. These lakes can be characterized as shallow, saline playa lakes, supplied by runoff and groundwater discharge. The playa lakes show a consistent drop in elevation from northeast to southwest, from Laguna Uno (3,011 ft above mean sea level [ft-amsl]) to Laguna Grande (2,956 ft-amsl). Descriptions of the depressions and playa lakes in the Site area are provided in

Table 3, and the locations of samples previously collected from the playa lakes and springs at the Site are shown in Figure 20.

As previously described in sections 2.4 and 2.5.2, TDS concentrations within Laguna Grande were naturally elevated prior to any brine discharge by Mosaic into the playa. According to Robinson and Lang (1938), samples collected by the USGS in July 1924 from the west side of Laguna Grande showed TDS concentrations of 162,300 and 239,000 ppm, respectively. The water quality of the playa lakes was further investigated in 2001 as part of the Hydrogeology Baseline Study (Golder 2002b), and the Brine Pipeline outfall is sampled quarterly by Mosaic personnel. All of the playa lakes contain poor quality water not suitable for human consumption and are slightly more saline than the tailings brine exiting the Brine Pipeline. As shown in Figure 21, the median TDS concentrations of the individual playa lakes have been measured to be slightly greater than the tailings brine TDS concentrations. Therefore, Mosaic's DP-1399-permitted release of tailings brine into Laguna Uno (before December 2010) and Laguna Grande (beginning in December 2010) does not appear to have resulted in a statistically significant increase in the salinity of these two playa lakes.

2.6.3 Springs and Seeps

The majority of non-mining-related surface water flow within the Site area is generated by natural springs and seeps, which were investigated in 2001 as part of the Hydrogeology Baseline Study (Golder 2002a and 2002b) and have been sampled periodically by Mosaic personnel. All of the springs observed in 2001 appeared to flow independently of precipitation events, and all of the springs and seeps were typically of very poor-quality water. The median TDS concentrations of the springs and seeps range from approximately 150,000 mg/L to 360,000 mg/L, and the median concentration of Mosaic's tailings brine discharge is approximately 285,000 mg/L (Figure 22). The springs investigated in 2001 are shown in Figure 20 and included the following, from north to south:

Springs North and East of Laguna Uno (Section 19 Springs). North of Laguna Uno and east of the Clay Settling Area, springs emerge from the Tamarisk Member for about one mile along the eastern edge of the Salt Stack. The springs ultimately discharge into Laguna Uno. The total discharge from the springs was estimated at approximately 900 gpm in 2001. Like other springs in this area of Nash Draw, the discharge is quite saline but is less concentrated than the Brine Pipeline tailings discharge.

Springs Near Lindsey Lake. A series of small springs along the northern end of Lindsey Lake provides a constant source of inflow to this lake. The springs are located near a steep section along the western divide of Nash Draw. Estimated flow is approximately 125 gpm. Other springs occurring along the eastern side of the lake may be related to seepage from Laguna Uno. All of the springs are quite saline.

Surprise Spring. Surprise Spring is located in the northern end of Laguna Grande. It has been mentioned in documents dating to the early 1900s and predates any potash mining activities in Nash Draw. Flow from Surprise Spring was estimated at 200 gpm and is not believed to vary significantly seasonally (Lambert and Harvey 1987). Chemical analysis of the spring discharge indicates a relation to the local surface water and tailings brine discharge (Lambert and Harvey 1987). In other words, Lambert and Harvey concluded in 1987 that the spring water quality was representative of a mixture of groundwater and historic tailings brine discharge in the area.

Seeps East and Northeast of Laguna Grande. A series of Rustler Formation outcrops seep small amounts of water to Laguna Grande during much of the year. The seeps are distributed over an area along the northeast side of the playa lake and the rate of discharge is difficult to estimate. All of the seeps are quite saline.

All the springs and seeps contain poor quality water and have salinity levels within the ranges observed in the tailings brine. Median TDS concentrations of the individual springs generally fall within the 250,000 to 360,000 mg/L range, far above the protectable groundwater limit. Two springs that have relatively lower mean TDS concentrations are the Section 19 Pond spring located north and east (upgradient) of Laguna Uno at approximately 152,000 mg/L, and the Laguna Dos spring located south and east (cross gradient) of Laguna Uno at approximately 151,000 mg/L, but both exceed the protectable groundwater limit.

Tailings Brine Water Chemistry

The TDS concentration and major ion (chloride, sulfate, etc.) composition of the Mosaic tailings brine discharge is presented in the DP-1399 semi-annual monitoring reports that Mosaic submits to the NMED and presented in Table 4. The TDS concentrations of tailings brine samples collected between 2012 and 2022 have ranged between 107,000 to 401,000 mg/L, with a median concentration of 285,000 mg/L (Figure 21). More recent brine samples from 2020 and 2022 show a decrease in TDS concentrations, with measured values between a low of 115,000 mg/L (October 2021) and a high of 341,000 mg/L (May 2021), for a median TDS concentration of 284,000 mg/L. In other words, the recent 2022 values fall within the historical range of TDS values measured in the Brine Pipeline samples taken at the Site since 2012.

2.6.4 Pecos River

The Pecos River, running from the northwest to the southeast near the Site, flows approximately 1.3 miles southwest of Laguna Grande and is the only freshwater perennial stream in the vicinity of the Site. The only significant continuously flowing tributary of the Pecos in the area is the Black River located on the west side of the Pecos River approximately 4 miles downstream and southeast of Laguna Grande (Figure 19). Studies of the chemical character of water in the Pecos River basin in New Mexico began in 1937. Results of early investigations in the area indicated that highly mineralized water enters the Pecos River through seeps and springs in the Malaga Bend section of the river, located approximately five miles south of Laguna Grande, adding greatly to the already high mineral load carried by the river as it enters that stretch (Hale et. al. 1954). The source of the concentrated brine in the alluvium at Malaga Bend is the brine aquifer that underlies the area at a depth of approximately 200 feet (Figure 11). The brine is under sufficient head in the aquifer to percolate upward through the overlying formations and ultimately to the Pecos River.

On behalf of Mosaic, Golder collects quarterly surface water quality samples from four locations on the Pecos River as part of the DP-1399 monitoring program, identified as River 1, River 2, River 3, and River 4 in Figure 2. River 4 is the most recent Pecos River sampling point added to the DP-1399 monitoring program, and was established in January 2022. A time-series plot of TDS concentrations over time at the Pecos River sampling points is included as Figure 23. The TDS concentrations at these four locations appear to show parallel seasonal changes (similar TDS values at the same sample time along the stretch of the Pecos closest to Laguna Grande) rather than a defined trend. A distinct drop in TDS concentrations was observed in July 2021 following the flooding that occurred in the Pecos River in late June 2021. The TDS concentrations were shown to rise back up to just below their average concentrations at all three sample points during the October 2021 sampling event.

The median TDS concentrations of the Pecos River sample points range from 4,390 mg/L at River 1 to 4,936 mg/L at River 2. River 3, located northwest and upgradient of the Site, has a median TDS concentration of 4,495 mg/L. River 4, the newest and most downgradient sample point with a total of three sampling events, has had TDS concentrations ranging between 4,560 mg/L and 5,220 mg/L.

Mosaic also installed three staff gauges and monitoring systems along the Pecos River in 2018, identified as Pecos River Staff Gauges #1, #2, #3 in Figure 2. A fourth Pecos River Staff Gauge and monitoring system (Staff Gauge #4) was installed in April 2022 downstream of Staff Gauge #3 (Figure 2). The staff gauges include adjacent automated camera systems programmed to record a photograph of the stage height of the Pecos River at one-hour intervals. Hourly water level data for the individual instrumented staff gauges are provided in the DP-1399 semi-annual monitoring reports Mosaic submits to the NMED. A summary of the daily average water level data collected from the individual staff gauges are included in Table 5.

3.0 SITE INVESTIGATION WORK PLAN [20.6.2.4106.C(2) NMAC]

This section provides a site investigation work plan for assessment of the Site in accordance with 20.6.2.4106.C(2) NMAC, and some area specific considerations. In accordance with the cited regulations, the S1AP will evaluate the areas of known ground water and surface water with TDS concentrations higher than the protectable groundwater standards and requirements set forth in Section 20.6.2.4103 NMAC. This work will be performed based on both existing site data collected as part of the DP-1399 monitoring program and other site investigations and additional data collected through the proposed S1AP scope of work as outlined below. See Table 9 for a proposed monitoring and reporting schedule and Table 10 for a proposed schedule of each task described below.

3.1 Task 1 – Data Gap Analysis [20.6.2.4106.C(7) NMAC]

Due to the extensive amount of information already available for the Site, the first step in the S1AP is an assessment of the existing information and identification of data gaps for purposes of an abatement plan. Following the data gap analysis, the next stage is the collection and evaluation of additional data, to be coordinated with studies already required under DP-1399 and other ongoing studies at the Site.

Although this Modified S1AP Proposal is designed to adequately define Site conditions and provide the necessary data to select and design an effective Stage 2 abatement option (if necessary), if Mosaic identifies data gaps as part of Task 1, applicable S1AP task scopes of work presented herein will be refined accordingly and submitted to the NMED. Results of the data gap analysis will be presented as an attachment to the summary S1AP quarterly progress report covering the period when the gap analysis is completed.

3.2 Task 2 – Workplan to Further Investigate Site Geology and Hydrogeology [20.6.2.4106.C(2)(a) NMAC]

Task 2 will include an investigation of the Site geology and hydrogeology in accordance with 20.6.2.4106.C(2)(a) NMAC. The results of this investigation will help further define the vertical and horizontal extent and magnitude of vadose-zone and groundwater with concentrations of constituents in excess of the standards and requirements set forth in Section 20.6.2.4103 NMAC, and subsurface hydraulic parameters including hydraulic conductivity, transmissivity, storativity, and migration rates and directions of various water quality constituents. The Task 2 investigation will also provide an inventory of water wells inside and within one mile from the perimeter of the three-dimensional body where the standards set forth in Subsection B of Section 20.6.2.4103 NMAC are exceeded, and location and number of such wells actually or potentially affected by Mosaic discharges

(Figure 24). Additionally, as part of the NMED's July 7, 2022 request for a Modified S1AP Proposal, the agency requested that Mosaic include an evaluation of water quality in monitoring wells with TDS concentrations >10,000 mg/L. The proposed Task 2 scope of work described below clarifies that essentially all wells and piezometers in the DP-1399 groundwater monitoring network (those with TDS concentrations >10,000 mg/L, and those with TDS concentrations <10,000 mg/L) will be included in the S1AP water quality analyses. Details of the proposed Task 2 investigation of the Site geology and hydrogeology are presented in the following sections.

3.2.1 Task 2a – Well Inventory

All groundwater wells inside and within a one-mile perimeter of the three-dimensional body of water where measured constituents are present in excess of the numerical standards of 20.6.2.3103 NMAC, and all groundwater wells actually or potentially affected by water contaminants from this area, will be identified as part of Task 2a. A well inventory was previously conducted in 2019 as part of further characterization of the hydrogeology in the area between Laguna Grande and the Pecos River at the request of the NMED (Mosaic Potash Carlsbad Inc. 2019). A summary of the available completion information for the soil borings, piezometers, and wells in the area of the Site was developed as part of this previous inventory, and the information has been updated with new well information obtained as part of the development of this Modified S1AP Proposal. Tables 6 through 8 present the completion information for the soil borings, piezometers and wells in the area of the Site.

The existing well inventory will be updated as part of the S1AP using the New Mexico Office of the State Engineer WATERS database and the USGS National Water Information System with subsequent field verification, as well as information in Mosaic files and personal knowledge of Mosaic staff. Results of the updated well inventory will be presented as an attachment to the summary S1AP quarterly progress report covering the period when the inventory is completed. The well inventory results will also be included as an attachment to the Final Site Investigation Report detailing the results of the S1AP.

3.2.2 Task 2b – Define the Extent of Potential Impacts to Groundwater from Mosaic Discharges

As previously described in Section 2.4 of this Modified S1AP Proposal, multiple studies have been conducted at the Site throughout the years to investigate the source of brine within the Rustler and Gatuña Formations and potential impacts to groundwater from Site discharges. Tasks 2c, 2d, 2e, 3, and 4 described below will provide a comprehensive evaluation of the geology, hydrogeology, surface water hydrology, and waste streams at the Site. The data obtained from these tasks will be evaluated together as one package to provide a comprehensive assessment of the potential impacts to groundwater from Mosaic discharges.

It is anticipated that through this evaluation, the detailed geochemical characteristics/signatures of the individual media (groundwater, surface water, brine discharge, and natural sources of brine) will be identified, and that the potential of mixing of the various media will be estimated. Mosaic anticipates that a series of maps will be developed showing the distribution of various geochemical constituents across the Site and by media as part of Task 2b, and the results of the analysis will provide an assessment of the potential impacts to groundwater from Mosaic discharges. The analysis will include at a minimum the following components:

- further analysis of groundwater quality trends within the current DP-1399 groundwater monitoring network, which includes 15 monitoring wells (LG-1, LG-5, LG-23, LG-25, LG-26, LG-28, LG 29, LG-30, LG-31, LG-32, LG-34, LG-35, LG-36, LG-37, LG-38) located between Laguna Grande and the Pecos River, one monitoring well (LG-33) located on the west side of the Pecos River, and three piezometers (P-East, P-West, and P-Center) located in the vicinity of the Salt Stack;

- analysis of surface water quality trends in the Pecos River sampling locations River 1, River 2, River 3, and River 4 (included as part of Task 2e);
- evaluation of the vertical and horizontal extent and magnitude of vadose-zone and groundwater constituents in excess of the standards and requirements set forth in Section 20.6.2.4103 NMAC;
- evaluation of the geochemical characteristics, or water types, of the individual media within the area (groundwater, surface water, brine discharge, and natural sources of brine) based on existing ion chemistry through the development of Stiff, Schoeller, and Piper Trilinear diagrams. Examples of these three diagrams are provided in Figure 25; and
- individual plan view figures will be developed showing the Stiff and Schoeller plots associated with each sample location. These figures will help identify the distribution of various water types throughout the Site associated with the individual media sampled.

The results of the assessment of the potential impacts to groundwater from Mosaic discharges will be included in the Final Site Investigation Report detailing the results of the S1AP.

3.2.3 Task 2c – Characterize the Hydrogeologic Conditions Between Laguna Grande and the Pecos River

Mosaic conducted multiple investigations throughout the years to characterize the hydrogeology in the area between Laguna Grande and the Pecos River, and the ongoing DP-1399 monitoring program continues to build on our understanding of the hydrogeology in the area. Some of the more recent work conducted at the Site to help further characterize the hydrogeology in the area between Laguna Grande and the Pecos River was completed in 2018 and 2019 at the request of the NMED (2018). As part of this investigation, Golder and HRS Water Consultants, Inc. completed a well and soil boring inventory of the area between Laguna Grande and Loving, New Mexico, on the west side of the Pecos River and developed four new regional hydrogeologic cross sections within the area based on the survey data (Figures 6 through 10). Additionally, Mosaic recently installed six additional groundwater monitoring wells in the area between November 2020 and December 2021 that provide additional information on the hydrogeology in the area.

As part of Task 2c, Mosaic will update the existing hydrogeologic cross sections with the new hydrogeologic data obtained from the six new wells (LG-33 through LG-38) installed by Mosaic since the original cross sections were developed, as well as any new hydrogeologic data obtained from the updated well inventory conducted as part of Task 2a. Additional analysis of the hydrogeologic conditions in the area will be conducted as part of Task 2c, including:

- analysis of water quality trends within the current DP-1399 groundwater monitoring network as described above in Task 2b;
- evaluation of the vertical and horizontal extent and magnitude of vadose-zone and groundwater constituents in excess of the standards and requirements set forth in Section 20.6.2.4103 NMAC between Laguna Grande and the Pecos River;
- evaluation of the geochemical characteristics, or water types, for the individual water-bearing units identified between Laguna Grande and the Pecos River based on existing ion chemistry through the development of Stiff, Schoeller, and Piper Trilinear diagrams; and

- evaluation of the subsurface hydraulic parameters for the individual water-bearing units identified between Laguna Grande and the Pecos River including hydraulic conductivity, transmissivity, storativity, and rate and direction of groundwater flow.

The results of the updated characterization of the hydrogeologic conditions between Laguna Grande and the Pecos River will be included in the Final Site Investigation Report detailing the results of the S1AP.

3.2.4 Task 2d – Characterize the Hydrogeologic Conditions West of the Pecos River

As part of Task 2d, Mosaic will attempt to perform a water level survey and water quality monitoring of privately-owned wells located on the west side of the Pecos River within a one-mile radius of the three-dimensional body where the standards set forth in Subsection B of Section 20.6.2.4103 NMAC are exceeded. Active wells currently identified on the west side of the Pecos River are shown in Figure 24, and available construction details for these wells is provided in Table 7 (Note: this list will be updated as part of the Task 2a well inventory). Additional soil boring details are provided in Table 8. The preliminary list of wells proposed to be monitored on the west side of the Pecos River is shown in Figure 24 and summarized in Table 9. This list may be updated following the Task 2a well inventory and will ultimately be finalized through collaboration between Mosaic and the NMED.

Once the final list of wells to be monitored is established and the associated landowners are identified, Mosaic will make all reasonable efforts to obtain access to the wells from the landowners. For the wells where access is granted, Mosaic will survey the wellheads, measure the water levels, and take water quality samples to be analyzed for the parameters listed in Table 9. Mosaic has also been monitoring one additional well on the west side of the Pecos River, LG-33 monitoring well as part of the DP-1399 monitoring program. Mosaic proposes to monitor the landowner wells during the quarterly DP-1399 monitoring events following NMED’s approval of the Modified S1AP Proposal.

Additionally, the C03965 and C04556 POD wells located on the west side of the Pecos River (Figure 24) are associated with a corrective action program being conducted by Chevron Environmental Management Company and Arcadis related to the accidental discharge of produced water from an oil and gas produced water pipeline in 2014. Semi-annual groundwater monitoring is currently being conducted on these wells under New Mexico Energy, Minerals and Natural Resources Department Oil Conservation Division (NMOCD) Remediation Permit Number 2RP-2400. Mosaic proposes to incorporate available semi-annual (second quarter and fourth quarter) water level and water quality data associated with this corrective action program into the S1AP.

As shown in Table 9, Mosaic will gather a minimum of eight quarters of data from the existing monitoring well network and a minimum of four quarters of data from the proposed wells to be monitored west of the Pecos River.

Golder will develop potentiometric maps and water quality maps covering both the east and west sides of the Pecos River for each quarterly monitoring event to help establish regional groundwater flow directions in the area, whether there appears to be a connection between the shallow groundwater on both sides of the Pecos River, and the regional distribution of groundwater quality parameters. Historical water level data is also available from several USGS wells located on the east and west sides of the Pecos River. There were USGS groundwater level monitoring events in 2013, 2018, 2021, and 2022 that correspond with historical DP-1399 quarterly monitoring events. Golder will also prepare potentiometric maps for these overlapping events to help establish regional groundwater flow directions in the area and determine whether the regional groundwater flow patterns have changed over time.

The results of the characterization of the hydrogeologic conditions on the west side of the Pecos River will be included in the Final Site Investigation Report detailing the results of the S1AP.

3.2.5 Task 2e – Characterize any Hydrogeologic Connection Between the Pecos River and Groundwater Discharging from the Site

Mosaic characterized the potential hydrogeologic connection between the Pecos River and groundwater discharging from the Site as part of the DP-1399 Condition 12 study in 2014 (Golder 2014b), and in 2019 (Mosaic 2019) at the request of the NMED (2018). Consistent with our previous analyses, groundwater levels at the Pecos River will be estimated from the automated monitoring data sets associated with wells nearest the Pecos River (wells LG 25, LG-26, LG-30, and LG-35). Groundwater levels directly adjacent to the Pecos River will be estimated at locations downgradient of each of these wells by projecting the corresponding potentiometric surfaces from the groundwater elevation maps that are developed quarterly as part of the DP-1399 monitoring program. The potentiometric maps (Figures 15 and 16) presented in each quarterly groundwater monitoring report will be evaluated to determine the hydraulic gradients near each of the four instrumented wells highlighted in yellow in Figure 26. The measured groundwater levels at each instrumented well will then be multiplied by the hydraulic gradient near each well (i.e., slope of the water table) and the distances downgradient to the Pecos River to estimate the groundwater levels directly adjacent to the Pecos River.

Surface water elevations at each of the projected points downgradient of the four individual wells will estimated by first determining the surface water gradient between the corresponding DP-1399 automated staff gauges (existing Pecos River Staff Gauges 1 through 4) and then multiplying the surface water gradient by the distance between the nearest staff gauge and the associated projected point downgradient of each well. This provides an estimate of the total change in the surface water elevation in feet between the nearest staff gauge and the projected point downgradient of each well. This number is then either added to (if upgradient) or subtracted from (if downgradient) the measured surface water elevation at the nearest staff gauge to provide an estimate of the surface water elevation downgradient of the projected point downgradient of each well. Hydrographs of projected surface water levels and projected groundwater levels at each of the four points along the Pecos River will be prepared quarterly and summarized in the summary quarterly progress reports submitted to NMED.

Additionally, as part of the DP-1399 monitoring program, Mosaic collects surface water quality samples from four sampling stations on the Pecos River designated as River 1, River 2, River 3, and River 4. The water quality data from these sampling points will be used to establish the geochemical characteristics, or water types, based on existing ion chemistry through the development of Stiff, Schoeller, and Piper Trilinear diagrams as described above in Task 2b. Additionally, water quality trend plots will be prepared for each of the river sample points that show the changes in concentrations of individual constituents over time and distance downstream within the Pecos River. The Pecos River water quality data will be compared to the groundwater quality data analyzed under Task 2b to determine if there are similar water types in any of the wells and if there are similar trends in concentrations of various constituents observed between any of the wells and the Pecos River sample points (Figure 26). The results of the geochemical characterization of the Pecos River water will be included in the Final Site Investigation Report detailing the results of the S1AP.

3.3 Task 3 – Workplan to Further Investigate Site Surface Water Hydrology [20.6.2.4106.C(2)(b) NMAC]

Task 3 will include an investigation of the Site surface water hydrology in accordance with 20.6.2.4106.C(2)(b) NMAC. The results of this investigation will provide details of the surface-water hydrology, seasonal stream flow characteristics, groundwater/surface-water relationships, and the potential for impacts to the Pecos River from mining operations. Existing Site data from previous investigations will be heavily relied upon in our evaluation as well as the surface water quality and stage data collected as part of the DP-1399 monitoring program and S1AP Task 2e (described above). Available water level and water quality data (both current and historic) will be obtained from the USGS National Water Information System Database for the Pecos River Station near Malaga Bend (USGS Station #8406500). The water quality data for USGS Station #8406500 will be compared to the water quality data obtained from Mosaic River Stations 1 through 4, and the Malaga Bend station stage data will be evaluated alongside the data from Mosaic Pecos River automated staff gauges #1 through #4.

Additional hydrographs of stage data from Laguna Grande automated staff gauges #1 through #3 will be evaluated along with groundwater hydrographs from nearby DP-1399 groundwater monitoring wells to provide estimated gradients between the surface water stage in Laguna Grande and the groundwater surface. These data, in combination with the water quality and water level data obtained as part of S1AP Task 2e, will provide a comprehensive characterization of the surface water hydrology at the Site. The results of the surface water hydrologic investigation will be included in the Final Site Investigation Report detailing the results of the S1AP.

3.4 Additional Site Investigation Components [20.6.2.4106.C(7) NMAC]

Several additional Site investigation components were identified by the NMED in their October 2021 abatement plan requirement notification letter to Mosaic, and their subsequent July 7, 2022 letter request to modify the S1AP Proposal (see Attachment 1). These individual scope items are described in the following sections.

3.4.1 Task 4 – Workplan for Characterization of the Waste Stream Discharged from the Plant to the Salt Stack and Laguna Grande

Flows and water quality from the Salt Stack to Laguna Grande are measured from the Brine Pipeline in accordance with DP-1399, and flow volumes of heavy media tailings and thickener underflows are measured as part of Site operations. The brine discharge will continue to be monitored quarterly in accordance with Conditions C105.G.2 and C105.G.3 of the draft DP-1399 permit, with the addition of total suspended solids (TSS) analyses as described below in S1AP Task 5. Additionally, as part of Task 5, daily flow rates for the heavy media tailings and thickener underflows will be recorded. The geochemical characteristics of the brine discharge will be compared to the geochemical characteristics of the groundwater and surface water at the Site determined as part of S1AP Tasks 2b, 2c and 2e (described above) and 8 (described below). This analysis will help determine if there are similar or unique water types observed between the brine discharge, groundwater, and surface water at the Site, or if there are similar or unique trends in concentrations of various constituents observed between the different media over time. The results of the characterization of the waste stream discharged from the Plant to the Salt Stack and Laguna Grande will be included in the Final Site Investigation Report detailing the results of the S1AP.

3.4.2 Task 5 – Workplan to Evaluate the Effect of the Discharge of Suspended Clay Particles to the Laguna Grande Brine Management Area

As described in S1AP Task 4 above, Mosaic will continue to quarterly sample the brine being discharged from the Brine Pipeline to Laguna Grande as part of the DP-1399 monitoring program. As detailed in Table 9, Mosaic proposes to add TSS to the quarterly brine discharge analyte list summarized in Conditions C105.G.2 and C105.G.3 of the draft DP-1399 permit. The addition of TSS to the analyte list in combination with the measured flow rates will allow for the quantification of the mass of solids added to Laguna Grande via the Brine Pipeline. By determining the solids addition rate to Laguna Grande, Mosaic can determine the effectiveness of the solids separation from the Salt Stack to the Clay Settling Pond, the relative quality of brine entering Laguna Grande, and the sediment load to Laguna Grande associated with Mosaic's brine discharge.

Mosaic will also collect a sample of water from the culvert that discharges naturally occurring surface water into the northern end of Laguna Grande during the quarterly monitoring events and analyze the sample for TSS and other inorganic constituents listed in Table 9. A visual estimate of the flow rate discharging from the natural runoff culvert will also be made during each quarterly monitoring event to allow for quantification of the sediment load to Laguna Grande from natural runoff. The locations of the Brine Pipeline discharge point and the natural runoff culvert are shown in Figure 2. The results of the Task 5 analysis will provide an estimate of the sediment load to Laguna Grande associated with both brine discharge from the Clay Settling Pond and from natural surface runoff. The results of the quarterly analyses will be presented in the DP-1399 semi-annual monitoring reports submitted in accordance with Condition C105.H of the draft DP-1399 permit. The full analysis of the estimated sediment load at Laguna Grande during the S1AP program will be presented in the Final Site Investigation Report detailing the results of the S1AP.

Additionally, Condition C105.N of draft DP-1399 permit requires Mosaic to submit a work plan to the NMED within 45 days of the effective date of the permit a plan to monitor the surface water quality in shorebird habitats that may be impacted by Mosaic's operations. Pertinent data collected from the Condition C105.N study will also be incorporated into Task 5 analysis, and the water quality data collected as part of Task 5 of the S1AP will be used to support the Condition C105.N study.

3.4.3 Task 6 – Workplan to Evaluate the Relationship Between Salt-Producer Operations and Impacts to Groundwater and the Pecos River

As previously described in Section 2.1, there are three current salt harvesting companies in the area: United Salt, New Mexico Salt, and Southwest Salt. Mosaic does not have the authority to compel any of these companies to participate in or contribute to this S1AP. However, Mosaic proposes to review any publicly available discharge permits issued by NMED, any discharge data submitted to the NMED, any salt transportation, storage or production data, producer site inspections and groundwater pumping data for each company. If there is any information that may be relevant to Task 1 above, or if any data correlations or causations of groundwater quality degradation can be determined from our analysis, this information will be presented in the Final Site Investigation Report.

3.4.4 Task 7 – Workplan to Address Hydrologic Conditions Present in the Area of Monitoring Well LG-2

At the request of the Mining Environmental Compliance Section (MECS) of NMED (2021a), Mosaic submitted the Work Plan for New Monitoring Wells Near Existing Well LG-2 (Work Plan) to the agency on June 16, 2021. The Work Plan was subsequently approved by the NMED on June 25, 2021 (NMED 2021b). Work was completed according to the NMED-approved work plan between December 2021 and January 2022 and included the installation of one monitoring well (LG-38) on Mosaic property, and two wells (LG-36 and LG-37) located on lands managed by the BLM (Figures 2, 3, and 16). The work completed was intended to meet the NMED's request to further characterize the hydrogeology in the DP-1399 monitoring network by addressing individual conditions in Section C105 of the draft DP-1399 permit. All associated field activities were performed at the direction of Golder on behalf of Mosaic.

The three new wells were drilled and installed by Cascade Environmental Drilling (Cascade) between December 13 and 18, 2021, in accordance with New Mexico State regulations (NMAC 19.27.4). The as-built well completion report for the new LG-2 area wells is scheduled to be submitted to the NMED in the third quarter of 2022 and will include specific details of the drilling and well completion program. The as-built report will provide detailed boring logs, well completion logs, and wellhead survey data for the three new wells, along with a detailed description of the drilling and well installation program. Detailed as-built construction details for wells LG-36, LG-37, and LG-38 are presented in Table 6.

Once these installations were completed, LG-37 and LG-38 were sampled in January 2022 as part of the DP-1399 quarterly monitoring program, and the laboratory analytical results were presented in the DP-1399 2022 first semi-annual monitoring report. Monitoring well LG36 was dry upon well completion in December 2021 and during the first quarter January 2022 monitoring event. During the second quarter 2022 monitoring event, monitoring well LG-36 had approximately 1.75 feet of water in the well; however, no water sample was collected due to the well going instantaneously dry once pumped. All three wells were successfully sampled in July 2022 during the third quarter 2022 monitoring event, and the laboratory analytical results will be presented in the DP-1399 2022 second semi-annual monitoring report. These wells will continue to be monitored and the results reported to the NMED in accordance with Condition C105 of the draft DP-1399 permit. Pressure transducers equipped with internal data loggers were installed within monitoring wells LG-37 and LG-38 in April 2022, and LG-36 will be instrumented in the third quarter of 2022 in accordance with condition C105.B of the draft DP-1399 permit. The submersible pressure transducers within wells LG-37 and LG-38 are programed to record water levels to the nearest 0.01 foot and water temperatures on an hourly basis. All three transducers will be routinely downloaded, and the data sets updated as part of the DP-1399 monitoring program in accordance with condition C105.H.1 of the draft DP-1399 permit.

3.4.5 Task 8 – Water Balance Analysis Within a Portion of Nash Draw

In the NMED's July 7, 2022 request for a Modified S1AP Proposal, the agency requested that Mosaic include a water balance analysis of Nash Draw in the Modified S1AP scope. In accordance with NMED's request, Mosaic is proposing to perform a detailed water balance for the northeastern section of Laguna Grande (Pond 4) as shown in Figure 27.

Mosaic selected this area for the detailed water balance because of several important factors:

1) Pond 4 is the approved discharge point for Mosaic's permitted brine discharge via the Brine Pipeline;
2) Pond 4 provides the most complete hydrologic data set required to complete the water balance thereby reducing uncertainties; and
3) Given its overall surface area is greater than 2,000 acres, Pond 4 has only minimal surface disturbance from salt harvesting operations in Laguna Grande. Such disturbances could impact evapotranspiration and seepage rates.

The detailed hydrologic data that exist for this area that makes it an optimum choice for the water balance analysis include the following:

- climate data collected from the Laguna Grande Meteorological Station (LGMS) since December 2018 (precipitation, temperature, relative humidity, wind speed and direction, solar radiation);
- stage data collected from the existing Laguna Grande automated staff gauges since 2018, and historically from other operational staff gauges;
- Brine Pipeline discharge flow and water quality measurements at Laguna Grande since 2012;
- visual estimates of the flow rate discharging from the natural runoff culvert at the northern end of Laguna Grande as part of Task 5 (described above);
- permeability data of the underlying playa sediments obtained from previous investigations;
- updated stormwater runoff estimates for the Laguna Grande watershed from updated HEC-HMS modeling conducted in 2022(Golder 2022b);
- Laguna Grande water quality data that will be collected as part of Condition C105.N of draft DP-1399, and water quality data that has been collected at Laguna Grande since 2000;
- high resolution 1-foot topography for the Laguna Grande area from the New Mexico LiDAR program released in December 2020; and
- historic aerial photographs of Laguna Grande.

As shown in Figure 27, the proposed water balance area covers an area of approximately 2,116 acres and is constrained on the southwest by the Pond 4 Dike. The water balance analyses will be performed using standard hydrologic calculations such as may be found in (Chow et. al. 1988) and (Freeze and Cherry 1979). The water balance model will consider the following inflows to Pond 4:

- direct precipitation on the pond surface (measured at the LGMS);
- brine discharge measured at the Brine Pipeline as part of DP-1399;
- stormwater runoff to Pond 4 (based on a combination of visual observations of flows at the natural runoff culvert at the northern end of Laguna Grande, and runoff estimates associated with observed storm events that are based on the 2022 HEC-HMS model); and
- estimates of groundwater inflow via springs on the northern and eastern sides of Laguna Grande based upon visual observations.

Outflows considered in the Pond 4 water balance model will include:

- pond evaporation (based on measured relative humidity, wind speed, air temperature, and solar radiation from the LGMS; TDS concentrations and water temperatures collected as part of Condition C105.N of draft DP-1399; and stage data from the Laguna Grande automated staff gauges and associated water surface areas based on the 2020 LiDAR survey);

- seepage to groundwater (based on stage data from the Laguna Grande automated staff gauges and associated water surface areas based on the 2020 LiDAR survey, and permeability data of the underlying playa sediments); and
- visual estimates of brine pumping out of Pond 4 based on pump ratings and hours of operation and/or operational pumping records (if available) of brine transfers from Pond 4 to other salt harvesting ponds by the salt harvesting companies.

The water balance analyses will begin in 2018 (the year the Laguna Grande automated staff gauges and LGMS were installed) and will extend through the data collection period of the S1AP. Available historical water calculations and estimates will also be reviewed as part of this analysis. Results of the water balance analysis will be presented in terms of estimated total monthly inflows and outflows and overall monthly water balance for Pond 4 between 2018 and the completion of the S1AP. Results of the water balance analysis will be presented in the Final Site Investigation Report detailing the results of the S1AP. The water balance component of the Final Site Investigation Report will present a concise, yet thorough description of the methods used, data relied on, assumptions, and results.

4.0 TASK 9 - PROPOSED MONITORING PLAN [20.6.2.4106.C(3) NMAC]

For the S1AP monitoring program, Mosaic proposes to continue monitoring existing DP-1399 groundwater monitoring wells, surface water sampling points, Pecos River staff gauges, Laguna Grande staff gauges, and the Brine Pipeline in accordance with the requirements listed in Table 1 of the draft DP-1399 permit. Additional monitoring is proposed in the S1AP that is separate from the DP-1399 monitoring program as described above in the individual proposed tasks scopes of work. The proposed S1AP monitoring and reporting schedule is presented in Table 9.

Unless otherwise approved in writing by NMED, Mosaic will conduct sampling and analysis in accordance with the most recent edition of the following documents (20.6.2.3107.B NMAC):

1) American Public Health Association, Standard Methods for the Examination of Water and Wastewater (18th, 19th, or current);
2) US Environmental Protection Agency, Methods for Chemical Analysis of Water and Waste;
3) USGS, Techniques for Water Resources Investigations of the USGS;
4) American Society for Testing and Materials (ASTM), Annual Book of ASTM Standards, Part 31. Water;
5) USGS et al., National Handbook of Recommended Methods for Water Data Acquisition;
6) Federal Register, latest methods published for monitoring pursuant to Resource Conservation and Recovery Act regulations;
7) Methods of Soil Analysis: Part 1. Physical and Mineralogical Methods; Part 2. Microbiological and Biochemical Properties; Part 3. Chemical Methods, American Society of Agronomy; and
8) Brine monitoring shall be conducted according to test procedures approved under Title 40 Code of Federal Regulations (CFR) Part 136.

Specific analytical methods to be employed at the Site during the S1AP will be provided in the quality assurance and quality control (QA/QC) plan being prepared as part of Task 10. As presented in Table 10, the proposed monitoring plan will be submitted to the NMED for approval within 30 days of the NMED's approval of the Modified S1AP Proposal.

5.0 TASK 10 – QUALITY ASSURANCE PLAN [20.6.2.4106.C(4) NMAC]

Mosaic will develop and submit a QA/QC plan to NMED sufficient to cover all expected activities at the Site related to the S1AP prior to the commencement of any field investigations. As presented in Table 10, the QA/QC plan will be submitted to the NMED for approval within 60 days of the NMED's approval of the Modified S1AP Proposal.

6.0 TASK 11 – SITE HEALTH AND SAFETY PLAN [20.6.2.4106.C(5) NMAC]

Mosaic will develop and submit a site health and safety plan to NMED sufficient to cover all expected activities at the Site related to the abatement plan prior to the commencement of any field investigations conducted under this S1AP. As presented in Table 10, the health and safety plan will be submitted to the NMED for approval within 60 days of the NMED's approval of the Modified S1AP Proposal.

7.0 TASK 12 – STAGE 1 ABATEMENT PLAN REPORTING

The proposed S1AP implementation and reporting schedule is provided in Table 10. Mosaic will submit summary quarterly progress reports covering each calendar quarter beginning with the first full calendar quarter following NMED's approval of the Modified S1AP Proposal. Summary quarterly progress reports will be submitted to the NMED detailing the status of S1AP activities conducted over the previous quarter, an updated project schedule, and any deviations from the approved Modified S1AP Proposal that occurred (if applicable). The summary quarterly reports will be submitted within 30 days of receipt of the final analytical results associated with each quarter and will continue up until the submittal of the Final Site Investigation Report.

A Final Site Investigation Report will be submitted to the NMED detailing the results of the S1AP. As detailed in Table 10, Mosaic's proposed reporting schedule includes the submittal of a Draft Final Site Investigation Report to the NMED within 90 days of receipt of the final quarterly analytical data set. The Final Site Investigation Report will be submitted within 90 days from receipt of NMED comments on the Draft Final Site Investigation Report.

8.0 STAGE 1 ABATEMENT PLAN IMPLEMENTATION SCHEDULE [20.6.2.4106.C(6) NMAC]

The proposed schedule for completion of the S1AP is outlined in Table 10. Because 20.6.2.4103.D NMAC states that abatement is not considered complete until a minimum of eight consecutive sampling events collected from all compliance sampling stations approved by the secretary, with a minimum of 90 days between sampling events spanning a time period no greater than four years, Mosaic is proposing a two-year completion schedule for implementation of the S1AP. The Draft Final Site Investigation Report will be submitted to the NMED within 90 days of receipt of the final quarterly analytical data set, and the Final Site Investigation Report will be submitted within 90 days from receipt of NMED comments on the Draft Final Site Investigation Report. It is also important to ensure that the S1AP schedule allows for fluctuations in Mosaic potash mining and K-Mag® production rates as well as seasonal variations in precipitation and evaporation rates.

Additional data collection required under the S1AP will be coordinated with additional facility-specific requirements stipulated in the draft DP-1399 permit to the extent possible. The additional facility specific requirements specified in the draft DP-1399 permit expected to be most closely integrated with the S1AP are listed in Part C of the draft permit and include Part C101.C (Clay Setting Pond dike raise as-built), Part C103.A (stormwater management plan), and Part C105.N (monitoring of water quality in shorebird habitats).

Key tasks that will need to be initiated at the beginning of the S1AP include the data gap analysis (Task 1), well inventory (Task 2a), monitoring plan (Task 9), QA/QC plan (Task 10), and Site health and safety plan (Task 11).

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Tables

Table 1: Current and Historic Potash Mining Operations Within the Area of the Mosaic Potash Mine

Site No. [1]	Site Name [2]	Site Name Other	Latitude (WGS84)	Longitude (WGS84)	Description
1	Mosaic Mine	Union Potash & Chemical Co. mine; International Agriculture mine; International Minerals & Chemical Corp. mine; Mosaic Potash mine	32° 24' 46" N	103° 56' 15" W	The time periods for the alternate names are: Union Potash & Chemical mine (1936-1940); International Agriculture mine (1940-1941); International Minerals & Chemical mine (1941-2004); Mosaic Potash mine (2004-Present). Acquired by Mosaic, in Oct. 2004, from IMC
2	Nash Draw Mine	Duval Sulphur & Potash Co. - Nash Draw mine; Potash Producers - Nash Draw; Western Ag - Nash Draw; IMC Potash - Nash Draw; Mosaic Potash - Nash Draw	32° 20' 14" N	103° 49' 55" W	The time periods for the names are: Duval (1952-1984), Potash Producers (1984-1985), Western Ag (1985-1996), IMC Potash (1996-2004), Mosaic Potash (2004-Present).
3a	U. S. Potash Co. Mine	U.S. Potash Mine; U.S. Borax & Chemical Co. Mine; U.S. Potash and Chemical Mine; Continental American Mine; Teledyne Mine; Mississippi Potash West Mine; Intrepid Potash West Mine	32° 28' 55" N	103° 53' 25" W	Mine site location. The time periods for the alternate names are: U.S. Potash mine (1931-1956); U.S. Borax mine (1956-1968); U.S. Potash and Chemical mine (1968-1970); Continental American mine (1970-1972); Teledyne mine (1972-1974); Mississippi Potash West mine (1974-2004); Intrepid Potash West mine (2004-Present).
3b	United States Potash Company	---	32° 18' 38" N	104° 1' 48" W	Refinery site location
4	National Potash Co. Mine	National Potash mine; Mississippi Potash North mine; Intrepid Potash North mine	32° 32' 30" N	104° 2' 9" W	The time periods for the alternate names are: National Potash mine (1957-1985), Mississippi Potash North mine (1985-2004), Intrepid Potash North mine (2004-Present).
5	Saunders Mine	Duval Sulphur & Potash - Saunders mine; Potash Producers - Saunders mine; Western Ag - Saunders mine	32° 32' 8" N	103° 56' 1" W	The time periods for the names are: Duval Sulphur & Potash (1952-1984), Potash Producers (1984-1985), Western Ag (1985-1990).
6	Kerr McGee Mine	Kermac Mine; Kerr McGee Mine; Vertac Mine; Fermetia Mine; New Mexico Potash Mine; Mississippi Potash East Mine; Intrepid Potash East Mine; Hobbs Potash facility	32° 30' 15" N	103° 46' 55" W	The time periods for the alternate names are: Kermac mine (1965-1975); Kerr McGee Mine (1975-1985); Vertac Mine (1985-1988); Fermetia Mine (1988-1989); New Mexico Potash Mine (1989-1996); Mississippi Potash East Mine (1996-2004); and, Intrepid Potash East Mine (2004-present).
7	Crescent/North Mine	Duval Sulphur & Potash - Crescent Mine; Mississippi Potash - Crescent/North Mine	32° 34' 8" N	103° 55' 9" W	The time periods for the alternate names are: Duval Sulphur & Potash - Crescent mine (1976-1984), Mississippi Potash Crescent/North mine (1985-1990s).
8	PCA Mine	Potash Company of America mine; Lundberg Industries mine; Eddy Potash mine; HB Potash mine; Intrepid Potash - HB Project	32° 35' 58" N	103° 58' 33" W	The time periods for the alternate names are: PCA mine (1935-1985), Lundberg Industries mine (1985-1987), Eddy Potash mine (1987-2004), HB Potash mine (2004-2009), Intrepid Potash - HB Project (2009-Present).
9	Amax Mine	Southwest Potash mine; Horizon Potash mine	32° 40' 15" N	103° 58' 6" W	The time periods for the names are: Southwest Potash mine (1952-1964), Amax mine (1964-1993), Horizon Potash mine (1993).
10	New Mexico Potash Corporation	Hobbs Underground Potash Mine	32° 36' 45" N	103° 43' 44" W	---
11	New Mexico Salt & Minerals Company	---	32° 18' 39" N	104° 1' 53" W	Salt harvesting operations
12	United Salt Carlsbad, LLC	---	32° 18' 41" N	104° 0' 20" W	Salt harvesting operations
13	Southwest Salt Company	---	32° 15' 7" N	104° 1' 12" W	Salt harvesting operations

Notes:

[1] - See Figure 1 for site locations.

[2] - Data provided by: mindat.org; sites 3a, 11, 12, and 13 from internet data search https://www.mindat.org/feature-5490702.html

Table 2: Summary of Key Investigations and Studies Conducted in and Around the Mosaic Potash Mine Site

Previous Investigations	Investigation Period	Reference	Summary
Geology and Groundwater Conditions Near Laguna Grande	1938	Robinson and Lang 1938	Description of historic operations, hydrogeology, groundwater and surface water constituent concentrations near Laguna Grande.
Groundwater Study – Proposed Expansion of Potash Mine	1978	Geohydrology Associates 1978	Geologic and hydrogeologic investigation of Carlsbad Potash area.
Water-Resources Study of Carlsbad Potash Area	1978-1979	Geohydrology Associates 1979	Geology and hydrogeology of the area; surface and subsurface water budget of ponds.
Hydrogeology Baseline Study	2000-2001	Golder 2002a	Surface and borehole geophysical surveys, 32 soil borings, 28 monitoring well installations, hydraulic testing, surface water and groundwater quality monitoring, geochemical characterizations, field reconnaissance surveys.
Baseline Surface Water Report, Prepared for IMC Potash	2002	Golder 2002b	Hydrogeological, geochemical, and geologic report for LG area – brine and evaporation ponds.
Baseline Monitoring of Groundwater in Support of the IMC Potash Tailings Management and Evaporation Pond Expansion	2002	Golder 2002c	Hydraulic testing of LG-26 and LG-27 and groundwater samples collected from LG-1,2,3,4,5,23,25,26,27 wells.
Design Report for Clay Settling Dike	2004	Golder 2004	Surface water hydrology and geotechnical design aspects of an earthen containment dike at Clay Settling Area.
Department of Energy Waste Isolation Pilot Plant Characterization	2004	Department of Energy 2004	Performance assessment to demonstrate the Waste Isolation Pilot Plant disposal system meets environmental performance standards.
Water Level and Water Quality Summary of the Potash Tailings Pons Near the WIPP Site	2006	Powers 2006	Current and historic information on water levels and specific gravity in Potash Tailings Ponds within the WIPP Culebra Modeling Domain
Southwest Laguna Grande Dike: Design Report	2006	Golder 2006	Mapping of Laguna Grande, geotechnical and design analyses of Southwest Laguna Grande Dike, and local hydrology of Laguna Grande and dike structure.
Hydraulic Testing Results in Support of Dewatering for Contingency Dike Design	2009	Golder 2009a	Test Pits, geotechnical borings, hydraulic testing.
Geologic Relationships Between the Laguna Grande Evaporation Pond and the Pecos River and Potential Groundwater Impacts	2012	Vail 2012a	Geologic relationships between Laguna Grande and the Pecos River, groundwater analyses, geologic cross sections.
Analysis of Pecos River and Nash Draw Geochemistry and Impact of Potash Brine Evaporation	2012	Vail 2012b	Pecos River water quality, brine water quality, surface water quality, groundwater quality.
Geology and Hydrology of the Rustler Formation (Permian) in Nash Draw	2014	Vail 2014	Hydrogeology of the Rustler Formation in Nash Draw, geologic cross sections, brine aquifer analyses.
Mosaic Potash Carlsbad Inc. TMA Hydrogeological Compilation	2014	SNC-Lavalin 2014	Hydrogeological compilation of available hydrogeological and stratigraphic information for Mosaic Carlsbad.
Revised Hydrologic Analysis for Southwest Laguna Grande Dike	2020 - 2021	Golder 2021	Modification report of hydrology analysis done on Southwest Laguna Grande Dike and spillway to comply with NMOSE-DSB standards, surface water hydrology and runoff estimates within Laguna Grande watershed, karst losses.
GIS Analysis Report – Karst Depressions in LG Watershed	2021	Lipson and Renninger 2021	Investigation of the geology and hydrogeology within Laguna Grande watershed, karst delineations, surface water losses.
Mosaic DP-1399 Monitoring Network Improvements: Completion Report	2020-2021	Mosaic 2021	Installation and monitoring of new wells LG-33 through LG-35, hydrogeologic logs, well completion logs
Mosaic DP-1399 LG-2 Area Well Installation Completion Report	2021	Mosaic 2022 (Pending)	Installation and monitoring of new wells LG-36 through LG-38, hydrogeologic logs, well completion logs

Table 3: Surface Water Bodies Within the Mosaic Potash Mine Site Area

Playa Lake or Depression	Approximate Aerial Extent (acres)	Average Depth (feet)	Watershed Area (acres)	Comments
Laguna Uno	300 (summer) to 700 (winter)	2	8,600	Laguna Uno is a natural depression and serves as the secondary evaporation pond for Mosaic's tailings brine during periods when the Brine Pipeline is shutdown or upset conditions occur within or up gradient of the CSP.
Lindsey Lake	110	Unknown	110	Lindsey Lake has overflow discharge to Tamarisk Flats.
Tamarisk Flats	215	<1	6,300	
Laguna Dos	75	<1	2,000	Water levels are fairly stable through the year indicating connection with shallow groundwater.
Laguna Cinco	Unknown	Unknown	Unknown	
Laguna Seis	Unknown	Unknown	Unknown	
Laguna Quatro	185	<1	1,600	Connected by a ditch to Laguna Tres.
Laguna Tres	Dry (summer) 900 (winter)	<1	2,500	
Laguna Grande	3,200 (including area used in salt harvesting)	2	5,600 north 8,000 south	Laguna Grande is a natural depression and serves as the primary evaporation pond for Mosaic's tailings brine. Salt harvesting occurs on all sections of the lake and water levels in each section are controlled by pumping, construction of dikes, and evaporation.

