Lithium Americas

NI 43 – 101 TECHNICAL REPORT
Updated Feasibility Study and Mineral Reserve Estimation to Support 40,000 tpa Lithium Carbonate Production at the Cauchari-Olaroz Salars, Jujuy Province, Argentina

ACSI

MONTGOMERY & ASSOCIATES Water Resource Consultants

Ausenco

Prepared by:
Ernest Burga, P.Eng.
David Burga, P.Geo.
Daniel Weber, P.G., RM-SME
Anthony Sanford, Pr.Sci.Nat.
Marek Dworzanowski, CEng, PrEng.

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1.0 SUMMARY

1.1 INTRODUCTION

This report titled “Updated Feasibility Study and Mineral Reserve Estimation to Support 40,000 tpa Lithium Carbonate Production at the Cauchari-Olaroz Salars, Jujuy Province, Argentina” (the “Report” or “Technical Report”), was prepared by Andeburg Consulting Services Inc. (“ACSI”) to provide Lithium Americas Corp. (“LAC” or “Lithium Americas” or “the Company”) with a Technical Report that is compliant with National Instrument 43-101 Standards of Disclosure for Mineral Projects (“NI-43-101”) on the Cauchari-Olaroz Salars (the “Cauchari-Olaroz Project” or “Project” or “Property”), located in the Jujuy Province, Argentina. Lithium Americas Corp. and Ganfeng Lithium Co. Ltd. (“GFL” or “Ganfeng Lithium”) own the Cauchari-Olaroz Project through a 49/51 joint venture company (“JV”), Minera Exar S.A. (“Minera Exar”). On August 26, 2020 GFL, LAC and Exar entered into a Share Acquisition Option Execution Agreement with Jujuy Energía y Minería S.E. (“JEMSE”) a Province of Jujuy state company, setting the guidelines of JEMSE acquisition of an 8,5% participating interest in Minera Exar, propotionally diluting GFL and LAC participating interest accordingly. JEMSE incorporation is expected to close during October 2020. Lithium Americas is a public company listed on the TSX and NYSE under the symbol “LAC.” GFL trades on the HKEX under the stock code 01772. ACSI understands that the Company may use this Report for internal decision-making purposes and it will be filed as required under applicable Canadian, American and Chinese securities laws.

The current updated Mineral Reserve Estimate presented in this Report has been prepared in compliance with the “CIM Standards on Mineral Resources and Reserves – Definitions and Guidelines” as referred to in NI 43-101 and Form 43-101F, Standards of Disclosure for Mineral Projects as well as Ontario Securities Commission (“OSC”) Staff Notice 43-704 regarding brine projects and in force as of the effective date of this Report, which is September 30, 2020.

1.2 LOCATION AND OWNERSHIP

The Cauchari and Olaroz Salars are located in the Department of Susques in the Province of Jujuy in northwestern Argentina, approximately 250 kilometers (“km”) northwest of San Salvador de Jujuy, the provincial capital. The salars extend in a north-south direction from S23º18’ to S24º05’ and in an east-west direction from W66º34’ to W66º51’. The average elevation of the salars is 3,940 meters. The midpoint between the Olaroz and Cauchari Salars is located along National Highway 52, 55 km west of the Town of Susques. The nearest port is Antofagasta (Chile), located 530 km west of the Project by road.

LAC, through its Argentine subsidiary, Minera Exar, has acquired mining and exploration permits applications through acquisition of such permits appications, direct request of permits from the applicable provinicial mining authority and/ or through brines usufruct agreements in the Province of Jujuy, Argentina. A total of 60,712 ha of exploration and mining permits have been requested in the Department of Susques; 28,717 ha have been granted to date and can support the entire project. The claims are contiguous and cover most of the Cauchari Salar and a portion of the Olaroz Salar. The aggregate annual property payment required by the Argentine Mining Code to the Province of Jujuy that Minera Exar needs to attend in order to maintain the tenements claims in good standing is approximately US$268,346 per year. Additionally, certain tenements rights acquisition payments to third parties apply (notably Borax Argentina S.A annual payments of US$200,000 per year for a 30-yr usufruct of brines payment and the Grupo Minero Los Boros S.A. tenements purchase price refered to below).