Table 4: Water Quality Data for Brine Discharge

Date	TDS	Sodium	Calcium	Magnesium	Potassium	Chloride	Sulfate	Alkalinity as $CaCO_3$	Specific Conductivity (mS/cm)	pH
	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(std. units)
11/26/2012	382,000	110,000	77	7,200	43,000	190,000	42,000	130	680	7.50
11/26/2012	320,800	89,000	21	6,210	37,194	156,600	31,684	213	765	7.82
4/29/2013	401,000	NA	NA	NA	NA	NA	NA	350	670	7.41
4/29/2013	317,800	79,700	11	8,542	36,503	149,100	43,959	306	778	7.88
7/31/2013	301,500	156,500	30	7,901	29,444	156,500	26,090	462	728	7.85
8/1/2013	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
2/18/2014	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
4/30/2014	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
7/22/2014	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
10/27/2014	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
1/16/2015	107,000	32,000	110	1,600	8,300	66,000	7,000	180	210	7.84
4/4/2016	273,183	77,193	377	359	16,625	142,022	62,072	127	385	7.46
6/12/2017	271,667	83,333	433	3,983	13,583	150,000	20,250	208	538	7.18
10/26/2017	274,590	79,180	261	3,410	18,279	170,492	26,066	262	662	7.37
2/20/2018	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
4/6/2018	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
7/27/2018	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
10/5/2018	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
7/27/2019	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
11/2/2019	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
1/29/2020	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
4/28/2020	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
6/22/2020	269,000	63,700	417	9,100	21,200	122,000	48,400	200	207,000	7.54
12/21/2020	284,000	NA	NA	NA	NA	NA	NA	NA	NA	NA
1/11/2021	254,000	NA	NA	NA	NA	NA	NA	NA	NA	NA
2/1/2021	285,000	NA	NA	NA	NA	NA	NA	NA	NA	NA
2/22/2021	199,000	NA	NA	NA	NA	NA	NA	NA	NA	NA
3/15/2021	297,000	NA	NA	NA	NA	NA	NA	NA	NA	NA
3/22/2021	293,000	NA	NA	NA	NA	NA	NA	NA	NA	NA
4/5/2021	285,000	NA	NA	NA	NA	NA	NA	NA	NA	NA
4/26/2021	173,000	NA	NA	NA	NA	NA	NA	NA	NA	NA
5/3/2021	341,000	NA	NA	NA	NA	NA	NA	NA	NA	NA
5/17/2021	287,000	NA	NA	NA	NA	NA	NA	NA	NA	NA
5/24/2021	265,000	NA	NA	NA	NA	NA	NA	NA	NA	NA
6/7/2021	298,000	NA	NA	NA	NA	NA	NA	NA	NA	NA
6/28/2021	201,000	NA	NA	NA	NA	NA	NA	NA	NA	NA
7/19/2021	283,000	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 4: Water Quality Data for Brine Discharge

Date	TDS	Sodium	Calcium	Magnesium	Potassium	Chloride	Sulfate	Alkalinity as $CaCO_3$	Specific Conductivity (mS/cm)	pH
	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(std. units)
7/26/2021	257,000	NA	NA	NA	NA	NA	NA	NA	NA	NA
8/9/2021	305,000	NA	NA	NA	NA	NA	NA	NA	NA	NA
9/1/2021	279,000	NA	NA	NA	NA	NA	NA	NA	NA	NA
9/6/2021	291,000	NA	NA	NA	NA	NA	NA	NA	NA	NA
10/12/2021	115,000	NA	NA	NA	NA	NA	NA	NA	NA	NA
1/3/2022	240,000	NA	NA	NA	NA	NA	NA	NA	NA	NA
4/8/2022	326,000	NA	NA	NA	NA	NA	NA	NA	NA	NA
7/10/2022	306,000	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
- NA: Not Analyzed
- ppm: parts per million
- All cation results are for the dissolved fraction

Brine Pipeline had no discharges from February 2018 to April 2020 while the CSP Dike raise project was underway. Brine was discharged to Laguna Uno during this time due to upset conditions.

Table 5: Pecos River Staff Gauge Surface Water Elevation Data

Date	PR-1 (ft amsl)	PR-2 (ft amsl)	PR-3 (ft amsl)
8/23/2018	2943.75	2936.75	2932.94
8/24/2018	2943.68	2936.80	2932.86
8/25/2018	2943.65	2936.85	2932.77
8/26/2018	2943.65	2936.85	2932.75
8/27/2018	2943.70	2936.81	2932.81
8/28/2018	2943.75	2936.76	2932.84
8/29/2018	2943.75	2936.85	2932.94
8/30/2018	2943.75	2936.76	2932.85
8/31/2018	2943.78	2936.81	2932.89
9/1/2018	2943.87	2936.85	2932.94
9/2/2018	2943.95	2936.85	2933.04
9/3/2018	2943.89	2936.85	2932.98
9/4/2018	2943.85	2936.90	2932.95
9/5/2018	2943.92	2936.96	2933.04
9/6/2018	2944.24	2937.32	2933.42
9/7/2018	2944.28	2937.36	2933.52
9/8/2018	2944.21	2937.22	2933.48
9/9/2018	2943.95	2936.88	2933.02
9/10/2018	2943.95	2936.93	2933.00
9/11/2018	2943.95	2936.95	2933.04
9/12/2018	2943.86	2936.82	2932.98
9/13/2018	2943.82	2936.71	2932.88
9/14/2018	2943.80	2936.69	2932.84
9/15/2018	2943.85	2936.82	2932.94
9/16/2018	2943.85	2936.85	2933.01
9/17/2018	2943.85	2936.85	2932.99
9/18/2018	2943.85	2936.78	2932.87
9/19/2018	2943.85	2936.75	2932.84
9/20/2018	2943.88	2936.79	2932.85
9/21/2018	2943.96	2936.97	2933.02
9/22/2018	2943.98	2937.01	2933.04
9/23/2018	2943.78	2936.76	2932.93
9/24/2018	2943.75	2936.70	2932.84
9/25/2018	2943.78	2936.77	2932.84
9/26/2018	2943.85	2936.87	2932.93
9/27/2018	2943.97	2936.98	2932.99
9/28/2018	2943.97	2936.92	2932.99
9/29/2018	2943.95	2936.97	2932.99
9/30/2018	2943.95	2937.03	2933.03
10/1/2018	2943.95	2937.05	2933.04
10/2/2018	2943.95	2936.98	2933.04
10/3/2018	2943.95	2936.97	2933.04
10/4/2018	2943.95	2936.98	2933.04
10/5/2018	2943.95	2936.95	2932.98
10/6/2018	2943.99	2936.95	2933.00
10/7/2018	2944.15	NR	2933.29
10/8/2018	2944.08	NR	2933.23
10/9/2018	2944.05	NR	2933.08
10/10/2018	2944.05	NR	2933.04
10/11/2018	2944.05	NR	2933.04
10/12/2018	2944.05	NR	2933.04
10/13/2018	2944.05	NR	2933.21
10/14/2018	2944.05	NR	2933.21
10/15/2018	2943.98	NR	2933.07
10/16/2018	2943.95	NR	2933.04
10/17/2018	2943.97	NR	2933.04
10/18/2018	2944.05	NR	2933.11
10/19/2018	2944.12	NR	2933.19
10/20/2018	2944.08	NR	2933.24
10/21/2018	2944.05	NR	2933.14
10/22/2018	2944.05	NR	2933.14
10/23/2018	2944.09	NR	2933.14
10/24/2018	2944.51	NR	2933.55
10/25/2018	2944.48	NR	2933.72
10/26/2018	2944.13	NR	2933.29
10/27/2018	2944.05	NR	2933.18
10/28/2018	2944.05	NR	2933.14
10/29/2018	2944.05	NR	2933.14
10/30/2018	2943.97	NR	2933.14

Table 5: Pecos River Staff Gauge Surface Water Elevation Data

Date	PR-1 (ft amsl)	PR-2 (ft amsl)	PR-3 (ft amsl)
10/31/2018	2943.95	NR	2933.14
11/1/2018	2943.95	NR	2933.15
11/2/2018	2943.95	NR	2933.18
11/3/2018	2943.95	NR	2933.14
11/4/2018	2943.95	NR	2933.14
11/5/2018	2943.95	NR	2933.14
11/6/2018	2943.95	NR	2933.14
11/7/2018	2943.95	NR	2933.14
11/8/2018	2943.95	NR	2933.14
11/9/2018	2943.95	2937.05	2933.14
11/10/2018	2943.95	2937.05	2933.14
11/11/2018	2943.95	2937.05	2933.14
11/12/2018	2943.95	2937.05	2933.14
11/13/2018	2943.95	2937.05	2933.14
11/14/2018	2943.95	2937.02	2933.08
11/15/2018	2943.95	2936.95	2933.04
11/16/2018	2943.95	2936.95	2933.04
11/17/2018	2943.95	2936.98	2933.04
11/18/2018	2943.95	2936.97	2933.04
11/19/2018	2943.95	2936.95	2933.04
11/20/2018	2943.95	2936.95	2933.04
11/21/2018	2943.95	2936.95	2933.04
11/22/2018	2943.95	2936.95	2933.04
11/23/2018	2943.95	2936.95	2933.04
11/24/2018	2943.95	2936.95	2933.04
11/25/2018	2943.89	2936.95	2933.04
11/26/2018	2943.85	2936.95	2933.04
11/27/2018	2943.85	2936.95	2933.04
11/28/2018	2943.85	2936.95	2933.04
11/29/2018	2943.85	2936.95	2933.04
11/30/2018	2943.85	2936.95	2933.04
12/1/2018	2943.85	2936.95	2933.04
12/2/2018	2943.85	2936.95	2933.04
12/3/2018	2943.85	2936.95	2933.04
12/4/2018	2943.85	2936.95	2933.04
12/5/2018	2943.85	2936.95	2933.04
12/6/2018	2943.85	2936.95	2933.04
12/7/2018	2943.89	2936.97	2933.04
12/8/2018	2943.95	2937.05	2933.13
12/9/2018	2943.95	2937.01	2933.14
12/10/2018	2943.95	2936.95	2933.14
12/11/2018	2943.95	2936.95	2933.14
12/12/2018	2943.95	2936.95	2933.14
12/13/2018	2944.01	2936.95	2933.14
12/14/2018	2944.05	2936.95	2933.14
12/15/2018	2943.98	2936.95	2933.09
12/16/2018	2943.95	2936.95	2933.04
12/17/2018	2943.95	2936.95	2933.04
12/18/2018	2943.95	2936.95	2933.04
12/19/2018	2943.95	2936.95	2933.04
12/20/2018	2943.95	2936.95	2933.04
12/21/2018	2943.95	2936.95	2933.04
12/22/2018	2943.88	2936.95	2933.04
12/23/2018	2943.88	2936.95	2932.97
12/24/2018	2943.95	2936.95	2932.96
12/25/2018	2943.95	2936.95	2933.04
12/26/2018	2943.95	2936.90	2933.04
12/27/2018	2943.95	2936.85	2933.04
12/28/2018	2943.95	2936.85	2933.04
12/29/2018	2943.95	2936.85	2933.04
12/30/2018	2943.95	2936.85	2933.04
12/31/2018	2943.95	2936.85	2932.98
1/1/2019	2943.95	2936.85	2932.94
1/2/2019	2943.88	2936.85	2932.95
1/3/2019	2943.92	2936.85	2933.04
1/4/2019	2943.95	2936.85	2933.04
1/5/2019	2943.95	2936.85	2933.04
1/6/2019	2943.95	2936.85	2933.04
1/7/2019	2943.95	2936.85	2933.04

Table 5: Pecos River Staff Gauge Surface Water Elevation Data

Date	PR-1 (ft amsl)	PR-2 (ft amsl)	PR-3 (ft amsl)
1/8/2019	2943.95	2936.85	2933.04
1/9/2019	2943.95	2936.85	2933.04
1/10/2019	2943.95	2936.85	2933.04
1/11/2019	2943.95	2936.95	2933.04
1/12/2019	2943.95	2936.95	2933.04
1/13/2019	2943.95	2936.95	2933.04
1/14/2019	2943.95	2936.88	2932.98
1/15/2019	2943.95	2936.85	2932.94
1/16/2019	2943.95	2936.85	2932.94
1/17/2019	2943.88	2936.85	2932.94
1/18/2019	2943.91	2936.85	2932.96
1/19/2019	2943.95	2936.85	2933.04
1/20/2019	2943.95	2936.85	2933.04
1/21/2019	2943.95	2936.85	2933.04
1/22/2019	2943.95	2936.79	2933.04
1/23/2019	2943.95	2936.75	2932.98
1/24/2019	2943.95	2936.75	2932.96
1/25/2019	2943.95	2936.75	2933.04
1/26/2019	2943.95	2936.75	2933.04
1/27/2019	2943.88	2936.75	2933.04
1/28/2019	2943.85	2936.75	2932.97
1/29/2019	2943.89	2936.75	2932.94
1/30/2019	2943.95	2936.80	2933.00
1/31/2019	2943.95	2936.85	2933.04
2/1/2019	2943.95	2936.85	2933.04
2/2/2019	2943.88	2936.85	2933.04
2/3/2019	2943.85	2936.85	2932.95
2/4/2019	2943.85	2936.79	2932.94
2/5/2019	2943.85	2936.75	2932.94
2/6/2019	2943.85	2936.75	2932.99
2/7/2019	2943.85	2936.75	2933.04
2/8/2019	2943.85	2936.75	2933.04
2/9/2019	2943.85	2936.75	2932.97
2/10/2019	2943.85	2936.75	2932.94
2/11/2019	2943.90	2936.75	2932.97
2/12/2019	2943.95	2936.75	2933.04
2/13/2019	2943.88	2936.75	2933.04
2/14/2019	2943.85	2936.75	2932.97
2/15/2019	2943.85	2936.75	2932.94
2/16/2019	2943.85	2936.75	2932.94
2/17/2019	2943.85	2936.75	2932.94
2/18/2019	2943.85	2936.75	2932.94
2/19/2019	2943.85	2936.75	2932.94
2/20/2019	2943.85	2936.75	2932.88
2/21/2019	2943.85	2936.75	2932.94
2/22/2019	2943.85	2936.75	2932.94
2/23/2019	2943.85	2936.75	2932.88
2/24/2019	2943.85	2936.68	2932.84
2/25/2019	2943.85	2936.65	2932.85
2/26/2019	2943.85	2936.65	2932.90
2/27/2019	2943.85	2936.65	2932.84
2/28/2019	2943.85	2936.65	2932.93
3/1/2019	2943.85	2936.67	2932.94
3/2/2019	2943.85	2936.74	2932.94
3/3/2019	2943.78	2936.52	2932.94
3/4/2019	2943.75	2936.45	2932.94
3/5/2019	2943.75	2936.45	2932.94
3/6/2019	2943.75	2936.50	2932.94
3/7/2019	2943.78	2936.63	2932.94
3/8/2019	2943.78	2936.48	2932.94
3/9/2019	2943.75	2936.52	2932.88
3/10/2019	2943.75	2936.55	2932.94
3/11/2019	2943.75	2936.55	2932.94
3/12/2019	2943.75	2936.58	2932.94
3/13/2019	2943.96	2936.98	2933.12
3/14/2019	2944.07	2937.10	2933.30
3/15/2019	2943.84	2936.68	2932.92
3/16/2019	2943.75	2936.60	2932.74
3/17/2019	2943.80	2936.64	2932.80

Table 5: Pecos River Staff Gauge Surface Water Elevation Data

Date	PR-1 (ft amsl)	PR-2 (ft amsl)	PR-3 (ft amsl)
3/18/2019	2943.85	2936.67	2932.93
3/19/2019	2943.85	2936.65	2932.94
3/20/2019	2943.76	2936.65	2932.89
3/21/2019	2943.75	2936.58	2932.82
3/22/2019	2943.75	2936.63	2932.94
3/23/2019	2943.83	2936.73	2932.94
3/24/2019	2943.78	2936.67	2932.88
3/25/2019	2943.75	2936.56	2932.80
3/26/2019	2943.75	2936.55	2932.77
3/27/2019	2943.81	2936.62	2932.94
3/28/2019	2943.85	2936.73	2932.94
3/29/2019	2943.85	2936.70	2932.94
3/30/2019	2943.78	2936.65	2932.86
3/31/2019	2943.75	2936.53	2932.77
4/1/2019	2943.75	2936.48	2932.77
4/2/2019	2943.80	2936.59	2932.94
4/3/2019	2943.85	2936.73	2932.94
4/4/2019	2943.85	2936.75	2932.85
4/5/2019	2943.79	2936.70	2932.80
4/6/2019	2943.75	2936.60	2932.74
4/7/2019	2943.75	2936.59	2932.74
4/8/2019	2943.75	2936.67	2932.79
4/9/2019	2943.75	2936.67	2932.84
4/10/2019	2943.76	2936.65	2932.84
4/11/2019	2943.73	2936.64	2932.75
4/12/2019	2943.73	2936.47	2932.67
4/13/2019	2943.85	2936.54	2932.70
4/14/2019	2943.85	2936.67	2932.84
4/15/2019	2943.85	2936.71	2932.84
4/16/2019	2943.85	2936.65	2932.84
4/17/2019	2943.85	2936.66	2932.85
4/18/2019	2943.81	2936.65	2932.85
4/19/2019	2943.81	2936.56	2932.85
4/20/2019	2943.75	2936.55	2932.80
4/21/2019	2943.75	2936.55	2932.74
4/22/2019	2943.76	2936.55	2932.75
4/23/2019	2943.88	2936.79	2932.93
4/24/2019	2943.97	2936.98	2933.19
4/25/2019	2943.85	2936.86	2933.00
4/26/2019	2943.85	2936.75	2932.94
4/27/2019	2943.85	2936.73	2932.94
4/28/2019	2943.85	2936.66	2932.94
4/29/2019	2943.85	2936.66	2932.90
4/30/2019	2943.85	2936.65	2932.84
5/1/2019	2943.85	2936.73	2932.84
5/2/2019	2943.77	2936.67	2932.84
5/3/2019	2943.75	2936.65	2932.84
5/4/2019	2943.79	2936.65	2932.84
5/5/2019	2943.85	2936.65	2932.90
5/6/2019	2943.85	2936.65	2932.91
5/7/2019	2943.84	2936.65	2932.90
5/8/2019	2943.85	2936.65	2932.93
5/9/2019	2943.85	2936.65	2932.80
5/10/2019	2943.75	2936.58	2932.81
5/11/2019	2943.75	2936.59	2932.84
5/12/2019	2943.75	2936.59	2932.76
5/13/2019	2943.79	2936.60	2932.75
5/14/2019	2943.85	2936.68	2932.91
5/15/2019	2943.81	2936.73	2932.94
5/16/2019	2943.75	2936.61	2932.86
5/17/2019	2943.76	2936.59	2932.91
5/18/2019	2943.81	2936.76	2932.99
5/19/2019	2943.77	2936.65	2932.89
5/20/2019	2943.75	2936.65	2932.84
5/21/2019	2943.75	2936.65	2932.84
5/22/2019	2943.81	2936.63	2932.87
5/23/2019	2943.68	2936.49	2932.84
5/24/2019	2943.75	2936.53	2932.84
5/25/2019	2943.75	2936.59	2932.84

Table 5: Pecos River Staff Gauge Surface Water Elevation Data

Date	PR-1 (ft amsl)	PR-2 (ft amsl)	PR-3 (ft amsl)
5/26/2019	2943.73	2936.56	2932.84
5/27/2019	2943.65	2936.55	2932.84
5/28/2019	2943.74	2936.63	2932.84
5/29/2019	2943.79	2936.66	2932.84
5/30/2019	2943.75	2936.65	2932.84
5/31/2019	2943.76	2936.66	2932.84
6/1/2019	2943.77	2936.65	2932.89
6/2/2019	2943.79	2936.70	2933.00
6/3/2019	2943.85	2936.85	2932.95
6/4/2019	2943.93	2936.95	2933.00
6/5/2019	2943.98	2936.93	2933.03
6/6/2019	2944.01	2937.00	2933.21
6/7/2019	2943.91	2936.91	2933.00
6/8/2019	2943.85	2936.81	2932.84
6/9/2019	2943.85	2936.75	2932.89
6/10/2019	2943.85	2936.75	2932.83
6/11/2019	2943.85	2936.75	2932.74
6/12/2019	2943.85	2936.76	2932.74
6/13/2019	2943.85	2936.73	2932.80
6/14/2019	2943.85	2936.75	2932.84
6/15/2019	2943.85	2936.75	2932.84
6/16/2019	2943.85	2936.75	2932.84
6/17/2019	2943.85	2936.75	2932.83
6/18/2019	2943.85	2936.75	2932.84
6/19/2019	2943.83	2936.75	2932.84
6/20/2019	2943.77	2936.73	2932.84
6/21/2019	2943.67	2936.56	2932.89
6/22/2019	2943.65	2936.55	2932.88
6/23/2019	2943.66	2936.59	2932.84
6/24/2019	2943.69	2936.58	2932.88
6/25/2019	2943.75	2936.65	2932.94
6/26/2019	2943.75	2936.65	2932.94
6/27/2019	2943.80	2936.65	2932.90
6/28/2019	2943.85	2936.69	2932.84
6/29/2019	2943.85	2936.75	2932.84
6/30/2019	2943.85	2936.74	2932.84
7/1/2019	2943.85	2936.61	2932.81
7/2/2019	2943.85	2936.55	2932.74
7/3/2019	2943.85	2936.61	2932.75
7/4/2019	2943.85	2936.75	2932.84
7/5/2019	2943.85	2936.75	2932.84
7/6/2019	2943.85	2936.75	2932.87
7/7/2019	2943.85	2936.75	2932.94
7/8/2019	2943.85	2936.84	2932.94
7/9/2019	2943.85	2936.82	2932.94
7/10/2019	2943.85	2936.75	2932.94
7/11/2019	2943.93	2936.78	2932.92
7/12/2019	2944.01	2936.91	2932.98
7/13/2019	2943.95	2936.89	2933.09
7/14/2019	2943.88	2936.85	2932.98
7/15/2019	2943.85	2936.80	2932.94
7/16/2019	2943.85	2936.75	2932.94
7/17/2019	2943.85	2936.75	2932.93
7/18/2019	2943.85	2936.75	2932.94
7/19/2019	2943.85	2936.70	2932.92
7/20/2019	2943.85	2936.69	2932.84
7/21/2019	2943.85	2936.75	2932.84
7/22/2019	2943.89	2936.83	2932.93
7/23/2019	2944.25	2937.22	2933.23
7/24/2019	2944.29	2937.22	2933.46
7/25/2019	2943.92	2936.92	2933.06
7/26/2019	2943.85	2936.78	2932.91
7/27/2019	2943.77	2936.75	2932.88
7/28/2019	2943.82	2936.75	2932.94
7/29/2019	2943.99	2936.75	2932.94
7/30/2019	2944.01	2936.75	2932.94
7/31/2019	2943.83	2936.75	2932.94
8/1/2019	2943.75	2936.75	2932.87
8/2/2019	2943.75	2936.75	2932.84

Table 5: Pecos River Staff Gauge Surface Water Elevation Data

Date	PR-1 (ft amsl)	PR-2 (ft amsl)	PR-3 (ft amsl)
8/3/2019	2943.75	2936.75	2932.84
8/4/2019	2943.83	2936.75	2932.84
8/5/2019	2943.92	2936.75	2932.90
8/6/2019	2943.95	2936.75	2932.89
8/7/2019	2943.95	2936.77	2932.84
8/8/2019	2943.95	2936.85	2932.91
8/9/2019	2943.95	2936.85	2932.94
8/10/2019	2943.95	2936.85	2932.94
8/11/2019	2943.95	2936.85	2932.94
8/12/2019	2943.95	2936.85	2932.94
8/13/2019	2943.99	2936.85	2932.94
8/14/2019	2943.98	2936.85	2932.94
8/15/2019	2943.95	2936.85	2932.94
8/16/2019	2943.87	2936.85	2932.94
8/17/2019	2943.85	2936.85	2932.94
8/18/2019	2943.92	2936.85	2932.94
8/19/2019	2943.88	2936.85	2932.94
8/20/2019	2943.85	2936.85	2932.94
8/21/2019	2943.81	2936.85	2932.94
8/22/2019	2943.75	2936.85	2932.94
8/23/2019	2943.78	2936.85	2932.94
8/24/2019	2943.85	2936.85	2932.94
8/25/2019	2943.85	2936.85	2932.94
8/26/2019	2943.85	2936.85	2932.94
8/27/2019	2943.85	2936.85	2932.94
8/28/2019	2943.85	2936.85	2932.94
8/29/2019	2943.85	2936.85	2932.94
8/30/2019	2943.85	2936.85	2932.94
8/31/2019	2943.70	2936.85	2932.94
9/1/2019	2943.72	2936.85	2932.94
9/2/2019	2943.75	2936.81	2932.94
9/3/2019	2943.75	2936.81	2932.94
9/4/2019	2943.75	2936.85	2932.94
9/5/2019	2943.75	2936.85	2932.94
9/6/2019	2943.80	2936.85	2932.94
9/7/2019	2943.85	2936.85	2932.94
9/8/2019	2943.66	2936.85	2932.94
9/9/2019	2943.69	2936.85	2932.94
9/10/2019	2943.85	2936.85	2932.94
9/11/2019	2943.91	2936.85	2932.94
9/12/2019	2943.85	2936.85	2932.94
9/13/2019	2943.75	2936.85	2932.94
9/14/2019	2943.71	2936.85	2932.94
9/15/2019	2943.65	2936.85	2932.94
9/16/2019	2943.71	2936.85	2932.94
9/17/2019	2943.75	2936.85	2932.94
9/18/2019	2943.75	2936.85	2932.94
9/19/2019	2943.81	2936.85	2932.94
9/20/2019	2943.76	2936.85	2932.94
9/21/2019	2943.88	2936.93	2932.94
9/22/2019	2944.21	2937.01	2932.97
9/23/2019	2943.97	2936.90	2933.04
9/24/2019	2943.75	2936.81	2933.04
9/25/2019	2943.75	2936.73	2933.04
9/26/2019	2943.82	2936.72	2933.04
9/27/2019	2943.85	2936.85	2933.04
9/28/2019	2943.85	2936.81	2933.04
9/29/2019	2943.88	2936.78	2933.04
9/30/2019	2943.95	2936.88	2933.08
10/1/2019	2944.24	2937.12	2933.35
10/2/2019	2944.41	2937.12	2933.65
10/3/2019	2944.05	2936.98	2933.23
10/4/2019	2944.05	2936.91	2933.14
10/5/2019	2943.98	2936.85	2933.14
10/6/2019	2943.95	2936.85	2933.14
10/7/2019	2943.95	2936.85	2933.14
10/8/2019	2943.95	2936.85	2933.14
10/9/2019	2943.95	2936.85	2933.14
10/10/2019	2943.88	2936.81	2933.14

Table 5: Pecos River Staff Gauge Surface Water Elevation Data

Date	PR-1 (ft amsl)	PR-2 (ft amsl)	PR-3 (ft amsl)
10/11/2019	2943.85	2936.75	2933.14
10/12/2019	2943.85	2936.75	2933.14
10/13/2019	2943.85	2936.75	2933.14
10/14/2019	2943.85	2936.75	2933.02
10/15/2019	2943.85	2936.81	2932.94
10/16/2019	2943.87	2936.91	2932.94
10/17/2019	2943.95	2936.85	2932.94
10/18/2019	2943.95	2936.85	2932.94
10/19/2019	2943.95	2936.85	2932.94
10/20/2019	2943.95	2936.85	2932.94
10/21/2019	2943.95	2936.85	2932.94
10/22/2019	2943.95	2936.85	2932.94
10/23/2019	2943.95	2936.85	2932.94
10/24/2019	2943.95	2936.85	2932.94
10/25/2019	2943.95	2936.85	2932.94
10/26/2019	2943.95	2936.85	2932.94
10/27/2019	2943.95	2936.85	2932.94
10/28/2019	2943.95	2936.85	2932.94
10/29/2019	2943.95	2936.85	2932.94
10/30/2019	2943.95	2936.85	2932.94
10/31/2019	2943.95	2936.85	2932.94
11/1/2019	2943.95	2936.85	2932.94
11/2/2019	2943.95	2936.88	2932.97
11/3/2019	2943.95	2936.95	2933.04
11/4/2019	2943.95	2936.91	2933.04
11/5/2019	2943.95	2936.84	2932.94
11/6/2019	2943.95	2936.85	2932.94
11/7/2019	2943.95	2936.85	2932.94
11/8/2019	2943.95	2936.85	2932.97
11/9/2019	2943.95	2936.85	2933.04
11/10/2019	2943.95	2936.85	2933.04
11/11/2019	2943.96	2936.85	2932.97
11/12/2019	2943.85	2936.85	2932.94
11/13/2019	2943.85	2936.85	2932.94
11/14/2019	2943.85	2936.85	2932.94
11/15/2019	2943.85	2936.85	2932.94
11/16/2019	2943.85	2936.85	2932.94
11/17/2019	2943.85	2936.85	2932.94
11/18/2019	2943.85	2936.85	2932.94
11/19/2019	2943.85	2936.85	2932.94
11/20/2019	2943.85	2936.85	2932.94
11/21/2019	2943.88	2936.85	2932.94
11/22/2019	2943.95	2936.86	2933.00
11/23/2019	2943.95	2936.84	2933.04
11/24/2019	2943.95	2936.85	2933.04
11/25/2019	2943.95	2936.85	2933.04
11/26/2019	2943.96	2936.85	2933.04
11/27/2019	2943.95	2936.86	2933.05
11/28/2019	2943.95	2936.88	2933.05
11/29/2019	2943.95	2936.87	2933.14
11/30/2019	2943.95	2936.85	2933.05
12/1/2019	2943.95	2936.85	2933.04
12/2/2019	2943.95	2936.85	2933.04
12/3/2019	2943.95	2936.85	2933.04
12/4/2019	2943.95	2936.85	2933.04
12/5/2019	2943.95	2936.85	2933.04
12/6/2019	2943.95	2936.85	2933.04
12/7/2019	2943.95	2936.85	2933.04
12/8/2019	2943.95	2936.85	2933.04
12/9/2019	2943.95	2936.85	2933.04
12/10/2019	2943.95	2936.85	2933.04
12/11/2019	2943.95	2936.85	2933.04
12/12/2019	2943.95	2936.85	2933.04
12/13/2019	2943.95	2936.85	2933.04
12/14/2019	2943.95	2936.85	2933.04
12/15/2019	2943.95	2936.85	2933.01
12/16/2019	2943.95	2936.85	2932.94
12/17/2019	2943.95	2936.85	2932.94
12/18/2019	2943.86	2936.85	2932.88

Table 5: Pecos River Staff Gauge Surface Water Elevation Data

Date	PR-1 (ft amsl)	PR-2 (ft amsl)	PR-3 (ft amsl)
12/19/2019	2943.88	2936.85	2932.84
12/20/2019	2943.95	2936.85	2932.94
12/21/2019	2943.95	2936.85	2932.94
12/22/2019	2943.95	2936.85	2932.94
12/23/2019	2943.95	2936.85	2932.94
12/24/2019	2943.95	2936.85	2932.94
12/25/2019	2943.95	2936.85	2932.94
12/26/2019	2943.95	2936.85	2932.94
12/27/2019	2943.95	2936.85	2932.94
12/28/2019	2943.95	2936.85	2932.94
12/29/2019	2943.91	2936.85	2932.94
12/30/2019	2943.85	2936.85	2932.94
12/31/2019	2943.85	2936.85	2932.94
1/1/2020	2943.85	2936.76	2932.94
1/2/2020	2943.90	2936.76	2932.94
1/3/2020	2943.98	2936.90	2932.98
1/4/2020	2943.95	2937.11	2933.29
1/5/2020	2943.95	2937.15	2933.17
1/6/2020	2943.95	2937.11	2933.14
1/7/2020	2943.95	2937.08	2933.16
1/8/2020	2944.05	2937.20	2933.43
1/9/2020	2944.05	2937.25	2933.54
1/10/2020	2944.15	2937.25	2933.46
1/11/2020	2944.15	2937.16	2933.36
1/12/2020	2944.15	2937.11	2933.25
1/13/2020	2944.15	2937.05	2933.24
1/14/2020	2944.15	2937.05	2933.24
1/15/2020	2944.08	2936.96	2933.17
1/16/2020	2944.05	2936.95	2933.14
1/17/2020	2944.05	2936.95	2933.14
1/18/2020	2944.05	2936.95	2933.14
1/19/2020	2943.96	2936.86	2933.09
1/20/2020	2943.95	2936.85	2933.04
1/21/2020	2944.01	2936.85	2933.08
1/22/2020	2944.05	2936.85	2933.14
1/23/2020	2944.05	2936.85	2933.05
1/24/2020	2944.05	2936.85	2933.06
1/25/2020	2944.05	2936.85	2933.14
1/26/2020	2944.05	2936.85	2933.14
1/27/2020	2944.05	2936.85	2933.14
1/28/2020	2944.01	2936.85	2933.13
1/29/2020	2943.95	2936.85	2932.94
1/30/2020	2943.95	2936.85	2932.95
1/31/2020	2943.95	2936.85	2933.10
2/1/2020	2943.95	2936.85	2933.02
2/2/2020	2943.95	2936.85	2932.94
2/3/2020	2943.95	2936.85	2932.99
2/4/2020	2943.95	2936.89	2933.14
2/5/2020	2944.05	2936.95	2933.14
2/6/2020	2944.05	2936.95	2933.14
2/7/2020	2944.05	2936.95	2933.14
2/8/2020	2944.02	2936.95	2933.14
2/9/2020	2943.95	2936.95	2932.95
2/10/2020	2943.95	2936.95	2932.94
2/11/2020	2943.95	2936.95	2932.95
2/12/2020	2943.99	2936.95	2933.08
2/13/2020	2944.02	2936.95	2933.14
2/14/2020	2943.95	2936.95	2933.14
2/15/2020	2943.96	2936.95	2933.14
2/16/2020	2944.05	2936.96	2933.14
2/17/2020	2944.05	2936.95	2933.14
2/18/2020	2943.99	2936.95	2933.14
2/19/2020	2943.95	2936.87	2933.14
2/20/2020	2943.95	2936.85	2933.14
2/21/2020	2943.95	2936.85	2933.14
2/22/2020	2943.95	2936.85	2933.14
2/23/2020	2943.98	2936.85	2933.14
2/24/2020	2944.01	2936.85	2933.13
2/25/2020	2943.90	2936.85	2933.04

Table 5: Pecos River Staff Gauge Surface Water Elevation Data

Date	PR-1 (ft amsl)	PR-2 (ft amsl)	PR-3 (ft amsl)
2/26/2020	2943.87	2936.85	2933.04
2/27/2020	2943.95	2936.85	2933.04
2/28/2020	2943.95	2936.85	2933.04
2/29/2020	2943.95	2936.85	2933.04
3/1/2020	2943.95	2936.85	2933.04
3/2/2020	2943.95	2936.85	2933.04
3/3/2020	2943.96	2936.87	2933.05
3/4/2020	2944.22	2937.09	2933.27
3/5/2020	2944.11	2937.14	2933.35
3/6/2020	2943.95	2937.00	2933.19
3/7/2020	2943.95	2936.95	2933.08
3/8/2020	2943.95	2936.95	2933.04
3/9/2020	2943.95	2936.95	2933.13
3/10/2020	2943.95	2936.95	2933.14
3/11/2020	2943.95	2936.95	2933.10
3/12/2020	2943.95	2936.95	2933.04
3/13/2020	2943.95	2936.95	2933.12
3/14/2020	2943.95	2936.95	2933.14
3/15/2020	2943.95	2936.95	2933.14
3/16/2020	2943.95	2936.95	2933.14
3/17/2020	2943.95	2936.95	2933.14
3/18/2020	2943.95	2936.95	2933.14
3/19/2020	2943.95	2936.95	2933.14
3/20/2020	2943.95	2936.95	2933.08
3/21/2020	2943.95	2936.95	2933.04
3/22/2020	2943.95	2936.95	2933.04
3/23/2020	2943.95	2936.95	2932.95
3/24/2020	2943.95	2936.95	2932.94
3/25/2020	2943.95	2936.95	2932.94
3/26/2020	2943.95	2936.89	2932.94
3/27/2020	2943.86	2936.79	2932.94
3/28/2020	2943.75	2936.75	2932.94
3/29/2020	2943.81	2936.75	2932.94
3/30/2020	2943.85	2936.76	2932.94
3/31/2020	2943.85	2936.85	2932.94
4/1/2020	2943.86	2936.85	2932.94
4/2/2020	2943.95	2936.85	2932.94
4/3/2020	2943.95	2936.89	2932.94
4/4/2020	2943.95	2936.85	2932.94
4/5/2020	2943.95	2936.85	2932.94
4/6/2020	2943.95	2936.85	2932.94
4/7/2020	2943.95	2936.85	2932.94
4/8/2020	2943.71	2936.61	2932.94
4/9/2020	2943.65	2936.45	2932.94
4/10/2020	2943.65	2936.45	2932.94
4/11/2020	2943.65	2936.45	2932.94
4/12/2020	2943.65	2936.45	2932.94
4/13/2020	2943.65	2936.45	2932.94
4/14/2020	2943.65	2936.45	2932.94
4/15/2020	2943.65	2936.45	2932.94
4/16/2020	2943.65	2936.45	2932.94
4/17/2020	2943.65	2936.45	2932.94
4/18/2020	2943.65	2936.45	2932.94
4/19/2020	2943.65	2936.45	2932.94
4/20/2020	2943.65	2936.45	2932.94
4/21/2020	2943.65	2936.45	2932.94
4/22/2020	2943.65	2936.51	2932.94
4/23/2020	2943.65	2936.55	2932.94
4/24/2020	2943.70	2936.55	2932.94
4/25/2020	2943.75	2936.55	2932.94
4/26/2020	2943.75	2936.55	2932.94
4/27/2020	2943.75	2936.55	2932.94
4/27/2020	2943.75	2936.52	2932.94
4/28/2020	2943.75	2936.45	2932.94
4/29/2020	2943.75	2936.42	2932.94
4/30/2020	2943.75	2936.45	2932.94
5/1/2020	2943.75	2936.45	2932.94
5/2/2020	2943.75	2936.45	2932.94
5/3/2020	2943.75	2936.45	2932.94

Table 5: Pecos River Staff Gauge Surface Water Elevation Data

Date	PR-1 (ft amsl)	PR-2 (ft amsl)	PR-3 (ft amsl)
5/4/2020	2943.75	2936.45	2932.94
5/5/2020	2943.75	2936.45	2932.94
5/6/2020	2943.75	2936.45	2932.94
5/7/2020	2943.75	2936.45	2932.94
5/8/2020	2943.75	2936.45	2932.94
5/9/2020	2943.75	2936.45	2932.94
5/10/2020	2943.75	2936.45	2932.94
5/11/2020	2943.75	2936.45	2932.94
5/12/2020	2943.75	2936.45	2932.94
5/13/2020	2943.75	2936.45	2932.94
5/14/2020	2943.75	2936.41	2932.94
5/15/2020	2943.75	2936.35	2932.94
5/16/2020	2943.75	2936.35	2932.94
5/17/2020	2943.75	2936.39	2932.94
5/18/2020	2943.75	2936.45	2932.94
5/19/2020	2943.75	2936.45	2932.94
5/20/2020	2943.75	2936.45	2932.94
5/21/2020	2943.75	2936.45	2932.94
5/22/2020	2943.75	2936.45	2932.94
5/23/2020	2943.75	2936.45	2932.94
5/24/2020	2943.75	2936.45	2932.94
5/25/2020	2943.75	2936.45	2932.94
5/26/2020	2943.75	2936.45	2932.94
5/27/2020	2943.75	2936.45	2932.94
5/28/2020	2943.75	2936.45	2932.94
5/29/2020	2943.75	2936.45	2932.94
5/30/2020	2943.75	2936.45	2932.94
5/31/2020	2943.75	2936.45	2932.94
6/1/2020	2943.75	2936.45	2932.94
6/2/2020	2943.75	2936.45	2932.94
6/3/2020	2943.75	2936.45	2932.94
6/4/2020	2943.75	2936.45	2932.94
6/5/2020	2943.75	2936.45	2932.94
6/6/2020	2943.75	2936.45	2932.94
6/7/2020	2943.75	2936.45	2932.94
6/8/2020	2943.75	2936.45	2932.94
6/9/2020	2943.75	2936.45	2932.94
6/10/2020	2943.75	2936.45	2932.94
6/11/2020	2943.75	2936.45	2932.94
6/12/2020	2943.75	2936.38	2932.94
6/13/2020	2943.75	2936.38	2932.94
6/14/2020	2943.75	2936.45	2932.94
6/15/2020	2943.75	2936.45	2932.94
6/16/2020	2943.75	2936.45	2932.94
6/17/2020	2943.75	2936.45	2932.94
6/18/2020	2943.75	2936.48	2932.94
6/19/2020	2943.75	2936.55	2932.94
6/20/2020	2943.75	2936.55	2932.94
6/21/2020	2943.75	2936.55	2932.94
6/22/2020	2943.75	2936.55	2932.94
6/23/2020	2943.75	2936.57	2932.94
6/24/2020	2943.75	2936.73	2932.94
6/25/2020	2943.75	2936.65	2932.94
6/26/2020	2943.75	2936.65	2932.94
6/27/2020	2943.75	2936.65	2932.94
6/28/2020	2943.75	2936.65	2932.94
6/29/2020	2943.75	2936.65	2932.94
6/30/2020	2943.75	2936.65	2932.94
7/1/2020	2943.75	2936.65	2932.94
7/2/2020	2943.75	2936.65	2932.94
7/3/2020	2943.75	2936.65	2932.94
7/4/2020	2943.75	2936.65	2932.94
7/5/2020	2943.75	2936.65	2932.94
7/6/2020	2943.75	2936.65	2932.94
7/7/2020	2943.75	2936.65	2932.94
7/8/2020	2943.75	2936.65	2932.94
7/9/2020	2943.75	2936.65	2932.94
7/10/2020	2943.75	2936.65	2932.94
7/11/2020	2943.75	2936.65	2932.94

Table 5: Pecos River Staff Gauge Surface Water Elevation Data

Date	PR-1 (ft amsl)	PR-2 (ft amsl)	PR-3 (ft amsl)
7/12/2020	2943.75	2936.59	2932.94
7/13/2020	2943.75	2936.55	2932.94
7/14/2020	2943.75	2936.55	2932.94
7/15/2020	2943.75	2936.60	2932.94
7/16/2020	2943.75	2936.65	2932.94
7/17/2020	2943.75	2936.65	2932.94
7/18/2020	2943.75	2936.65	2932.94
7/19/2020	2943.75	2936.65	2932.94
7/20/2020	2943.85	2936.73	2932.94
7/21/2020	2943.85	2936.75	2932.94
7/22/2020	2943.85	2936.75	2932.94
7/23/2020	2943.85	2936.75	2932.94
7/24/2020	2943.85	2936.75	2932.94
7/25/2020	2943.78	2936.75	2932.94
7/26/2020	2943.75	2936.75	2932.94
7/27/2020	2943.75	2936.75	2932.94
7/28/2020	2943.74	2936.71	2932.89
7/29/2020	2943.65	2936.65	2932.74
7/30/2020	2943.65	2936.65	2932.74
7/31/2020	2943.65	2936.65	2932.74
8/1/2020	2943.65	2936.65	2932.74
8/2/2020	2943.65	2936.65	2932.74
8/3/2020	2943.65	2936.65	2932.74
8/4/2020	2943.65	2936.65	2932.74
8/5/2020	2943.65	2936.65	2932.74
8/6/2020	2943.65	2936.65	2932.74
8/7/2020	2943.65	2936.65	2932.74
8/8/2020	2943.65	2936.65	2932.74
8/9/2020	2943.65	2936.65	2932.74
8/10/2020	2943.65	2936.65	2932.74
8/11/2020	2943.65	2936.65	2932.74
8/12/2020	2943.65	2936.65	2932.74
8/13/2020	2943.65	2936.65	2932.74
8/14/2020	2943.65	2936.65	2932.74
8/15/2020	2943.65	2936.65	2932.74
8/16/2020	2943.65	2936.65	2932.74
8/17/2020	2943.65	2936.65	2932.74
8/18/2020	2943.65	2936.65	2932.74
8/19/2020	2943.65	2936.65	2932.74
8/20/2020	2943.65	2936.64	2932.74
8/21/2020	2943.65	2936.55	2932.74
8/22/2020	2943.65	2936.55	2932.74
8/23/2020	2943.65	2936.55	2932.74
8/24/2020	2943.65	2936.55	2932.74
8/25/2020	2943.65	2936.55	2932.74
8/26/2020	2943.65	2936.55	2932.74
8/27/2020	2943.65	2936.55	2932.74
8/28/2020	2943.65	2936.57	2932.74
8/29/2020	2943.65	2936.55	2932.74
8/30/2020	2943.65	2936.55	2932.74
8/31/2020	2943.65	2936.55	2932.74
9/1/2020	2943.65	2936.55	2932.74
9/2/2020	2943.65	2936.55	2932.74
9/3/2020	2943.65	2936.55	2932.74
9/4/2020	2943.65	2936.55	2932.74
9/5/2020	2943.65	2936.55	2932.74
9/6/2020	2943.65	2936.55	2932.74
9/7/2020	2943.65	2936.55	2932.74
9/8/2020	2943.65	2936.55	2932.74
9/9/2020	2943.65	2936.58	2932.74
9/10/2020	2943.65	2936.65	2932.74
9/11/2020	2943.65	2936.65	2932.74
9/12/2020	2943.65	2936.65	2932.74
9/13/2020	2943.65	2936.65	2932.74
9/14/2020	2943.65	2936.65	2932.74
9/15/2020	2943.65	2936.65	2932.74
9/16/2020	2943.65	2936.65	2932.74
9/17/2020	2943.65	2936.65	2932.74
9/18/2020	2943.65	2936.65	2932.74

Table 5: Pecos River Staff Gauge Surface Water Elevation Data

Date	PR-1 (ft amsl)	PR-2 (ft amsl)	PR-3 (ft amsl)
9/19/2020	2943.65	2936.65	2932.74
9/20/2020	2943.65	2936.65	2932.74
9/21/2020	2943.65	2936.65	2932.74
9/22/2020	2943.65	2936.65	2932.74
9/23/2020	2943.65	2936.65	2932.74
9/24/2020	2943.65	2936.65	2932.74
9/25/2020	2943.65	2936.65	2932.74
9/26/2020	2943.65	2936.65	2932.74
9/27/2020	2943.65	2936.65	2932.74
9/28/2020	2943.62	2936.59	2932.74
9/29/2020	2943.55	2936.62	2932.74
9/30/2020	2943.55	2936.65	2932.74
10/1/2020	2943.55	2936.66	2932.74
10/2/2020	2943.55	2936.65	2932.74
10/3/2020	2943.55	2936.68	2932.74
10/4/2020	2943.55	2936.75	2932.74
10/5/2020	2943.55	2936.74	2932.74
10/6/2020	2943.55	2936.65	2932.74
10/7/2020	2943.55	2936.72	2932.74
10/8/2020	2943.55	2936.75	2932.74
10/9/2020	2943.55	2936.66	2932.74
10/10/2020	2943.55	2936.65	2932.74
10/11/2020	2943.55	2936.65	2932.74
10/12/2020	2943.55	2936.65	2932.74
10/13/2020	2943.55	2936.65	2932.74
10/14/2020	2943.55	2936.65	2932.74
10/15/2020	2943.55	2936.78	2932.74
10/16/2020	2943.55	2936.72	2932.74
10/17/2020	2943.55	2936.65	2932.74
10/18/2020	2943.55	2936.65	2932.74
10/19/2020	2943.55	2936.65	2932.74
10/20/2020	2943.55	2936.65	2932.74
10/21/2020	2943.55	2936.65	2932.74
10/22/2020	2943.55	2936.65	2932.74
10/23/2020	2943.55	2936.65	2932.74
10/24/2020	2943.55	2936.65	2932.74
10/25/2020	2943.55	2936.65	2932.74
10/26/2020	2943.58	2936.65	2932.74
10/27/2020	2943.73	2936.83	2932.76
10/28/2020	2943.89	2936.90	2932.79
10/28/2020	2943.89	2936.90	2932.80
10/29/2020	2943.85	2936.89	2932.84
10/30/2020	2943.85	2936.95	2932.84
10/31/2020	2943.85	2936.95	2932.84
11/1/2020	2943.85	2936.95	2932.84
11/2/2020	2943.85	2936.95	2932.84
11/3/2020	2943.85	2936.95	2932.84
11/4/2020	2943.85	2936.95	2932.84
11/5/2020	2943.85	2936.95	2932.84
11/6/2020	2943.85	2936.95	2932.84
11/7/2020	2943.85	2936.95	2932.84
11/8/2020	2943.85	2936.95	2932.84
11/9/2020	2943.85	2936.95	2932.84
11/10/2020	2943.85	2936.95	2932.84
11/11/2020	2943.85	2936.95	2932.84
11/12/2020	2943.85	2936.95	2932.84
11/13/2020	2943.85	2936.95	2932.84
11/14/2020	2943.85	2936.95	2932.84
11/15/2020	2943.85	2936.95	2932.84
11/16/2020	2943.85	2936.95	2932.84
11/17/2020	2943.85	2936.95	2932.84
11/18/2020	2943.85	2936.95	2932.84
11/19/2020	2943.85	2936.95	2932.84
11/20/2020	2943.85	2936.95	2932.84
11/21/2020	2943.85	2936.95	2932.84
11/22/2020	2943.85	2936.95	2932.84
11/23/2020	2943.85	2936.95	2932.84
11/24/2020	2943.85	2936.95	2932.84
11/25/2020	2943.85	2936.95	2932.84

Table 5: Pecos River Staff Gauge Surface Water Elevation Data

Date	PR-1 (ft amsl)	PR-2 (ft amsl)	PR-3 (ft amsl)
11/26/2020	2943.85	2936.95	2932.84
11/27/2020	2943.85	2936.95	2932.84
11/28/2020	2943.85	2936.95	2932.84
11/29/2020	2943.85	2936.95	2932.84
11/30/2020	2943.85	2936.95	2932.84
12/1/2020	2943.85	2936.95	2932.84
12/2/2020	2943.85	2936.95	2932.84
12/3/2020	2943.85	2936.95	2932.84
12/4/2020	2943.85	2936.95	2932.84
12/5/2020	2943.85	2936.95	2932.84
12/6/2020	2943.85	2936.95	2932.84
12/7/2020	2943.85	2936.95	2932.84
12/8/2020	2943.85	2936.95	2932.84
12/9/2020	2943.85	2936.89	2932.84
12/10/2020	2943.85	2936.85	2932.84
12/11/2020	2943.85	2936.79	2932.84
12/12/2020	2943.85	2936.75	2932.84
12/13/2020	2943.85	2936.91	2932.84
12/14/2020	2943.85	2936.95	NR
12/15/2020	2943.85	2936.95	NR
12/16/2020	2943.85	2936.95	NR
12/17/2020	2943.85	2936.95	NR
12/18/2020	2943.85	2936.95	NR
12/19/2020	2943.85	2936.95	NR
12/20/2020	2943.85	2936.95	NR
12/21/2020	2943.85	2936.95	NR
12/22/2020	2943.85	2936.95	NR
12/23/2020	2943.85	2936.95	NR
12/24/2020	2943.85	2936.95	NR
12/25/2020	2943.85	2936.95	NR
12/26/2020	2943.85	2936.95	NR
12/27/2020	2943.85	2936.95	NR
12/28/2020	2943.85	2936.95	NR
12/29/2020	2943.85	2936.95	NR
12/30/2020	2943.85	2936.95	NR
12/31/2020	2943.85	2936.95	NR
1/1/2021	2943.85	2936.95	NR
1/2/2021	2943.85	2936.95	NR
1/3/2021	2943.85	2936.95	NR
1/4/2021	2943.85	2936.95	NR
1/5/2021	2943.85	2936.95	NR
1/6/2021	2943.85	2936.95	NR
1/7/2021	2943.85	2936.95	NR
1/8/2021	2943.85	2936.95	NR
1/9/2021	2943.85	2936.95	NR
1/10/2021	NR	2936.95	NR
1/11/2021	NR	NR	NR
1/12/2021	NR	NR	NR
1/13/2021	NR	NR	NR
1/14/2021	NR	NR	NR
1/15/2021	NR	NR	NR
1/16/2021	NR	NR	NR
1/17/2021	NR	NR	NR
1/18/2021	NR	NR	NR
1/19/2021	NR	NR	NR
1/20/2021	NR	NR	NR
1/21/2021	NR	NR	NR
1/22/2021	NR	NR	NR
1/23/2021	NR	NR	NR
1/24/2021	NR	NR	NR
1/25/2021	NR	NR	NR
1/26/2021	NR	NR	2932.54
1/27/2021	2943.75	2936.45	2932.54
1/28/2021	2943.75	2936.45	2932.54
1/29/2021	2943.75	2936.45	2932.54
1/30/2021	2943.75	2936.45	2932.54
1/31/2021	2943.75	2936.45	2932.54
2/1/2021	2943.75	2936.45	2932.54
2/2/2021	2943.75	2936.45	2932.54

Table 5: Pecos River Staff Gauge Surface Water Elevation Data

Date	PR-1 (ft amsl)	PR-2 (ft amsl)	PR-3 (ft amsl)
2/3/2021	2943.75	2936.45	2932.54
2/4/2021	2943.75	2936.45	2932.54
2/5/2021	2943.75	2936.45	2932.54
2/6/2021	2943.75	2936.45	2932.54
2/7/2021	2943.75	2936.45	2932.54
2/8/2021	2943.75	2936.45	2932.54
2/9/2021	2943.75	2936.45	2932.54
2/10/2021	2943.75	2936.45	2932.54
2/11/2021	2943.75	2936.45	2932.54
2/12/2021	2943.75	2936.45	2932.54
2/13/2021	2943.75	2936.45	2932.54
2/14/2021	2943.75	2936.45	2932.54
2/15/2021	2943.75	2936.45	2932.54
2/16/2021	2943.75	2936.45	2932.54
2/17/2021	2943.75	2936.45	2932.54
2/18/2021	2943.75	2936.45	2932.54
2/19/2021	2943.75	2936.45	2932.54
2/20/2021	2943.75	2936.45	2932.54
2/21/2021	2943.75	2936.45	2932.54
2/22/2021	2943.75	2936.45	2932.54
2/23/2021	2943.75	2936.45	2932.54
2/24/2021	2943.75	2936.45	2932.54
2/25/2021	2943.75	2936.45	2932.54
2/26/2021	2943.75	2936.45	2932.54
2/27/2021	2943.75	2936.45	2932.54
2/28/2021	2943.75	2936.45	2932.54
3/1/2021	2943.75	2936.45	2932.54
3/2/2021	2943.75	2936.45	2932.54
3/3/2021	2943.75	2936.45	2932.54
3/4/2021	2943.75	2936.45	2932.54
3/5/2021	2943.75	2936.45	2932.54
3/6/2021	2943.75	2936.45	2932.54
3/7/2021	2943.75	2936.45	2932.54
3/8/2021	2943.75	2936.45	2932.54
3/9/2021	2943.75	2936.45	2932.54
3/10/2021	2943.75	2936.45	2932.54
3/11/2021	2943.75	2936.45	2932.54
3/12/2021	2943.75	2936.45	2932.54
3/13/2021	2943.75	2936.45	2932.54
3/14/2021	2943.75	2936.45	2932.54
3/15/2021	2943.75	2936.45	2932.54
3/16/2021	2943.75	2936.45	2932.54
3/17/2021	2943.75	2936.45	2932.54
3/18/2021	2943.75	2936.45	2932.54
3/19/2021	2943.75	2936.45	2932.54
3/20/2021	2943.75	2936.45	2932.54
3/21/2021	2943.75	2936.45	2932.54
3/22/2021	2943.75	2936.45	2932.54
3/23/2021	2943.75	2936.45	2932.54
3/24/2021	2943.75	2936.45	2932.54
3/25/2021	2943.75	2936.45	2932.54
3/26/2021	2943.75	2936.45	2932.54
3/27/2021	2943.75	2936.45	2932.54
3/28/2021	2943.75	2936.45	2932.54
3/29/2021	2943.75	2936.45	2932.54
3/30/2021	2943.75	2936.45	2932.54
3/31/2021	2943.75	2936.45	2932.54
4/1/2021	2943.75	2936.45	2932.54
4/2/2021	2943.75	2936.45	2932.54
4/3/2021	2943.75	2936.45	2932.54
4/4/2021	2943.75	2936.45	2932.54
4/5/2021	2943.75	2936.45	2932.54
4/6/2021	2943.75	2936.45	2932.54
4/7/2021	2943.75	2936.45	2932.54
4/8/2021	2943.75	2936.45	2932.54
4/9/2021	2943.75	2936.45	2932.54
4/10/2021	2943.75	2936.45	2932.54
4/11/2021	2943.75	2936.45	2932.54
4/12/2021	2943.75	2936.45	2932.54

Table 5: Pecos River Staff Gauge Surface Water Elevation Data

Date	PR-1 (ft amsl)	PR-2 (ft amsl)	PR-3 (ft amsl)
4/13/2021	2943.75	2936.45	2932.54
4/14/2021	2943.75	2936.45	2932.54
4/15/2021	2943.75	2936.45	2932.54
4/16/2021	2943.75	2936.45	2932.54
4/17/2021	2943.75	2936.45	2932.54
4/18/2021	2943.75	2936.45	2932.54
4/19/2021	2943.75	2936.45	2932.54
4/20/2021	2943.75	2936.45	2932.54
4/21/2021	2943.75	2936.45	2932.54
4/22/2021	2943.75	2936.45	2932.54
4/23/2021	2943.75	2936.45	2932.54
4/24/2021	2943.75	2936.45	2932.54
4/25/2021	2943.75	2936.45	2932.54
4/26/2021	2943.75	2936.45	2932.54
4/27/2021	2943.75	2936.45	2932.54
4/28/2021	2943.75	2936.45	2932.54
4/29/2021	2943.75	2936.45	2932.54
4/30/2021	2943.75	2936.45	2932.54
5/1/2021	2943.75	2936.45	2932.54
5/2/2021	2943.75	2936.45	2932.54
5/3/2021	2943.75	2936.45	2932.54
5/4/2021	2943.75	2936.45	2932.54
5/5/2021	2943.75	2936.45	2932.54
5/6/2021	2943.75	2936.45	2932.54
5/7/2021	2943.75	2936.45	2932.54
5/8/2021	2943.75	2936.45	2932.54
5/9/2021	2943.75	2936.45	2932.54
5/10/2021	2943.75	2936.45	2932.54
5/11/2021	2943.75	2936.45	2932.54
5/12/2021	2943.75	2936.45	2932.54
5/13/2021	2943.75	2936.45	2932.54
5/14/2021	2943.75	2936.45	2932.54
5/15/2021	2943.75	2936.45	2932.54
5/16/2021	2943.75	2936.45	2932.54
5/17/2021	2943.75	2936.45	2932.54
5/18/2021	2943.75	2936.45	2932.54
5/19/2021	2943.75	2936.45	2932.54
5/20/2021	2943.75	2936.45	2932.54
5/21/2021	2943.75	2936.45	2932.54
5/22/2021	2943.75	2936.45	2932.54
5/23/2021	2943.75	2936.45	2932.54
5/24/2021	2943.75	2936.45	2932.54
5/25/2021	2943.75	2936.45	2932.54
5/26/2021	2943.75	2936.45	2932.54
5/27/2021	2943.75	2936.45	2932.54
5/28/2021	2943.75	2936.45	2932.54
5/29/2021	2943.75	2936.45	2932.54
5/30/2021	2943.75	2936.45	2932.54
5/31/2021	2943.75	2936.45	2932.54
6/1/2021	2943.75	2936.45	2932.54
6/2/2021	2943.75	2936.45	2932.54
6/3/2021	2943.75	2936.45	2932.54
6/4/2021	2943.75	2936.45	2932.54
6/5/2021	2943.71	2936.45	2932.54
6/6/2021	2943.65	2936.45	2932.54
6/7/2021	2943.65	2936.45	2932.54
6/8/2021	2943.65	2936.45	2932.54
6/9/2021	2943.65	2936.45	2932.54
6/10/2021	2943.65	2936.45	2932.54
6/11/2021	2943.65	2936.45	2932.54
6/12/2021	2943.65	2936.45	2932.54
6/13/2021	2943.65	2936.45	2932.54
6/14/2021	2943.65	2936.45	2932.54
6/15/2021	2943.65	2936.45	2932.54
6/16/2021	2943.65	2936.45	2932.54
6/17/2021	2943.65	2936.45	2932.54
6/18/2021	2943.65	2936.45	2932.54
6/19/2021	2943.65	2936.45	2932.54
6/20/2021	2943.65	2936.45	2932.54

Table 5: Pecos River Staff Gauge Surface Water Elevation Data

Date	PR-1 (ft amsl)	PR-2 (ft amsl)	PR-3 (ft amsl)
6/21/2021	2943.65	2936.45	2932.54
6/22/2021	2943.65	2936.45	2932.54
6/23/2021	2943.65	2936.45	2932.54
6/24/2021	2943.65	2936.45	2932.54
6/25/2021	2943.65	2936.45	2932.54
6/26/2021	2943.65	2936.45	2932.54
6/27/2021	2943.58	2936.45	2932.52
6/28/2021	2943.73	2936.53	2932.52
6/29/2021	2944.01	2936.79	2932.76
6/30/2021	2948.88	NR	NR
7/1/2021	2946.63	NR	NR
7/2/2021	2945.28	NR	NR
7/3/2021	2946.90	NR	NR
7/4/2021	2945.36	NR	NR
7/5/2021	2945.17	NR	NR
7/6/2021	2945.51	NR	NR
7/7/2021	2945.05	NR	NR
7/8/2021	2944.40	NR	NR
7/9/2021	2944.09	NR	NR
7/10/2021	2943.95	NR	NR
7/11/2021	2943.88	NR	NR
7/12/2021	2943.85	NR	NR
7/13/2021	2943.87	NR	NR
7/14/2021	2945.07	NR	NR
7/15/2021	2945.16	NR	NR
7/16/2021	2944.88	NR	NR
7/17/2021	2944.58	NR	NR
7/18/2021	2944.20	NR	NR
7/19/2021	2943.95	NR	NR
7/20/2021	2943.95	NR	NR
7/21/2021	2943.95	NR	NR
7/22/2021	2943.95	NR	NR
7/23/2021	2943.95	NR	NR
7/24/2021	2943.95	NR	NR
7/25/2021	2943.97	NR	NR
7/26/2021	2943.95	NR	NR
7/27/2021	2943.95	NR	NR
7/28/2021	2943.95	NR	NR
7/29/2021	2943.95	NR	NR
7/30/2021	2943.95	NR	NR
7/31/2021	2943.95	NR	NR
8/1/2021	2943.95	NR	NR
8/2/2021	2944.02	NR	NR
8/3/2021	2944.05	NR	NR
8/4/2021	2943.97	NR	NR
8/5/2021	2943.95	NR	NR
8/6/2021	2943.95	NR	NR
8/7/2021	2943.95	NR	NR
8/8/2021	2943.95	NR	NR
8/9/2021	2943.95	NR	NR
8/10/2021	2943.95	NR	NR
8/11/2021	2943.95	NR	NR
8/12/2021	2943.95	NR	NR
8/13/2021	2943.95	NR	NR
8/14/2021	2943.95	NR	NR
8/15/2021	2945.44	NR	NR
8/16/2021	2945.40	NR	NR
8/17/2021	2944.38	NR	NR
8/18/2021	2943.97	NR	NR
8/19/2021	2943.95	NR	NR
8/20/2021	2943.95	NR	NR
8/21/2021	2943.95	NR	NR
8/22/2021	2944.90	NR	NR
8/23/2021	2946.19	NR	NR
8/24/2021	2946.24	NR	NR
8/25/2021	2945.76	NR	NR
8/26/2021	2944.92	NR	NR
8/27/2021	2944.44	NR	NR
8/28/2021	2943.95	NR	NR

Table 5: Pecos River Staff Gauge Surface Water Elevation Data

Date	PR-1 (ft amsl)	PR-2 (ft amsl)	PR-3 (ft amsl)
8/29/2021	2943.95	NR	NR
8/30/2021	2943.95	NR	NR
8/31/2021	2943.95	NR	NR
9/1/2021	2943.95	NR	NR
9/2/2021	2943.95	NR	NR
9/3/2021	2943.95	NR	NR
9/4/2021	2943.95	NR	NR
9/5/2021	2944.04	NR	NR
9/6/2021	2944.13	NR	NR
9/7/2021	2943.95	NR	NR
9/8/2021	2943.95	NR	NR
9/9/2021	2943.95	NR	NR
9/10/2021	2943.95	NR	NR
9/11/2021	2943.95	NR	NR
9/12/2021	2943.95	NR	NR
9/13/2021	2943.95	NR	NR
9/14/2021	2943.95	NR	NR
9/15/2021	2943.95	NR	NR
9/16/2021	2943.95	NR	NR
9/17/2021	2943.95	NR	NR
9/18/2021	2943.95	NR	NR
9/19/2021	2943.95	NR	NR
9/20/2021	2943.95	NR	NR
9/21/2021	2943.95	NR	NR
9/22/2021	2943.95	NR	NR
9/23/2021	2943.95	NR	NR
9/24/2021	2943.95	NR	NR
9/25/2021	2943.95	NR	NR
9/26/2021	2943.95	NR	NR
9/27/2021	2943.95	NR	NR
9/28/2021	2943.95	NR	NR
9/29/2021	2943.95	NR	NR
9/30/2021	2943.95	NR	NR
10/1/2021	2943.95	NR	NR
10/2/2021	2943.95	NR	NR
10/3/2021	2943.95	NR	NR
10/4/2021	2943.95	NR	NR
10/5/2021	2943.95	NR	NR
10/6/2021	2943.95	NR	NR
10/7/2021	2943.95	NR	NR
10/8/2021	2943.95	NR	NR
10/9/2021	2943.95	NR	NR
10/10/2021	2943.95	NR	NR
10/11/2021	2943.95	NR	NR
10/12/2021	2943.95	NR	NR
10/13/2021	2943.95	NR	NR
10/14/2021	2943.95	NR	NR
10/15/2021	2943.95	NR	NR
10/16/2021	2943.95	NR	NR
10/17/2021	2943.95	NR	NR
10/18/2021	2943.95	NR	NR
10/19/2021	2943.95	NR	NR
10/20/2021	2943.95	NR	NR
10/21/2021	2943.95	NR	NR
10/22/2021	2943.95	NR	NR
10/23/2021	2943.95	NR	NR
10/24/2021	2943.95	NR	NR
10/25/2021	2943.95	NR	NR
10/26/2021	2943.95	NR	NR
10/27/2021	2943.95	NR	NR
10/28/2021	2943.95	NR	NR
10/29/2021	2943.95	NR	NR
10/30/2021	2943.95	NR	NR
10/31/2021	2943.95	NR	NR
11/1/2021	2943.95	NR	NR
11/2/2021	2943.95	NR	NR
11/3/2021	2943.95	NR	NR
11/4/2021	2943.95	NR	NR
11/5/2021	2943.95	NR	NR

Table 5: Pecos River Staff Gauge Surface Water Elevation Data

Date	PR-1 (ft amsl)	PR-2 (ft amsl)	PR-3 (ft amsl)
11/6/2021	2943.95	NR	NR
11/7/2021	2943.95	NR	NR
11/8/2021	2943.95	NR	NR
11/9/2021	2943.95	NR	NR
11/10/2021	2943.95	NR	NR
11/11/2021	2943.95	NR	NR
11/12/2021	2943.95	NR	NR
11/13/2021	2943.95	NR	NR
11/14/2021	2943.95	NR	NR
11/15/2021	2943.95	NR	NR
11/16/2021	2943.95	NR	NR
11/17/2021	2943.95	NR	NR
11/18/2021	2943.95	NR	NR
11/19/2021	2943.95	NR	NR
11/20/2021	2943.95	NR	NR
11/21/2021	2943.95	NR	NR
11/22/2021	2943.95	NR	NR
11/23/2021	2943.95	NR	NR
11/24/2021	2943.95	NR	NR
11/25/2021	2943.95	NR	NR
11/26/2021	2943.95	NR	NR
11/27/2021	2943.95	NR	NR
11/28/2021	2943.95	NR	NR
11/29/2021	2943.95	NR	NR
11/30/2021	2943.95	NR	NR
12/1/2021	2943.95	NR	NR
12/2/2021	2943.95	NR	NR
12/3/2021	2943.95	NR	NR
12/4/2021	2943.95	NR	NR
12/5/2021	2943.95	NR	NR
12/6/2021	2943.95	NR	NR
12/7/2021	2943.95	NR	NR
12/8/2021	2943.95	NR	NR
12/9/2021	2943.95	NR	NR
12/10/2021	2943.95	NR	NR
12/11/2021	2943.95	NR	NR
12/12/2021	2943.95	NR	NR
12/13/2021	2943.95	NR	NR
12/14/2021	2943.95	NR	NR
12/15/2021	2943.95	NR	NR
12/16/2021	2943.95	NR	NR
12/17/2021	2943.95	NR	NR
12/18/2021	2943.95	NR	NR
12/19/2021	2943.95	NR	NR
12/20/2021	2943.95	NR	NR
12/21/2021	2943.95	NR	NR
12/22/2021	2943.95	NR	NR
12/23/2021	2943.95	NR	NR
12/24/2021	2943.95	NR	NR
12/25/2021	2943.95	NR	NR
12/26/2021	2943.95	NR	NR
12/27/2021	2943.95	NR	NR
12/28/2021	2943.95	NR	NR
12/29/2021	2943.95	NR	NR
12/30/2021	2943.95	NR	NR
12/31/2021	2943.95	NR	NR
1/1/2022	2943.95	NR	NR
1/2/2022	2943.95	NR	NR
1/3/2022	2943.95	NR	NR
1/4/2022	2943.95	NR	NR
1/5/2022	2943.95	NR	NR
1/6/2022	2943.95	NR	NR
1/7/2022	2943.95	NR	NR
1/8/2022	2943.95	NR	NR
1/9/2022	2943.95	NR	NR
1/10/2022	2943.95	NR	NR
1/11/2022	2943.95	NR	NR
1/12/2022	2943.95	NR	NR
1/13/2022	2943.95	NR	NR

Table 5: Pecos River Staff Gauge Surface Water Elevation Data

Date	PR-1 (ft amsl)	PR-2 (ft amsl)	PR-3 (ft amsl)
1/14/2022	2943.95	NR	NR
1/15/2022	2943.95	NR	NR
1/16/2022	2943.95	NR	NR
1/17/2022	2943.95	NR	NR
1/18/2022	2943.95	NR	NR
1/19/2022	2943.95	NR	NR
1/20/2022	2943.95	NR	NR
1/21/2022	2943.95	2939.70	2934.50
1/22/2022	2943.95	2939.70	2934.50
1/23/2022	2943.95	2939.70	2934.50
1/24/2022	2943.95	2939.70	2934.50
1/25/2022	2943.95	2939.70	2934.50
1/26/2022	2943.95	2939.70	2934.50
1/27/2022	2943.95	2939.70	2934.50
1/28/2022	2943.95	2939.70	2934.50
1/29/2022	2943.95	2939.70	2934.50
1/30/2022	2943.95	2939.70	2934.50
1/31/2022	2943.95	2939.70	2934.50
2/1/2022	2943.95	2939.70	2934.50
2/2/2022	2943.95	2939.70	2934.50
2/3/2022	2943.95	2939.70	2934.50
2/4/2022	2943.95	2939.70	2934.50
2/5/2022	2943.95	2939.70	2934.50
2/6/2022	2943.95	2939.70	2934.50
2/7/2022	2943.95	2939.70	2934.50
2/8/2022	2943.95	2939.70	2934.50
2/9/2022	2943.95	2939.70	2934.50
2/10/2022	2943.95	2939.70	2934.50
2/11/2022	2943.95	2939.70	2934.50
2/12/2022	2943.95	2939.70	2934.50
2/13/2022	2943.95	2939.70	2934.50
2/14/2022	2943.95	2939.70	2934.50
2/15/2022	2943.95	2939.70	2934.50
2/16/2022	2943.95	2939.70	2934.50
2/17/2022	2943.95	2939.70	2934.50
2/18/2022	2943.95	2939.70	2934.50
2/19/2022	2943.95	2939.70	2934.50
2/20/2022	2943.95	2939.70	2934.50
2/21/2022	2943.95	2939.70	2934.50
2/22/2022	2943.95	2939.70	2934.50
2/23/2022	2943.95	2939.70	2934.50
2/24/2022	2943.95	2939.70	2934.50
2/25/2022	2943.95	2939.70	2934.50
2/26/2022	2943.95	2939.70	2934.50
2/27/2022	2943.95	2939.70	2934.50
2/28/2022	2943.95	2939.70	2934.50
3/1/2022	2943.95	2939.70	2934.50
3/2/2022	2943.95	2939.70	2934.50
3/3/2022	2943.95	2939.70	2934.50
3/4/2022	2943.95	2939.70	2934.50
3/5/2022	2943.95	2939.70	2934.50
3/6/2022	2943.95	2939.70	2934.50
3/7/2022	2943.95	2939.70	2934.50
3/8/2022	2943.95	2939.70	2934.50
3/9/2022	2943.95	2939.70	2934.50
3/10/2022	2943.95	2939.70	2934.50
3/11/2022	2943.95	2939.70	2934.50
3/12/2022	2943.95	2939.70	2934.50
3/13/2022	2943.95	2939.70	2934.50
3/14/2022	2943.95	2939.70	2934.50
3/15/2022	2943.89	2939.70	2934.50
3/16/2022	2943.85	2939.70	2934.50
3/17/2022	2943.85	2939.70	2934.50
3/18/2022	2943.85	2939.70	2934.50
3/19/2022	2943.85	2939.70	2934.50
3/20/2022	2943.85	2939.70	2934.50
3/21/2022	2943.85	2939.70	2934.50
3/22/2022	2943.85	2939.70	2934.50
3/23/2022	2943.85	2939.70	2934.50

Table 5: Pecos River Staff Gauge Surface Water Elevation Data

Date	PR-1 (ft amsl)	PR-2 (ft amsl)	PR-3 (ft amsl)
3/24/2022	2943.85	2939.70	2934.50
3/25/2022	2943.85	2939.70	2934.50
3/26/2022	2943.85	2939.70	2934.50
3/27/2022	2943.85	2939.70	2934.50
3/28/2022	2943.85	2939.70	2934.50
3/29/2022	2943.85	2939.70	2934.50
3/30/2022	2943.85	2939.70	2934.50
3/31/2022	2943.85	2939.70	2934.50
4/1/2022	2943.85	2939.70	2934.50
4/2/2022	2943.85	2939.70	2934.50
4/3/2022	2943.85	2939.70	2934.50
4/4/2022	2943.85	2939.70	2934.50
4/5/2022	2943.85	2939.70	2934.50
4/6/2022	2943.85	2939.70	2934.50
4/7/2022	2943.85	2939.70	2934.50
4/8/2022	2943.85	2939.70	2934.50
4/9/2022	2943.85	2939.70	2934.50
4/10/2022	2943.85	2939.70	2934.50
4/11/2022	2943.85	2939.70	2934.50
4/12/2022	2943.85	2939.70	2934.50
4/13/2022	2943.85	2939.70	2934.50
4/14/2022	2943.85	2939.70	2934.50
4/15/2022	2943.85	2939.70	2934.50
4/16/2022	2943.85	2939.70	2934.50
4/17/2022	2943.85	2939.70	2934.50
4/18/2022	2943.85	2939.70	2934.46
4/19/2022	2943.85	2939.70	2934.40
4/20/2022	2943.85	2939.70	2934.39
4/21/2022	2943.85	2939.70	2934.30
4/22/2022	2943.85	2939.70	2934.30
4/23/2022	2943.85	2939.70	2934.30
4/24/2022	2943.85	2939.70	2934.30
4/25/2022	2943.85	2939.70	2934.30
4/26/2022	2943.85	2939.70	2934.30
4/27/2022	2943.81	2939.67	2934.31
4/28/2022	2943.75	2939.60	2934.40
4/29/2022	2943.75	2939.60	2934.40
4/30/2022	2943.75	2939.60	2934.40
5/1/2022	2943.75	2939.60	2934.40
5/2/2022	2943.75	2939.60	2934.40
5/3/2022	2943.75	2939.60	2934.40
5/4/2022	2943.75	2939.60	2934.40
5/5/2022	2943.75	2939.60	2934.40
5/6/2022	2943.75	2939.60	2934.40
5/7/2022	2943.75	2939.60	2934.40
5/8/2022	2943.75	2939.60	2934.40
5/9/2022	2943.75	2939.60	2934.40
5/10/2022	2943.75	2939.60	2934.40
5/11/2022	2943.75	2939.60	2934.40
5/12/2022	2943.75	2939.60	2934.40
5/13/2022	2943.75	2939.60	2934.40
5/14/2022	2943.75	2939.60	2934.31
5/15/2022	2943.75	2939.60	2934.21
5/16/2022	2943.75	2939.60	2934.14
5/17/2022	2943.75	2939.60	2934.29
5/18/2022	2943.75	2939.60	2934.23
5/19/2022	2943.75	2939.60	2934.17
5/20/2022	2943.75	2939.60	2934.14
5/21/2022	2943.75	2939.60	2934.25
5/22/2022	2943.75	2939.60	2934.20
5/23/2022	2943.75	2939.60	2934.20
5/24/2022	2943.75	2939.60	2934.22
5/25/2022	2943.75	2939.60	2934.30
5/26/2022	2943.75	2939.60	2934.30
5/27/2022	2943.75	2939.60	2934.30
5/28/2022	2943.75	2939.60	2934.30
5/29/2022	2943.75	2939.60	2934.30
5/30/2022	2943.75	2939.60	2934.30
5/31/2022	2943.75	2939.60	2934.30

Table 5: Pecos River Staff Gauge Surface Water Elevation Data

Date	PR-1 (ft amsl)	PR-2 (ft amsl)	PR-3 (ft amsl)
6/1/2022	2943.75	2939.60	2934.30
6/2/2022	2943.75	2939.60	2934.30
6/3/2022	2943.75	2939.60	2934.30
6/4/2022	2943.75	2939.60	2934.34
6/5/2022	2943.75	2939.60	2934.40
6/6/2022	2943.75	2939.60	2934.30
6/7/2022	2943.75	2939.60	2934.30
6/8/2022	2943.75	2939.60	2934.23
6/9/2022	2943.75	2939.60	2934.30
6/10/2022	2943.75	2939.60	2934.30
6/11/2022	2943.75	2939.60	2934.30
6/12/2022	2943.75	2939.60	2934.30
6/13/2022	2943.75	2939.60	2934.30
6/14/2022	2943.75	2939.60	2934.30
6/15/2022	2943.75	2939.60	2934.30
6/16/2022	2943.75	2939.60	2934.30
6/17/2022	2943.75	2939.60	2934.30
6/18/2022	2943.75	2939.60	2934.30
6/19/2022	2943.75	2939.60	2934.30
6/20/2022	2943.75	2939.60	2934.30
6/21/2022	2943.75	2939.60	2934.30
6/22/2022	2943.75	2939.60	2934.30
6/23/2022	2943.75	2939.60	2934.30
6/24/2022	2943.75	2939.60	2934.30
6/25/2022	2943.75	2939.60	2934.30
6/26/2022	2943.75	2939.61	2934.30
6/27/2022	2943.79	2939.65	2934.35
6/28/2022	2943.88	2939.74	2933.72
6/29/2022	2943.80	2939.70	2933.00
6/30/2022	2943.75	2939.70	2933.00
7/1/2022	2943.71	2939.60	2933.00
7/2/2022	2943.65	2939.60	2933.00
7/3/2022	2943.65	2939.60	2933.00
7/4/2022	2943.65	2939.60	2933.00
7/5/2022	2943.65	2939.60	2933.00
7/6/2022	2943.75	2939.60	2933.00
7/7/2022	2943.75	2939.60	2933.00
7/8/2022	2943.75	2939.60	2933.00
7/9/2022	2943.75	2939.60	2933.00
7/10/2022	2943.75	2939.60	2933.00
7/11/2022	2943.75	2939.60	2933.00
7/12/2022	2943.75	2939.60	2933.00
7/13/2022	2943.75	2939.60	2933.00
7/14/2022	2943.75	2939.60	2933.00
7/15/2022	2943.75	2939.60	2933.00
7/16/2022	2943.75	2939.60	2933.00
7/17/2022	2943.75	2939.60	2933.00
7/18/2022	2943.75	2939.60	2933.00
7/19/2022	2943.75	2939.60	2933.00
7/20/2022	2943.75	2939.60	2933.00
7/21/2022	2943.75	2939.60	2933.00
7/22/2022	2943.75	2939.60	2933.00
7/23/2022	2943.75	2939.60	2933.00
7/24/2022	2943.66	2939.60	2933.00
7/25/2022	2943.65	2939.60	2933.00
7/26/2022	2943.75	2939.60	2933.00
Average:	**2943.87**	**2937.19**	**2933.09**

Note:
- Data are presented as daily average water elevation measurements taken from hourly staff gauge readings
- ft amsl : Feet above mean sea level
- NR : Data not recorded (values not recorded due to battery issue or loss of staff gauge)
- -- : Data has not yet been downloaded
- Pecos River staff gauges were installed in August 2018 and measurements began immediately following installations
PR-4 staff gauge was installed in June 2022 and will be surveyed in the third quarter of 2022, elevation readings will then be incorporated into this table

Table 6. Summary of Laguna Grande Area Monitor Well Construction Details (Mosaic Wells)

Well ID	Date Drilled	Current Status	NAD83 Coordinates [1]		Ground Surface Elevation [3]	Elevation Top of Casing	Primary Formation Completed In	Total Depth of Boring	Total Depth of Well	Top of Screen	Bottom of Screen	Top of Screen	Bottom of Screen	Data Availability			
			Northing [2]	Easting [2]	(ft amsl)	(ft amsl)		(ft bgs)	(ft bgs)	(ft bgs)	(ft bgs)	(ft amsl)	(ft amsl)	Boring Logs	Well Logs	Water Levels	
LG-1	5/22/2000	Existing	470386.0	635526.2	2966.08	2966.78	Caliche	60.0	39.0	27.8	39	2938.3	2927.1	YES	YES	23.32 ft bgs (7/25/01)	1/04 to present
LG-2	6/6/2000	Existing, no longer part of DP-1399	476867.3	632230.7	2972.77	2974.52	Caliche	150.0	35.0	25	35	2947.8	2937.8	YES	YES	22.89 ft bgs (7/25/01)	1/04 to present
LG-3	5/25/2000	Missing/Inaccessible	472201.0	637323.0	2957.9	---	Fine Sand and Silt	30.0	17.0	12	17	2945.9	2940.9	YES	YES	7.12 ft bgs (7/25/01)	1/04 to 7/05
LG-4	9/6/2000	Missing/Inaccessible	470892.0	638475.0	2958.9	---	Caliche	150.0	68.0	48	68	2910.9	2890.9	YES	YES	8.80 ft bgs (7/25/01)	1/04 to 7/05
LG-5	9/6/2000	Existing	465855.4	648445.6	2970.68	2972.42	Limestone/Dolomite	213.5	40.0	35	40	2935.7	2930.7	YES	YES	15.61 ft bgs (7/25/01)	1/04 to present
LG-6	2/17/2001	Plugged and Abandoned [4]	469344.0	652215.0	2960.4	---	Caliche	80.0	20.0	10	20	2950.4	2940.4	YES	YES	6.93 ft bgs (7/25/01)	---
LG-7a	2/12/2001	Plugged and Abandoned [4]	477803.0	653487.0	2961.8	---	Limestone/Dolomite	48.0	27.5	18.5	27.5	2943.3	2934.3	YES	YES	4.42 ft bgs (7/25/01)	---
LG-7b	2/14/2001	Plugged and Abandoned [4]	477803.0	653487.0	2961.9	---	Caliche	13.0	12.5	7.5	12.5	2954.4	2949.4	YES	YES	4.07 ft bgs (7/25/01)	---
LG-8a	2/6/2001	Plugged and Abandoned [4]	483546.0	650006.0	2957.9	---	Limestone/Dolomite	85.0	75.0	65	75	2892.9	2882.9	YES	YES	0.43 ft bgs (7/25/01)	---
LG-8b	2/6/2001	Plugged and Abandoned [4]	483546.0	650006.0	2958.0	---	Gypsite	36.0	35.6	30.6	35.6	2927.4	2922.4	YES	YES	1.73 ft bgs (7/25/01)	---
LG-8c	2/8/2001	Plugged and Abandoned [4]	483546.0	650006.0	2958.0	---	Salt, Sand, Silt and Clay	12.0	11.5	6.5	11.5	2951.5	2946.5	YES	YES	3.08 ft bgs (7/25/01)	---
LG-9a	2/19/2001	Plugged and Abandoned [4]	482712.0	644383.0	2957.7	---	Limestone/Dolomite	38.0	30.0	10	30	2947.7	2927.7	YES	YES	1.51 ft bgs (7/25/01)	---
LG-9b	2/21/2001	Plugged and Abandoned [4]	482712.0	644383.0	2957.7	---	Caliche	5.0	5.0	2.5	5	2955.2	2952.7	YES	YES	1.44 ft bgs (7/25/01)	---
LG-10	3/5/2001	Plugged and Abandoned [4]	481967.0	641571.0	2988.6	---	Limestone/Dolomite	32.0	30.7	10.7	30.7	2977.9	2957.9	YES	YES	Dry (3/15/01)	---
LG-11	7/20/2001	Plugged and Abandoned [4]	472766.0	655006.0	2946.2	---	Limestone/Dolomite	56.0	51.0	31	51	2915.2	2895.2	YES	YES	30.06 ft bgs (7/25/01)	---
LG-12	*7/13/2001*	Plugged and Abandoned [4]	479797.0	665465.0	2983.6	---	*Limestone/Dolomite*	*45.0*	*36.0*	*26*	*36*	2957.6	2947.6	YES	YES	5.33 ft bgs (7/25/01)	---
LG-13	3/13/2001	Plugged and Abandoned [4]	477697.0	643277.0	2956.7	---	Sand, Silt and Clay	60.0	29.5	19.5	29.5	2937.2	2927.2	YES	YES	1.85 ft bgs (3/16/01)	---
LG-14	3/9/2001	Plugged and Abandoned [4]	477258.0	645769.0	2974.6	---	Caliche and Limestone/Dolomite	70.0	70.0	37	70	2937.6	2904.6	YES	YES	20.30 ft bgs (3/12/01)	---
LG-15	3/24/2001	Plugged and Abandoned [4]	475793.0	646837.0	2960.6	---	Clay with Sand and Gravel	60.0	---	---	---	---	---	YES	NA		---
LG-16a	3/20/2001	Plugged and Abandoned [4]	474261.0	647456.0	2958.1	---	Sand, Gravel (Caliche)	22.0	10.8	7.5	10.8	2950.6	2947.3	YES	YES	3.98 ft bgs (3/22/01)	---
LG-16b	3/21/2001	Plugged and Abandoned [4]	474261.0	647456.0	2957.1	---	Limestone/Dolomite	40.0	35.0	25	35	2932.1	2922.1	YES	YES	3.47 ft bgs (3/24/01)	---
LG-17	3/17/2001	Plugged and Abandoned [4]	477060.0	639980.0	2960.7	---	Sand, Silt and Clay	40.0	24.0	20	24	2940.7	2936.7	YES	YES	6.27 ft bgs (3/19/01)	---
LG-18	3/14/2001	No Well Installed	473893.0	639418.0	2960.2	NA	Sand, Silt and Clay, Cobbles at Bottom	49.0	NA	NA	NA	NA	NA	YES	NA		---
LG-19	3/16/2001	Plugged and Abandoned [4]	469674.0	647430.0	2955.4	---	Clay and Sand	60.0	26.0	21	26	2934.4	2929.4	YES	YES	0.41 ft bgs (3/19/01)	---
LG-20	3/12/2001	No Well Installed	472582.0	646588.0	2951.7	NA	Salt - Lake Bottom	4.0	NA	NA	NA	NA	NA	YES	NA	No Data	---
LG-21	3/25/2001	Plugged and Abandoned [4]	479027.0	641893.0	2958.1	---	Clay, Silt and Sand, Some Gravel	50.0	24.0	14	24	2944.1	2934.1	YES	YES	2.44 ft bgs (3/25/01)	---
LG-22	3/30/2001	Plugged and Abandoned [4]	474778.0	649944.0	2966.0	---	Limestone/Dolomite	60.0	56.9	36.9	56.9	2929.1	2909.1	YES	YES	8.57 ft bgs (7/25/01)	---
LG-23	7/10/2001	Existing	463050.8	648440.1	2972.08	2973.22	Limestone/Dolomite	80.0	75.0	47.5	75	2924.6	2897.1	YES	YES	20.78 ft ngs (7/25/01)	1/04 to present
LG-24	7/22/2001	Plugged and Abandoned [4]	449630.0	645931.0	2957.8	---	Limestone/Dolomite	46.0	41.0	21	41	2936.8	2916.8	YES	YES	Dry (7/25/01)	---
LG-25	7/27/2001	Existing	472539.1	631039.2	2972.11	2972.92	Caliche and Sand	50.0	26.0	11	26	2961.1	2946.1	YES	YES	21.88 (8/01/01)	1/04 to present
LG-26	8/13/2002	Existing	464579.4	638904.2	2951.22	2952.61	Conglomerate	47.0	45.0	30	45	2921.2	2906.2	YES	YES	17.2 ft bgs (5/1/13)	1/04 to present
LG-27	8/15/2002	Existing, no longer part of DP-1399	456419.0	639735.6	2958.21	2959.4	Silt and Clay with Gypsum Streaks	82.0	55.0	30	55	2928.2	2903.2	YES	YES	30.23 ft bgs (08/15/02)	1/04 to 3/17
LG-28	1/12/2006	Existing	468369.0	641030.1	2961.25	2962.52	Conglomerate	40.0	38.0	28	38	2933.3	2923.3	YES	YES	7.33 ft bgs (1/12/06), 1.29 ft bgs (5/29/13)	2/06 to present
LG-29	1/9/2006	Existing	468782.4	644247.2	2974.80	2976.14	Conglomerate	30.0	26.0	18	26	2956.8	2948.8	YES	YES	17.53 ft bgs (5/30/13)	2/06 to present
LG-30	1/13/2006	Existing	468468.3	636128.4	2966.70	2968.55	Conglomerate	50.0	48.0	38	48	2928.7	2918.7	YES	YES	24..58 ft bgs (1/13/06), 25.77 ft bgs (5/30/13)	2/06 to present
LG-31	4/13/2013	Existing	461969.5	641604.6	2982.31	2984.72	Clay	99.5	99.0	89	99	2893.3	2883.3	YES	YES	53.61 ft bgs (5/30/13)	4/13 to present
LG-32	4/11/2013	Existing	468401.5	637956.0	2960.91	2963.80	Conglomerate Top, Sandy Clay Bottom	77.0	71.0	61	71	2899.9	2889.9	YES	YES	17 ft (4/13/13), 7.90 ft bgs (5/29/13)	4/13 to present
LG-33	11/17/2020	Existing	467732	633572	2967.33	2969.52	Gravelly clay, sand, gravelly sand, clayey sand	101.5	36.5	21.2	36.2	2946.1	2931.1	YES	YES	25.03 ft bgs on 11/22/2020	
LG-34	11/19/2020	Existing	473535	630365	2972.47	2974.70	Caliche with gravel and sand stringers, clay at btm.	100.0	23.3	13	23	2959.5	2949.5	YES	YES	17.71 ft bgs on 11/22/2020	
LG-35	11/16/2020	Existing	471062	632668	2977.29	2979.80	Gravel, calichefied gravel (conglomerate), sand	100.0	36.8	26.5	36.5	2950.8	2940.8	YES	YES	32.7 ft bgs on 11/22/2020	
LG-36	12/17/2021	Existing	479447.7	632035.3	3005.27	3007.78	Dolomite, mudstone with clayey sand 7 gravel stringers	101.0	62.5	47.2	62.2	2958.1	2943.1	YES	YES	Dry January 2022	
LG-37	12/15/2021	Existing	476401.8	631566.5	2974.98	2977.41	Sand with gravel, and clay stringers	100.0	33.8	13.5	33.5	2961.5	2941.5	YES	YES	18.5 ft bgs on 1/20/2022	
LG-38	12/14/2021	Existing	476343.1	633597.2	2960.82	2963.89	Sand, clayey sand, gravelly clay	101.0	31.1	15.8	30.8	2945.0	2930.0	YES	YES	5.1 ft bgs on 1/20/2022	
P-East	4/2/2013	Existing	512122.0	668725.5	3108.06	3110.60	Gypsum/Anhydrite	80.0	80.0	65	80	3043.1	3028.1	YES	YES		
P-West	4/2/2013	Existing	504594.6	660645.3	3068.44	3070.96	Gypsum/Anhydrite	80.0	79.0	59	79	3009.4	2989.4	YES	YES		
P-Center	4/2/2013	Existing	504886.3	664160.8	3032.65	3034.84	Gypsum, gravelly	20.0	20.0	15	20	3017.7	3012.7	YES	YES		
P-1D	8/7/2009	Existing	505574.6	665358.3	3030.0	3031.8	Silty Sand, Clay	31.0	27.5	22.5	27.5	3007.5	3002.5	YES	YES	2.7 ft bgs (8/7/09)	---
P-1S	8/6/2009	Existing	505573.1	665360.2	3030.0	3031.6	Clay, Salt, Minor Sand	20.0	20.0	10	20	3020.0	3010	YES	YES	1.4 ft bgs (8/6/09)	---
P-2S	8/6/2009	Existing	505567.0	665341.4	3030.0	3031.4	Salt and Silt with Sand	20.0	20.0	10	20	3020.0	3010	YES	YES	1.7 ft bgs (8/6/09)	---
P-3D	8/9/2009	Existing	505599.3	665372.4	3030.0	3031.5	Clay with Silt	30.0	28.5	23.5	28.5	3006.5	3001.5	YES	YES	6.5 ft bgs (8/9/09)	---
P-3S	8/7/2009	Existing	505598.3	665374.9	3030.0	3031.3	Salt	22.0	20.0	10	20	3020.0	3010	YES	YES	2.7 ft bgs (8/7/09)	---
PW-1	8/4/2009	Existing	505578.6	665379.5	3030.0	3032.3	Salt	27.0	25.0	10	20	3020.0	3010	YES	YES	2.2 ft bgs (8/4/09)	---
PW-2	8/5/2009	Existing	505580.2	665372.9	3030.0	3032.6	Silty Sand, Clayey Silt	41.0	39.5	24.5	39.5	3005.5	2990.5	YES	YES	2.2 ft bgs (8/5/09)	---

Notes:

[1] State Plane NAD83 Coordinates, New Mexico East 3001 Zone in Feet

[2] Coordinates are approximate—translated to NAD83 according to approximate section line locations on archived maps for the following wells: LG-3, 4, 6, 7a, 7b, 8a, 8b, 8c, 9a, 9b, 10, 11, 12, 13, 14, 15, 16a 16b, 17, 18, 19, 20, 21, 22, and 24.