On March 28, 2016, Minera Exar entered into a purchase option agreement ("Option Agreement") with Grupo Minero Los Boros ("Los Boros") for the transfer of title to Minera Exar for certain mining properties that comprised a portion of the Cauchari-Olaroz Project. Under the terms of the Option Agreement, Minera Exar paid US$100,000 upon signing, and obtained a right to exercise the purchase option at any time within 30 months for the total consideration of US$12,000,000 payable in sixty quarterly installments of US$200,000.

On November 12th, 2018 Minera Exar exercised the purchase option; as a result, the following royalties became payable to Los Boros:

- US$300,000 was payed on November 27, 2018 because the commercial plant construction started (purchase option established payment within 10 days of the commercial plant construction start date); and

- 3% net profit interest for 40 years, payable in pesos, annually within 10 business days after calendar year end.

Minera Exar can cancel the first 20 years of net profit interest in exchange for a one-time payment of US$7M and the next 20 years for an additional US$7M.

On March 28, 2016, SQM made a US$25M capital contribution in Minera Exar for a 50% participating interest in it and the Company, SQM and Minera Exar executed a Shareholders Agreement that established the terms by which the parties planned to develop the Cauchari-Olaroz Project.

On October 31, 2018, the Company closed a transaction with Ganfeng Lithium and SQM. Ganfeng Lithium agreed to purchase SQM's interest in the Cauchari-Olaroz Project. LAC increased its interest in the Project from 50% to 62.5% with Ganfeng holding the remaining 37.5% interest and the parties entered into a shareholder agreement to govern their ownership and business operations of Minera Exar. Ganfeng Lithium also provided the Company with a US$100 million unsecured, limited recourse subordinated loan facility as part of funding its 62.5% share of the project expenditures.

On August 19, 2019, LAC and Ganfeng completed a transaction whereby Ganfeng contributed US$160 million in Minera Exar and increased its participating interest in Minera Exar to 50%. At such transaction closing, LAC and GFL each owned a 50% equity interest in Minera Exar. The parties made certain consequential amendments to the shareholders agreement governing their relationship to refer to the new equity ownership structure in Minera Exar. LAC and GFL authorized Minera Exar to undertake a feasibility study on a development plan to increase the initial production capacity from 25,000 tpa to 40,000 tpa of lithium carbonate, as well as certain permitting and development work in advance of a decision to increase the project production rate.

On August 27, 2020, LAC and Ganfeng closed a transaction whereby Ganfeng increased its participating interest in Minera Exar to 51% by completion of US$16 million capital contribution in Minera Exar. At such transaction closing, GFL owned a 51% equity interest in Minera Exar and LAC a 49%. The parties made certain consequential amendments to the shareholders agreement governing their relationship to refer to the new equity ownership structure in Minera Exar.

On August 26, 2020 GFL, LAC and Exar entered into a Share Acquisition Option Execution Agreement with Jujuy Energía y Minería S.E. ("JEMSE") a Province of Jujuy state company, setting the guidelines of JEMSE acquisition of an 8,5% participating interest in Minera Exar, propotionally diluting GFL and LAC participating interest accordingly. JEMSE incorporation is expected to close during October 2020. JEMSE will acquire the Minera Exar shares for a consideration of US$1 plus an amount equal to 8.5% of the capital contributions in Minera Exar. JEMSE will pay for this amount to the shareholders through the assignment of one-third of the dividends to be received by JEMSE from Minera Exar after taxes. In accordance with the agreement, for future equity contributions GFL and LAC are obliged to loan to JEMSE 8.5% of the contributions necessary for JEMSE to avoid dillution, which loans also would be repayable from the same one-third dividends assignment, after taxes.

1.3 GEOLOGY

There are two dominant structural features in the region of the Cauchari and Olaroz Salars: north-south trending high-angle normal faults and northwest-southeast trending lineaments. The high-angle north-south trending faults form narrow and deep horst-and-graben basins, which are accumulation sites for numerous salars, including Olaroz and Cauchari. Basement rock in this area is composed of Lower Ordovician turbidites (shale and sandstone) that are intruded by Late Ordovician granitoids. Bedrock is exposed to the east, west and south of the two salars, and generally along the eastern boundary of the Puna Region.