[3] Elevations are approximate—unknown survey accuracy from archived well logs for the following wells: LG-3, 4, 6, 7a, 7b, 8a, 8b, 8c, 9a, 9b, 10, 11, 12, 13, 14, 15, 16a 16b, 17, 18, 19, 20, 21, 22, and 24.

[4] Wells were plugged and abandoned (Personal Communication with Scott Vail, 6/3/2009)

ft amsl: Feet above mean sea level

Table 7. Summary of Laguna Grande Area Monitor Well Construction Details (Other Wells)

Well ID	Date Drilled	Current Status	NAD83 Coordinates		Ground Surface Elevation ²	Elevation Top of Casing	Primary Formation Completed In	Total Depth of Boring	Total Depth of Well	Top of Screen	Bottom of Screen	Top of Screen	Bottom of Screen	Data Availability			
			Northing ³	Easting ³	(ft amsl)	(ft amsl)		(ft bgs)	(ft bgs)	(ft bgs)	(ft bgs)	(ft amsl)	(ft amsl)	Boring Logs	Well Logs	Water Levels	
BLM 1979 Test Holes[1,3]																	
23.28.1.11	10/26/1978	Unknown	487770.6	629527.6	3068.81	NA	Clayey Shale and Gypsum	300	280	260	280	2808.81	2788.81	YES	NO	3/14/1979	155.69
23.29.18.14	11/17/1978	Unknown	475834.9	636216.1	2959.23	NA	Sand and Gravel	35	35	15	35	2944.23	2924.23	YES	NO	3/13/1979	7.12
23.29.20.33	10/25/1978	Unknown	467804.4	640125.5	2970.90	NA	Siltstone Top, Limestone	60	60	40	60	2930.9	2910.9	YES	NO	3/14/1979	22.88
23.29.26.12	10/24/1978	Unknown	466644.1	657408.3	3030.88	NA	Anhydrite/Shale	160	160	140	160	2890.88	2870.88	YES	NO	3/6/1979	107.75
23.29.28.41	10/24/1978	Unknown	463900.1	648116.4	2988.16	NA	Shale	100	80	50	60	2938.16	2928.16	YES	NO	3/14/1979	40.97
							Shale and Gypsum			70	80	2918.16	2908.16	YES	NO	3/14/1979	40.97
USGS 1965[2,3]																	
19.421	12/17/1962	Existing	437642.1	638845.1	2941.2	NA	Culebra Dolomite	72	70	16	72	2925.2	2869.2	YES	NO	12/17/1962	37.26
20.134	12/11/1962	Unknown	438314.7	640812.3	2959.3	NA	Culebra Dolomite, Shale, Gypsum	92	92	45.5	92	2913.8	2867.3	YES	NO	12/11/1962	61.75
20.322	10/31/1962	Unknown	437654.5	642147.7	2958.1	NA	Culebra Dolomite, Limestone	95.5	94	62	80	2896.1	2878.1	YES	NO	10/31/1962	60.18
20.412	11/14/1962	Unknown	437658.8	643471.2	2949	NA	Shale, Clay, Sand	105.5	105.5	72	102	2877.0	2847.0	YES	NO	11/14/1962	59.21
20.431	10/10/1962	Unknown	436328.5	642819.6	2962.4	NA	Dolomite w/Clay Stringers	84.5	84.5	54	84	2908.4	2878.4	YES	NO	10/10/1962	63.66
20.432	10/22/1962	Unknown	436328.5	643488.3	2957.8	NA	Conglomerate, Sand and Clay	77.5	73	27	61	2930.8	2896.8	YES	NO	10/22/1962	59.35
29.141	12/5/1962	Unknown	433666.2	641534.8	2946.3	NA	Culebra Dolomite w/Clay Stringers	92	90	54	90	2892.3	2856.3	YES	NO	12/5/1962	37.92
29.143	12/7/1962	Unknown	433002.0	641542.5	2928.7	NA	Culebra Dolomite w/Clay Stringers	62	62	33	62	2895.7	2866.7	YES	NO	12/7/1962	25.91
29.213	11/23/1962	Unknown	434331.6	642852.0	2949.6	NA	Culebra Dolomite w/Clay Stringers, Shale	101	100	61.5	100	2888.1	2849.6	YES	NO	11/23/1962	56.67
29.241	11/30/1962	Unknown	433668.5	644184.6	2949.1	NA	Shale, Siltstone, Limestone	115	114	56.5	114	2892.6	2835.1	YES	NO	11/30/1962	60.24
USGS National Water Information System[4]																	
USGS 321832104022001	---	Inactive	590478	3575080	2972	---	Alluvium, Bolson Deposits and Other Surface Deposits	---	45	---	---	---	---	NO	NO	05/1950	
USGS 321828104024301	---	Inactive	589878	3574952	2980	---	Alluvium, Bolson Deposits and Other Surface Deposits	---	40	---	---	---	---	NO	NO	05/1950	
USGS 321828104024601	---	Inactive	589799	3574951	2980	---	Alluvium, Bolson Deposits and Other Surface Deposits	---	79	---	---	---	---	NO	NO	05/1950	
USGS 321818104025001	---	Inactive	589698	3574642	2976	---	Alluvium, Bolson Deposits and Other Surface Deposits	---	210	---	---	---	---	NO	NO	1983-1996	
USGS 321821104025501	---	Inactive	589566	3574733	2873	---	Alluvium, Bolson Deposits and Other Surface Deposits	---	132	---	---	---	---	NO	NO	09/1954	
USGS 321825104025901	---	Inactive	589460	3574856	2980	---	Alluvium, Bolson Deposits and Other Surface Deposits	---	130	---	---	---	---	NO	NO	10/1954	
USGS 321830104030301	---	Inactive	589354	3575009	2980	---	Alluvium, Bolson Deposits and Other Surface Deposits	---	80	---	---	---	---	NO	NO	1954-2018	
USGS 321836104031001	---	Inactive	589170	3575192	2979	---	Alluvium, Bolson Deposits and Other Surface Deposits	---	---	---	---	---	---	NO	NO	09/1954	
USGS 321847104044501	---	Inactive	586682	3575509	2999	---	Alluvium, Bolson Deposits and Other Surface Deposits	---	196	---	---	---	---	NO	NO	1983-2003	
USGS 321852104045601	---	Inactive	586393	3575660	3011	---	Alluvium, Bolson Deposits and Other Surface Deposits	130	130	---	---	---	---	NO	NO	10/1991	
USGS 321818104043601	---	Inactive	586698	3574631	3004.9	---	Alluvium, Bolson Deposits and Other Surface Deposits	---	160	---	---	---	---	NO	NO	1954-2018	
USGS National Water Information System[4] (continued)																	
USGS 321818104043501	---	Inactive	586952	3574618	2998	---	Alluvium, Bolson Deposits and Other Surface Deposits	---	137	---	---	---	---	NO	NO	1946-1956	
USGS 321817104042101	---	Inactive	587318	3574590	2995	---	Alluvium, Bolson Deposits and Other Surface Deposits	---	88	---	---	---	---	NO	NO	1947-1955	
USGS 321818104032101	---	Inactive	588887	3574635	2981	---	Alluvium, Bolson Deposits and Other Surface Deposits	---	100	---	---	---	---	NO	NO	1946-1948	
USGS 321806104043601	---	Inactive	586929	3574248	3001	---	Alluvium, Bolson Deposits and Other Surface Deposits	---	145	---	---	---	---	NO	NO	1946-2021	
USGS 321728104052101	---	Inactive	585762	3573068	3034	---	Alluvium, Bolson Deposits and Other Surface Deposits	---	200	---	---	---	---	NO	NO	1978-2003	
USGS 321728104040001	---	Inactive	587880	3573086	3020	---	Alluvium, Bolson Deposits and Other Surface Deposits	---	220	---	---	---	---	NO	NO	1983-2003	
USGS 321733104035001	---	Inactive	588141	3573243	3032	---	Alluvium, Bolson Deposits and Other Surface Deposits	---	148	---	---	---	---	NO	NO	1947-1981	
USGS 321727104023901	---	Inactive	589999	3573074	2993	---	Alluvium, Bolson Deposits and Other Surface Deposits	---	96	---	---	---	---	NO	NO	1946-2003	

Table 7. Summary of Laguna Grande Area Monitor Well Construction Details (Other Wells)

Well ID	Date Drilled	Current Status	NAD83 Coordinates		Ground Surface Elevation [2]	Elevation Top of Casing	Primary Formation Completed In	Total Depth of Boring	Total Depth of Well	Top of Screen	Bottom of Screen	Top of Screen	Bottom of Screen	Data Availability			
			Northing [3]	Easting [3]	(ft amsl)	(ft amsl)		(ft bgs)	(ft bgs)	(ft bgs)	(ft bgs)	(ft amsl)	(ft amsl)	Boring Logs	Well Logs	Water Levels	
USGS 321701104044901	---	Inactive	586606	3572244	3032	---	Alluvium, Bolson Deposits and Other Surface Deposits	---	150	---	---	---	---	NO	NO	1947-1979	
USGS 321702104041601	---	Inactive	587469	3572282	3034	---	Alluvium, Bolson Deposits and Other Surface Deposits	---	174	---	---	---	---	NO	NO	02/1947	
USGS 321701104034401	---	Inactive	588081	3572290	3023	---	Alluvium, Bolson Deposits and Other Surface Deposits	---	150	---	---	---	---	NO	NO	1978-2021	
USGS 321700104032001	---	Inactive	588934	3572233	3002	---	Alluvium, Bolson Deposits and Other Surface Deposits	---	---	---	---	---	---	NO	NO	01/1978	
USGS 321652104021901	---	Inactive	590532	3572001	2982	---	Alluvium, Bolson Deposits and Other Surface Deposits	---	200	---	---	---	---	NO	NO	1946-2003	
USGS 321652104021902	---	Inactive	590532	3572001	2982	---	Alluvium, Bolson Deposits and Other Surface Deposits	---	80	---	---	---	---	NO	NO	1955-1996	
USGS 321621104050001	---	Inactive	586329	3571010	3055	---	Alluvium, Bolson Deposits and Other Surface Deposits	---	---	---	---	---	---	NO	NO	10/1954	
USGS 321634104023501	---	Inactive	589832	3571287	2992	---	Alluvium, Bolson Deposits and Other Surface Deposits	---	96	---	---	---	---	NO	NO	11/1954	
USGS 321609104025001	---	Inactive	589733	3570670	2993	---	Alluvium, Bolson Deposits and Other Surface Deposits	---	31	---	---	---	---	NO	NO	11/1954	
USGS 321615104014601	---	Inactive	591406	3570870	2962	---	Alluvium, Bolson Deposits and Other Surface Deposits	---	89	---	---	---	---	NO	NO	11/1954	
USGS 321536104043701	---	Inactive	586942	3569629	3042	---	Alluvium, Bolson Deposits and Other Surface Deposits	---	125	---	---	---	---	NO	NO	1978-2003	
USGS 321526104033201	---	Inactive	588646	3569336	3016	---	Alluvium, Bolson Deposits and Other Surface Deposits	---	250	---	---	---	---	NO	NO	1978-1996	
USGS 321545104015401	---	Inactive	591205	3569944	2921	---	Alluvium, Bolson Deposits and Other Surface Deposits	---	75	---	---	---	---	NO	NO	1978-2003	
OSE Well Database[4]																	
C03965-POD1	3/22/2016	Unknown	589800	3573463	---	---	---	---	---	---	---	---	---	---	---	---	---
C03965-POD2	3/22/2016	Unknown	589891	3573473	---	---	---	---	---	---	---	---	---	---	---	---	---
C03965-POD3	3/22/2016	Unknown	590014	3573527	---	---	---	---	---	---	---	---	---	---	---	---	---
C03965-POD4	7/18/2016	Active	589918	3573381	---	---	Sandstone w/Clay	40	40	30	40	---	---	YES	YES	7/18/2016	31
C03965-POD5	7/18/2016	Active	589864	3573534	---	---	Sandstone/Sand	35	35	25	35	---	---	YES	YES	7/18/2016	31
C03965-POD6	5/27/2020	Unknown	590021	3573526	---	---	---	---	---	---	---	---	---	---	---	---	---
C03965-POD7	5/27/2020	Unknown	589884	3573599	---	---	---	---	---	---	---	---	---	---	---	---	---
C03965-POD8	5/27/2020	Unknown	589723	3573587	---	---	---	---	---	---	---	---	---	---	---	---	---
C03965-POD9	5/28/2020	Unknown	589707	3573460	---	---	---	---	---	---	---	---	---	---	---	---	---
C03965-POD10	5/28/2020	Unknown	589813	3573358	---	---	---	---	---	---	---	---	---	---	---	---	---
C03965-POD11	5/28/2020	Unknown	589504	3573464	---	---	---	---	---	---	---	---	---	---	---	---	---
C01967	7/15/1981	Existing	590111	3574498	---	---	Sand and Gravel	264	264	256	264	---	---	YES	NO	7/15/1981	200
C02706	5/24/2000	Unknown	591528	3574304	---	---	Sandy Clay	30	17	12	17	---	---	YES	NO	5/24/2000	10
C03469-POD1	1/25/2011	Existing	588374	3575538	---	---	Sandy Silt/Clayey Sand	68	68	40	68	---	---	YES	YES	1/25/2011	38.47
C04216-POD1	4/4/2018	Active	588488	3576534	---	---	Clayey Sand/Sand	20	20	5	20	---	---	YES	YES	4/4/2018	9.98
C04216-POD2	4/4/2018	Active	588465	3576555	---	---	Sand	22	20.25	5.25	20.25	---	---	YES	YES	4/4/2018	9.92
C04216-POD3	4/4/2018	Active	588501	3576556	---	---	Caliche and Sand	24	23	8	23	---	---	YES	YES	4/4/2018	13.2
C04216-POD4	4/4/2018	Active	588499	3576513	---	---	Sandy Clay	20	20	5	20	---	---	YES	YES	4/4/2018	9.65
C04551-POD1	10/1/2020	Active	587818	3575529	---	---	Gravel	120	120	---	---	---	---	YES	YES	10/1/2020	50
C04556-POD1	---	---	589816	3573264	---	---	---	---	---	---	---	---	---	---	---	---	---
C04556-POD2	---	---	589891	3573239	---	---	---	---	---	---	---	---	---	---	---	---	---
C04556-POD3	---	---	589915	3573259	---	---	---	---	---	---	---	---	---	---	---	---	---
C04564-POD1	7/28/2021***	Plugged	589706	3573277	---	---	---	---	---	---	---	---	---	---	---	---	---
C04564-POD2	7/28/2021***	Plugged	589720	3573237	---	---	---	---	---	---	---	---	---	---	---	---	---
C01102	12/21/1962	Active	588901	3573672	---	---	Sand and Gravel	100	100	14	20	---	---	YES	NO	12/21/1962	12
C01816	7/27/1979	Unknown	587992	3573355	---	---	Sand/Broken Rock/Clay	200	102	42	102	---	---	YES	NO	7/27/1979	40
C00128	1/10/1953	Unknown	587783	3574162	---	---	Conglomerate Rock	149	130.1	36.7	130.1	---	---	YES	NO	1/10/1953	---
C02189	3/12/1990	Active	587985	3574572	---	---	Sand/Gravel/Shale	48		21	48	---	---	YES	NO	3/12/1990	29
C02503	8/29/1996	Unknown	587679	3574874	---	---	Sand/Gravel/Clay	70	70	30	70	---	---	YES	NO	8/29/1996	12
C00235	7/23/1950	Active	587676	3575280	---	---	Gypsum and Red Rock	160	160	0	160	---	---	YES	NO	7/23/1950	---
CO3762-POD1	8/11/2014	Active	585314	3574066	---	---	Sand with Clay	40	40	30	40	---	---	YES	YES	8/11/2014	31
CO3762-POD2	8/11/2014	Active	584893	3575598	---	---	Sand	40	40	30	40	---	---	YES	YES	8/11/2014	30
CO3762-POD3	8/11/2014	Active	586203	3574642	---	---	Sand	40		30	40	---	---	YES	YES	8/11/2014	30
C00211	1/12/1950, 6/20/1979	Unknown	586570	3573949	---	---	Conglomerate/Sand & Gravel	89	89	---	---	---	---	YES	NO	1/12/1950, 6/20/1979	48
C01336	9/20/1966	Unknown	586572	3573744	---	---	Gravel and Conglomerate	190	190	38	190	---	---	YES	NO	9/20/1966	30
C01872	6/12/1980	Unknown	586878	3573649	---	---	Conglomerate Rock	68	68	---	---	---	---	YES	NO	6/12/1980	48
C0443	2/9/1978	Unknown	587790	3572745	---	---	Sand and Clay	171		152	172	---	---	YES	NO	2/9/1978	160
C01870	12/6/1979	Unknown	586885	3572432	---	---	Conglomerate Rock	105	105	50	70	---	---	YES	NO	12/6/1979	48
							Conglomerate Rock			80	90	---	---				
C03146	2/15/2005	Active	589613	3572970	---	---	Conglomerate and Sand	82	82	62	82	---	---	YES	NO	2/15/2005	36
C00340	8/13/1952	Unknown	586483	3572022	---	---	Sandy Gypsum	117	---	---	---	---	---	YES	NO	8/13/1952	18
C03974-POD1	8/16/2016	Active	587087	3572220	---	---	Conglomerate with Sand	80	75	55	75	---	---	YES	NO	8/16/2016	42.5
C03732-POD1	4/13/2014	Existing	586321	3570929	---	---	Conglomerate with Clay Stringers	200	171	111	171	---	---	YES	YES	4/13/2014	10

Table 7. Summary of Laguna Grande Area Monitor Well Construction Details (Other Wells)

Well ID	Date Drilled	Current Status	NAD83 Coordinates		Ground Surface Elevation[2]	Elevation Top of Casing	Primary Formation Completed In	Total Depth of Boring	Total Depth of Well	Top of Screen	Bottom of Screen	Top of Screen	Bottom of Screen	Data Availability			
			Northing[3]	Easting[3]	(ft amsl)	(ft amsl)		(ft bgs)	(ft bgs)	(ft bgs)	(ft bgs)	(ft amsl)	(ft amsl)	Boring Logs	Well Logs	Water Levels	
C01938	2/1/1981	Unknown	586085	3571205	---	---	Clay with Sand	80	80	40	80	---	---	YES	YES	2/1/1981	3
C03432-POD1	10/20/2009	Existing	587527	3572162	---	---	Conglomerate and Sand	115	115	70	115	---	---	YES	NO	10/20/2009	65
C01122	1/5/1965	Unknown	587999	3572138	---	---	Gravel and Shale	175	175	---	---	---	---	YES	NO	1/5/1965	30
C01443	11/8/1970	Active	590123	3572064	---	---	Caliche/Sand/Gravel/Redbed	50	50	35	50	---	---	YES	NO	11/8/1970	27
C03535-POD1	4/8/2012	Existing	589860	3570751	---	---	Silty Clay/Coarse Sandstone/Silty Sand	210	210	110	210	---	---	YES	NO	4/8/2012	25
C02182	9/26/1989	Unknown	592328	3571048	---	---	Sand/Gravel with Shale	75	75	25	65	---	---	YES	NO	9/26/1989	30
C02707	6/9/2000	Unknown	595535	3571868	---	---	Limestone-Dolomitic Fractured	40	40	35	40	---	---	YES	NO	6/9/2000	18
C01240	10/15/1964	Unknown	586494	3569592	---	---	Conglomerate/Shale/Sand	125	125	---	---	---	---	YES	NO	10/15/1964	25
C02186	2/4/1990	Unknown	589128	3568606	---	---	Sand	100	100	80	100	---	---	YES	NO	2/4/1990	55
C02198	8/13/1990	Unknown	589940	3568611	---	---	Clay, Sand, and Gravel	78	78	22	78	---	---	YES	NO	8/13/1990	Dry
C02184	12/10/1989	Unknown	590248	3567700	---	---	Coarse Sand and Gravel	87	87	47	87	---	---	YES	NO	12/10/1989	60
C03615-POD1	5/4/2013	Existing	591964	3568500	---	---	Sand and Gravel	60	60	50	60	---	---	YES	YES	5/4/2013	36
C03615-POD2	5/1/2013	Existing	592661	3568013	---	---	Sand and Gravel, Clay on Bottom	60	60	45	60	---	---	YES	YES	5/1/2013	26
C01237	10/15/1964	Unknown	587197	3567298	---	---	Sand and Gravel/Shale	123	123	70	100	---	---	YES	NO	10/15/1964	---
C01442	10/17/1970	Unknown	587298	3567199	---	---	Clay and Gravel	100	100	---	---	---	---	YES	NO	10/17/1970	---
C02705	5/26/2000	Unknown	593902	3575093	---	---	Sand and Gravel, Clay	150	68	48	68	---	---	YES	YES	5/26/2000	28
C00136A	9/27/2003	Existing	591037	3570753	---	---	---	---	100	---	---	---	---	NO	NO	9/27/2003	60
C00136S	4/5/1976	Unknown	590426	3572167	---	---	---	---	122	---	---	---	---	NO	NO	4/5/1976	45
C00500	2/28/1945	Unknown	589811	3573176	---	---	---	---	130	---	---	---	---	NO	NO	---	---
C00571	7/30/1954	Existing	591241	3570957	---	---	Sandstone/Conglomerate, Limestone/Dolomite	---	90	---	---	---	---	NO	NO	7/30/1954	38
C00573	3/15/1957	Unknown	586188	3568087	---	---	Alluvium/Basin Fill	---	250	35	45	---	---	NO	NO	3/15/1957	35
					---	---		---		175	250	---	---				
OSE Well Database[4] (continued)																	
C01108	6/20/1967	Existing	588395	3573566	---	---	Anhydrite & Lime Conglomerate	60	60	---	---	---	---	NO	NO	---	---
C00868		Existing	589811	3573176	---	---	---	---	190	---	---	---	---	NO	NO	---	---
C00869	5/31/1946	Existing	587188	3572335	---	---	---	---	360	---	---	---	---	NO	NO	---	---
C00869S		Existing	587388	3572335	---	---	---	---	---	---	---	---	---	NO	NO	---	---
C00869S2		Existing	587996	3572343	---	---	---	---	---	---	---	---	---	NO	NO	---	---
C01892		Existing	584151	3573313	---	---	---	---	---	---	---	---	---	NO	NO	---	---
C02846	12/31/1938	Existing	581726	3576726	---	---	---	---	150	---	---	---	---	NO	NO	---	---
C02846S	10/8/2003	Existing	582926	3575527	---	---	---	---	150	---	---	---	---	NO	NO	---	---
C00616	12/5/1980	Unknown	587982	3574978	---	---	Alluvium/Basin Fill	---	120	60	120	---	---	NO	NO	12/5/1980	30
C01214	8/2/1964	Unknown	590010	3574597	---	---	Sandstone/Conglomerate/ Gravel	---	70	---	---	---	---	NO	NO	8/2/1964	20
C01215	8/4/1964	Unknown	590210	3574397	---	---	Sandstone/Conglomerate/ Gravel	---	104	---	---	---	---	NO	NO	8/4/1964	15
C01217	8/11/1964	Existing	589606	3574593	---	---	Sandstone/Conglomerate/ Gravel	---	87	---	---	---	---	NO	NO	8/11/1964	50
C01217S	1/12/1999	Unknown	595413	3574403	---	---	---	---	350	---	---	---	---	NO	NO	---	---
C01253	6/4/1965	Unknown	586375	3573338	---	---	Sandstone/Conglomerate/ Gravel	---	179	---	---	---	---	NO	NO	6/4/1965	50
C03001 EXPLORE	9/24/2003	Unknown	590430	3571355	---	---	---	---	140	---	---	---	---	NO	NO	---	---
C03059 EXPLORE	4/6/2004	Unknown	592993	3574378	---	---	Sandstone/Conglomerate/ Gravel/Limestone Dolomite	---	---	13	56	---	---	NO	NO	4/6/2004	65

Notes:
1 - Geohydrology Associates, Inc., 1979, Water-Resources Study of the Carlsbad Potash Area, New Mexico: Consultant report to the United States Department of the Interior Bureau of Land Management, Denver Colorado, Contract No. YA-512-CT8-195.
2 - Cox, E.R. and Havens, J.S. 1965. A Progress Report on the Malaga Bend Experimental Salinity Alleviation Project, Eddy County, New Mexico. United States Geological Survey Open File 65-35. November.
3 - State Plane NAD83 Coordinates, New Mexico East 3001 Zone in Feet (derived from original PLSS coordinates)
4 - NAD83 UTM in Meters (derived from original PLSS coordinates)
NA: Not Applicable
---: No data available

Table 8. Summary of Laguna Grande Area Soil Boring Details (Mosaic and Others)

Borehole ID	Date Drilled	Total Depth (feet)	NAD83 Coordinates [1]		Elevation[3] (ft msl)	Data Availability			
			Northing [2]	Easting [2]		Boring Logs	Well Logs	Water Levels (ft bgs)	Water Levels (ft msl)
Mosaic - Perimeter Dike									
GA-PD-01	3/9/2009	36.0	505246.5	664478.4	3029.5	YES	NA	11	3018.5
GA-PD-02	3/9/2009	41.5	505309.1	664675.7	3029.5	YES	NA	12	3017.5
GA-PD-03	3/10/2009	46.0	505386.2	664863.7	3029.7	YES	NA	12	3017.7
GA-PD-04	3/11/2009	41.0	505448.7	665054.9	3030.8	YES	NA	8	3022.8
GA-PD-05	3/11/2009	36.5	505529.5	665249.1	3030.5	YES	NA	11.5	3019
GA-PD-06	3/12/2009	40.0	505610.2	665434.0	3030.7	YES	NA	6 to 10	3024.7 to 3020.7
GA-PD-07	3/14/2009	27.0	505680.1	665628.2	3030.6	YES	NA	4	3026.6
GA-PD-08	3/12/2009	31.5	505742.6	665813.1	3031.0	YES	NA	2.5	3028.5
GA-PD-09	3/13/2009	27.0	505819.7	666004.2	3031.0	YES	NA	3	3028.0
Mosaic - Laguna Grande									
GA-LG-01	3/14/2009	39.0	474166.1	639014.5	2960.0	YES	NA	6	2954
GA-LG-02	3/15/2009	36.5	473784.4	639105.3	2960.0	YES	NA	2 to 3.5	2958 to 2956.5
GA-LG-03	3/15/2009	41.5	473406.3	639180.5	2960.0	YES	NA	6 to 7	2954 to 2953
GA-LG-04	3/15/2009	27.0	475046.7	637834.8	2960.0	YES	NA	5	2955
GA-LG-05	3/16/2009	32.0	474729.9	637730.7	2960.0	YES	NA	4	2956
GA-LG-06	3/16/2009	36.5	474376.6	637608.1	2959.0	YES	NA	4	2955
GA-LG-07	3/15/2009	31.5	473757.9	637520.3	2962.0	YES	NA	8	2954
GA-LG-08	3/16/2009	31.5	473132.2	637528.3	2962.0	YES	NA	5	2957
GA-LG-09	3/19/2009	31.5	472558.9	638021.3	2961.0	YES	NA	4.5	2956.5
GA-LG-10	3/17/2009	25.0	473578.7	639655.9	2957.0	YES	NA	0.5	2956.5
GA-LG-11	3/17/2009	22.0	473878.3	640093.7	2957.0	YES	NA	1	2956
GA-LG-12	3/17/2009	19.7	470404.8	642739.9	2960.0	YES	NA	7	2953
GA-LG-13	3/17/2009	16.5	470755.8	642133.1	2958.0	YES	NA	4.5	2953.5
GBH-1	6/20/2007	21.5	470302.8	642874.3	2960.0	YES	NA	5	2955
GBH-2	6/20/2007	29.0	470428.9	642710.9	2957.0	YES	NA	3	2954
GBH-3	6/22/2007	36.5	470483.8	642637.6	2960.0	YES	NA	7	2953
GBH-4	6/22/2007	26.5	470722.3	642186.5	2959.0	YES	NA	3.5	2955.5
GBH-5	6/22/2007	27.5	473165.9	639257.8	2960.0	YES	NA	3	2957
GBH-6	6/23/2007	43.0	472585.5	639818.8	2962.0	YES	NA	4.5	2957.5
DH-1	1/7/2006	60.0	3572811.0	593837.0	---	YES	NA	Dry	Dry
DH-2	1/6/2006	40.0	3572930.0	593475.0	2954.0	YES	NA	1.5	2952.5
DH-3	1/5/2006	60.0	3573188.0	593101.0	2955.0	YES	NA	Dry	Dry
DH-4	1/3/2006	60.0	3572910.0	592930.0	2958.0	YES	NA	2	2956
USGS 1965									
19.244	11/13/1962	149.0	---	---	---	YES	NA	Dry	Dry
OSE Well Database[3]									
C02704	5/19/2000	174	590722	3573486	---	YES	NA	---	---
C03460-POD1	10/8/2010	100	588857	3575004	---	YES	NA	38	---
C00315	8/26/1952	225	587973	3575995	---	YES	NA	45	---
C03862-POD1	4/23/2015	17	589672	3567505	---	YES	NA	10	---
C03862-POD2	4/23/2015	30	589665	3567507	---	YES	NA	10	---
C03862-POD3	4/23/2015	60	589685	3567500	---	YES	NA	10	---
C03862-POD4	4/23/2015	30	589705	3567490	---	YES	NA	10	---
C03862-POD5	4/23/2015	17	589785	3567458	---	YES	NA	10	---

Notes:
[1] State Plane NAD83 Coordinates, New Mexico East 3001 Zone in feet with the exception of borings DH-1 through DH-5 which are in NAD27 UTM in meters
[2] Elevations from AutoCAD base map
[3] - NAD83 UTM in Meters (derived from original PLSS coordinates)
ft amsl: Feet above mean sea level
ft bgs: Feet below ground surface
NA: Not Applicable
---: No data available

Table 9: Stage 1 Abatement Plan Proposed Monitoring and Reporting Schedule

Monitoring Report Schedule of Submittal			
Annual Reporting Frequency	**Estimated Number of Submittals**	**Description**	**Submittal Date(s)**
4	8	Summary quarterly progress reports	Within 30 days following receipt of final analytical results for each quarter
1	2	Draft and Final Site Investigation reports	Draft - 90 days following receipt of analytical results from final quarter of S1AP investigation. Final - 90 days following receipt of NMED's comments on Draft Report.

Stage 1 Abatement Plan Monitoring Schedule					
Mosaic Site Monitoring Well Network	**Sampling Program/Analytical Suite**				Notes
	Q1	**Q2**	**Q3**	**Q4**	
LG-1	ABC	ABC	ABC	ABC	Part of DP-1399 Monitoring Program[1]
LG-5	ABC	ABC	ABC	ABC	
LG-23	ABC	ABC	ABC	ABC	
LG-25	ABC	ABC	ABC	ABC	
LG-26	ABC	ABC	ABC	ABC	
LG-28	ABC	ABC	ABC	ABC	
LG-29	ABC	ABC	ABC	ABC	
LG-30	ABC	ABC	ABC	ABC	
LG-31	ABC	ABC	ABC	ABC	
LG-32	ABC	ABC	ABC	ABC	
LG-33	ABC	ABC	ABC	ABC	
LG-34	ABC	ABC	ABC	ABC	
LG-35	ABC	ABC	ABC	ABC	
LG-36	ABC	ABC	ABC	ABC	
LG-37	ABC	ABC	ABC	ABC	
LG-38	ABC	ABC	ABC	ABC	
Mosaic Salt Stack Piezometers	**Sampling Program/Analytical Suite**				Notes
	Q1	**Q2**	**Q3**	**Q4**	
P-East	ABC	ABC	ABC	ABC	Part of DP-1399 Monitoring Program[1]
P-Central	ABC	ABC	ABC	ABC	
P-West	ABC	ABC	ABC	ABC	
Proposed West Side Monitoring Well Network[2]	**Sampling Program/Analytical Suite**				Notes
	Q1	**Q2**	**Q3**	**Q4**	
To Be Determined					
C03146		ABC		ABC	West Side Wells to be Monitored if Access is Granted by Well Owner
C00571		ABC		ABC	
C00136A		ABC		ABC	
C00136S		ABC		ABC	
C01443		ABC		ABC	
C01102		ABC		ABC	

Table 9: Stage 1 Abatement Plan Proposed Monitoring and Reporting Schedule

Stage 1 Abatement Plan Monitoring Schedule					
Proposed West Side Monitoring Well Network[2]	Sampling Program/Analytical Suite				Notes
	Q1	Q2	Q3	Q4	
C01108		ABC		ABC	West Side Wells to be Monitored if Access is Granted by Well Owner (cont.)
C03965 POD1		ABE		ABE	
C03965 POD2		ABE		ABE	
C03965 POD4		ABE		ABE	
C03965 POD5		ABE		ABE	
C03965 POD6		ABE		ABE	
C03965 POD7		ABE		ABE	
C03965 POD8		ABE		ABE	
C03965 POD9		ABE		ABE	
C03965 POD10		ABE		ABE	
C03965 POD11		ABE		ABE	
C04556-POD1		ABE		ABE	
C04556-POD2		ABE		ABE	
C04556-POD3		ABE		ABE	
Laguna Grande Sampling Locations	Sampling Program/Analytical Suite				Notes
	Q1	Q2	Q3	Q4	
Brine Pipeline	ABDF	ABDF	ABDF	ABDF	Part of DP-1399 Monitoring Program[1]
Laguna Grande Staff Gauge #1,2,3	W	W	W	W	
Southwest Laguna Grande Dike Staff Gauge	W	W	W	W	
Natural runoff culverts outlet into Laguna Grande	ABF	ABF	ABF	ABF	Stormwater Runoff Sample
Pecos River Sampling Locations	Sampling Program/Analytical Suite				Notes
	Q1	Q2	Q3	Q4	
River-1	AB	AB	AB	AB	Part of DP-1399 Monitoring Program[1]
River-2	AB	AB	AB	AB	
River-3	AB	AB	AB	AB	
River-4	AB	AB	AB	AB	
Pecos River Staff Gauge #1, 2, 3, 4	W	W	W	W	

Notes:

[1] - Monitored in accordance with DP-1399 monitoring program. Data obtained from this monitoring program will be incorporated into the Stage 1 Abatement Plan Site Investigation.

[2] -Water level survey and water quality monitoring of private landowner wells located on the west side of the Pecos River within a 1-mile radius of the three-dimensional body where the standards set forth in Subsection B of Section 20.6.2.4103 NMAC are exceeded. C03965 and C04556 POD wells are associated with a corrective action program being conducted by Chevron Environmental Management Company related to the discharge of Chevron produced water from a pipeline in 2014. Semi-annual groundwater monitoring is currently being conducted under New Mexico Oil Conservation Division (NMOCD) remediation permit number 2RP-2400. Mosaic proposes to incorporate available semi-annual (Q2 and Q4) water level and water quality data associated with this corrective action program into the Stage 1 Abatement Plan until a minimum of eight quarters of data have been collected from the individual wells.

Sampling Analytical Suites:

A - Field Measurements: Temperature, pH, specific conductance,

B - Laboratory Analyses: TDS, Na, Ca, Mg, K, Cl, SO4, B, Mn, Se, alkalinity (ppm as CaCO3), specific conductivity, and pH

C - Depth to water measurements, top of well casing, and water elevation to the nearest 0.01 foot

D - Fecal coliform or E. coli bacteria, total nitrogen

E - Laboratory Analyses: TDS, Na, Ca, Mg, K, Cl, SO4, alkalinity (ppm as CaCO3), specific conductivity, and pH

F - Total suspended solids

W - Stage height/water depth to nearest 0.1 foot

B - Laboratory Analyses: TDS, Na, Ca, Mg, K, Cl, SO4, B, Mn, Se, alkalinity (ppm as CaCO3), specific conductivity, and pH

Sampling Quarters: Q1 = January – March; Q2 = April – June; Q3 = July – September; Q4 = October – December

TDS = total dissolved solids; Na = Sodium; Ca = Calcium; Mg = Magnesium; K = Potassium; Cl- = Chloride; S04 = Sulfate; B = Boron; Mn = Manganese; Se = Selenium; Alkalinity = CaCO3 alkalinity; total nitrogen = total Kjeldahl nitrogen plus nitrate as nitrogen (TKN + NO3-N)

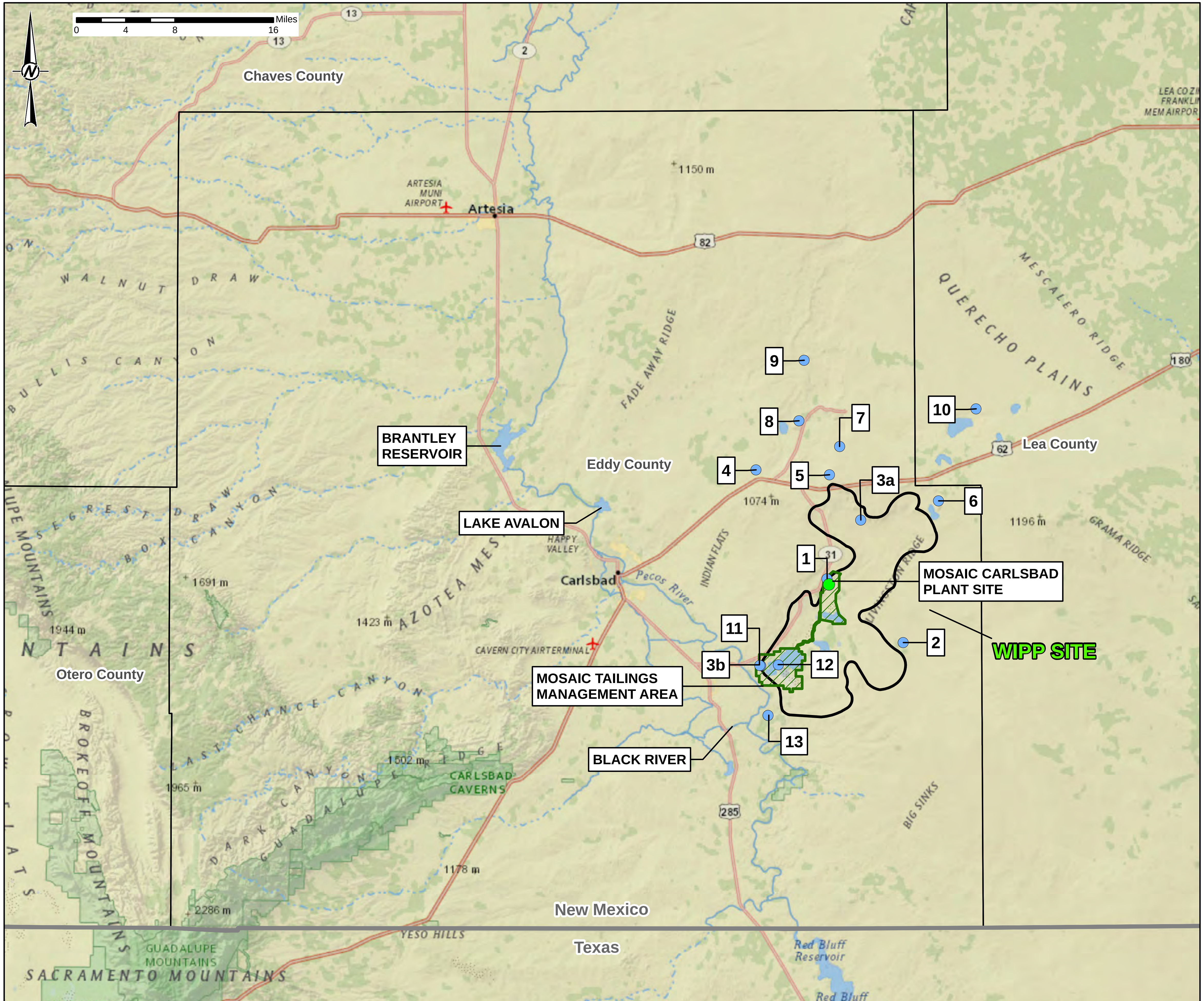
Table 10. Proposed Schedule for Stage 1 Abatement Plan Activities

Task	Description	Completion Date
---	Compile and Evaluate Existing Information	90 days from approval of Modified S1AP Proposal by NMED
1	Data Gap Analysis	90 days from approval of Modified S1AP Proposal by NMED
2	Further Investigate Site Geology and Hydrogeology	90 days from approval of Modified S1AP Proposal by NMED
2a	Well Inventory	90 days from approval of Modified S1AP Proposal by NMED
2b	Define the Extent of Potential Impacts to Groundwater from Mosaic Discharges	90 days following receipt of analytical results from final quarter of S1AP investigation
2c	Characterize the Hydrogeologic Conditions Between Laguna Grande and the Pecos River	90 days following receipt of analytical results from final quarter of S1AP investigation
2d	Characterize the Hydrogeologic Conditions West of the Pecos River	90 days following receipt of analytical results from final quarter of S1AP investigation
2e	Characterize the Hydrogeologic Connection Between the Pecos River and Groundwater	90 days following receipt of analytical results from final quarter of S1AP investigation
3	Further Investigate Site Surface Water Hydrology	90 days following receipt of analytical results from final quarter of S1AP investigation
4	Characterization of the Waste Stream Discharged from the Plant Site to the Salt Stack and Laguna Grande	90 days following receipt of analytical results from final quarter of S1AP investigation
5	Evaluate the Effect of the Discharge of Suspended Clay Particles to the Laguna Grande Brine Management Area	90 days following receipt of analytical results from final quarter of S1AP investigation
6	Evaluate the Relationship Between Salt-Producer Operations and Impacts to Groundwater and the Pecos River	90 days following receipt of analytical results from final quarter of S1AP investigation
7	Study Hydrologic Conditions Present in the Area of Monitoring Well LG-2	Third quarter of 2022[a]
8	Water Balance Analysis Within Nash Draw	90 days following receipt of analytical results from final quarter of S1AP investigation
9	Proposed Monitoring Plan	30 days from approval of the Modified S1AP Proposal by NMED
10	Quality Assurance Plan	60 days from approval of the Modified S1AP Proposal by NMED
11	Site Health and Safety Plan	60 days from approval of the Modified S1AP Proposal by NMED
12	Stage 1 Abatement Plan Reporting	---
12a	Summary Quarterly Progress Reports	Begin the first quarter following approval of the Modified S1AP Proposal by NMED; final report for the eighth quarter of monitoring submitted within 30 days of receipt of final analytical report
12b	Draft Final Site Investigation Report	90 days following receipt of analytical results from final quarter of S1AP investigation
	Final Site Investigation Report	90 days following receipt of NMED's comments on Final Site Investigation Report

Notes:

[a] – Target submittal date for the as-built well completion report. The wells will continue to be monitored and the results reported to the NMED in accordance with Condition C105 of the Draft DP-1399 Permit.

Figures



LEGEND

- PLANT SITE
- HISTORIC AND CURRENT MINING OPERATIONS
- TAILINGS MANAGEMENT AREA
- APPROXIMATE NASH DRAW BOUNDARY DELINEATION
- STATE BOUNDARY
- COUNTY BOUNDARY

NOTES

1. SEE TABLE 1 FOR INFORMATION ON THE SITES IDENTIFIED ON THIS FIGURE.

REFERENCES

1. BASEMAP: ESRI PROVIDED BASEMAP SERVICE. NATIONAL GEOGRAPHIC.
2. HISTORIC AND CURRENT MINING OPERATIONS: HUDSON INSTITUTE OF MINERALOGY. MINDAT.ORG. SCOGGIN FLAT, EDDY COUNTY, NEW MEXICO, UNITED STATES.

CLIENT
MOSAIC POTASH CARLSBAD, INC.

PROJECT
MOSAIC POTASH MINE
MODIFIED STAGE 1 ABATEMENT PLAN PROPOSAL

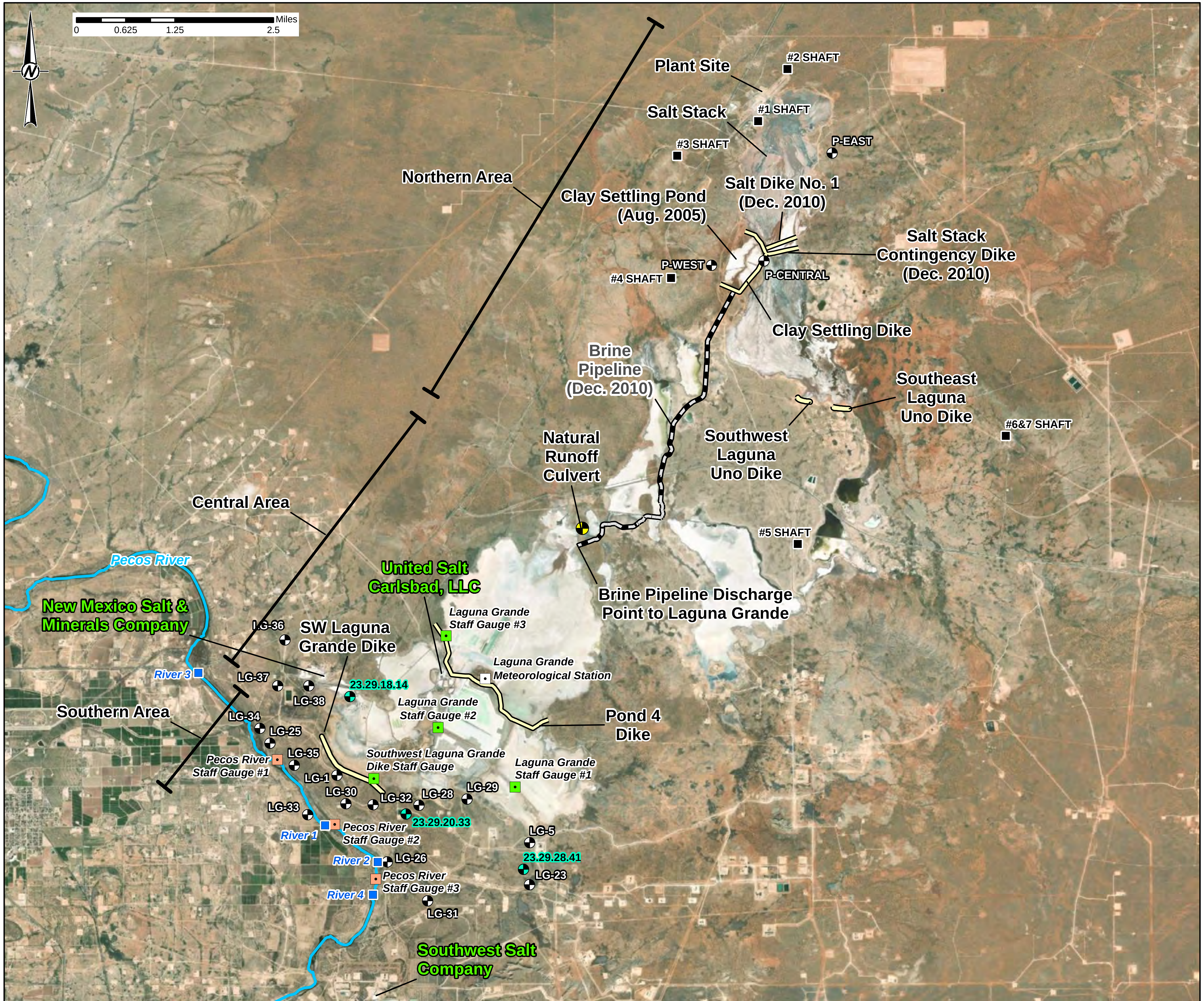
TITLE
MOSAIC POTASH MINE LOCATION AND HISTORIC AND CURRENT POTASH MINING OPERATIONS IN THE AREA

CONSULTANT
WSP GOLDER

YYYY-MM-DD	2022-03-18
DESIGNED	TS
PREPARED	RHG
REVIEWED	-
APPROVED	-

PROJECT NO.
21502059

FIGURE
1



LEGEND

- BRINE PIPELINE (COMPLETION DATE)
- DIKES
- PECOS RIVER
- GENERAL GEOGRAPHIC AREA OF THE SITE
- SHAFTS
- RIVER SURFACE WATER SAMPLE
- EXISTING MONITORING WELLS
- AUTOMATED METEOROLOGICAL STATION
- AUTOMATED STAFF GAUGE - LAGUNA GRANDE
- AUTOMATED STAFF GAUGE - PECOS RIVER
- BLM WELL ID
- NATURAL RUNOFF CULVERT

REFERENCES

1. BASEMAP: ESRI PROVIDED BASEMAP SERVICE. VIVID. MAXAR. IMAGERY COLLECTED 2020/2021.

CLIENT
MOSAIC POTASH CARLSBAD, INC.