The salars are in-filled with flat-lying sedimentary deposits, including the following five primary informal lithological units that have been identified in drill cores:

- Red silts with minor clay and sand;
- Banded halite beds with clay, silt and minor sand;
- Fine sands with minor silt and salt beds;
- Massive halite and banded halite beds with minor sand; and
- Medium and fine sands.

Alluvial deposits intrude into these salar deposits to varying degrees, depending on location. The alluvium surfaces slope into the salar from outside the basin perimeter. Raised bedrock exposures occur outside the salar basin. The most extensive intrusion of alluvium into the basin is the Archibarca Fan, which partially separates the Olaroz and Cauchari Salars. National Highway 52 is constructed across this alluvial fan. In addition to this major fan, much of the perimeter zone of both salars exhibits encroachments of alluvial material associated with fans of varying sizes.

1.4 MINERALIZATION

The brines from Cauchari are saturated in sodium chloride with total dissolved solids (TDS) on the order of 27% (324 to 335 grams per litre) and an average density of about 1.215 grams per cubic centimetre. The other primary components of these brines include potassium, lithium, magnesium, calcium, sulphate, HCO_3, and boron as borates and free H_3BO_3. Since the brine is saturated in NaCl, halite is expected to precipitate during evaporation. In addition, the Cauchari brine is predicted to initially precipitate halite (NaCl) and ternadite (Na_2SO_4) as well as a wide range of secondary salts that could include: astrakanite ($Na_2Mg(SO_4)_2 \cdot 4H_2O$), schoenite ($K_2Mg(SO_4)_2 \cdot 6H_2O$), leonite ($K_2Mg(SO_4)_2 \cdot 4H_2O$), kainite ($MgSO_4 \cdot KCl \cdot 3H_2O$), carnalite ($MgCl_2 \cdot KCl \cdot 6H_2O$), epsomite ($MgSO_4 \cdot 7H_2O$) and bischofite ($MgCl_2 \cdot 6H_2O$).

1.5 EXPLORATION AND DRILLING

The following exploration programs were conducted between 2009 and 2019 to evaluate the lithium development potential of the Project area:

- Surface Brine Program – 55 brine samples were collected from shallow pits throughout the salars to obtain a preliminary indication of lithium occurrence and distribution.

- Seismic Geophysical Program – Seismic surveying was conducted to support delineation of basin geometry, mapping of basin-fill sequences, and siting borehole locations.

- Gravity Survey - A limited gravity test survey was completed to evaluate the utility of this method for determining depths to basement rock.

- Time Domain Electromagnetic (TEM) Survey – TEM surveying was conducted to attempt to define fresh water and brine interfaces within the salar.

- Air Lift Testing Program – Testing was conducted within individual boreholes as a preliminary step in estimating aquifer properties related to brine recovery.

- Vertical Electrical Sounding (VES) Survey – A VES survey was conducted to attempt to identify fresh water and brine interfaces, and surrounding fresh water occurrences.

- Surface Water Sampling Program – A program was conducted to monitor the flow and chemistry of surface water entering the salars.

- Pumping Test Program 2011-2019 – Pumping wells were installed at eleven locations, to estimate aquifer parameters related to brine recovery. One of the locations was used to estimate the capacity of fresh water supply. Some tests were carried out using multiple wells on the same platform in order to estimate three-dimensional aquifer parameters.

- Boundary Investigation –A test pitting and borehole program was conducted to assess the configuration of the fresh water/brine interface at the salar surface and at depth, at selected locations on the salar perimeter.

- Reverse Circulation (RC) Borehole Program – Dual-tube, reverse circulation drilling was conducted to develop vertical profiles of brine chemistry at depth in the salars and to provide geological and hydrogeological data. The program included installation of 24 boreholes and collection of 1487 field brine samples (and additional Quality Control samples).

- Diamond Drilling ("DD") Borehole Program 2009-2010 – A drilling and sampling program was conducted to collect continuous cores for geotechnical testing (relative brine release capacity ("RBRC"), grain size and density) and geological characterization. The program included 29 boreholes and collection of 127 field brine samples.