PROJECT
MOSAIC POTASH MINE
MODIFIED STAGE 1 ABATEMENT PLAN PROPOSAL

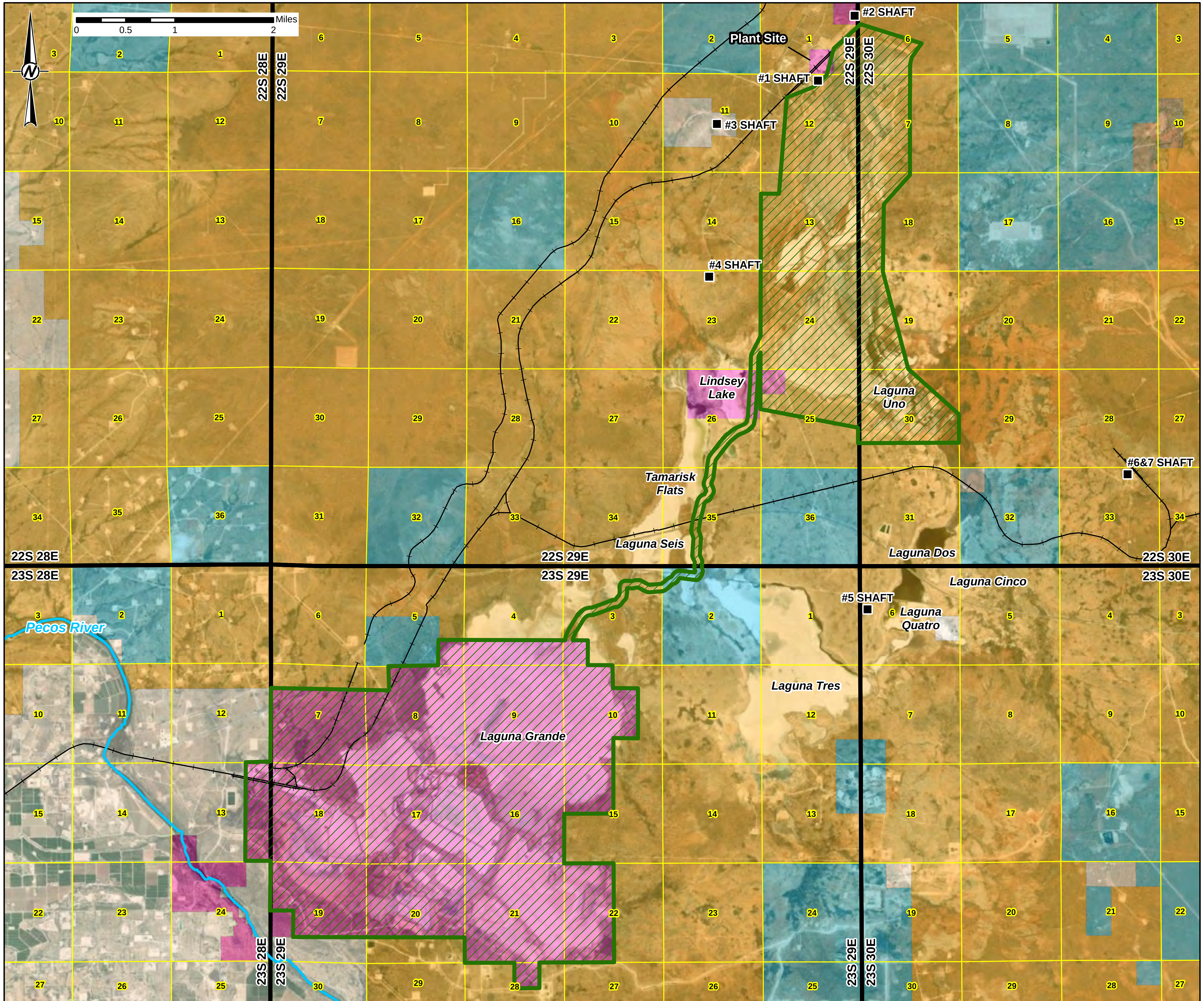
TITLE
MINE FACILITIES

CONSULTANT
WSP GOLDER

YYYY-MM-DD	2022-03-18
DESIGNED	TS
PREPARED	RHG
REVIEWED	-
APPROVED	-

PROJECT NO. 21502059

FIGURE 2



LEGEND

- SHAFTS
- TAILINGS MANAGEMENT AREA
- TOWNSHIP/RANGE BOUNDARY
- SECTION BOUNDARY
- PECOS RIVER
- RAILROAD

SURFACE LAND OWNERSHIP

- MOSAIC FEE LAND
- PRIVATE (OTHER)
- BLM
- STATE

REFERENCES

1. BASEMAP: ESRI PROVIDED BASEMAP SERVICE. VIVID. MAXAR. IMAGERY COLLECTED 2020/2021.
2. SURFACE OWNERSHIP DATASET: MODIFIED FROM BUREAU OF LAND MANAGEMENT, 2014.

CLIENT
MOSAIC POTASH CARLSBAD, INC.

PROJECT
MOSAIC POTASH MINE
MODIFIED STAGE 1 ABATEMENT PLAN PROPOSAL

TITLE
SURFACE OWNERSHIP

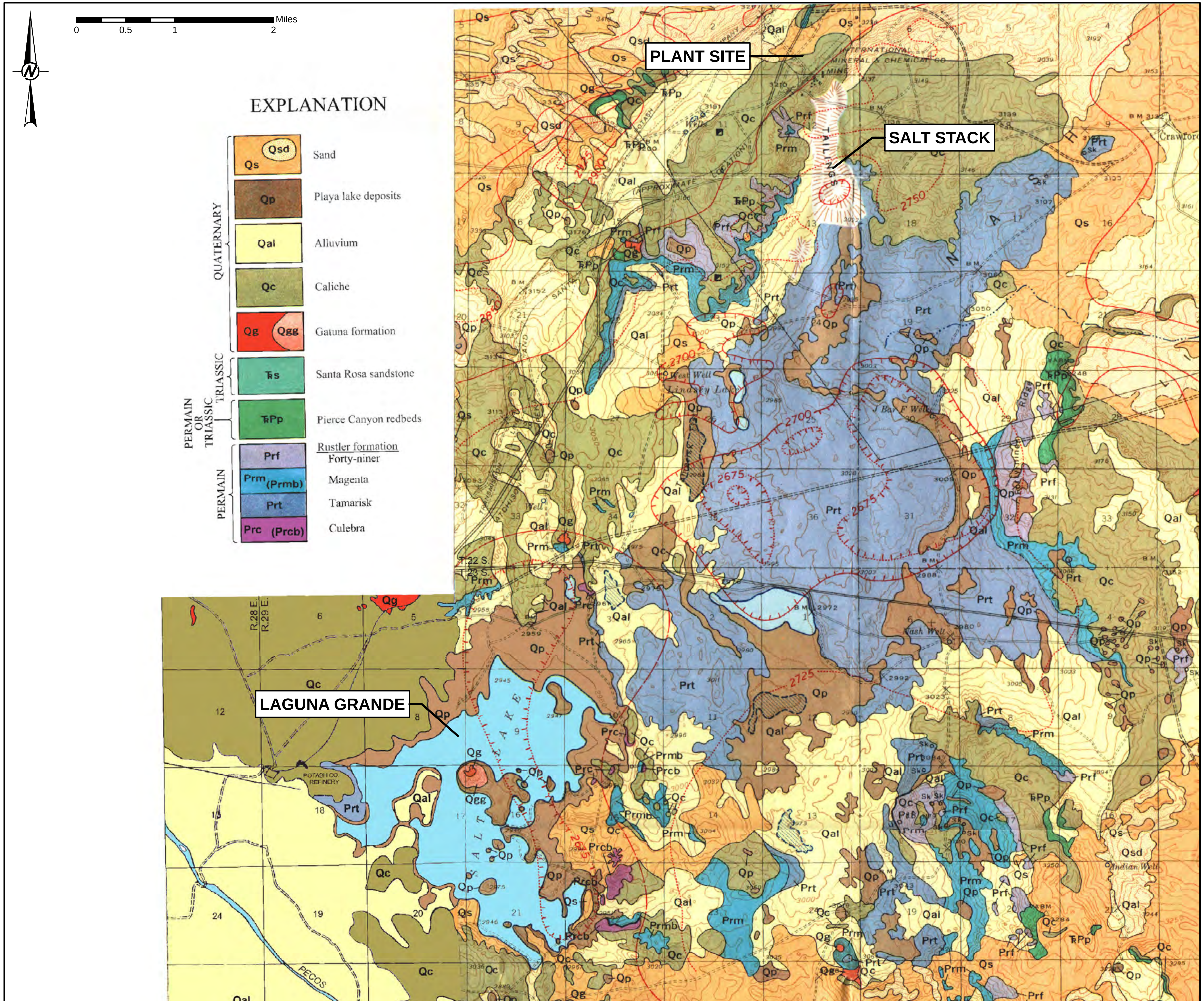
CONSULTANT
WSP GOLDER

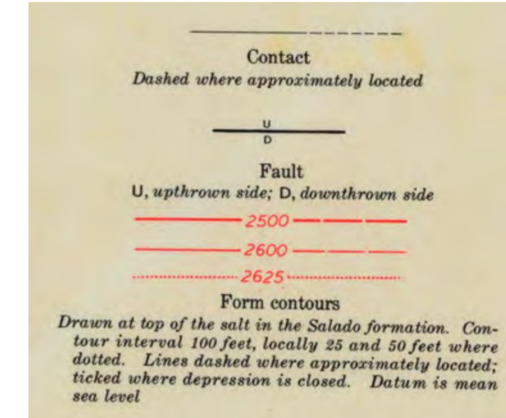
YYYY-MM-DD	2022-03-18
DESIGNED	TS
PREPARED	RHG
REVIEWED	-
APPROVED	-

PROJECT NO.
21502059

FIGURE
3

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B





REFERENCES

1. VINE, J.D., 1963, SURFACE GEOLOGY OF THE NASH DRAW QUADRANGLE, EDDY COUNTY, NEW MEXICO: U.S. GEOLOGICAL SURVEY, BULLETIN 1141-B, SCALE 1:62,500.
2. ROBINSON, T.W., AND LANG, W.B., 1938, GEOLOGY AND GROUND-WATER CONDITIONS OF THE PECOS RIVER VALLEY IN THE VICINITY OF LAGUNA GRANDE DE LA SAL, NEW MEXICO: NEW MEXICO STATE ENGINEER OFFICE 12TH AND 13TH BIENNIAL REPORT, 1934-1938.

CLIENT
MOSAIC POTASH CARLSBAD, INC.

PROJECT
MOSAIC POTASH MINE
MODIFIED STAGE 1 ABATEMENT PLAN PROPOSAL

TITLE
NASH DRAW SURFACE GEOLOGY

CONSULTANT
WSP GOLDER

YYYY-MM-DD	2022-03-18
DESIGNED	TS
PREPARED	RHG
REVIEWED	-
APPROVED	-

PROJECT NO.
21502059

FIGURE
4

Aeolian Sands and Playa Lake Deposits		Quaternary	Aeolian sands are thickest along the Pecos River and form a low berm over the Gatuna between the river and Laguna Grande. The playa lake deposits are fine-grained sediments with low permeability and are often intermixed with salt deposits.
Caliche	Gatuna Formation		Caliche is consistently found at the top of the Gatuna as a replacement of Gatuna sediments. Thickness varies in Nash Draw is typically between five and six feet. Caliche thickness may be significantly greater locally, particularly over relict sink hole deposits.
Conglomerate			Cobbles, up to six inches, are matrix supported, well-rounded clasts of chert, quartzite and the underlying Permian units. Conglomerate appears to be concentrated near the top of the Gatuna, but not sufficiently continuous to be mapped aerially across the site.
Mixture of Sands, Silts, and Clays			Unconsolidated sands, silts and clays are present in several boreholes beneath the caliche and conglomerate units (where present).
Sandstone, Siltstone, and Claystone			Reddish-orange friable sandstone, siltstone, but locally includes gypsum, gray shale, and claystone.
Dewey Lake Red Beds	Dewey Lake Formation	Permian	The Dewey Lake Formation consists of thin-bedded, fine-grained, red sandstone, probably from a fluvial (river) source indicative of the end of basin deposition.
Forty-Niner Member	Rustler Formation		Massive gypsum or anhydrite with silt interbeds. In the Nash Draw area the Fortyniner is nearly everywhere removed by surface erosion or solution.
Magenta Dolomite			Consists of varigated greenish- to reddish-gray platy dolomite. Where present in the Nash Draw area, it is everywhere higher than the water table.
Tamarisk Gypsum			Underlies much of the floor of Nash Draw, but doesn't appear to be present in the area between Laguna Grande and the Pecos River.
Culebra Dolomite			Underlies the Gatuna Formation under much of Nash Draw adjacent to Laguna Grande. Fine-grained dolomite mud interbedded with primary breccia zones.
Los Medanos (Lower Rustler) Member			Silty sandstone overlain by interbedded silt and gypsum.

Notes: Unit descriptions based in part from: (Vail, 2012) Geologic Relationships Between the Laguna Grande Evaporation Pond and the Pecos River, Eddy County, New Mexico and Potential for Groundwater Impacts. For Mosaic Potash Carlsbad Inc. January; and (Vail, 2014) Geology and Hydrology of the Rustler Formation (Permian)in Nash Draw, Eddy County, NM. April.

PROJECT

MOSAIC POTASH CARLSBAD INC.
MODIFIED STAGE 1 ABATEMENT PLAN PROPOSAL

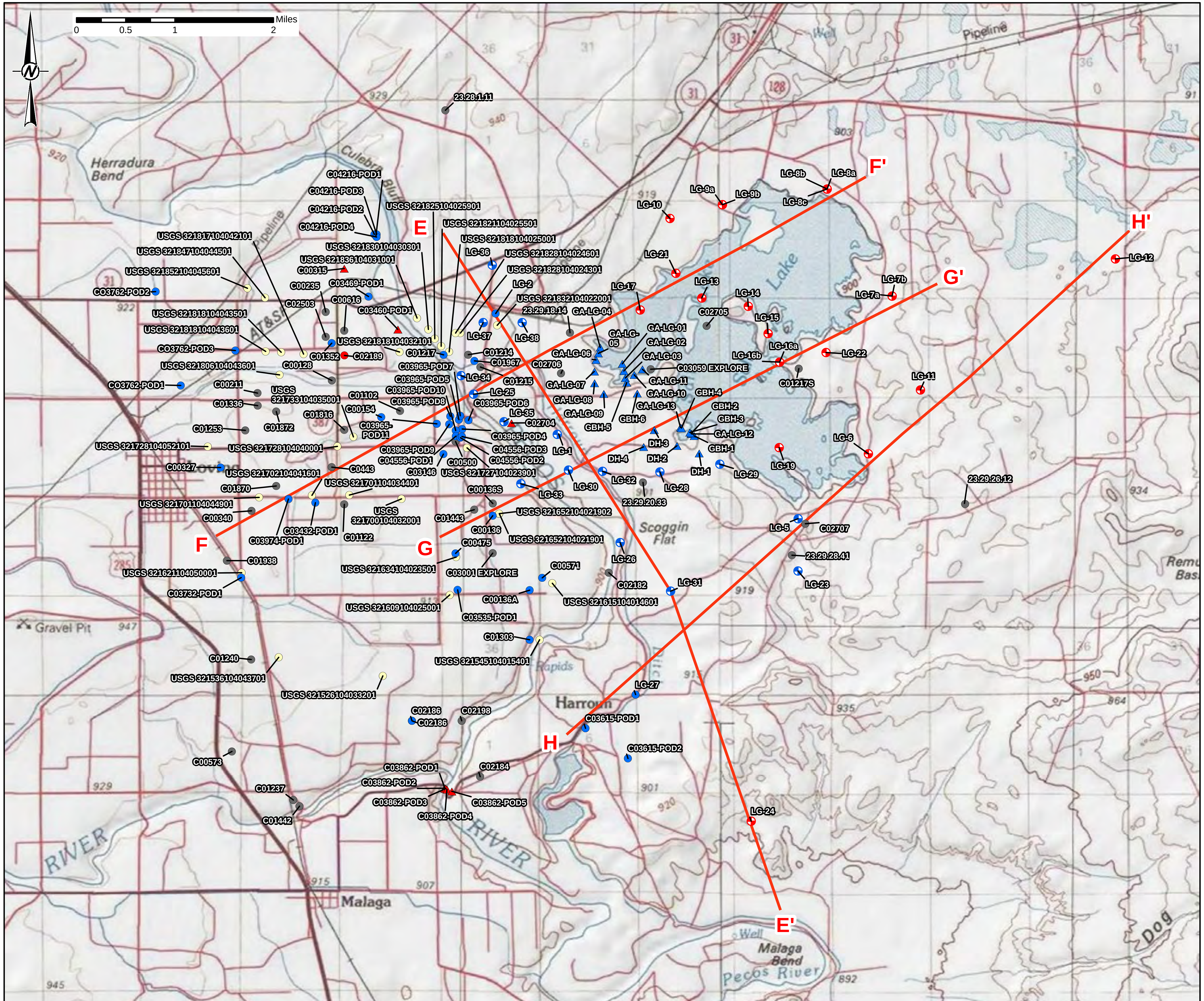
CARLSBAD, NEW MEXICO

WSP GOLDER

TITLE

SHALLOW STRATIGRAPHIC UNITS IN THE NASH DRAW AREA

AUTHOR	CHECKED	REVIEWED	DATE	SCALE	JOB NO.	DWG NO.	SUBTITLE	REV. NO.	FIGURE
TS			02-23-22	NA	21502059	NA	NA	A	5



LEGEND

- NEW HYDROGEOLOGIC CROSS-SECTION
- MOSAIC MONITORING WELL/PIEZOMETER (EXISTING)
- MOSAIC MONITORING WELL (PLUGGED AND ABANDONED)
- MONITORING/PUMPING WELL (OTHERS - EXISTING)
- MONITORING/PUMPING WELL (OTHERS - PLUGGED AND ABANDONED)
- MONITORING/PUMPING WELL (OTHERS - INACTIVE)
- MONITORING/PUMPING WELL (OTHERS -UNKNOWN STATUS)
- SOIL BORING (MOSAIC)
- SOIL BORING (OTHERS)

REFERENCES

1. TOPOGRAPHIC BACKGROUND: ESRI BASEMAP SERVICES. USGS 1:24,000 TOPOGRAPHIC QUADRANGLES SHOWN: LOVING, REMUDA BASIN, MALAGA, AND PIERCE CANYON.

CLIENT

MOSAIC POTASH CARLSBAD, INC.

PROJECT

MOSAIC POTASH MINE
MODIFIED STAGE 1 ABATEMENT PLAN PROPOSAL

TITLE

WELLS, PIEZOMETERS, AND SOIL BORINGS WITHIN THE SITE AREA

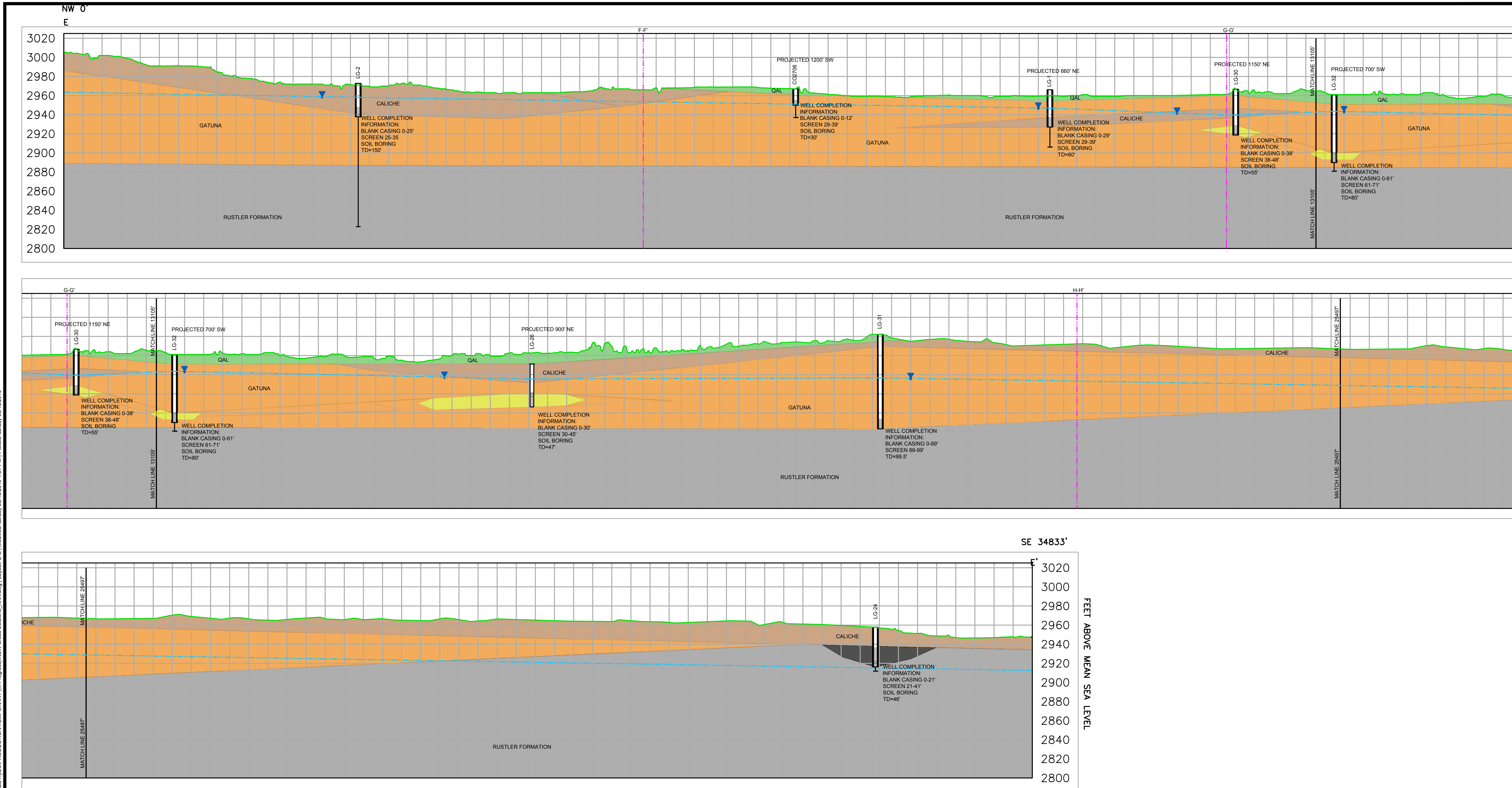
CONSULTANT

WSP GOLDER

YYYY-MM-DD	2022-03-18
DESIGNED	TS
PREPARED	RHG
REVIEWED	-
APPROVED	-

PROJECT NO. 21502059

FIGURE 6



LEGEND

QAL	RECENT ALLUVIUM, AEOLIAN SANDS, LACUSTRINE SILTS AND CLAYS
CALICHE	CALICHE
GATUNA	UNCONSOLIDATED SILT AND CLAY WITH MINOR SAND (GATUNA FORMATION) ALSO INCLUDES LOCALIZED SANDSTONE, SILTSTONE AND MUDSTONE
CONGLOMERATE	CONGLOMERATE
RUSTLER FORMATION	RUSTLER FORMATION CULEBRA MEMBER
RUSTLER FORMATION	LOWER RUSTLER FORMATION
TD	TOTAL DEPTH (FEET BGS)
BGS	BELOW GROUND SURFACE
	MEASURED WATER LEVEL (APRIL 2019) AND PROJECTED POTENTIOMETRIC SURFACE

BLANK CASING

SCREEN INTERVAL

TOTAL DEPTH

BORING

NOTES

1. SURFACE TOPOGRAPHY BASED ON 2009 LIDAR SURVEY AND USGS TOPOGRAPHY OUTSIDE LIDAR SURVEY LIMITS

0 500 1000 1500
HORIZONTAL SCALE FEET

0 50 100 150
VERTICAL SCALE FEET

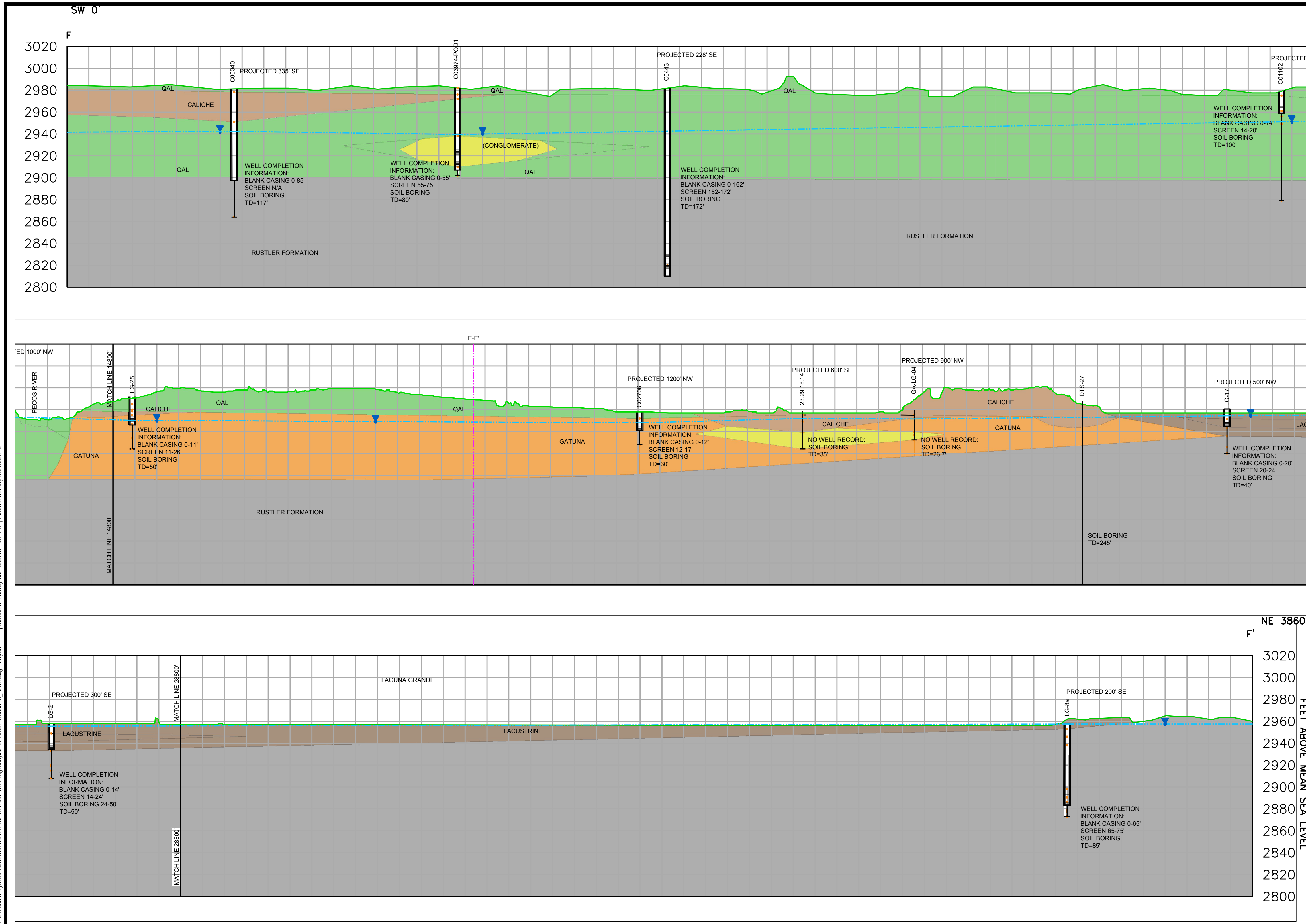
REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
0	8/16/19	FINAL	TS	SB	EC	TS
B	8/12/19	CLIENT COMMENTS	TS	SB	EC	TS
A	2/23/22	DRAFT FOR REVIEW	TS	SB	EC	TS

PROJECT
MOSAIC POTASH CARLSBAD INC.
MODIFIED STAGE 1 ABATEMENT PLAN PROPOSAL
CARLSBAD, NEW MEXICO

TITLE
HYDROGEOLOGIC CROSS SECTION E-E'

WSP GOLDER

PROJECT No.		21502059	FILE No. NEW Cross Sections_KRK
DESIGN	TS	8/16/19	SCALE AS SHOWN
CADD	SB	8/16/19	DRAWING
CHECK	EC	8/16/19	**FIGURE 7**
REVIEW	TS	2/23/22	



LEGEND

QAL	RECENT ALLUVIUM, AEOLIAN SANDS, LACUSTRINE SILTS AND CLAYS
LACUSTRINE	UNDIFFERENTIATED LACUSTRINE, LAKE BOTTOM/SALT
CALICHE	CALICHE
GATUNA	UNCONSOLIDATED SILT AND CLAY WITH MINOR SAND (GATUNA FORMATION) ALSO INCLUDES LOCALIZED SANDSTONE, SILTSTONE AND MUDSTONE
CONGLOMERATE	CONGLOMERATE
RUSTLER FORMATION	LOWER RUSTLER FORMATION
TD	TOTAL DEPTH (FEET BGS)
BGS	BELOW GROUND SURFACE
(water level symbol)	MEASURED WATER LEVEL (APRIL 2019) AND PROJECTED POTENTIOMETRIC SURFACE

BLANK CASING

SCREEN INTERVAL

TOTAL DEPTH

BORING

NOTES

1. SURFACE TOPOGRAPHY BASED ON 2009 LIDAR SURVEY AND USGS TOPOGRAPHY OUTSIDE LIDAR SURVEY LIMITS

0 500 1000 1500
HORIZONTAL SCALE FEET

0 50 100 150
VERTICAL SCALE FEET

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
0	8/16/19	FINAL	TS	SB	EC	TS
B	8/12/19	CLIENT COMMENTS	TS	SB	EC	TS
A	7/17/19	DRAFT FOR REVIEW	TS	SB	EC	TS

PROJECT

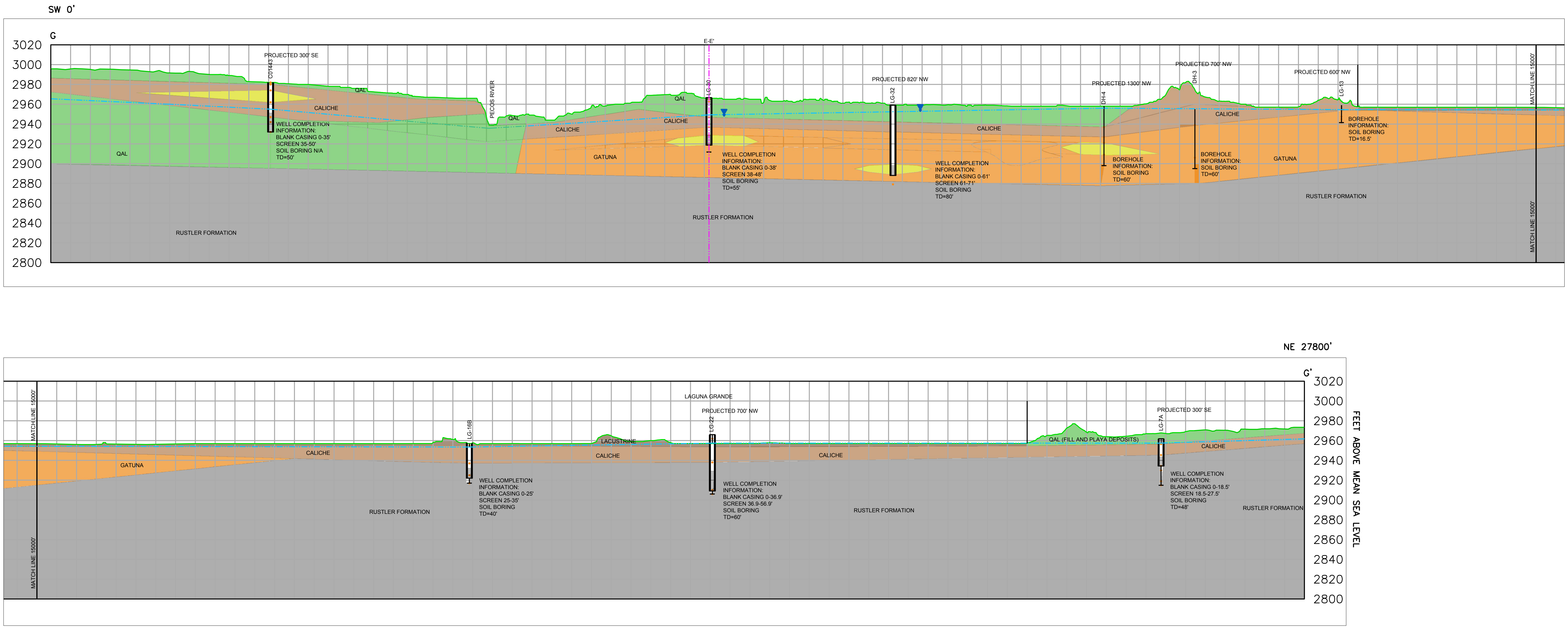
MOSAIC POTASH CARLSBAD INC.
MODIFIED STAGE 1 ABATEMENT PLAN PROPOSAL
CARLSBAD, NEW MEXICO

TITLE

HYDROGEOLOGIC CROSS SECTION F-F'

WSP GOLDER

PROJECT No.		21502059	FILE No. NEW Cross Sections_KRK
DESIGN	TS	8/16/19	SCALE AS SHOWN
CADD	SB	8/16/19	DRAWING
CHECK	EC	8/16/19	FIGURE 8
REVIEW	TS	2/23/22	



LEGEND

- QAL — RECENT ALLUVIUM, AEOLIAN SANDS, LACUSTRINE SILTS AND CLAYS
- LACUSTRINE — UNDIFFERENTIATED LACUSTRINE, LAKE BOTTOM SALT
- CALICHE — CALICHE
- GATUNA — UNCONSOLIDATED SILT AND CLAY WITH MINOR SAND (GATUNA FORMATION) ALSO INCLUDES LOCALIZED SANDSTONE, SILTSTONE AND MUDSTONE
- CONGLOMERATE — CONGLOMERATE
- RUSTLER FORMATION — LOWER RUSTLER FORMATION
- TD — TOTAL DEPTH (FEET BGS)
- BGS — BELOW GROUND SURFACE
- MEASURED WATER LEVEL (APRIL 2019) AND PROJECTED POTENTIOMETRIC SURFACE

BLANK CASING
SCREEN INTERVAL
TOTAL DEPTH
BORING

NOTES

1. SURFACE TOPOGRAPHY BASED ON 2009 LIDAR SURVEY AND USGS TOPOGRAPHY OUTSIDE LIDAR SURVEY LIMITS

HORIZONTAL SCALE 0 500 1000 1500 FEET

VERTICAL SCALE 0 50 100 150 FEET

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
0	8/16/19	FINAL	TS	SB	EC	TS
B	8/12/19	CLIENT COMMENTS	TS	SB	EC	TS
A	7/17/19	DRAFT FOR REVIEW	TS	SB	EC	TS

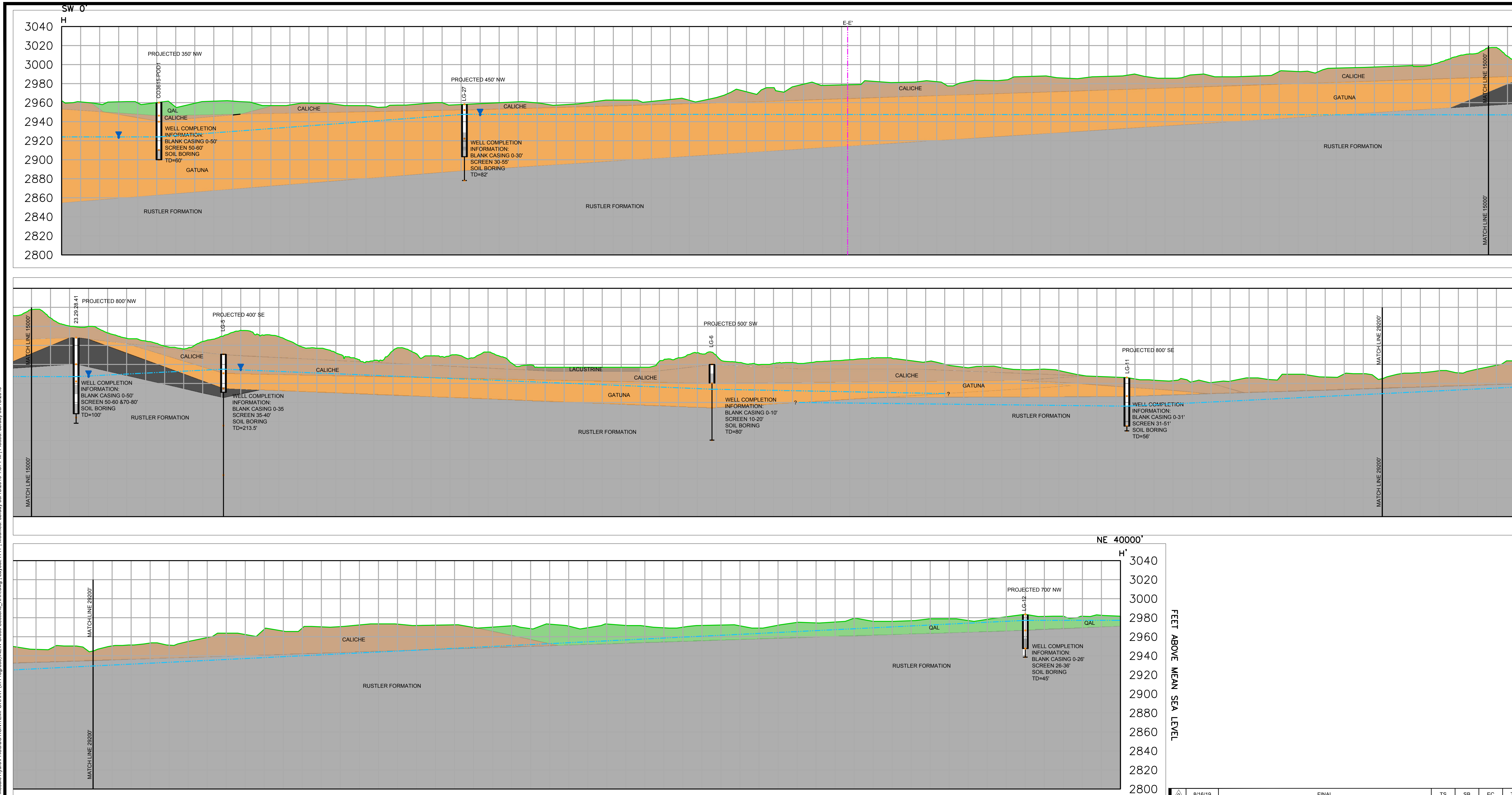
PROJECT
MOSAIC POTASH CARLSBAD INC.
MODIFIED STAGE 1 ABATEMENT PLAN PROPOSAL
CARLSBAD, NEW MEXICO

TITLE

HYDROGEOLOGIC CROSS SECTION G-G'

WSP GOLDER

PROJECT No.		21502059	FILE No. NEW Cross Sections_KRK
DESIGN	TS	8/16/19	SCALE AS SHOWN
CADD	SB	8/16/19	DRAWING
CHECK	EC	8/16/19	
REVIEW	TS	2/23/22	FIGURE 9



LEGEND

QAL	RECENT ALLUVIUM, AEOLIAN SANDS, LACUSTRINE SILTS AND CLAYS
LACUSTRINE	UNDIFFERENTIATED LACUSTRINE, LAKE BOTTOM/SALT
CALICHE	CALICHE
GATUNA	UNCONSOLIDATED SILT AND CLAY WITH MINOR SAND (GATUNA FORMATION) ALSO INCLUDES LOCALIZED SANDSTONE, SILTSTONE AND MUDSTONE
CONGLOMERATE	CONGLOMERATE
RUSTLER FORMATION	RUSTLER FORMATION– CULEBRA MEMBER
RUSTLER FORMATION	LOWER RUSTLER FORMATION
TD	TOTAL DEPTH (FEET BGS)
BGS	BELOW GROUND SURFACE
▼	MEASURED WATER LEVEL (APRIL 2019) AND PROJECTED POTENTIOMETRIC SURFACE

BLANK CASING

SCREEN INTERVAL

TOTAL DEPTH

BORING

NOTES

1. SURFACE TOPOGRAPHY BASED ON 2009 LIDAR SURVEY AND USGS TOPOGRAPHY OUTSIDE LIDAR SURVEY LIMITS

0 500 1000 1500
HORIZONTAL SCALE FEET

0 50 100 150
VERTICAL SCALE FEET

REV	DATE	REVISION DESCRIPTION	DES	CADD	CHK	RVW
0	8/16/19	FINAL	TS	SB	EC	TS
B	8/12/19	CLIENT COMMENTS	TS	SB	EC	TS
A	2/23/22	DRAFT FOR REVIEW	TS	SB	EC	TS

PROJECT
MOSAIC POTASH CARLSBAD INC.
MODIFIED STAGE 1 ABATEMENT PLAN PROPOSAL
CARLSBAD, NEW MEXICO

TITLE
HYDROGEOLOGIC CROSS SECTION H-H'

wsp GOLDER

PROJECT No.		21502059	FILE No. NEW Cross Sections_KRK
DESIGN	TS	8/16/19	SCALE AS SHOWN
CADD	SB	8/16/19	DRAWING
CHECK	EC	8/16/19	
REVIEW	TS	2/23/22	**FIGURE 10**

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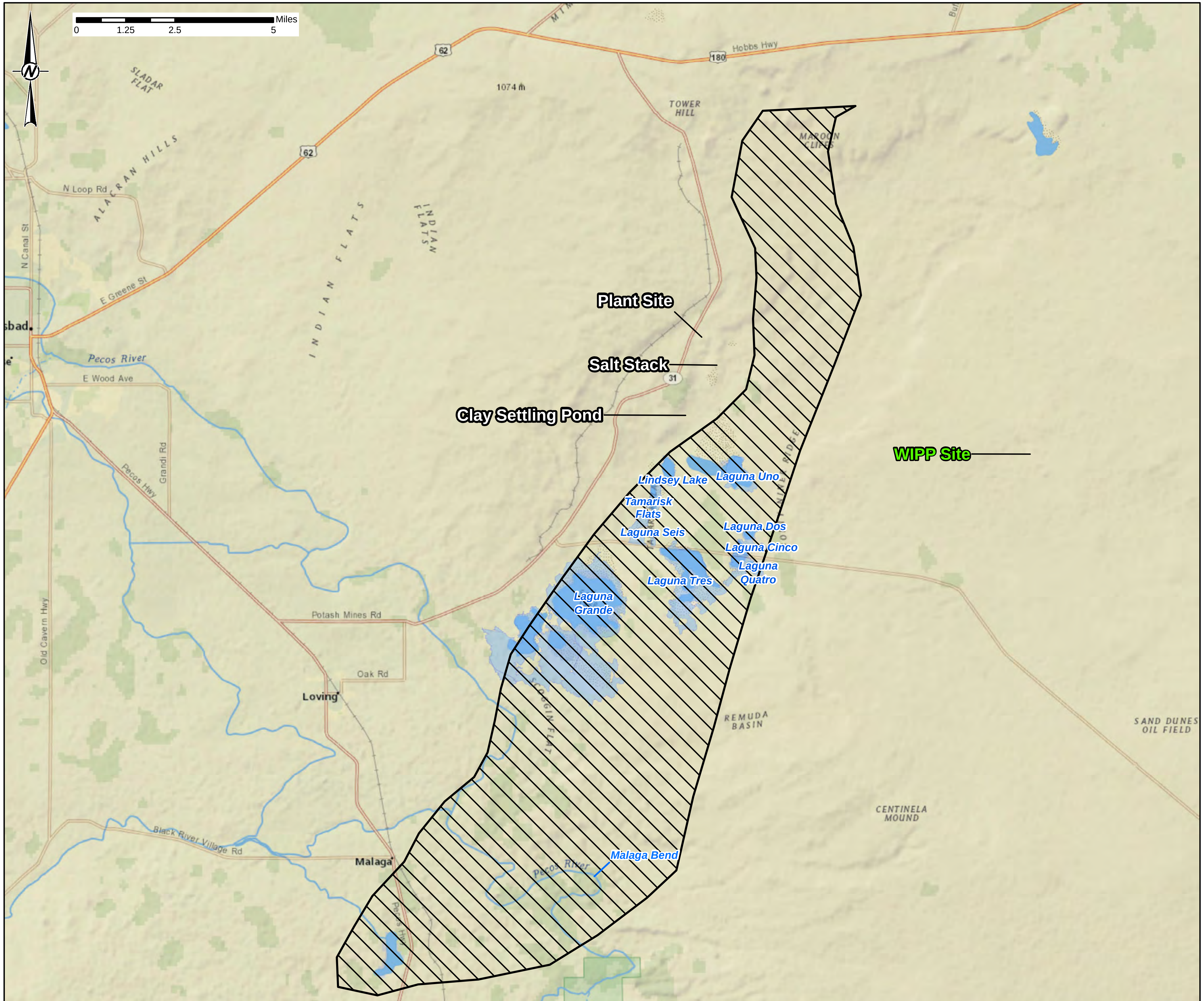


LEGEND

DELINEATED BRINE AQUIFER

LAKES/PLAYAS

REFERENCES

1. BASEMAP: ESRI PROVIDED BASEMAP SERVICE. NATIONAL GEOGRAPHIC BASEMAP SERVICE, 2021.
2. DELINEATED BRINE AQUIFER: FIGURE 6 - GENERAL DISTRIBUTION OF WATER-BEARING FORMATIONS IN THE PROJECT GNOME AREA (COOPER AND GLANZMAN 1971).

CLIENT

MOSAIC POTASH CARLSBAD, INC.

PROJECT

MOSAIC POTASH MINE
MODIFIED STAGE 1 ABATEMENT PLAN PROPOSAL

TITLE

APPROXIMATE EXTENT OF BRINE AQUIFER

CONSULTANT

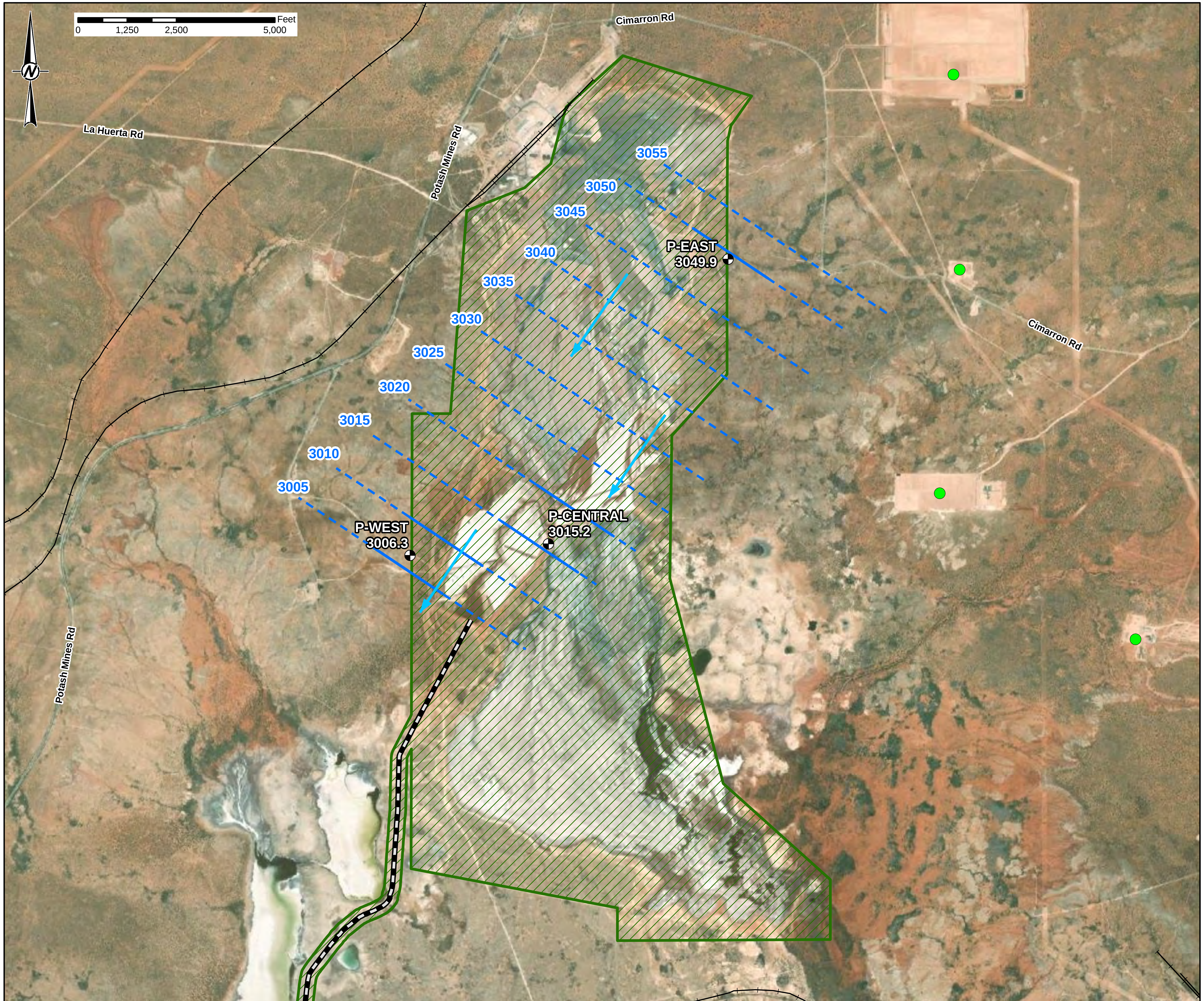
WSP GOLDER

YYYY-MM-DD	2022-03-18
DESIGNED	TS
PREPARED	RHG
REVIEWED	-
APPROVED	-

PROJECT NO.
21502059

FIGURE
11

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B



LEGEND

- TAILINGS MANAGEMENT AREA
- BRINE PIPELINE
- RAILROAD
- MOSAIC PIEZOMETER ID
- OIL AND GAS DEVELOPMENT PAD
- GROUNDWATER FLOW DIRECTION
- GROUNDWATER ELEVATION CONTOUR
- (DASHED WHERE INFERRED)

NOTES

1. GROUNDWATER ELEVATIONS MEASURED IN JULY, 2022.

REFERENCES

1. BASEMAP: ESRI PROVIDED BASEMAP SERVICE. VIVID. MAXAR. IMAGERY COLLECTED 2020/2021.

CLIENT

MOSAIC POTASH CARLSBAD, INC.

PROJECT

MOSAIC POTASH MINE
MODIFIED STAGE 1 ABATEMENT PLAN PROPOSAL

TITLE

POTENTIOMETRIC SURFACE THIRD QUARTER 2022
SALT STACK AREA

CONSULTANT

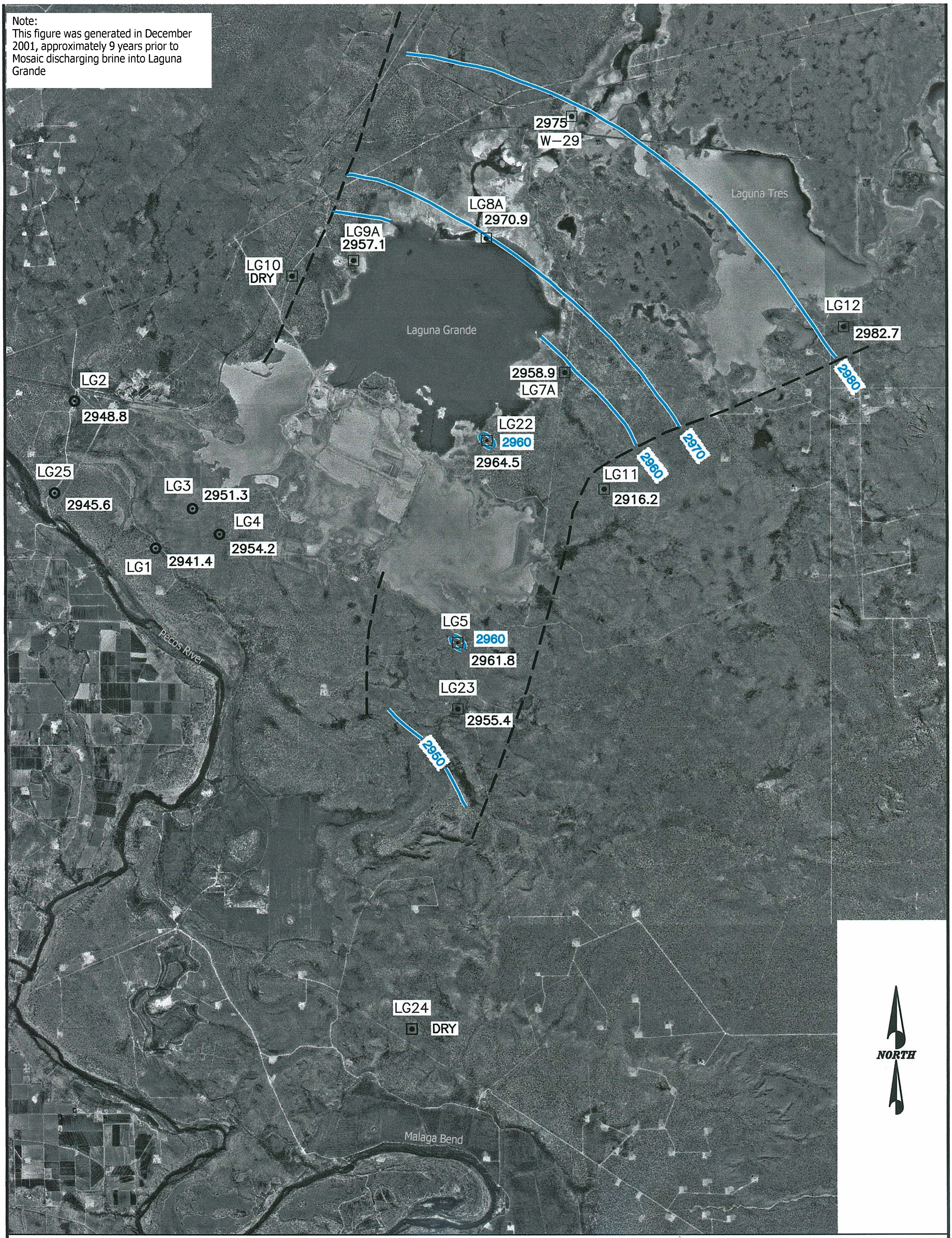
WSP GOLDER

YYYY-MM-DD	2022-08-26
DESIGNED	ML
PREPARED	RHG
REVIEWED	TS
APPROVED	TS

PROJECT NO. 21502059

FIGURE 12

Note:
This figure was generated in December 2001, approximately 9 years prior to Mosaic discharging brine into Laguna Grande



Scale in Feet

0 2000 4000 8000

1" = 4000 feet

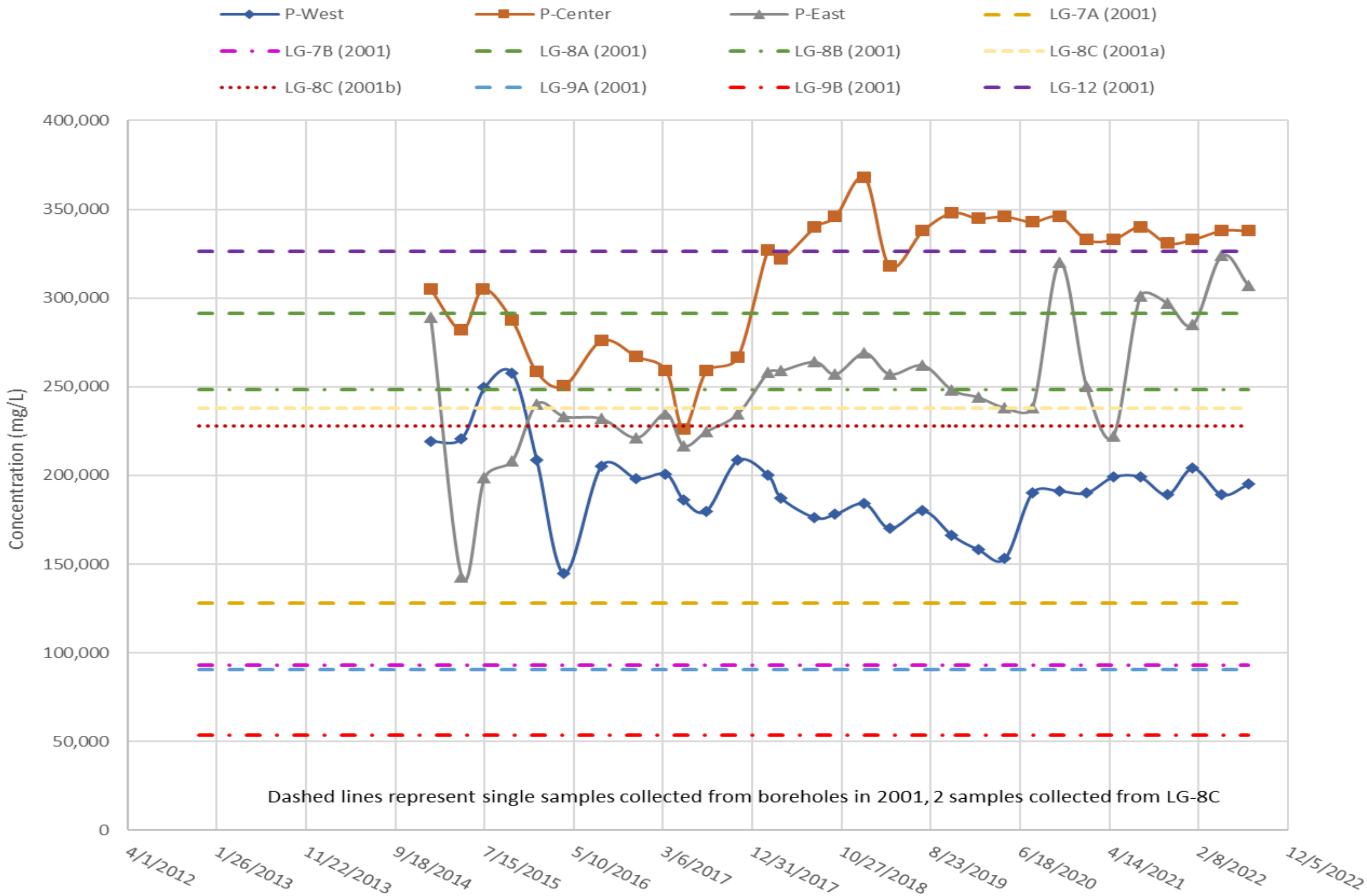
LEGEND

2955.4	ELEVATION OF FRESH WATER LEVELS AS OF 7/25/01 (FOR LG WELLS)	⊙	QUATERNARY WELLS
⊡	CULEBRA WELLS	——	POTENTIOMETRIC CONTOUR
		— — —	FLOW SYSTEM BOUNDARY

Figure from the Hydrogeology Baseline Report (Golder 2002)

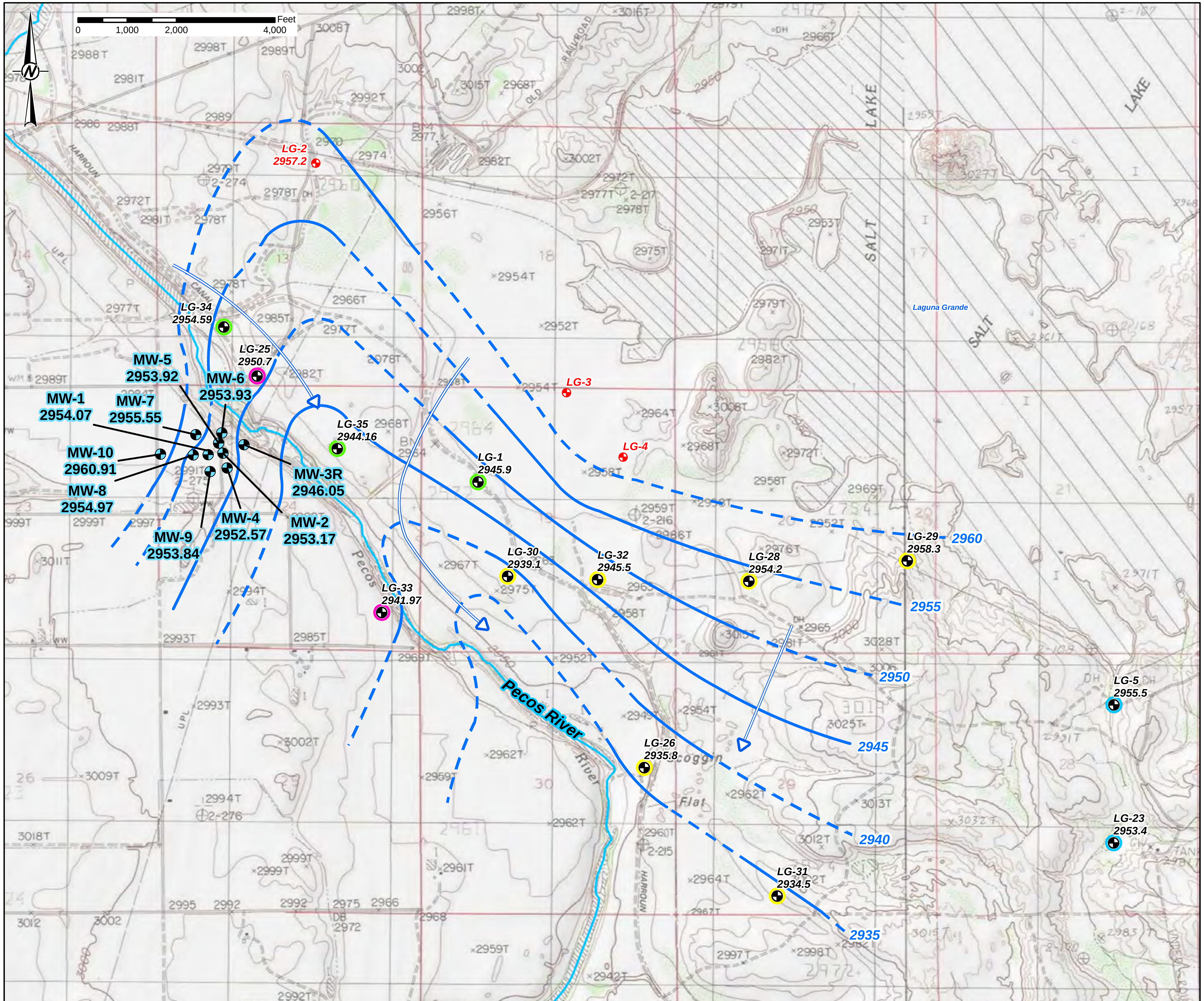
CLIENT/PROJECT		TITLE
MOSAIC POTASH CARLSBAD INC. MODIFIED STAGE 1 ABATEMENT PLAN PROPOSAL	wsp GOLDER Denver, Colorado	POTENTIOMETRIC SURFACE OF THE CULEBRA DOLOMITE

DRAWN	CHECKED	REVIEWED	DATE	SCALE	FILE NO.	JOB NO.	DWG NO./REV.NO.	FIGURE
sfd	TS	MWB	MAY 2002	AS SHOWN	2214B190.dwg	21502059	B190	13



PROJECT		TITLE
MOSAIC POTASH CARLSBAD INC. MODIFIED STAGE 1 ABATEMENT PLAN PROPOSAL CARLSBAD, NEW MEXICO	WSP GOLDER	**TDS CONCENTRATIONS IN GROUNDWATER – NORTHERN AND CENTRAL AREAS**

AUTHOR	CHECKED	REVIEWED	DATE	SCALE	JOB NO.	DWG NO.	SUBTITLE	REV. NO.	FIGURE
EMC	TS		08-25-22	NA	21502059	NA	NA	A	**14**



LEGEND

- GROUNDWATER FLOW DIRECTION
- MEASURED GROUNDWATER ELEVATION CONTOUR
- (DASHED WHERE INFERRED)
- ARCADIS WELLS

MONITORING WELLS WITH OCTOBER 2020 MEASURED GROUNDWATER ELEVATION (WHERE APPLICABLE)

- PRESENT
- CURRENTLY INACCESSIBLE

MONITORING WELLS BY GEOLOGIC UNIT (SEE NOTE 2)

- ALLUVIUM / CALICHE
- CALICHE
- CULEBRA
- GATUNA

NOTE

1. GROUNDWATER ELEVATIONS REPORTED IN FEET ABOVE MEAN SEA LEVEL.
2. WELLS LG-5 AND 23 WERE SCREENED IN THE CULEBRA AQUIFER AND WERE NOT USED IN CONTOURING.
3. MONITORING WELLS LG-33, LG-34, AND LG-35 GROUNDWATER ELEVATIONS WERE TAKEN FROM NOVEMBER 2020 AND ALL OTHER WELLS WERE TAKEN FROM OCTOBER 2020.

REFERENCES

1. BASEMAP: USGS 1:24,000 SCALE TOPOGRAPHIC QUADRANGLES: "MALAGA, NM", "PIERCE CANYON, NM", "LOVING, NM", AND "REMUDA BASIN, NM".
2. GROUNDWATER ELEVATION CONTOURS DEVELOPED BY GOLDER ASSOCIATES BASED ON OCTOBER 2020 WELL DATA PROVIDED BY MOSAIC.

CLIENT
MOSAIC POTASH CARLSBAD, INC.

PROJECT
MOSAIC POTASH MINE
MODIFIED STAGE 1 ABATEMENT PLAN PROPOSAL

TITLE
POTENTIOMETRIC SURFACE OCTOBER 2020
SOUTHERN AREA OF THE SITE

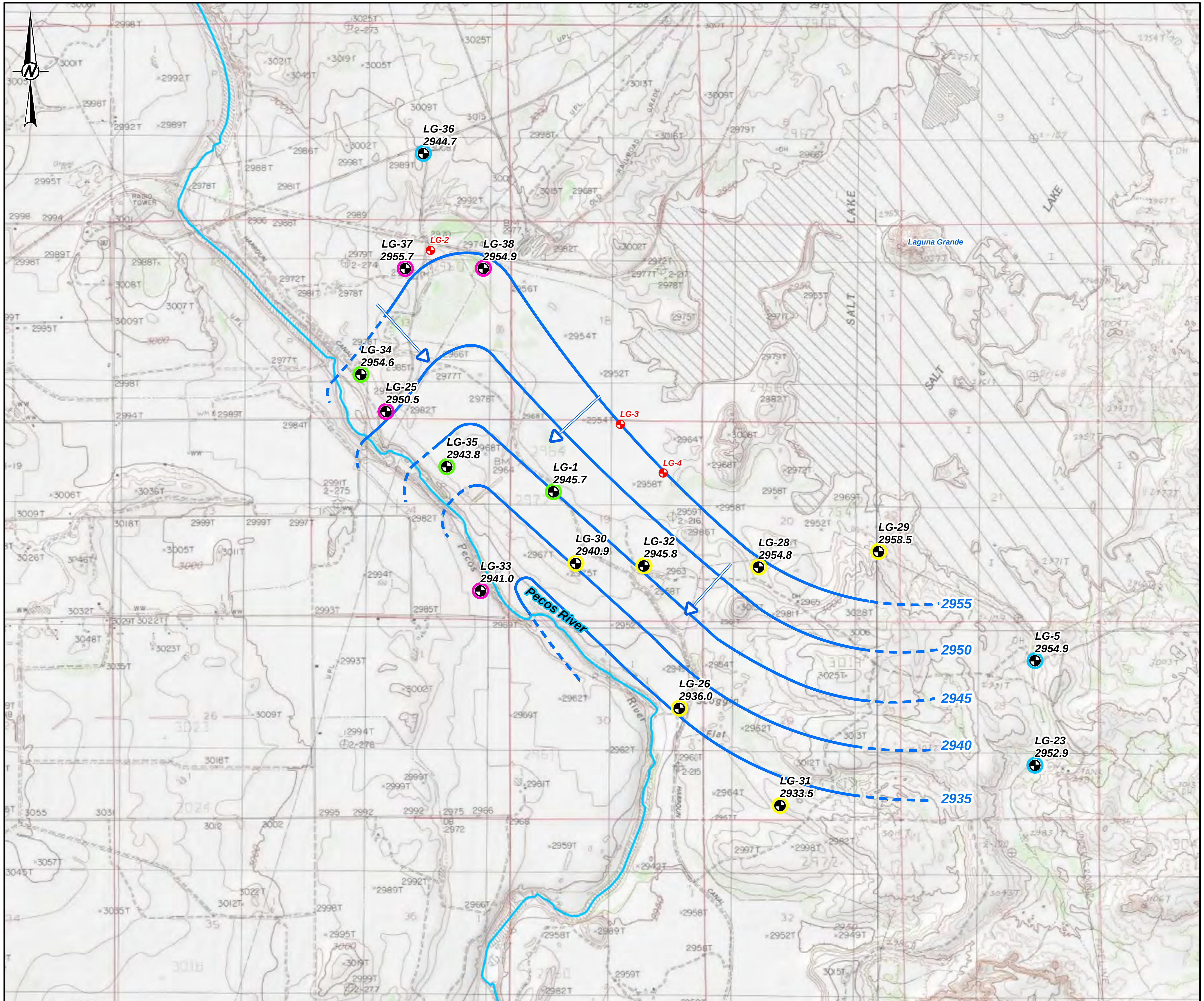
CONSULTANT

WSP GOLDER

YYYY-MM-DD	2022-03-18
DESIGNED	TS
PREPARED	RHG
REVIEWED	-
APPROVED	-

PROJECT NO.
21502059

FIGURE
15



LEGEND

GROUNDWATER FLOW DIRECTION

MONITORING WELLS WITH JULY 2022 GROUNDWATER ELEVATIONS (WHERE APPLICABLE)

PRESENT

CURRENTLY INACCESSIBLE

MONITORING WELLS BY GEOLOGIC UNIT (SEE NOTE 2)

ALLUVIUM / CALICHE

CALICHE

CULEBRA

GATUNA

NOTE

1. GROUNDWATER ELEVATIONS REPORTED IN FEET ABOVE MEAN SEA LEVEL.
2. WELLS LG-5, LG-23, AND LG-36 WERE SCREENED IN THE CULEBRA AQUIFER AND WERE NOT USED IN CONTOURING.

REFERENCES

1. BASEMAP: USGS 1:24,000 SCALE TOPOGRAPHIC QUADRANGLES: "MALAGA, NM", "PIERCE CANYON, NM", "LOVING, NM", AND "REMUDA BASIN, NM".
2. GROUNDWATER ELEVATION CONTOURS DEVELOPED BY GOLDER ASSOCIATES BASED ON JULY 2022 WELL DATA PROVIDED BY MOSAIC.

CLIENT
MOSAIC POTASH CARLSBAD INC.

PROJECT
MOSAIC POTASH MINE
MODIFIED STAGE 1 ABATEMENT PLAN PROPOSAL

TITLE
POTENTIOMETRIC SURFACE
THIRD QUARTER 2022
SOUTHERN AREA OF THE SITE

CONSULTANT
WSP GOLDER

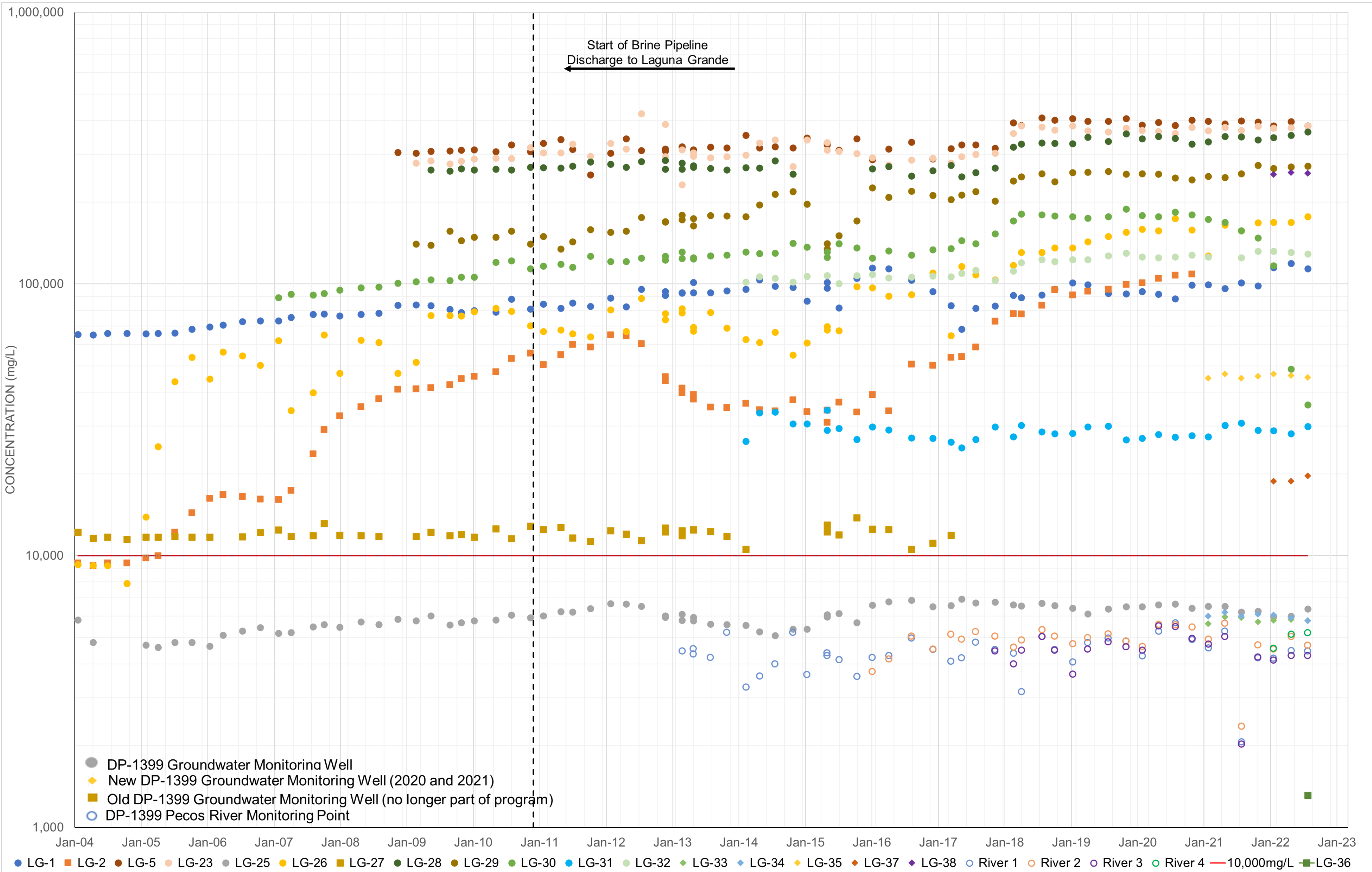
YYYY-MM-DD	2022-08-26
DESIGNED	KJC
PREPARED	RHG
REVIEWED	GP
APPROVED	TS

PROJECT NO.
20448935

FIGURE
16

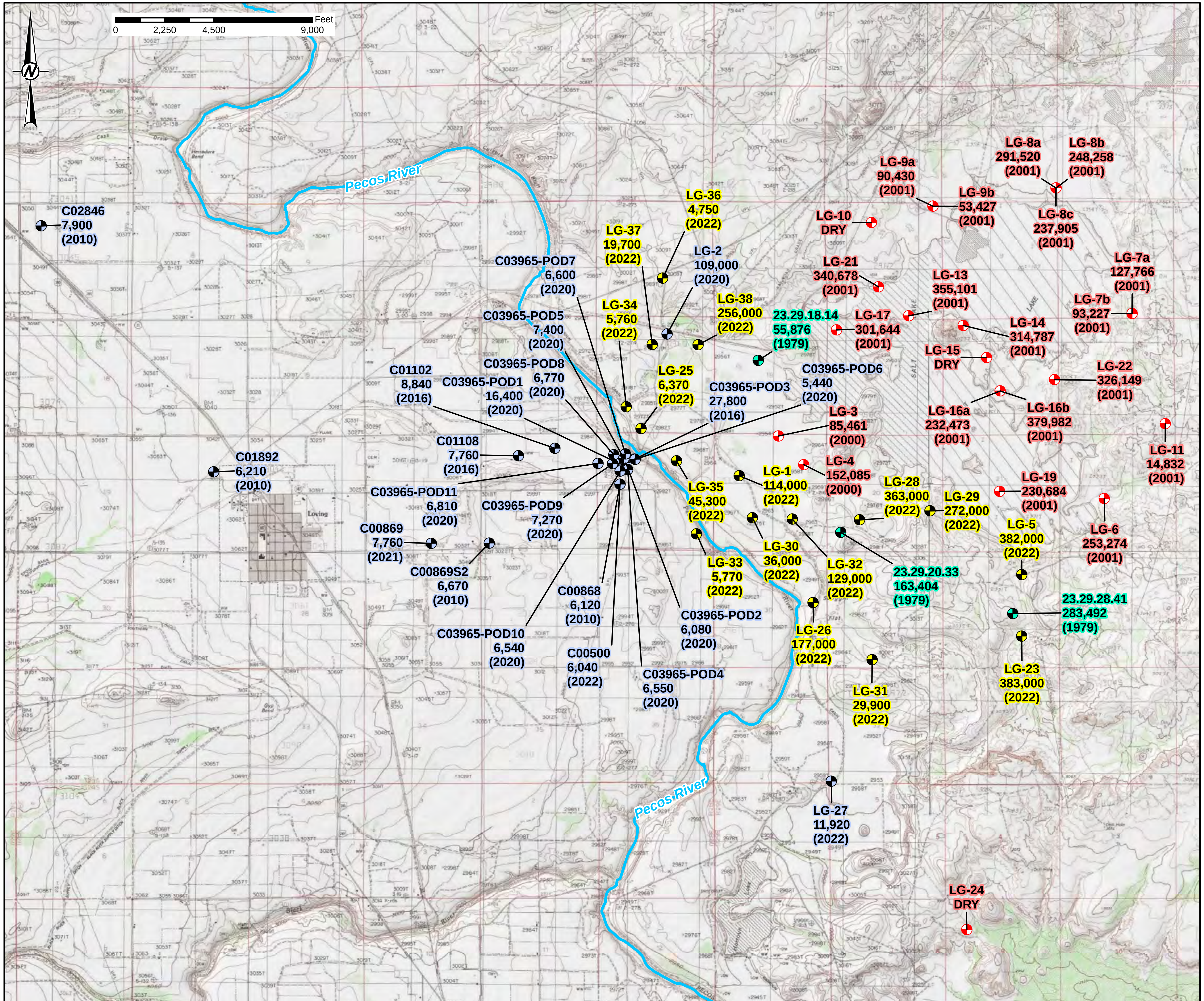
IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

PATH: M:\Mosaic_Stage1_Abatement_2022\20220\Stage1Abatement_Update\11x17_21502059_Mosaic_S1A_update_Fig16_GWEJuly2022.mxd PRINTED ON: 2022-08-26 AT: 2:29:11 PM



PROJECT		TITLE
MOSAIC POTASH CARLSBAD INC. MODIFIED STAGE 1 ABATEMENT PLAN PROPOSAL CARLSBAD, NEW MEXICO	WSP GOLDER	**TDS CONCENTRATION TRENDS IN GROUNDWATER AND THE PECOS RIVER - SOUTHERN AREA**

AUTHOR	CHECKED	REVIEWED	DATE	SCALE	JOB NO.	DWG NO.	SUBTITLE	REV. NO.	FIGURE
EMC	TS		08-25-22	NA	21502059	NA	NA	A	17



LEGEND

- BLM WELL ID / TDS WELL CONCENTRATION mg/L / (YEAR OF SAMPLE)
- MOSAIC WELL ID / TDS WELL CONCENTRATION mg/L / (YEAR OF SAMPLE)
- PRIVATE WELL ID / TDS WELL CONCENTRATION mg/L / (YEAR OF SAMPLE)
- MOSAIC MONITORING WELL (PLUGGED AND ABANDONED)
- PECOS RIVER

NOTES

1. C03965-POD WELLS ARE ASSOCIATED WITH AN INVESTIGATION BY CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY OF A PRODUCED WATER RELEASE THAT OCCURRED IN 2014.

REFERENCES

1. TOPOGRAPHIC BACKGROUND: ESRI BASEMAP SERVICES. USGS 1:24,000 TOPOGRAPHIC QUADRANGLES SHOWN: LOVING, REMUDA BASIN, MALAGA, AND PIERCE CANYON.

CLIENT
MOSAIC POTASH CARLSBAD, INC.

PROJECT
MOSAIC POTASH MINE
MODIFIED STAGE 1 ABATEMENT PLAN PROPOSAL

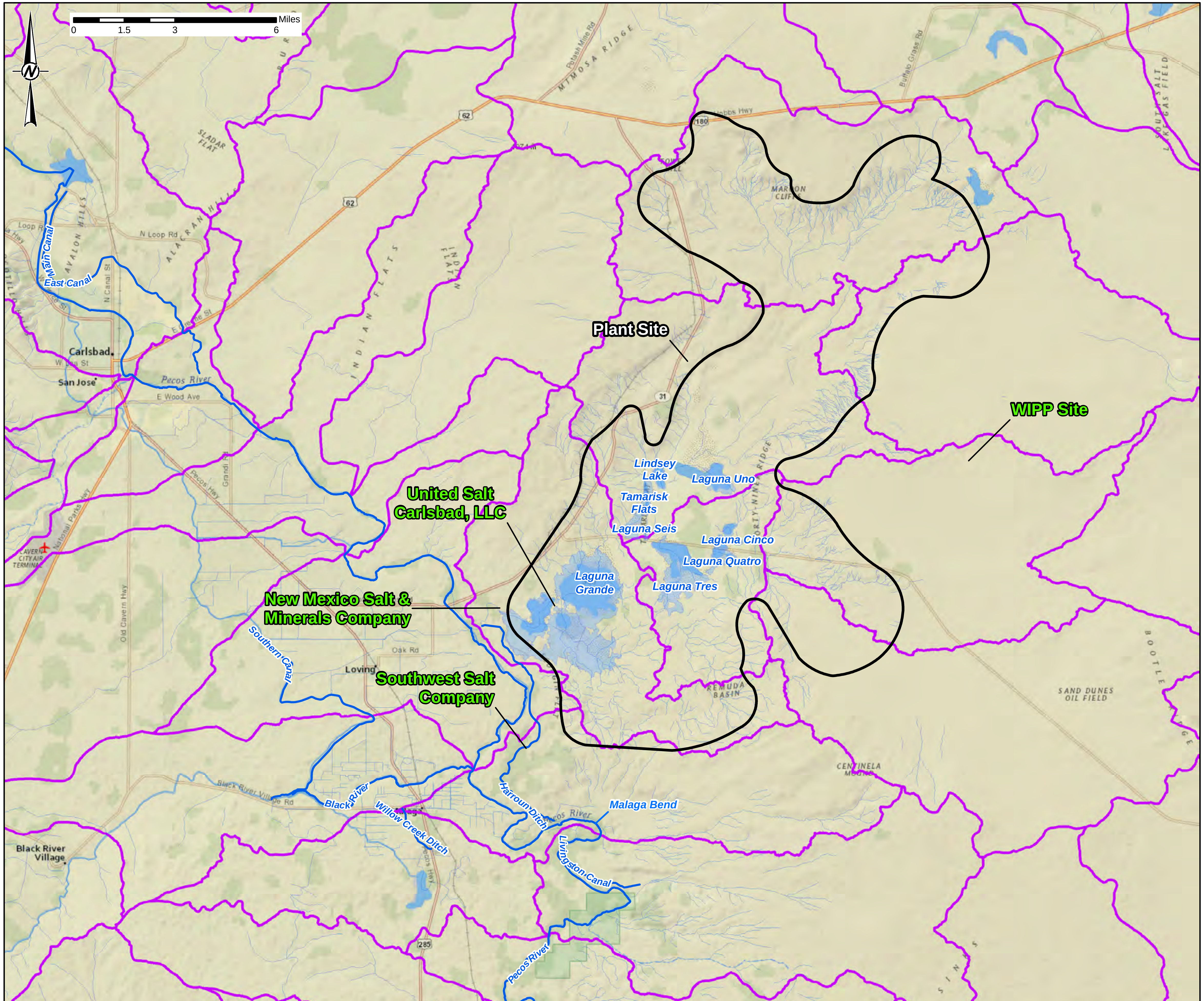
TITLE
WELL LOCATIONS WITH MOST RECENT TDS CONCENTRATIONS - SOUTHERN AREA OF THE SITE

CONSULTANT
WSP GOLDER

YYYY-MM-DD	2022-08-26
DESIGNED	TS
PREPARED	RHG
REVIEWED	-
APPROVED	-

PROJECT NO. 21502059

FIGURE 18



LEGEND

- NAMED CHANNELS/RIVERS
- DRAINAGES
- LAKES/PLAYAS
- WATERSHED BOUNDARY (HUC12)
- APPROXIMATE NASH DRAW BOUNDARY DELINEATION

REFERENCES

1. BASEMAP: ESRI PROVIDED BASEMAP SERVICE. NATIONAL GEOGRAPHIC BASEMAP SERVICE, 2021.
2. HYDROLOGIC FEATURES: NATIONAL HYDROLOGY DATASET (NHD), USGS.
3. WATERSHEDS: NATIONAL WATERSHED BOUNDARY DATASET (WBD), USGS.

CLIENT
MOSAIC POTASH CARLSBAD, INC.

PROJECT
MOSAIC POTASH MINE
MODIFIED STAGE 1 ABATEMENT PLAN PROPOSAL

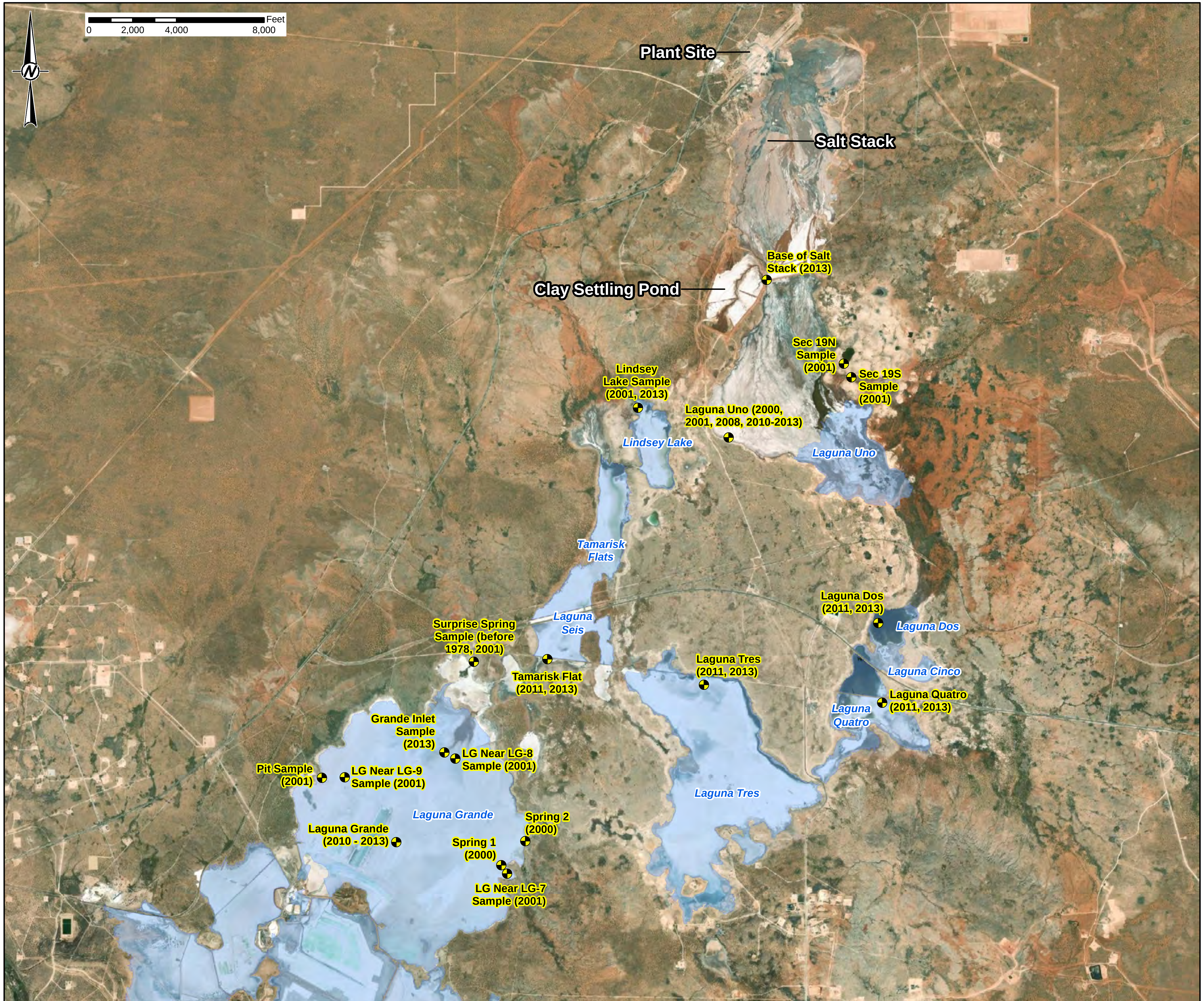
TITLE
NASH DRAW WATERSHEDS

CONSULTANT
WSP GOLDER

YYYY-MM-DD	2022-03-18
DESIGNED	TS
PREPARED	RHG
REVIEWED	-
APPROVED	-

PROJECT NO.
21502059

FIGURE
19



LEGEND

- APPROXIMATE SAMPLE LOCATION (SAMPLE DATES)
- LAKES/PLAYAS

REFERENCES

1. BASEMAP: ESRI PROVIDED BASEMAP SERVICE. VIVD. MAXAR. IMAGERY COLLECTED 2020/2021.

CLIENT
MOSAIC POTASH CARLSBAD, INC.

PROJECT
MOSAIC POTASH MINE
MODIFIED STAGE 1 ABATEMENT PLAN PROPOSAL

TITLE
PLAYA LAKE AND SPRING SAMPLING LOCATIONS

CONSULTANT
WSP GOLDER

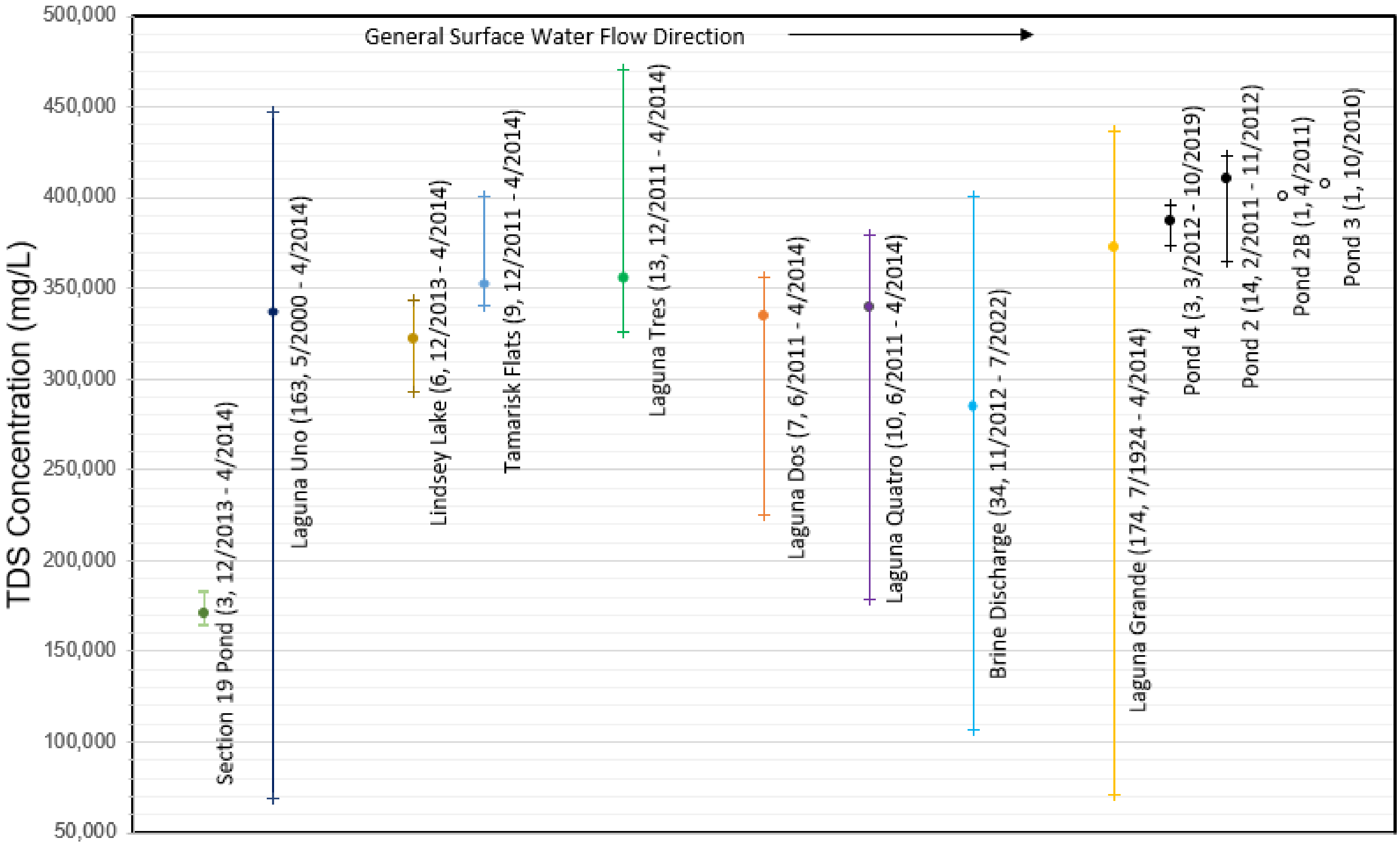
YYYY-MM-DD	2022-03-18
DESIGNED	TS
PREPARED	RHG
REVIEWED	-
APPROVED	-

PROJECT NO.
21502059

FIGURE
20

PATH: M:\Mosaic_Stage1_Abatement_2022\11x17_21502059_Mosaic_Stage1APP_Fig20_PlayaLakeSpringSamp.mxd PRINTED ON: 2022-03-18 AT: 12:04:30 PM

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B



Legend: The data ranges are indicated by a solid line with + at the mnimum and maximum values.

Median TDS Concentration (mg/L)

Single Sample TDS Concentration (mg/L)

(34, 11/2012 - 7/2022) = (total # of samples, sample date range)

PROJECT

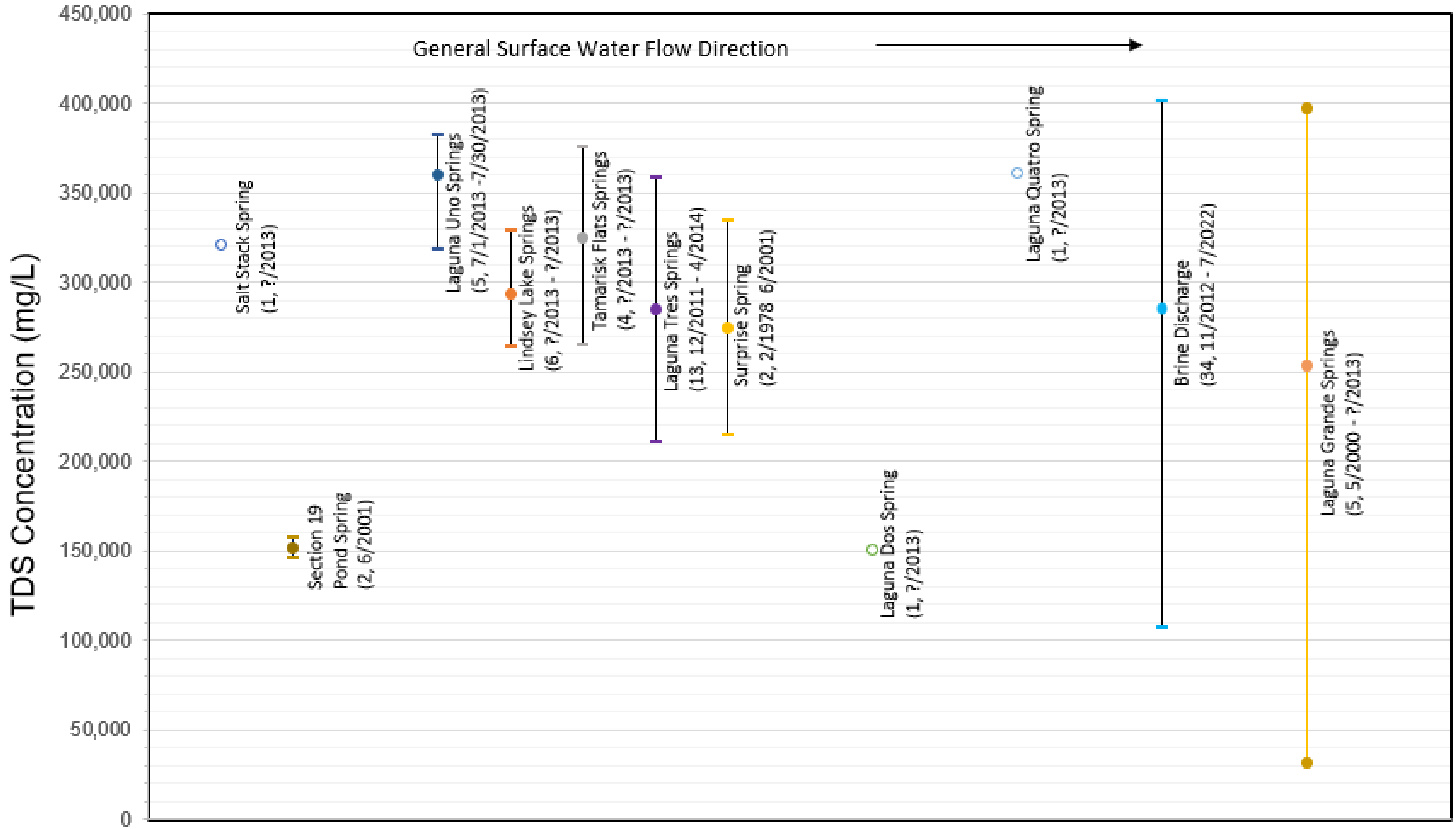
MOSAIC POTASH CARLSBAD INC.
MODIFIED STAGE 1 ABATEMENT PLAN PROPOSAL
CARLSBAD, NEW MEXICO

WSP GOLDER

TITLE

TDS CONCENTRATIONS IN SURFACE WATER

AUTHOR	CHECKED	REVIEWED	DATE	SCALE	JOB NO.	DWG NO.	SUBTITLE	REV. NO.	FIGURE
EMC	TS		08-25-22	NA	21502059	NA	NA	A	21



Legend: The data ranges are indicated by a solid line with + at the mnimum and maximum values.

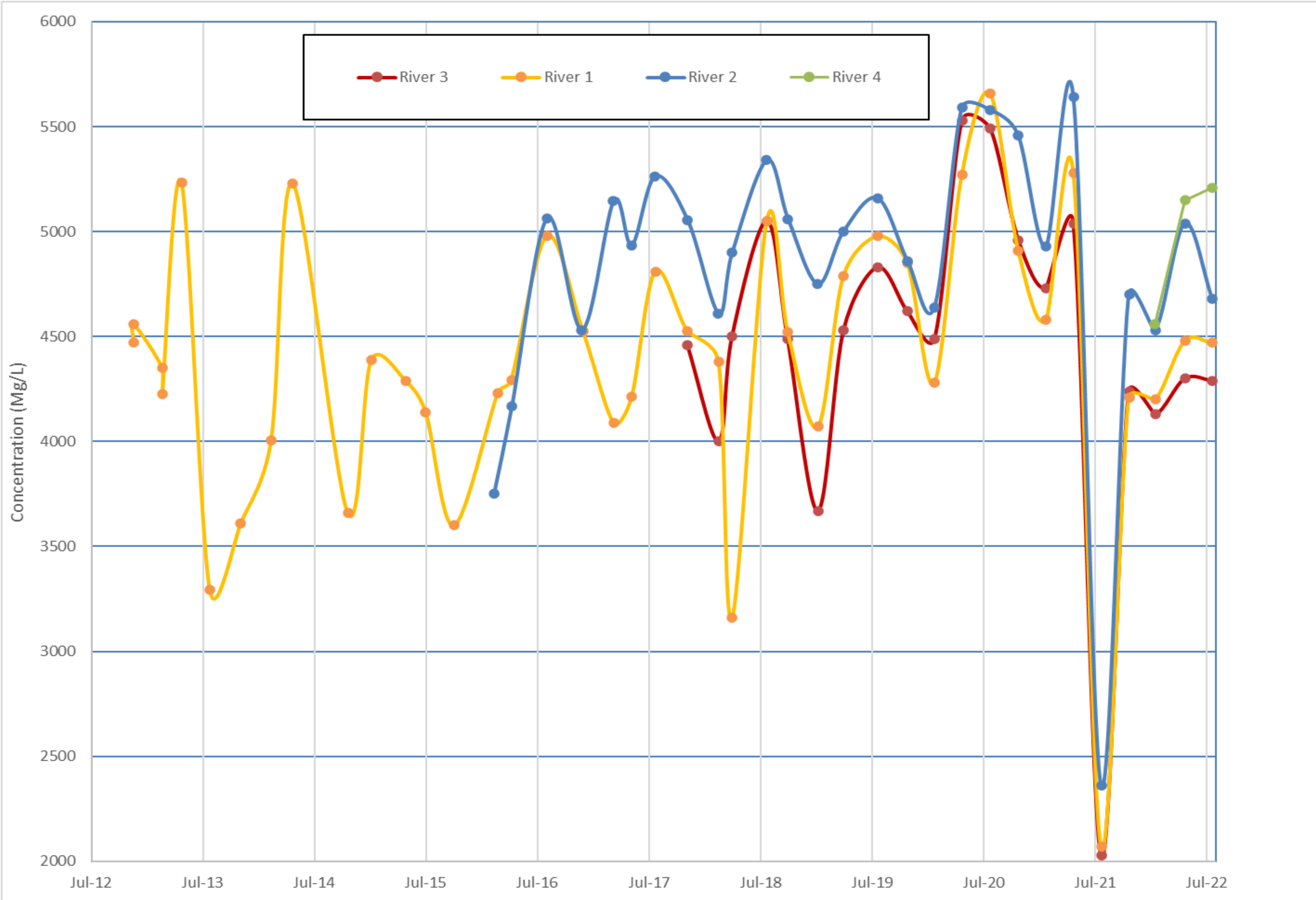
Median TDS Concentration (mg/L)

Single Sample TDS Concentration (mg/L)

(34, 11/2012 - 7/2022) = (total # of samples, sample date range), ?/2013 = unknown month sampled

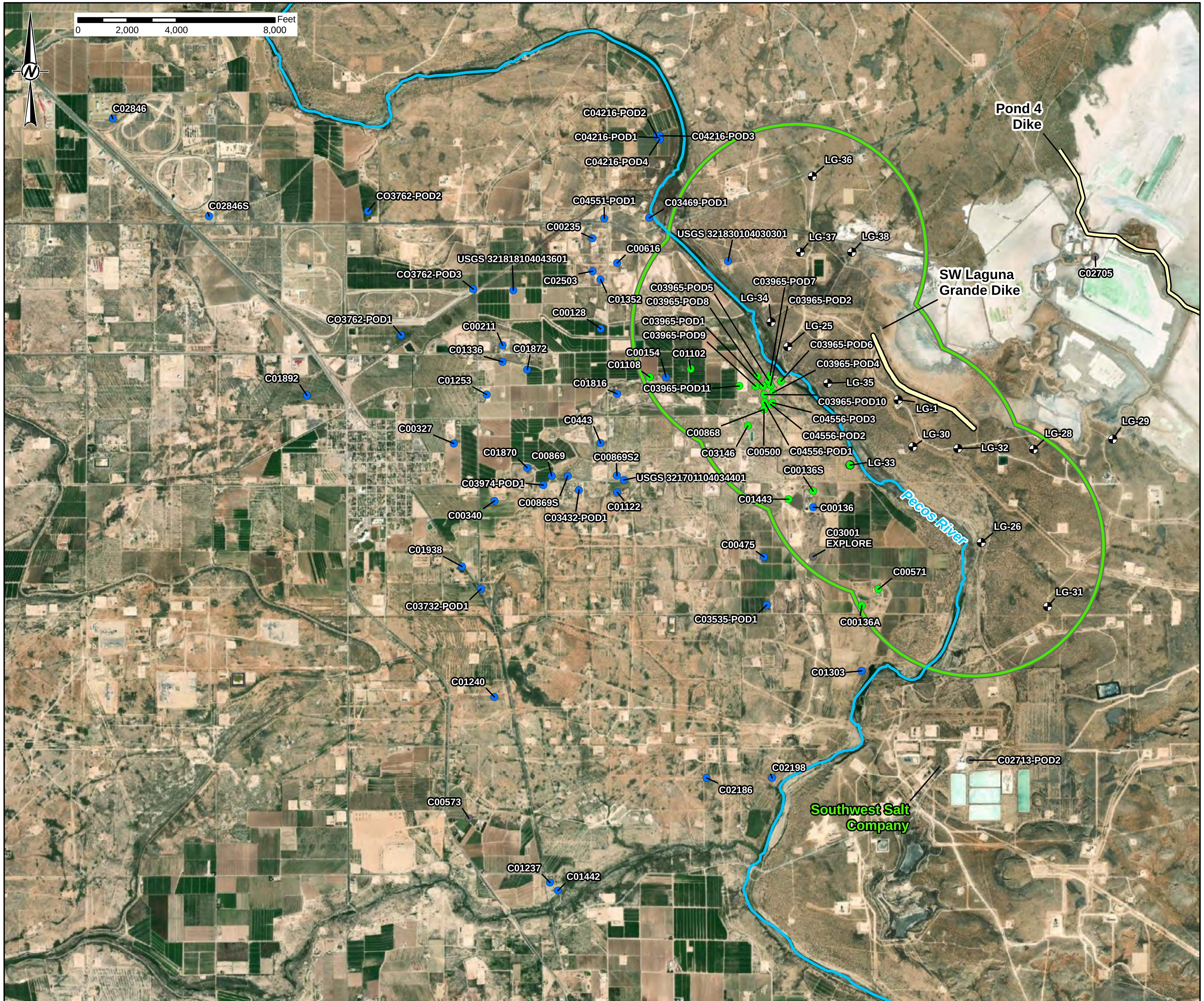
PROJECT		TITLE
MOSAIC POTASH CARLSBAD INC. MODIFIED STAGE 1 ABATEMENT PLAN PROPOSAL CARLSBAD, NEW MEXICO	WSP GOLDER	**TDS CONCENTRATIONS IN SPRING DISCHARGE WATER**

AUTHOR	CHECKED	REVIEWED	DATE	SCALE	JOB NO.	DWG NO.	SUBTITLE	REV. NO.	FIGURE
EMC	TS		08-25-22	NA	21502059	NA	NA	A	22



PROJECT		TITLE
MOSAIC POTASH CARLSBAD INC. MODIFIED STAGE 1 ABATEMENT PLAN PROPOSAL CARLSBAD, NEW MEXICO	WSP GOLDER	**PECOS RIVER TDS CONCENTRATIONS**

AUTHOR	CHECKED	REVIEWED	DATE	SCALE	JOB NO.	DWG NO.	SUBTITLE	REV. NO.	FIGURE
EMC	TS		08-25-22	NA	21502059	NA	NA	A	**23**



LEGEND

- EXISTING DP-1399 MONITORING WELLS
- MONITORING/PUMPING WELL (EXISTING)
- MONITORING/PUMPING WELL (OTHERS -UNKNOWN STATUS)
- PROPOSED WEST SIDE WELL TO BE MONITORED AS PART OF THE STAGE 1 ABATEMENT PLAN (IF ACCESS IS GRANTED BY WELL OWNER)
- 1-MILE RADIUS OF PERIMETER OF THE THREE-DIMENSIONAL BODY WHERE THE STANDARDS SET FORTH IN SUBSECTION B OF SECTION 20.6.2.4103 NMAC ARE EXCEEDED
- PECOS RIVER
- DIKES

REFERENCES

1. BASEMAP: ESRI PROVIDED BASEMAP SERVICE. VIVID. MAXAR. IMAGERY COLLECTED 2020/2021.

CLIENT
MOSAIC POTASH CARLSBAD, INC.

PROJECT
MOSAIC POTASH MINE
MODIFIED STAGE 1 ABATEMENT PLAN PROPOSAL

TITLE
EXISTING WELLS LOCATED ON THE WEST SIDE OF THE PECOS RIVER

CONSULTANT

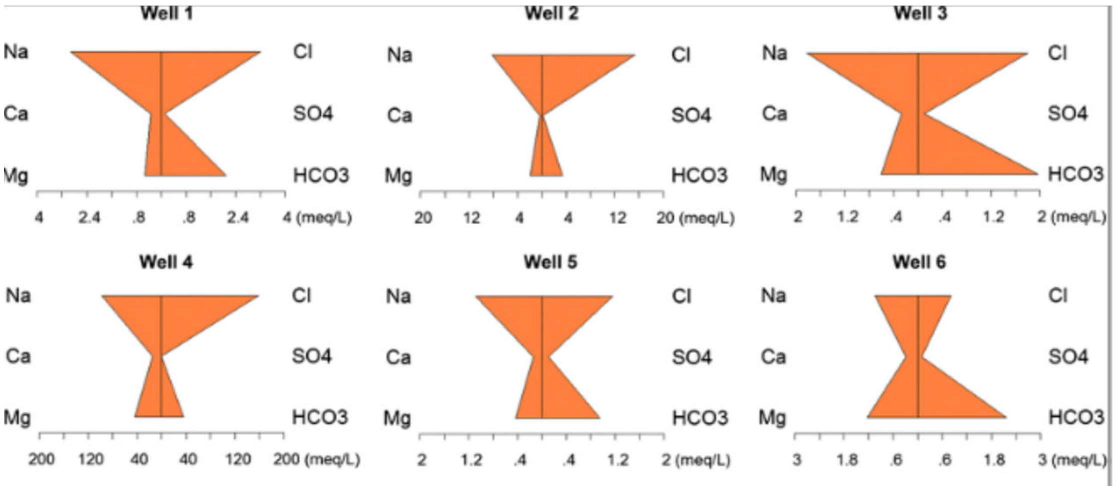
WSP GOLDER

YYYY-MM-DD	2022-03-18
DESIGNED	TS
PREPARED	RHG
REVIEWED	-
APPROVED	-

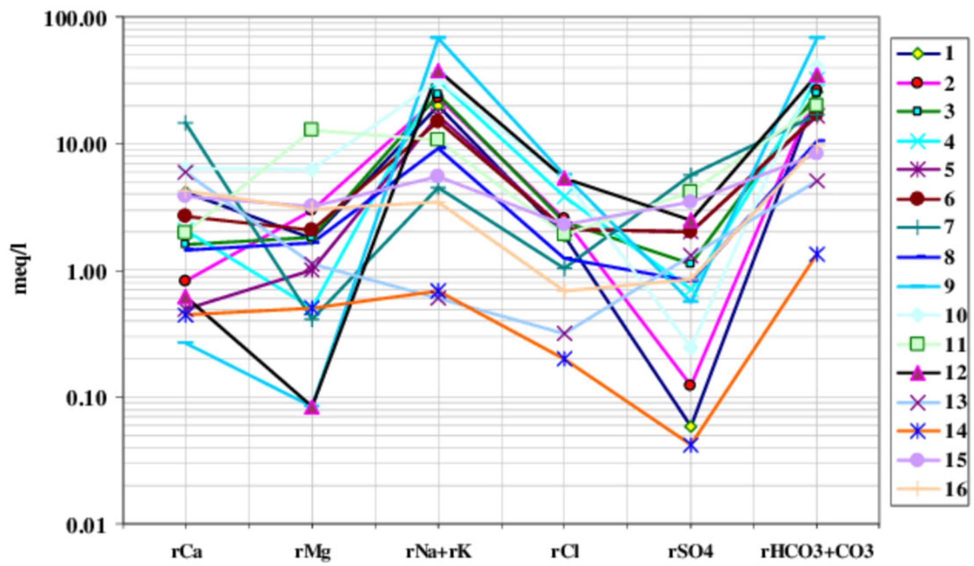
PROJECT NO.
21502059

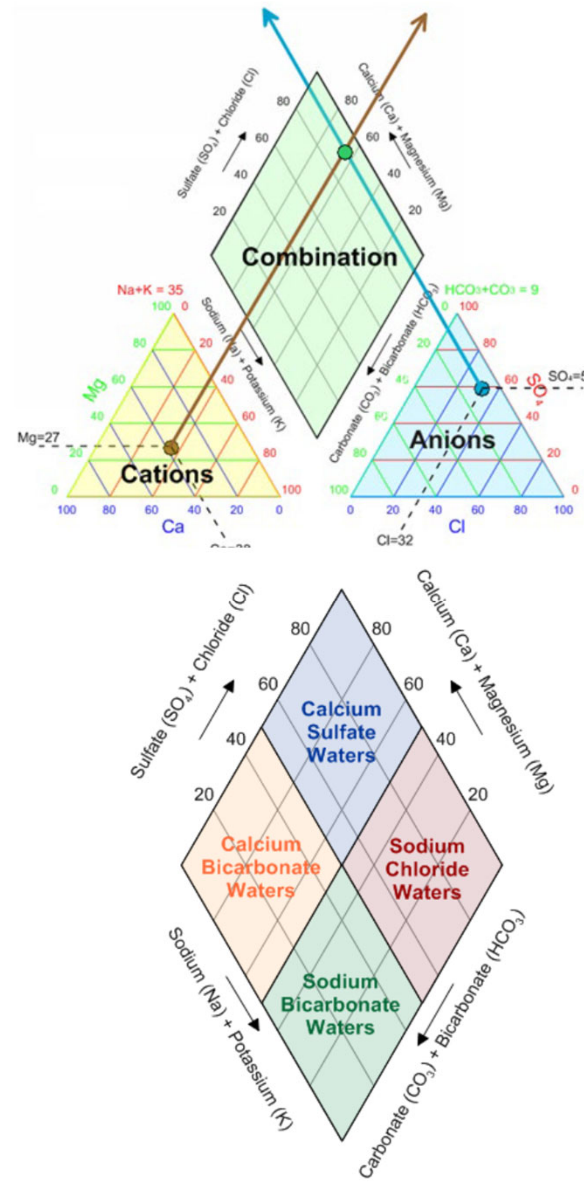
FIGURE
24

Example of a Stiff Diagrams



Example of a Schoeller Diagram

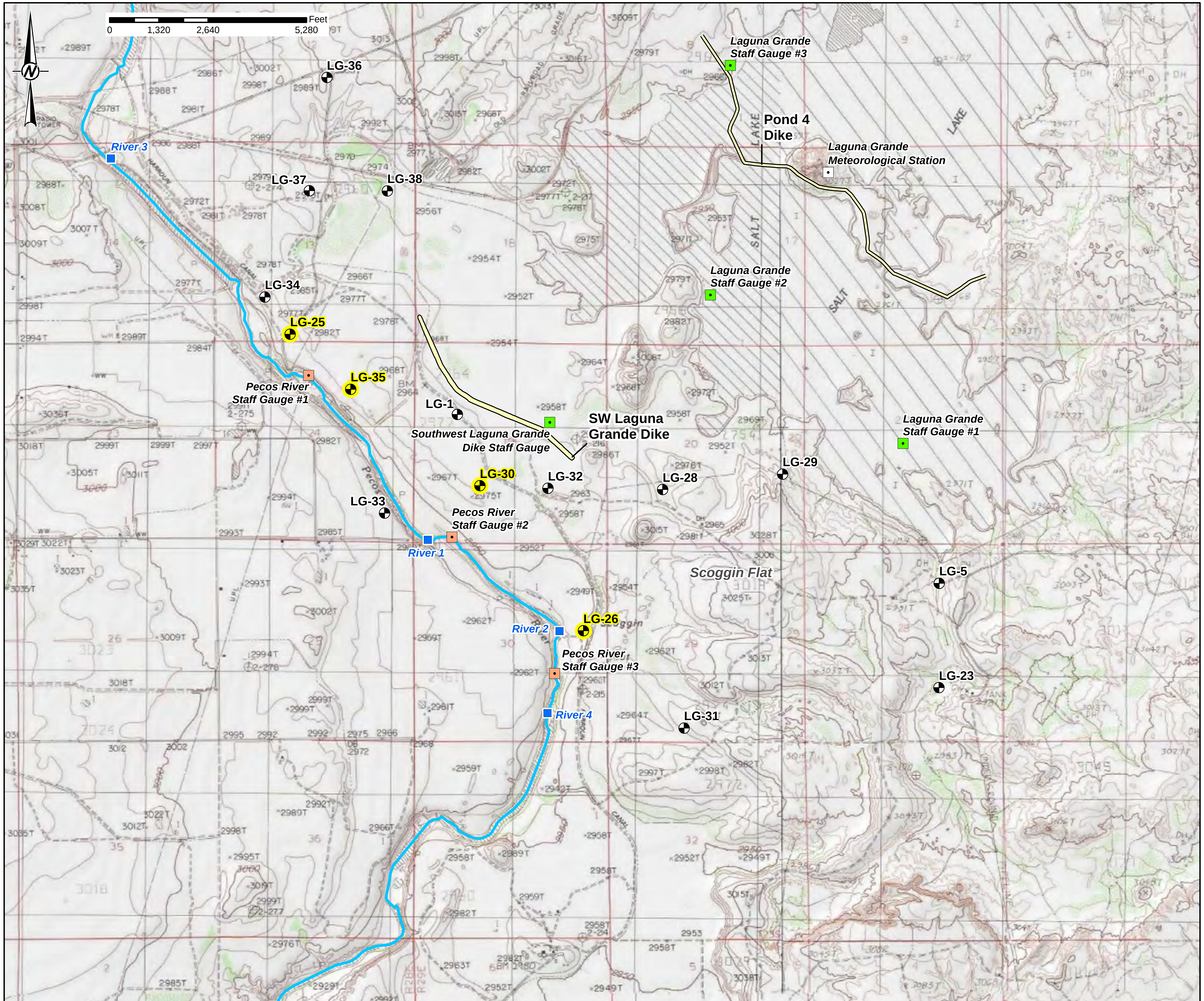




Example of a Piper Trilinear Diagram

PROJECT		TITLE
MOSAIC POTASH CARLSBAD INC. MODIFIED STAGE 1 ABATEMENT PLAN PROPOSAL CARLSBAD, NEW MEXICO	WSP GOLDER	**EXAMPLE GRAPHICAL METHODS OF PRESENTING WATER TYPES**

AUTHOR	CHECKED	REVIEWED	DATE	SCALE	JOB NO.	DWG NO.	SUBTITLE	REV. NO.	FIGURE
EMC	TS		08-25-22	NA	21502059	NA	NA	A	25



LEGEND

- MOSAIC WELL ID
- WELLS USED IN THE ANALYSIS OF THE HYDRAULIC CONNECTION BETWEEN GROUNDWATER AND THE PECOS RIVER
- RIVER SURFACE WATER SAMPLE
- AUTOMATED METEOROLOGICAL STATION
- AUTOMATED STAFF GAUGE - LAGUNA GRANDE
- AUTOMATED STAFF GAUGE - PECOS RIVER
- PECOS RIVER
- DIKES

REFERENCES

1. TOPOGRAPHIC BACKGROUND: ESRI BASEMAP SERVICES. USGS 1:24,000 TOPOGRAPHIC QUADRANGLES SHOWN: LOVING, REMUDA BASIN, MALAGA, AND PIERCE CANYON.

CLIENT

MOSAIC POTASH CARLSBAD, INC.

PROJECT

MOSAIC POTASH MINE
MODIFIED STAGE 1 ABATEMENT PLAN PROPOSAL

TITLE

MONITORING POINTS USED FOR CHARACTERIZING THE HYDRAULIC CONNECTION BETWEEN GROUNDWATER AND THE PECOS RIVER

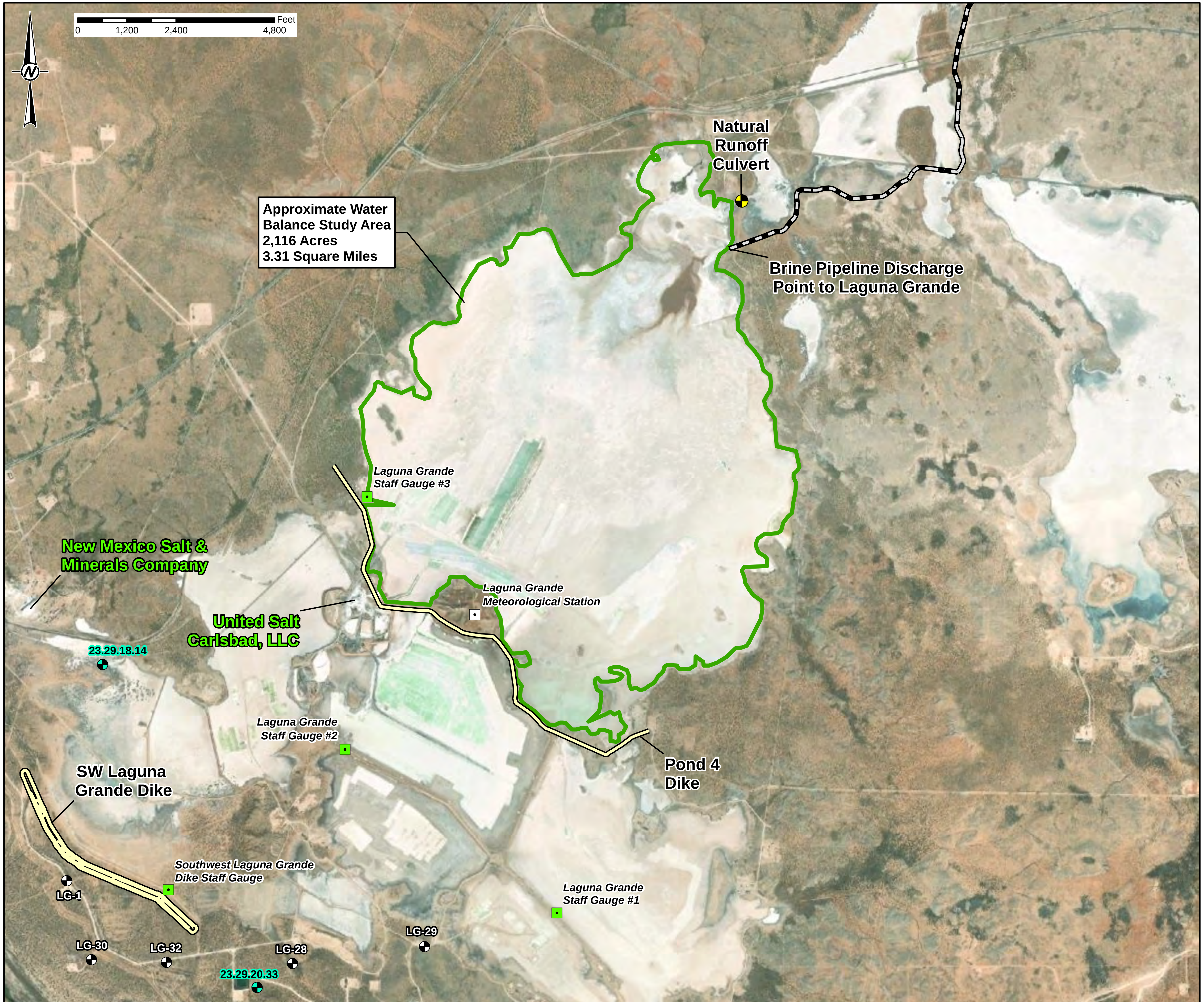
CONSULTANT

WSP GOLDER

YYYY-MM-DD	2022-03-18
DESIGNED	TS
PREPARED	RHG
REVIEWED	-
APPROVED	-

PROJECT NO. 21502059

FIGURE 26



LEGEND

- APPROXIMATE WATER BALANCE STUDY AREA
- BRINE PIPELINE (COMPLETION DATE)
- DIKES
- EXISTING MONITORING WELLS
- AUTOMATED METEOROLOGICAL STATION
- AUTOMATED STAFF GAUGE - LAGUNA GRANDE
- AUTOMATED STAFF GAUGE - PECOS RIVER
- BLM WELL ID
- NATURAL RUNOFF CULVERT

REFERENCES

1. BASEMAP: ESRI PROVIDED BASEMAP SERVICE. VIVID. MAXAR. IMAGERY COLLECTED 2020/2021.

CLIENT
MOSAIC POTASH CARLSBAD, INC.

PROJECT
MOSAIC POTASH MINE
MODIFIED STAGE 1 ABATEMENT PLAN PROPOSAL

TITLE
PROPOSED WATER BALANCE STUDY AREA

CONSULTANT
WSP GOLDER

YYYY-MM-DD	2022-08-26
DESIGNED	TS
PREPARED	RHG
REVIEWED	-
APPROVED	-

PROJECT NO.
21502059

FIGURE
27

ATTACHMENT 1

Stage 1 Abatement Plan Proposal Correspondence Between Mosaic and the NMED

VIA CERTIFIED MAIL

October 20, 2021

John Anderson
Mosaic Potash Carlsbad, Inc.
1361 Potash Mines Road
Carlsbad, New Mexico 88221
John.Anderson@mosaicco.com

RE: Abatement Plan Required for the Mosaic Potash Mine, Mosaic Potash Carlsbad, Inc., Carlsbad, NM

Dear John Anderson,

The Mining Environmental Compliance Section (MECS) of the New Mexico Environment Department (NMED) hereby notifies Mosaic Potash Carlsbad, Inc. (Permittee) that a Stage 1 Abatement Plan (S1AP) is required for the Mosaic Potash Mine (Site), pursuant to 20.6.2.4106(A) NMAC of the Ground Water and Surface Water Protection Regulations, 20.6.2 NMAC. The physical address for the Site is 1361 Potash Mines Road, Carlsbad, NM 88221.

The Permittee was first issued Discharge Permit 1399 (DP-1399) in 2004. Subsequently, DP-1399 was renewed in 2011, and a draft renewal of DP-1399 was sent out for public notice on May 27, 2020, and again on June 25, 2021. The draft DP-1399 renewal includes a condition requiring submittal of a S1AP. MECS has received multiple requests for a public hearing on the draft DP-1399. Any final agency determination regarding renewal of DP-1399 will most likely come after the potentially lengthy public hearing process. Discharges associated with the Site will continue to be regulated under the administratively continued DP-1399 dated September 30, 2011. Due to the importance of initiating abatement, MECS is requiring submission of a S1AP in accordance with 20.6.2.4104 NMAC outside of the DP-1399 renewal process.

Total dissolved solids (TDS), chloride, and sulfate have been reported in groundwater downgradient of the Site at concentrations exceeding the groundwater standards of 20.6.2.3103 NMAC in locations where the background concentration of groundwater is less than 10,000 mg/L TDS consistent with 20.6.2.4101(A)(1) NMAC.

Within 60 days of receipt of this letter, the Permittee is required to submit to NMED an S1AP proposal to address TDS, chloride, and sulfate contamination in groundwater downgradient of the Site. The S1AP proposal shall be designed to define site conditions as outlined in Subsection 20.6.2.4106(C) NMAC, including a proposal to define the extent of contamination of groundwater from Mosaic discharges, characterize the hydrogeologic conditions in groundwater between Laguna Grande and the Pecos River, hydrogeologic conditions west of the Pecos River to the extent that there may be contamination from discharges from the Site, and characterizing the connection between the Pecos River and groundwater impacted by the Permittee's operations. In addition to characterizing site conditions as required by 20.6.2.4106(C) NMAC, the S1AP Proposal shall also contain the following components per 20.6.2.4106(C)(7) NMAC.

1. A workplan for a comprehensive characterization of the waste stream discharged from the Plant Site to the Salt Stack and Laguna Grande. The waste stream characterization shall include analysis for, but not be limited to: TDS, boron, sodium, calcium, magnesium, potassium, chloride, sulfate, alkalinity reported as CaCO3, specific conductance, and pH.

2. A workplan to evaluate the effect of the discharge of suspended clay particles to the long-term storage capacity of the Laguna Grande Brine Management Area and shorebird habitats, and the relationship between salt-producer operations and impacts to groundwater and the Pecos River.

3. A summary of existing information collected under previous groundwater investigations and groundwater monitoring, including information gained from the focused study to evaluate the hydrologic conditions and potential sources of contamination observed in monitoring well LG-2 as required by NMED in a letter to the Permittee dated May 17, 2021.

4. A data gap analysis to guide groundwater and surface water investigations.

5. A workplan as addressed in a letter from NMED dated May 17, 2021, to the Permittee to address hydrologic conditions present in the area of monitoring well LG-2.

If you have any questions, please contact Anne Maurer (anne.maurer@state.nm.us) of MECS at (505) 660-8878 or Kurt Vollbrecht (kurt.vollbrecht@state.nm.us), Program Manager of MECS at (505) 660-9420.

Sincerely,

John Rhoderick Digitally signed by John Rhoderick
Date: 2021.10.21 12:30:25 -06'00'

John Rhoderick, Acting Division Director
Water Protection Division
New Mexico Environment Department

Cc: Kurt Vollbrecht, Program Manager, MECS (signed PDF copy sent via electronic mail to: Kurt.vollbrecht@state.nm.us)
Anne Maurer, Mining Act Team Leader, MECS (signed PDF copy sent via electronic mail to: anne.maurer@state.nm.us
Robert E. Salaz, BLM (rsalaz@blm.gov)

ELECTRONIC DELIVERY

November 24, 2021

John Anderson
Mosaic Potash Carlsbad, Inc.
1361 Potash Mines Road
Carlsbad, New Mexico 88221

RE: Approval of Extension, Stage 1 Abatement Plan, DP-1399

Dear John Anderson,

The Mining Environmental Compliance Section (MECS) of the New Mexico Environment Department (NMED) received a letter from Mosaic Potash Carlsbad Inc. (Permittee) titled *Request for Extension of Stage 1 Abatement Plan Proposal Submittal* (Letter) dated November 22, 2021. The Permittee is requesting an extension of 60 days (for a total of 120 days) to submit the Stage 1 Abatement Plan Proposal. The requested deadline for submittal is February 19, 2022.

NMED hereby approves the extension request. Given February 19, 2022 is a Saturday, the Stage 1 Abatement Plan shall be submitted no later than **February 21, 2022**.

NMED approves this extension request pursuant to the New Mexico Water Quality Act (WQA), NMSA 1978 §§74-6-1 through 74-6-17, and the New Mexico Water Quality Control Commission Regulations at 20.6.2 NMAC (WQCC Regulations) and the NMED Delegation Order dated May 24, 2021, through which the Cabinet Secretary has delegated this authority to the Director of the Water Protection Division and Chief of the Ground Water Quality Bureau.

Please contact Anne Maurer at (505) 660-8848 or anne.maurer@state.nm.us with any questions.

Sincerely,

John Rhoderick, Division Director
Water Protection Division
New Mexico Environment Department

Cc: Anne Maurer, Mining Act Team Leader, MECS (signed PDF copy sent via electronic mail to: anne.maurer@state.nm.us)
Kurt Vollbrecht, Program Manager, MECS (signed PDF copy sent via electronic mail to: kurt.vollbrecht@state.nm.us)
Robert E. Salaz, BLM (rsalaz@blm.gov)

MICHELLE LUJAN GRISHAM
GOVERNOR

JAMES C. KENNEY
CABINET SECRETARY

ELECTRONIC DELIVERY

February 14, 2022

John Anderson
Mosaic Potash Carlsbad, Inc.
1361 Potash Mines Road
Carlsbad, New Mexico 88221

RE: Approval of Extension, Stage 1 Abatement Plan, DP-1399

Dear John Anderson,

The Mining Environmental Compliance Section (MECS) of the New Mexico Environment Department (NMED) received a letter from Mosaic Potash Carlsbad Inc. (Permittee) titled *Request for Extension of Stage 1 Abatement Plan Proposal Submittal* (Letter) dated February 10, 2022. The Permittee is requesting an additional extension of 30 days (for a total of 150 days) to submit the Stage 1 Abatement Plan Proposal. The requested deadline for submittal is March 21, 2022.

NMED hereby approves the extension request. The Stage 1 Abatement Plan shall be submitted no later than **March 21, 2022**.

NMED approves this extension request pursuant to the New Mexico Water Quality Act (WQA), NMSA 1978 §§74-6-1 through 74-6-17, and the New Mexico Water Quality Control Commission Regulations at 20.6.2 NMAC (WQCC Regulations) and the NMED Delegation Order dated May 24, 2021, through which the Cabinet Secretary has delegated this authority to the Director of the Water Protection Division and Chief of the Ground Water Quality Bureau.

Please contact Anne Maurer at (505) 660-8848 or anne.maurer@state.nm.us with any questions.

Sincerely,

John Rhoderick Digitally signed by John Rhoderick
Date: 2022.02.15 11:12:59 -07'00'

John Rhoderick, Division Director
Water Protection Division
New Mexico Environment Department

Cc: Anne Maurer, Mining Act Team Leader, MECS (anne.maurer@state.nm.us)
Joseph Fox, Acting Program Manager, MECS (joseph.fox@state.nm.us)
Robert E. Salaz, BLM (rsalaz@blm.gov)
John Verheul, NMED-OGC (john.verheul@state.nm.us)

VIA ELECTRONIC MAIL

May 23, 2022

John Anderson
Mosaic Potash Carlsbad, Inc.
1361 Potash Mines Road
Carlsbad, New Mexico 88221
John.Anderson@mosaicco.com

RE: Modified Abatement Plan Required for the Mosaic Potash Mine, Mosaic Potash Carlsbad, Inc., Carlsbad, NM

Dear John Anderson,

The Mining Environmental Compliance Section (MECS) of the New Mexico Environment Department (NMED) hereby notifies Mosaic Potash Carlsbad, Inc. (Permittee) that a modified Stage 1 Abatement Plan (S1AP) is required for the Mosaic Potash Carlsbad Mine (Site), pursuant to 20.6.2.4106(A) NMAC of the Ground Water and Surface Water Protection Regulations, 20.6.2 NMAC. The physical address for the Site is 1361 Potash Mines Road, Carlsbad, NM 88221.

NMED sent the Permittee a letter requiring submittal of a S1AP on October 20, 2021. This letter supersedes the October 20, 2021 letter and requires a new regulatory deadline for submittal as indicated below. The Permittee submitted a S1AP on March 21, 2022. Since the time NMED requested the S1AP and after reviewing the March 21, 2022 S1AP, NMED has acquired new information that requires modification and resubmittal of the S1AP.

The Permittee was first issued Discharge Permit 1399 (DP-1399) in 2004. Subsequently, DP-1399 was renewed in 2011, and a draft renewal of DP-1399 was sent out for public notice on May 27, 2020, and again on June 25, 2021. The draft DP-1399 renewal includes a condition requiring submittal of a S1AP. MECS has received multiple requests for a public hearing on the draft DP-1399. Any final agency determination regarding renewal of DP-1399 will most likely come after the potentially lengthy public hearing process. Discharges associated with the Site will continue to be regulated under the administratively continued DP-1399 dated September 30, 2011. Due to the importance of initiating abatement, MECS is requiring submission of a S1AP in accordance with 20.6.2.4104 NMAC outside of the DP-1399 renewal process.

Total dissolved solids (TDS), chloride, and sulfate have been reported in groundwater downgradient of the Site at concentrations exceeding the groundwater standards of 20.6.2.3103 NMAC in locations where the background concentration of groundwater is less than 10,000 mg/L TDS consistent with 20.6.2.4101(A)(1) NMAC.

Within 60 days of receipt of this letter, the Permittee is required to submit to NMED a modified S1AP proposal to address TDS, chloride, and sulfate contamination in groundwater downgradient of the Site. The S1AP proposal shall be designed to define site conditions as outlined in Subsection 20.6.2.4106(C) NMAC, including a proposal to define the extent of contamination of groundwater from Mosaic discharges, characterize the hydrogeologic conditions in groundwater between Laguna Grande and the Pecos River, hydrogeologic conditions west of the Pecos River to the extent that there may be contamination from discharges from the Site, and characterizing the connection between the Pecos River and groundwater impacted by the Permittee's operations. In addition to characterizing site conditions as required by 20.6.2.4106(C) NMAC, the S1AP Proposal shall also contain the following components per 20.6.2.4106(C)(7) NMAC.

1. A workplan for a comprehensive characterization of the waste stream discharged from the Plant Site to the Salt Stack and Laguna Grande. The waste stream characterization shall include analysis for, but not be limited to: TDS, boron, sodium, calcium, magnesium, potassium, chloride, sulfate, alkalinity reported as CaCO3, specific conductance, and pH.

2. A workplan to evaluate the effect of the discharge of suspended clay particles to the long-term storage capacity of the Laguna Grande Brine Management Area and shorebird habitats, and the relationship between salt-producer operations and impacts to groundwater and the Pecos River.

3. A summary of existing information collected under previous groundwater investigations and groundwater monitoring, including information gained from the focused study to evaluate the hydrologic conditions and potential sources of contamination observed in monitoring well LG-2 as required by NMED in a letter to the Permittee dated May 17, 2021.

4. A data gap analysis to guide groundwater and surface water investigations.

5. A workplan as addressed in a letter from NMED dated May 17, 2021, to the Permittee to address hydrologic conditions present in the area of monitoring well LG-2.

In addition to the components addressed above, the modified S1AP shall also include the following additional information:

A. Based on a review of a report titled *Investigations of the Inundation of Laguno Quatro, Eddy County, New Mexico*, compiled by James Goodbar, dated June 26, 2019 (unpublished), the water balance in Nash Draw has significantly changed as a result of potash mining. Based on Goodbar, 2019, there has been a significant increase in the potentiometric surface as a result of potash mine discharges. The water balance and increase in potentiometric surface should be part of the comprehensive characterization of the waste stream discharged from the Plant Site to the Salt Stack and Laguna Grande. The workplan requested in Number 1 (above) requires a comprehensive characterization of the waste stream discharged from the Plant Site to the Salt Stack and Laguna Grande. Please ensure that the workplan submitted includes an overall water balance for Nash Draw. The water balance should include an evaluation of the pre-potash mining water balance for Nash Draw and document the changes in the water balance in Nash Draw to the present day.

B. It is important to note that even though groundwater in monitoring wells may have exhibited total dissolved solids (TDS) concentrations above 10,000 mg/L historically, any increase in TDS over time in these wells may indicate impacts from mine water discharges. Trends in TDS, chloride, calcium, potassium, sulfate and magnesium concentrations in all wells including the wells that are completed in sections of aquifers that are above 10,000 mg/L TDS, need to be evaluated to determine if there are impacts from mine water discharges. The modified S1AP must address how Mosaic will evaluate all water quality in wells, including those completed in aquifers that may be above the groundwater protection standard. This shall include evaluation of any mine water discharge geochemical signatures in downgradient monitoring wells.

C. Given that LG-36 is reportedly dry, a workplan for a new well in the area around LG-36 is needed. It is important to determine the potentiometric surface, gradient, and flow path of the aquifer in this area, in addition to confirmation of the formation lithology.

D. Given that LG-33 is the only groundwater monitoring well the Permittee is monitoring on the west side of the Pecos River and Figures 15 and 16 in the March 21, 2022 S1AP show inconsistencies in the potentiometric surface, the Permittee shall provide a workplan to evaluate the need for additional monitoring wells on the west side of the Pecos River.

If you have any questions, please contact Anne Maurer (anne.maurer@state.nm.us) of MECS at (505) 660-8878 or Joseph Fox (joseph.fox@state.nm.us), Acting Program Manager of MECS, at (505) 660-9060.

Sincerely,

John Rhoderick

Digitally signed by John Rhoderick
Date: 2022.05.23 08:14:05 -06'00'

John Rhoderick, Acting Division Director
Water Protection Division
New Mexico Environment Department

Cc: Joseph Fox, Acting Program Manager, MECS (signed PDF copy sent via electronic mail to: joseph.fox@state.nm.us)
Anne Maurer, Mining Act Team Leader, MECS (signed PDF copy sent via electronic mail to: anne.maurer@state.nm.us
Robert E. Salaz, BLM (rsalaz@blm.gov)

Mosaic Potash Carlsbad Inc.
PO Box 71
1361 Potash Mines Road
Carlsbad, NM 88221

(575) 628-6200
Fax (575) 887-0589
www.mosaicco.com

June 15, 2022 **Via Electronic Mail**

Mr. John Rhoderick, Acting Division Director
New Mexico Environment Department
Water Protection Division
PO Box 5469
Santa Fe, New Mexico 87502-5469

Re: NMED's Modified Abatement Plan Letter Dated May 23, 2022 to Mosaic Potash Carlsbad Inc.

Dear Mr. Rhoderick:

Your May 23, 2022 letter to Mosaic Potash Carlsbad Inc. (Mosaic) notified Mosaic that the Mining Environmental Compliance Section (MECS) of the New Mexico Environment Department (NMED) requires a modified Stage 1 Abatement Plan (S1AP) for the Mosaic Potash Carlsbad Mine (Site) pursuant to 20.6.2.4106(A) NMAC of the Ground Water and Surface Water Protection Regulations. Subsequently, representatives of NMED kindly agreed to participate in a Teams Meeting on June 1, 2022 to discuss the May 23 letter. Although I was not able to personally participate in that meeting, I understand the meeting was productive, and that NMED was open to receiving Mosaic's input regarding the May 23 letter.

This letter explains Mosaic's views expressed in the Teams Meeting about the four new requirements of the May 23 letter that are in addition to those addressed in the original March 2022 S1AP prepared by Golder Associates USA Inc. (Golder) and submitted by Mosaic to NMED Secretary Kenney on March 17 pursuant to NMED's October 20, 2021 notification. Mosaic summarizes the four new requirements as follows:

1. An "overall water balance for Nash Draw" that includes "an evaluation of the pre-potash mining water balance for the Nash Draw" and documents "the changes in the water balance in Nash Draw to the present day."

2. An evaluation of wells that historically have exhibited total dissolved solids (TDS) concentrations above the 10,000 mg/L ground water protection threshold to determine if there are impacts from mine water discharges, including an evaluation of "any mine water discharge geochemical signatures" in downgradient monitoring wells.

3. A workplan for a new well in the area around LG-36 (one of the three wells Mosaic added due to its inability to obtain surface owner access permission to well LG-2) to determine the potentiometric surface, gradient, and flow path of the aquifer in the area, and to confirm formation lithology.

4. A workplan "to evaluate the need for additional monitoring wells on the west side of the Pecos River."

The remainder of this letter sets forth Mosaic's response to each of these new elements in turn, and includes the company's corresponding understanding from the June 1, 2022 Teams Meeting discussions.

1. <u>Overall Water Balance for Nash Draw from Pre-Potash Mining to Date</u>

Mosaic understands that the genesis of this new request is an unpublished June 26, 2019 report compiled by James Goodbar entitled *Investigations of the Inundation of Laguno Cuatro, Eddy County, New Mexico,* as well as verbal input NMED received from Mr. Goodbar on the S1AP already submitted by Mosaic. In the May 23 letter, NMED cites Mr. Goodbar's report and uses conclusions from the unpublished report that "the water balance in Nash Draw has significantly changed as a result of potash mining," and that "there has been a significant increase in the potentiometric surface as a result of potash mining discharge" as the basis for a modified Stage 1 Abatement Plan requirement.

As Mosaic pointed out in the June 1, 2022 Teams Meeting, Mr. Goodbar's unpublished report was prepared in the context of a private dispute between Mosaic and an adjacent landowner over the source of water inundating a single well near Laguna Cuatro within the Nash Draw. In the context of that private dispute, Mr. Goodbar's conclusions were refuted as being erroneous, speculative, unsupported, and internally inconsistent by hydrogeologist David S. Lipson, Ph.D., C.P.G. of HRS Water Consultants, Inc. As we discussed during the meeting, Mosaic is enclosing an updated revision of Dr. Lipson's expert review for NMED's consideration.

More to the point, however, NMED's request for an overall water balance for the entire Nash Draw from pre-potash mining to the present day is unrealistically expansive (in both geographical and temporal senses), is an economically infeasible expectation to place on Mosaic alone, and is inconsistent with the Water Quality Control Commission's (WQCC) abatement program regulations administered by NMED. As the literature reviewed by Mr. Goodbar reveals, potash mining and refining by multiple potash operators has occurred in the Nash Draw for at least nine decades. In addition, oil and gas operators in and near the Nash Draw region have, in decades past, received permissions from the New Mexico Energy, Minerals and Natural Resources Department, Oil Conservation Division, for produced water disposal activities in Laguna Cuatro and Laguna Tres.

Mosaic respectfully submits that NMED's reliance on the abatement regulations to impose such an expansive, and therefore expensive, expectation on the operator of a single facility as part of an initial stage abatement investigation is unreasonable and unwarranted. The basic purpose and mechanism of the Stage 1 abatement process is to perform a *site* investigation to define *site* conditions. *See* 20.6.2.4106(C) NMAC. The "site" in question is the Mosaic Potash Carlsbad Mine, not the entirety of the Nash Draw. NMED's May 23 letter acknowledges this when it defined "Site" by reference to Mosaic's mine.

Based upon our June 1 Teams Meeting discussions, Mosaic's understanding is that NMED would be agreeable to scaling back its expectations relating to the water balance investigation of Nash Draw so that it relates more directly to Mosaic's site. In our view, the S1AP proposal already submitted by Mosaic, which MECS staff described as well done and fully responsive to NMED's original S1AP request, does exactly that by describing the workplan to investigate site-specific geology and hydrogeology. Considering all of this information, Mosaic sees no need for NMED to amend the May 23 modification request, and instead recommends that NMED withdraw the requirement.

2. <u>Evaluation of Wells Historically Yielding Greater than 10,000 mg/L</u>

Mosaic has surmised that the basis of this new request results from various speculative inputs received over time from counsel for Intrepid Potash, which, along with its predecessor Mississippi Chemical Corporation, is identified in Mr. Goodbar's report as two of the other historic operators within the Nash Draw.

Mosaic appreciates NMED's acknowledgment during the June 1 meeting that the purpose of this request would not be to determine whether any abatement of water in areas where TDS is greater than 10,000 mg/L may be needed. Mosaic also appreciates NMED's acknowledgment in the May 23 letter itself that the areas in question have "historically" yielded TDS levels in excess of 10,000 mg/L. These acknowledgments are important because the timeframe against which to assess the 10,000 mg/L threshold is based upon when the WQCC-adopted Water Quality Act program regulations in the second half of the 1970s, and what may have contributed to concentrations prior to that time is legally not subject to the Water Quality Act regulations. Accordingly, if any part of MECS's motivation to request this evaluation, whether using the vague notion of "discharge geochemical signatures" or otherwise, is to determine whether those areas may have been within NMED's jurisdictional threshold at some point prior to when potash operations commenced in the 1930s, Mosaic respectfully submits that is misplaced and beyond NMED's authority under the existing regulations.

Moreover, as Mosaic explained in the June 1 meeting, the concept of evaluating water quality based upon "discharge geochemical signatures" itself is practically and technically infeasible. Mosaic's mine tailings brine is indistinguishable from either surface water in Laguna Grande or groundwater in the Nash Draw, which is the location and origin of the tailings material. This is the case insofar as the Mosaic Potash Carlsbad Mine is concerned, and is even moreso the case if NMED somehow expects Mosaic to evaluate "geochemical signatures" in relation to other potash and oil and gas operators that have had longstanding operations in the general area. Accordingly, Mosaic respectfully requests that this new requirement be withdrawn. Finally, Mosaic's submitted S1AP proposal includes tasks that would characterize wastes and water quality effects of discharges from Mosaic's operations, and we recommend that NMED withdraw the entire requirement.

3. Workplan for New Well to Replace LG-36

NMED's stated reason for its new request for a workplan for a new groundwater monitoring well to replace LG-36 is that once the well was drilled in December 2021 (because Mosaic has been unable to obtain surface landowner permission from Intrepid Potash to access Mosaic's LG-2 well), the LG-36 well has, in the first two quarters of data collection, been dry. Apart from the lithology and hydrological information that the drilling activity yielded for the upslope area in question to the north of the LG-2 well, Mosaic shared the enclosed map of the monitoring wells and land ownership in the area to point out that a replacement well to achieve the "triangulation" purposes MECS had hoped to achieve is not practical based upon the land ownership status and the remaining areas where a new monitoring well might feasibly be drilled.

In any event, Mosaic understands that NMED would be willing to forego installation of a replacement well until it sees the results of the data gap analysis for that area, which is one of the tasks described in Mosaic's already-submitted S1AP proposal. Mosaic appreciates NMED's understanding, and requests that this new requirement, which would have considerable expense with limited utility, also be withdrawn.

4. Workplan to Evaluate Need for More Wells West of the Pecos River

Mosaic understands that NMED is cognizant and desirous of being responsive to the speculative claims by landowners west of the Pecos River that Mosaic's tailings management operations are the source of potential groundwater quality (increasing TDS) issues in that area. However, these claims ignore the potential for historic and present day crop irrigation, ranching and oil and gas operations, or possibly even naturally occurring conditions on the west side of the river. We also understand that NMED has made progress in obtaining access permission from private well owners to take groundwater samples that will assist in evaluating that area. Given this progress, and the fact that Mosaic's already-submitted S1AP proposal includes tasks to both characterize the hydrogeologic conditions west of the Pecos River and perform data gap analysis tasks that would yield information about whether more wells are needed west of the river, Mosaic also requests that NMED withdraw the new requirement for this workplan. Based upon the discussions in the June 1 meeting, Mosaic understands that MECS is willing to take a "wait and see" approach on this issue as well.

<u>Summary</u>

For all of the above reasons, Mosaic respectfully requests that NMED withdraw the May 23 letter and its newly proposed requirements, and instead recommends that NMED approve the already-submitted S1AP proposal as sufficient and appropriate under the abatement program as outlined by the WQCC in its regulations. Although MECS staff raised the possibility of revising the modification request outlined in the May 23 letter, such an approach would not seem to be necessary or justified based upon the analysis in this letter combined with the helpful and productive discussions that occurred in the June 1 Teams Meeting.

Mosaic appreciates the opportunity to provide this additional input, and looks forward to receiving NMED's response. Mosaic also appreciates NMED's willingness to consider future discussions about the timing of Mosaic's modified S1AP response discussed during the June 1 meeting.

Sincerely,

John Anderson

John Anderson
Mosaic Potash Carlsbad, Inc.

CC: Joseph Fox, Acting Program Manager, MECS
Anne Maurer, Mining Act Team Leader, MECS
Robert Salaz, BLM
Beth Niec, P.E., Sr. Environmental Manager, Mosaic
Haskins Hobson, P.E., Sr. Environmental Engineer, Mosaic

Enclosures: May 29, 2022 Review of Goodbar Report dated June 26, 2019 *Investigations of the Inundation of Laguna Cuatro Eddy County, New Mexico* by Dave Lipson, Ph.D., C.P.G., HRS Water Consultants, Inc.

LG-2, LG-36, LG-37, and LG-38 Monitoring Well Locations

HRS WATER CONSULTANTS, INC.
8885 West 14th Avenue
Lakewood, CO 80215
(303) 462-1111
FAX (303) 462-3030
Email: dlipson@hrswater.com

David S. Lipson, Ph.D., C.P.G.
Principal Hydrogeologist

Consultants in
Water Resources
& Hydrogeology

May 29, 2022

Mr. Haskins Hobson, P.E.
North America Environmental Team
1361 Potash Mines Rd
Carlsbad, NM 88220

Subject: Review of Goodbar Report Dated June 26, 2019
Investigations of the Inundation of Laguna Cuatro
Eddy County, New Mexico

Dear Mr. Hobson,

As requested, HRS Water Consultants, Inc. (HRS) performed a technical review of Mr. Goodbar's June 26, 2019, report titled *"Investigations of the Inundation of Laguna Cuatro, Eddy County, New Mexico."* In this report Mr. Goodbar asserts, among other things, that Mosaic Potash Carlsbad Inc.'s (Mosaic's) brine discharge into Laguna Uno is the primary cause of water in Laguna Cuatro and inundation of a historical stock well he refers to as "Nash Well" (Goodbar, 2019, page 30). Mr. Goodbar based his assertions on historical literature sources, topographic maps, aerial photographs, and field investigations performed in April 2019. As discussed in greater detail below, these assertions of Mr. Goodbar are unsupportable because they are speculative, based on insufficient facts and data, contain errors, do not consider all available information, and fail to consider alternative causes. Laguna Cuatro is a naturally-occurring intermittent playa lake that fluctuates over time due to factors such as seasonal weather changes, precipitation events, evaporation, and land-use changes.

It should be noted that Mr. Goodbar's report does not mention who commissioned his work, or who he was working on behalf of when he issued his report on June 26, 2019. It is standard practice for consulting reports issued to regulatory agencies to clearly indicate on whose behalf the report is being issued, in order to avoid real or potential conflicts of interest.

The remainder of this review discusses hydrologic conditions at Laguna Cuatro and Nash Well and the shortcomings with Mr. Goodbar's report.

Laguna Cuatro and Nash Well

Our review of the historical information indicates Laguna Cuatro is a naturally-occurring, intermittent playa lake that predates Mosaic's and its predecessor's mining operations because geologic units beneath and near Laguna Cuatro were mapped as fine-grained playa lake sediments (Vine, 1963). A historical topographic map indicates Laguna Cuatro had water in it as early as 1965 (USGS, 1965). According to Vine (1963), the playa lakes in Nash Draw form after periods of heavy precipitation and runoff and evaporate soon thereafter. Therefore, it is to be expected that the lake level and surface area of Laguna Cuatro naturally fluctuate over time due to seasonal and even decadal climate fluctuations as well as heavy precipitation events. A good example of a heavy Nash Draw precipitation event that changed the lake level and area of Lugana Cuatro significantly is the 1,000-year rainstorm that occurred in September 2014, during which an unprecedented 25 inches of rain fell over a 21-day period. As a result of this storm event, lake levels and surface areas of all the playa lakes in Nash Draw increased significantly and did not return to pre-storm levels for many months.

A historical topographic map indicates that Nash Well is located within the same closed topographic depression (i.e., basin) as Laguna Cuatro (USGS, 1939) and, therefore, it should be expected that this well will be surrounded by surface water when Laguna Cuatro is filled with water. Nash Well has been surrounded by surface water since at least 1977 (GA, 1979).

As discussed below, many of Mr. Goodbar's assertions regarding groundwater flow in Nash Draw, water budgets in Nash Draw, hydrologic factors influencing Laguna Cuatro and Nash Well, and Mosaic's discharge of refinery wastes are unsupportable.

Mr. Goodbar's Assertions are Unsupportable

Goodbar Assertion: *"Nash Draw is a karst valley containing hundreds of sinkholes and caves that provide point sources for groundwater recharge and conduits for hydrologic flow." – Page 30*

This assertion is unsupportable because it is speculative and based on insufficient facts and data. Rather, the reports that Mr. Goodbar relied on indicate an absence in Nash Draw of karst conduits for groundwater flow. A karst conduit may be defined as a relatively large dissolution void in bedrock, and can include enlarged fissures and tubular openings which carry, can carry, or have carried groundwater at rates fast enough to develop turbulent flow conditions (USEPA, 2002; KGS, 2019). Furthermore, for turbulent groundwater flow conditions to develop, the conduits or conduit network must be long enough to convey groundwater from locations of recharge to discharge (Worthington et al., 2002).

Throughout his report Mr. Goodbar primarily relied on facts and data contained in historical studies, such as a 1979 study completed by Geohydrology Associates, Inc. (GA) which contains detailed hydrogeologic information for 27 wells drilled in and near Nash Draw between October and November 1978 (GA, 1979). The facts and data contained in the GA (1979) report contradict Mr. Goodbar's assertion. The depths of the wells drilled by GA in 1978 varied between 35 and 460 feet below ground and the total amount of bedrock drilled was 4,805 vertical feet. In all this drilling, the only indication of a potential bedrock void was noted at Well 23.28.1.11 where the driller suspected a cavity somewhere between 260 and 270 feet below ground based on loss of circulation of drilling fluid. Subsequent hydraulic testing at Well 23.28.1.11 showed it was dry (GA, 1979). Therefore, even the suspected cavity at Well 23.28.1.11 between 260 and 270 feet below ground is not indicative of a karst conduit or conduit network. There were no other voids or cavities identified in any of the lithologic logs for the 4,805 feet of drilling completed in and near Nash Draw in 1978 (GA, 1979).

Additionally, GA completed hydraulic tests at 20 of these wells in 1978 (GA, 1979). Conventional aquifer tests were completed at 11 wells and slug tests were completed at nine wells. Results of GA's hydraulic tests indicate the maximum hydraulic conductivity (aka permeability) measured in the tested wells was 26.1 feet per day (ft/day) (GA, 1979). However, the hydraulic conductivity of a karst conduit can be greater than 1,000 ft/day because conduits and conduit networks offer relatively little resistance to groundwater flow (Worthington et al., 2002). Therefore, GA's 1978 hydraulic testing results provide additional evidence for a lack of karst conduits or conduit networks in Nash Draw.

Furthermore, GA performed downhole geophysical testing at the wells in 1978 and provided geophysical logs for 22 of the wells in their 1979 report (GA, 1979). The downhole geophysical testing reportedly included gamma, neutron, and density logging. The total amount of bedrock logged with downhole geophysical testing was 4,510 vertical feet. In all this downhole geophysical testing, there were no indications of cavities, voids, or conduits on the geophysical logs (GA, 1979). Therefore, GA's 1978 downhole geophysical testing results provide additional evidence for a lack of karst conduits or conduit networks in Nash Draw.

Although Mr. Goodbar quotes extensively from the GA 1979 report to support his assertions, he omitted any mention of GA's 1979 lithologic, hydraulic, and geophysical testing data from his report, which all indicate a lack of karst conduits or conduit networks in Nash Draw.

Moreover, Mr. Goodbar provided insufficient facts or data to support his assertion that sinkholes in Nash Draw function as point sources for recharge. The fact is, Nash Draw is mostly blanketed by deposits of fine-grained soils including loess, playa deposits, silt, marine clay, and other fine-grained soils (Vine, 1963). These fine-grained soils also line the bottom of low spots and sinkholes. Therefore, the sinkholes in Nash Draw do not provide pathways for water to rapidly enter the groundwater system. Mr. Goodbar has provided no evidence that sinkholes in Nash Draw are open at the bottom or connect to karst conduits or a conduit network.

Goodbar Assertion: *"The hydrologic gradient of Nash Draw is from the north to the south towards Laguna Grande through Lagunas Uno, Dos, Cuatro, and Tres…Lagunas Dos and Cuatro are down hydrologic gradient from Laguna Uno" – Page 30*

This assertion of Mr. Goodbar's is unsupportable because it is contradicted by water table contour mapping (GA, 1979). Figure 1, attached, is an exact copy of a zoomed-in section of "Plate 1 – Water Table Contour Map" from the GA 1979 report on which we have highlighted the Nash Draw playa lakes including Lagunas Uno, Dos, Tres, Cuatro, and Grande for clarity. The water table contours shown on Figure 1 indicate locations of equal groundwater pressure (aka hydraulic head). Because groundwater flows from locations of high to low pressure, the hydraulic gradient direction is oriented perpendicular to the water table contour lines. The water table contour lines on Figure 1 therefore show the hydraulic gradient at Laguna Uno is oriented to the southwest toward Laguna Grande and not to the south toward Laguna Dos as asserted by Mr. Goodbar. The water table contour lines shown on Figure 1 also show that the hydraulic gradient at Laguna Dos is oriented due west toward Laguna Grande and not to the south toward Laguna Cuatro as asserted by Mr. Goodbar. Mr. Goodbar omitted this information from his report. Therefore, Mr.

Goodbar's assertion that Lagunas Dos and Cuatro are down hydrologic gradient from Laguna Uno is unsupportable.

Goodbar Assertion: *"All refining waste from the former IMC, now Mosaic, enters Laguna Uno." – Page 30*

This assertion is unsupportable because: (1) Mosaic discharges solids onto the tailings pile and these solids do not enter Laguna Uno; (2) discharged brine that evaporates to the atmosphere does not enter Laguna Uno; and (3) Mosaic's discharge currently is diverted to the west around Laguna Uno via the clay settling pond where the brine is then piped through a 24-inch diameter pipeline directly to Laguna Grande. Mr. Goodbar has not provided any facts or data to support his assertion.

Goodbar Assertion: *"Laguna Uno leaks 64% of the discharge it receives." – Page 30*

This assertion is unsupportable because it is erroneous and the reports from which it is drawn provide unreliable seepage rate estimates. In this assertion Mr. Goodbar erroneously quoted the 1978 GA report, which instead states that GA's estimate of the seepage rate from Laguna Uno was 48% (GA, 1978, page 74). However, notwithstanding this error, Mr. Goodbar failed to mention that the water-budget method GA used to estimate the seepage rate from Laguna Uno was admittedly based on insufficient facts and data. GA stated: "The amount of this inflow and outflow cannot be determined from existing data; therefore, an accurate water budget for Laguna Uno and IMC cannot be calculated" (GA, 1978, page 73).

In 1979 GA updated their Laguna Uno seepage rate estimate as 110 gallons per minute (gpm) in the summer and 3,300 gpm in the winter. These seepage rate estimates were based in part on observations that water levels in Laguna Uno dropped 0.39 inches in summer 1978 when the water temperature was approximately 30 degrees Celsius (^{o}C) and rose 0.09 inches in winter 1979 when the water temperature was approximately 5 ^{o}C. But these seepage rate estimates of GA's are unreliable for Mr. Goodbar's purposes for several reasons. First, GA's 1979 calculations assumed the surface area of Laguna Uno remained constant (710 acres) throughout the study period which is unrealistic because the lake area changes as water levels change and this assumption led to over-estimated seepage rates. Second, GA's 1979 calculations assumed the density of lake water was constant at all temperatures which is unrealistic because thermal expansion would cause lake levels to rise at colder temperatures and this assumption led to over-estimated seepage rates. Third, GA's 1979 calculations assumed the viscosity of lake water was constant at all temperatures which is unrealistic because the viscosity of brine can double or even triple at colder temperatures and this assumption led to over-estimated seepage rates. GA's 1979 seepage rate estimates for Laguna Uno are therefore unreliable for Mr. Goodbar's purposes because they are based on too many unrealistic assumptions that led to over-inflated estimates.

GA's 1979 seepage rate estimates for Laguna Uno are also unreliable for Mr. Goodbar because they do not account for the single-most important factor governing seepage from open bodies of water, which is the hydraulic conductivity of bottom sediments. A more realistic estimate of potential seepage rates from Laguna Uno is in the order-of-magnitude of 5 to 50 gpm based on Darcy's Law of groundwater flow. Darcy's Law explicitly accounts for the hydraulic conductivity of bottom sediments in Laguna Uno which are known to consist of marine clay. The hydraulic conductivity of marine clay is on the order-of-magnitude of 1×10^{-7} to 1×10^{-8} centimeters per second (cm/sec; Freeze and Cherry, 1979).

Goodbar Assertion: *"Discharged refining brine waste can travel 100 feet per day in the Rustler." – Page 30*

This assertion of Mr. Goodbar's is unsupportable because it is speculative, based on insufficient facts and data, and has been misquoted from the original GA 1978 report. The actual quote from the GA 1978 report states: "Brine wastes are discharged to members of the Rustler Formation above the Culebra Dolomite. No aquifer test data for these rocks within the potash area are available. Based on the test data from Malaga Bend and the Project Gnome Site, the hydraulic conductivity in Nash Draw is assumed to be 100 feet per day" (GA, 1978, page 23). In fact, nowhere in the GA 1978 report or any other reports cited by Mr. Goodbar are there data, facts, or statements that support his assertion. The GA 1978 report on page 22 provides travel time estimates that vary between 0.4 and 3.7 feet per day and contradict Mr. Goodbar's assertion.

Moreover, the hydraulic test data in the GA 1979 report contradict this assertion because the maximum hydraulic conductivity provided in that report is 26.1 feet per day.

Goodbar Assertion: *"Elevated quantities of potassium have been detected in water wells near Nash Well in Laguna Cuatro." – Page 30*

This assertion of Mr. Goodbar's is unsupportable because there is no established background level for potassium in Nash Draw and the definition of "elevated quantities" in this context is therefore relative, speculative, and subjective. Potassium is the sixth most abundant naturally-occurring element in earth's crust and seawater (Hem, 1986) and, as such, it is prevalent throughout the bedrock layers and water resources in Nash Draw.

On page 8 of his report Mr. Goodbar refers to a water sample taken in 1923 from a well in T.22S., R.29E., Sec. 24 that had a potassium concentration of 980 parts per million (ppm) and asserts that this result sets a baseline of potassium before potash mining began. This assertion is unsupportable because it is based on only a single water sample which is an insufficient amount of data to establish scientifically defensible background conditions. There also was no context provided for the sample such as whether it rained the day before the sample was collected. And, there are other potential sources of potassium in Nash Draw that have not been adequately characterized such as the brine aquifer which is under artesian pressure and contains 1,000s of ppm of potassium. Moreover, the 1923 water sample was collected more than two miles away from Nash Well. Additionally, Mr. Goodbar failed to mention that the 1923 sample was collected at a location near "springs of salty water" (Lee, 1925).

Goodbar Assertion: *"High specific-gravity-water enters Laguna Dos via spring flow. The only source of such water is from the refining discharge disposed of into Laguna Uno." – Page 30*

This assertion is unsupportable because Mosaic's discharge currently is diverted to the west around Laguna Uno via the clay settling pond where the brine is then piped through a 24-inch diameter pipeline directly to Laguna Grande. Moreover, there are other potential sources of high specific-gravity-water that could enter Laguna Dos which Mr. Goodbar has failed to mention, evaluate, and rule out.

For example, the brine aquifer which exists under most of Nash Draw is a source of high specific-gravity-water that could potentially discharge into Laguna Dos. The brine aquifer is under artesian pressure and high-specific-gravity groundwater from the aquifer could potentially migrate vertically upward into Laguna Dos via diffuse flow or fracture flow along Mr. Goodbar's interpreted lineaments and joints as depicted on page 21 of his report.

Another source of high specific-gravity-water is produced water from oil and gas drilling operations which are widespread near Nash Draw. Produced water (aka oil-field brine) could potentially enter the shallow groundwater system and discharge into Lagunas Dos and Cuatro via improperly sealed, aging, or deteriorated oil and gas wells or via abandoned (i.e., orphaned) oil and gas wells. Additionally, oil-field brine has been historically discharged directly into Laguna Cuatro.

Another source of high specific-gravity-water is saltwater disposal wells which are also widespread near Nash Draw. Saltwater from these disposal wells could potentially enter the shallow groundwater system and discharge into Lagunas Dos and Cuatro via improperly sealed, aging, or deteriorated saltwater disposal wells.

Mr. Goodbar would need to evaluate these other sources of high specific-gravity-water before concluding that refinery waste is the only source of high specific-gravity-water that could enter Laguna Dos.

Goodbar Assertion: *"J Bar F well, 2.2 miles north of Nash well, also in the bottom of Nash Draw, was also completed as a stock well and operational in 1948. At the time the static water level in J Bar F well was 134 feet below ground level. In 1975 the groundwater level at Nash Well and J Bar F well was at the surface. This shows a 134 foot rise in the local water table between 1935 and 1975. The 1985 USGS topographic map shows a permanent water table and the Nash Well at an elevation of 2,981 feet AMSL." – Page 30*

This assertion is unsupportable because it is based on unreliable information and improper interpretation of a USGS topographic map.

The source of the J Bar F Well information is a study published by Hendrickson and Jones (1952) which contains an error that Mr. Goodbar has propagated forward into his analysis (Figure 2). According to Hendrickson and Jones (1952), the depth of the J Bar F Well was 75 feet below ground (page 134) but they also indicate the depth to water in the J Bar F Well was 134.0 feet below ground on December 17, 1948 (page 135). Because it is physically impossible to measure a groundwater level 134 feet below ground in a 75 foot deep well, this information is in error, it is unreliable, and it does not support Mr. Goodbar's assertion of a 134 foot rise in the local water table between 1935 and 1975.

Moreover, the Nash Well was relatively shallow, only 30 feet deep, and had a water level of 6.5 feet below ground on August 19, 1958 (Cooper and Glanzman, 1971). This information demonstrates that the water table near Laguna Cuatro and at Nash Well was always relatively shallow, i.e., within at least 30 feet of ground surface since the well was installed, and contradicts Mr. Goodbar's assertion of a 134 foot rise in the local water table between 1935 and 1975. This information also supports that Laguna Cuatro is a naturally-occurring, intermittent playa lake that predates mining operations.

Lastly, Mr. Goodbar has improperly interpreted the 1985 USGS topographic map because it only shows a surface water elevation of 2,981 feet, not a groundwater elevation. The 1985 USGS topographic map also does not show the water table. In fact, there is nothing about the 1985 USGS topographic map that supports Mr. Goodbar's assertion.

Other Shortcomings with the Goodbar Report

Mr. Goodbar's 2019 report in numerous places relies on facts and data from areas outside of Nash Draw to support his assertions, but these areas outside of Nash Draw have a different hydrogeology and are therefore irrelevant regarding hydrogeologic conditions at Laguna Cuatro. For example, on page 3 of his report Mr. Goodbar states that "…where exposed in the Burton Flats area the Forty-niner also supports well developed cave systems that, at times, reach the water table." The problem with this statement is that Burton Flats is well outside of and has a different hydrogeology than Nash Draw, and it is irrelevant to Mr. Goodbar's assertions.

Similarly, on page 6 of his report Mr. Goodbar refers to hydrogeologic studies performed at Malaga Bend, USGS's Gnome Project, and the Department of Energy's Waste Isolation Pilot Plant. These areas are all outside of and have a different hydrogeology than Nash Draw and are therefore irrelevant to Mr. Goodbar's assertions.

Furthermore, Mr. Goodbar contradicted himself in a previous publication. In his current report Mr. Goodbar asserts "…there is a high scientific probability that the inundation of Laguna Cuatro and Nash Well is primarily from refining discharge from potash operations in the immediate area" (Goodbar, 2019, page 30). However, in a previous publication he stated that "…there have been no conclusive studies to determine where water or potash industry discharge goes once it enters the karst conduit system" (Goodbar and Goodbar 2014, page 106). Mr. Goodbar's 2014 publication also stated "…the extent of influence that karst conduit flow has on the system and the potential impacts to the downstream ecosystems are still not understood" (Goodbar and Goodbar, 2014, page 100) which is also contradictory. Mr. Goodbar's assertions are unsupportable and unreliable.

Another shortcoming with Mr. Goodbar's 2019 report is that his photographs of field observations are insufficient to support his assertions. For example, Mr. Goodbar's photograph of "surface expressions of joints and fractures" (Goodbar, 2019, Figure 14) does not show evidence of water flow and does not correlate with lineaments and joints on his Figure 13. Mr. Goodbar's photograph of "spring issuing from a bedrock fracture into Laguna Dos" (Goodbar, 2019, Figure 15) does not show a bedrock fracture, provides no context or scale, and is a point-in-time observation that gives no indication of the fluctuations or longevity of the water. Mr. Goodbar's "oblique air photo" (Goodbar, 2019, Figure 16) claims to show Laguna Uno inundated with refining discharge, but it is simply a picture of the lake with water in it and the photo shows no indication of refining discharge. Mr. Goodbar's Figure 16 also shows playa lakes in the background that have water in them, indicating recent rainfall. Mr. Goodbar's photographs of "springs and seeps" flowing into Laguna Cuatro and Laguna Dos (Goodbar, 2019, Figures 17 through 24) are point-in-time observations that give no indication of the context, flow conditions, fluctuations, or longevity of the water. Mr. Goodbar's photographs of field observations in his 2019 report do not support his assertions.

Summary

Groundwater and surface water dynamics at Laguna Cuatro are related to naturally-occurring hydrogeologic conditions in the area. Mr. Goodbar's assertion that Laguna Cuatro's water issues are being caused by Mosaic's mining operation is simply unsupportable because it is speculative, based on insufficient facts and data, contains errors, and does not consider all of the available information. Mr Goodbar has relied on facts and data that support his assertions and omitted facts and data that refute or contradict his assertions.

Respectfully submitted,

HRS WATER CONSULTANTS, INC.

David S. Lipson, Ph.D., C.P.G.
Technical Expert

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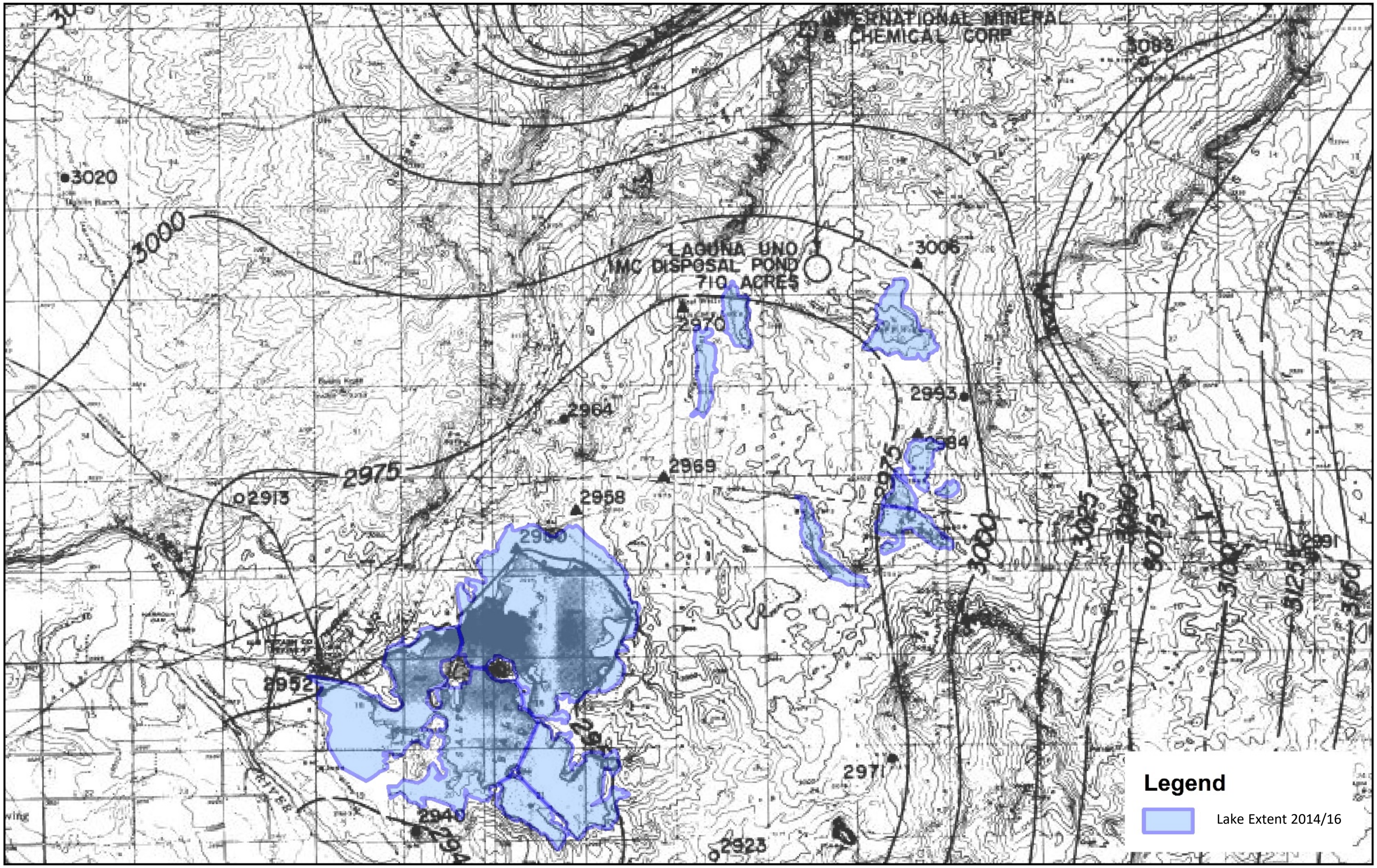


Figure 1

Zoomed-In Section of Plate 1 – Water Table Contour Map (GA, 1979) Showing Nash Draw Playa Lakes

Job Number: 18-17.3
Prepared By: TDR
Date May 2022
Projection: NAD 83 UTM Zone 13N
File Name: Mosaic_TDR.mxd
Source: Geohydrology Associates 1979, Google Earth 2014, 2016

1 inch = 8,000 feet

0 6,000 12,000 Feet

N

HRS Water Consultants

TABLE 1. RECORDS OF WELLS IN EDDY COUNTY, NEW MEXICO. (Continued)

LOCATION NUMBER	OWNER OR NAME	DATE COMPLETED	TOPOGRAPHIC SITUATION	ALTITUDE ABOVE SEA LEVEL (feet)	DEPTH OF WELL (feet)	DIAMETER OF WELL (inches)	PRINCIPAL WATER-BEARING BED: CHARACTER OF MATERIAL	PRINCIPAL WATER-BEARING BED: GEOLOGIC UNIT
22.30.6.424	International M. & C. Corp.	–	Nash draw	3,150	–	–	Redbeds, gypsum, limestone	Rustler
6.444	do.	–	do.	3,155	–	20	do.	do.
7.244	do.	–	do.	3,120	–	12	do.	do.
7.311	do.	–	do.	3,134	250	12	do.	do.
8.241	do.	–	do.	3,155	–	24	do.	do.
10.310	C. Johnson	–	do.	3,130	77	6	Redbeds, gypsum and limestone [illegible]	Rustler or Quaternary
30.240	J Bar F well	–	do.	3,000	75	8	do.	do.
[illegible]	[illegible] Livestock Co.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2.242a	do.	–	do.	4,345	340	–	Limestone	Chalk Bluff
16.220	do.	1947	Wagontire draw	4,595	975	7	do.	San Andres (?)
23.130	do.	1936	Red Bluff draw	4,450	630	–	do.	San Andres
24.222	do.	–	Pediment	4,290	296	7	Limestone and sandstone	Chalk Bluff

See explanation at beginning of table.

LOCATION NUMBER	WATER LEVEL: BELOW LAND SURFACE (feet)	WATER LEVEL: DATE OF MEASUREMENT	YIELD (g.p.m.)	METHOD OF LIFT	USE OF WATER	REMARKS
22.30.6.424	112.4	May 18, 1949	–	N	N	
6.444	117.3	do.	–	N	N	Abandoned.
7.244	85.7	do.	–	N	N	
7.311	106.0	do.	–	N	N	
8.241	115.1	do.	–	N	N	
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
30.240	134.0	Dec. 17, 1948	–	W	S	See analysis, Table 3.
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2.242a	300	–	–	W	D & S	East well of two. Driller: Roy Freek.
16.220	775	–	–	–	S	Encountered water at 840 ft., water rose to 775 ft.
23.130	600	–	–	–	S	
24.222	250	–	–	W	S	See analysis, Table 3.

See explanation at beginning of table.

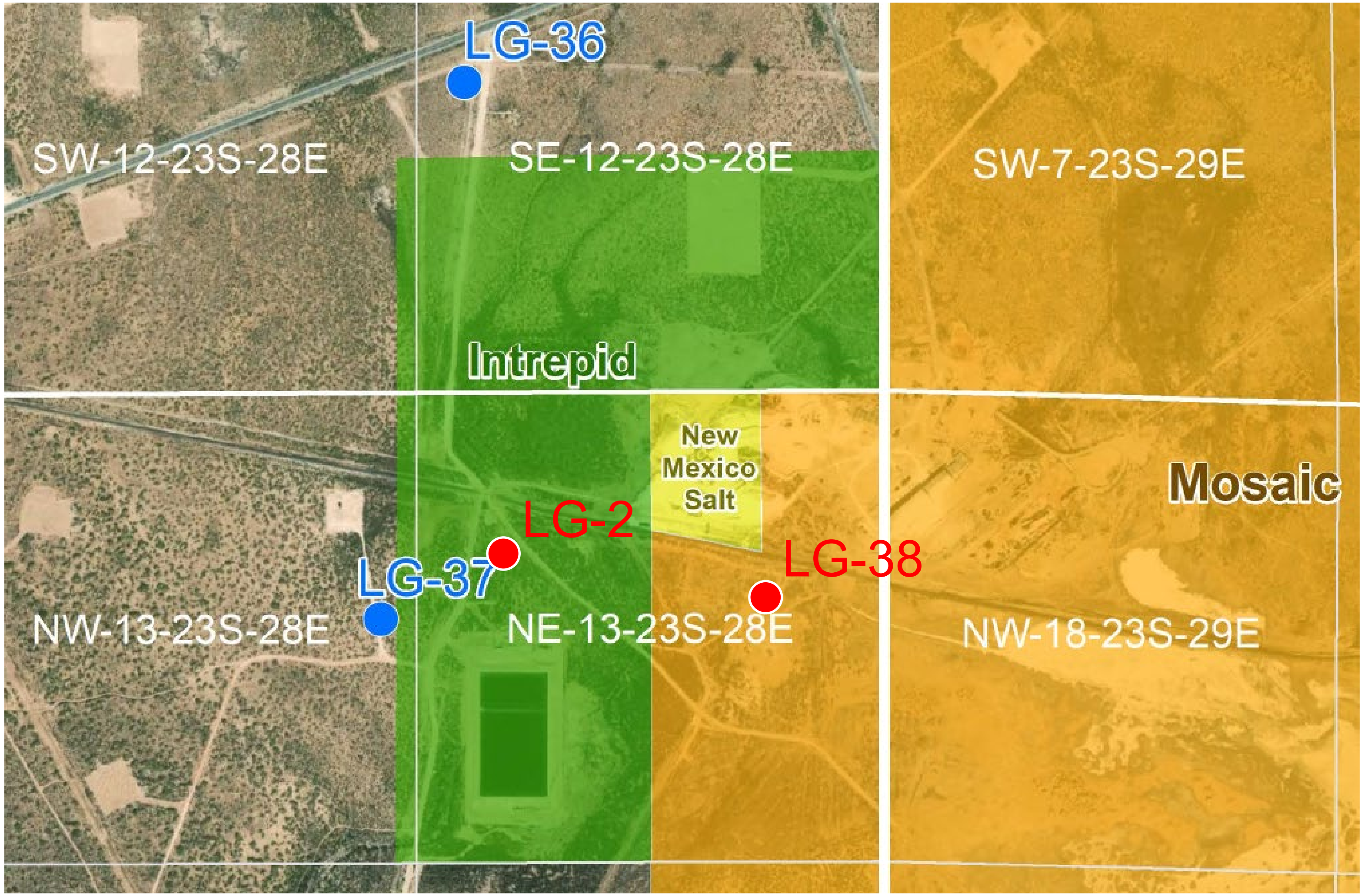
Pages 134 and 135 from the Hendrickson and Jones 1952 report which contain an error regarding the J Bar F well (22.30.30.240).

The report indicates the depth of the J Bar F well was 75 feet below ground, but the water level was 134 feet below ground on December 17, 1948.

This is an error because it is impossible to measure a water level of 134 feet below ground in a 75-foot deep well.

Figure 2 – Example of Erroneous Information Relied on by Mr. Goodbar

LG-2, LG-36, LG-37, and LG-38 Monitoring Well Locations



Legend

- Mosaic
- Intrepid
- New Mexico Salt
- Well on Private Land
- Well on BLM Land

Electronic Transmission

July 7, 2022

Haskins Hobson, P.E., Senior Environmental Engineer
Mosaic Potash Carlsbad
1361 Potash Mines Road
Carlsbad, New Mexico 88221

Transmitted via email on the date of this letter to Haskins Hobson at haskins.hobson@mosaicco.com

Re: Response to Comments, Request to Modify Stage I Abatement Plan, DP-1399, Mosaic Potash Carlsbad

Dear Mr. Hobson:

On March 21, 2022, the New Mexico Environment Department (NMED) Ground Water Quality Bureau (GWQB) received a Stage 1 Abatement Plan (S1AP) for Mosaic Potash Carlsbad Inc. (Mosaic), Carlsbad, New Mexico. NMED sent a letter to Mosaic dated May 23, 2022, requesting modification of the S1AP to address additional technical information that was acquired during review of the S1AP. Mosaic and NMED met on June 1, 2022, to discuss the S1AP. Mosaic sent NMED a letter dated June 15, 2022 in response to the request to modify the S1AP. The purpose of this letter is to respond to the letter from Mosaic dated June 15, 2022.

In the June 15, 2022, letter, Mosaic requested that NMED withdraw the request to modify the S1AP. NMED respectfully declines to withdraw the request to modify the S1AP, but is willing to modify the request as follows:

1) *Work Plan for Replacement of LG-36.* NMED acknowledges that Mosaic will perform a data gap analysis as part of the S1AP and use this as the basis to determine if another monitoring location is needed in this area. The work plan for replacement of LG-36 is not needed at this time but may be required after NMED reviews the data gap analysis.
2) *Work Plan to Evaluate Need for Additional Monitoring Wells on the West Side of the Pecos River.* NMED acknowledges that Mosaic will perform a data gap analysis as part of the S1AP that will include areas to the west of the Pecos River. NMED is willing to wait until the data gap analysis is performed as part of the S1AP and use this as the basis to

determine if additional monitoring locations are needed in this area. The work plan for evaluation of wells on the west side of the Pecos River is not needed at this time but may be required after NMED reviews the data gap analysis.

NMED requires that the following technical information is still addressed in the modification to the S1AP:

1) *Water Balance for Nash Draw*. NMED agreed with Mosaic in the meeting on June 1, 2022, that the scope of the water balance could be refined to only include areas that have the potential to be impacted by Mosaic's operations. A water balance is a basic component of any conceptual site model, and therefore needs to be addressed in the S1AP. A water balance is not specifically addressed in the S1AP, but if Mosaic can demonstrate that this will be performed as part of the S1AP and provide details how this will be accomplished, NMED will consider amending the request to modify the S1AP to reflect this information.

2) *Evaluation of Water Quality in Monitoring Wells with Total Dissolved Solids (TDS) Concentrations >10,000 mg/L*. Concentrations of TDS, chloride, sulfate, potassium and chloride are increasing in numerous downgradient monitoring wells located in portions of the aquifer determined to have concentrations of TDS above 10,000 mg/L. NMED has regulatory authority to require evaluation of all wells that may be adversely impacted by Mosaic's operations, including wells located in portions of the aquifer(s) that have concentrations of TDS above >10,000 mg/L.

   At this time, NMED is not requesting evaluation of "historical" increases in groundwater concentrations of contaminants listed in 20.6.2.3103 NMAC in wells located in portions of aquifers >10,000 mg/L. However, in order to better define the nature and extent of all groundwater impacts resulting from discharges related to Mosaic operations, NMED is requesting evaluation of increases measured in these wells utilizing data Mosaic has available in the semi-annual monitoring reports. Any increase in concentrations of contaminants listed in 20.6.2.3103 NMAC in wells downgradient of Mosaic's operations may indicate impacts from Mosaic's discharges, and therefore may need to be addressed in the proposed remedy.

NMED requests a meeting with Mosaic as soon as possible upon receipt of this letter to discuss next steps.

Please contact Anne Maurer at (505) 660-8878 or anne.maurer@state.nm.us with any questions.

Sincerely,

John Rhoderick Digitally signed by John Rhoderick
Date: 2022.07.06 14:11:11 -06'00'

John Rhoderick, Acting Director
Water Protection Division

JR:JF:am

cc: Joseph Fox, GWQB – MECS Acting Program Manager (joseph.fox@state.nm.us)
Anne Maurer, GWQB – MECS Mining Act Team Leader (anne.maurer@state.nm.us)
John Verheul, NMED – OGC – Deputy General Counsel (john.verheul@state.nm.us)
MECS Reading File

Mosaic Potash Carlsbad Inc.
PO Box 71
1361 Potash Mines Road
Carlsbad, NM 88221

(575) 628-6200
Fax (575) 887-0589
www.mosaicco.com

July 18, 2022

Mr. John Rhoderick, Acting Division Director
New Mexico Environment Department
Water Protection Division
1190 South St. Francis Drive
Santa Fe, New Mexico 87505

RE: Mosaic Potash Carlsbad Inc.
Request for Extension of Modified Stage 1 Abatement Plan Proposal Submittal

Dear Mr. Rhoderick:

Mosaic Potash Carlsbad Inc. (Mosaic) received a letter from the New Mexico Environment Department (NMED) Water Protection Division's Mining Environmental Compliance Section (MECS) on May 23, 2022 requiring Mosaic to submit a modified Stage 1 Abatement Plan (S1AP) Proposal for the Mosaic Potash Mine (Site) in Carlsbad, NM, pursuant to 20.6.2.4106(A) NMAC of the Ground Water and Surface Water Protection Regulations. Mosaic and NMED subsequently communicated about the modification requirements in two virtual meetings on June 1 and July 18 and an exchange of letters from Mosaic to NMED dated June 15, and from NMED to Mosaic dated July 7.

Mosaic has employed our groundwater engineering consulting firm, Golder Associates (Golder), and a hydrogeologist consulting firm, HRS Water Consultants (HRS), to complete our modified S1AP proposal. Due to the period of time that has elapsed while clarifying the May 23 letter's request for a modified S1AP, Mosaic would now like to request an extension of time to submit our modified S1AP proposal.

Section 20.6.2.4106(A) NMAC allows the NMED Secretary to grant a total of 120 days for submittal of the abatement plan proposal if good cause is shown. On July 18, Mosaic, Golder, and HRS shared with NMED MECS our proposed scope of work for this modified S1AP. Therefore, Mosaic is formally requesting an additional 60 days to the original response period (a total of 120 days) for the submittal of our Modified S1AP proposal, which would extend the submittal deadline from July 22 to September 20, 2022.

Thank you very much for your attention to this matter. We look forward to your response.

Sincerely,

Haskins Hobson, P.E.

Haskins Hobson, P.E.
Senior Environmental Engineer

CC: Anne Maurer, Mining Act Team Leader, MECS
Robert E. Salaz, BLM
Beth Niec, Sr. Environmental Manager, Mosaic
John Anderson, Sr. Manager, Maintenance and Engineering, Mosaic

ELECTRONIC DELIVERY

August 3, 2022

John Anderson (john.anderson@mosaicco.com)
Mosaic Potash Carlsbad, Inc.
1361 Potash Mines Road
Carlsbad, New Mexico 88221

RE: Approval of Extension, Modified Stage 1 Abatement Plan, DP-1399

Dear John Anderson,

The Mining Environmental Compliance Section (MECS) of the New Mexico Environment Department (NMED) received a letter from Mosaic Potash Carlsbad Inc. (Permittee) titled *Request for Extension of Modified Stage 1 Abatement Plan Proposal Submittal* (Letter) dated July 18, 2022. The Permittee is requesting an extension of 60 days to submit the Modified Stage 1 Abatement Plan Proposal. The requested deadline for submittal is September 20, 2022.

NMED hereby approves the extension request. The Modified Stage 1 Abatement Plan shall be submitted no later than **September 20, 2022**.

NMED approves this extension request pursuant to the New Mexico Water Quality Act (WQA), NMSA 1978 §§74-6-1 through 74-6-17, and the New Mexico Water Quality Control Commission Regulations at 20.6.2 NMAC (WQCC Regulations) and the NMED Delegation Order dated May 24, 2021, through which the Cabinet Secretary has delegated this authority to the Director of the Water Protection Division and Chief of the Ground Water Quality Bureau.

Please contact Anne Maurer at (505) 660-8848 or anne.maurer@state.nm.us with any questions.

Sincerely,

Justin Ball Digitally signed by Justin Ball
Date: 2022.08.03 15:44:08
-06'00'

Justin Ball, Chief
Ground Water Quality Bureau
New Mexico Environment Department

Cc: Anne Maurer, Mining Act Team Leader, MECS (anne.maurer@state.nm.us)
Joseph Fox, Acting Program Manager, MECS (joseph.fox@state.nm.us)
Robert E. Salaz, BLM (rsalaz@blm.gov)
Christal Weatherly, NMED-OGC (christal.weatherly@state.nm.us)
Haskins Hobson, Mosaic Potash Carlsbad (Haskins.hobson@mosaicco.com)

golder.com