- Diamond Drilling (DD) Borehole Program 2017-2019 – A drilling and sampling program included a total of 49 boreholes and 9,703 meters of cores recovered. In 2019, 58 additional samples were sent for RBRC testing at Daniel B. Stephens & Associates, Inc. (samples from DD19D-001 and DD19D-PE09; this program also included a total of 1,006 samples sent to the laboratory for brine characterization, including QAQC samples).

The additional data collected and analyzed during the 2017-2019 field programs are included in the Updated Mineral Resource Estimate and Mineral Reserve Estimate and aided in identifying the future production wells for the brine extraction wellfield.

1.6 MINERAL RESOURCES AND MINERAL RESERVES

The lithium Mineral Resources and Mineral Reserves described in this report occur in subsurface brine. The brine is contained within the pore space of alluvial, lacustrine, and evaporite deposits that have accumulated as a multi-layer aquifer in the structural basin of the salars.

The Mineral Resource Estimate, updated earlier in 2019 by Burga et. al. (2019), effective date February 13, 2019, incorporated a Mineral Resource Evaluation Area extending north to include the Minera Exar property areas, as well as deeper in the brine mineral deposit, with 2017 and 2018 exploration results meeting the criteria of Mineral Resource classification for Mineral Resource estimation. Overall, it incorporated information consisting of the following: 1) the prior 2012 Mineral Resource Estimate for lithium and associated database, and 2) the expanded Project database compiled from results of 2017 through 2018 exploration drilling and sampling campaigns and additional sampling in early 2019 as part of data verification.

Since the effective date of the 2019 Mineral Resource Estimate, the results of deeper drilling and sampling has allowed for partial conversion of the Inferred Mineral Resource aquifer volume in the updated hydrostratigraphic unit (HSU) model to Measured and Indicated Mineral Resource aquifer volumes of the deeper HSUs. This conversion of aquifer volume to more confident Mineral Resource Estimate classification categories provided the support for simulated wells in the Mineral Reserve Estimate numerical model to be completed in the deeper and more permeable Lower Sand and Basal Sand HSUs in the southeast part of the model domain. This resulted in the latest Updated Mineral Resource Estimate for the Project with an effective date of May 7, 2019.

The Updated Mineral Resource Estimate at the Measured, Indicated, and Inferred Mineral Resource classification (CIM, 2014) for lithium is based on the total amount of lithium in brine that is theoretically drainable from the bulk aquifer volume. The Mineral Resource Estimate is computed as the overall product of the Resource Evaluation Area and aquifer thickness resulting in an aquifer volume, lithium concentration dissolved in the brine, and specific yield of the resource aquifer volume. This framework is based on an expanded and updated hydrostratigraphic model incorporating bulk aquifer volume lithologies and specific yield estimates for block modeling of the Mineral Resource Estimate. Radial basis function was performed as the main lithium distribution methodology using variogram modeling techniques; the interpolation method was verified with ordinary kriging. The Mineral Resource block model was validated by means of visual inspection, checks of composite versus model statistics and swath plots. No areas of significant bias were noted.

The Mineral Resource Estimate is summarized in Table 1.1 at the Measured, Indicated, and Inferred confidence level categories. As is accepted in standard practice for lithium brine Mineral Resource Estimates, Table 1.2 provides lithium represented as Li_2CO_3, or Lithium Carbonate Equivalent ("LCE"), at the Measured, Indicated, and Inferred level categories.

TABLE 1.1
SUMMARY OF UPDATED MINERAL RESOURCE ESTIMATE FOR LITHIUM

Classification	Aquifer Volume (m^3)	Drainable Brine Volume (m^3)	Average Lithium Concentration (mg/L)	Lithium (tonnes)
Measured Resource	1.07E+10	1.13E+09	591	667,800
Indicated Resource	4.66E+10	5.17E+09	592	3,061,900
Measured + Indicated	**5.73E+10**	**6.30E+09**	**592**	**3,729,700**
Inferred	1.33E+10	1.50E+09	592	887,300

Notes:

1. *The Mineral Resource Estimate has an effective date of May 7, 2019 and is expressed relative to the Resource Evaluation Area and a lithium grade cut-off of greater than or equal to 300 mg/L.*
2. *The Mineral Resource Estimate is not a Mineral Reserve Estimate and does not have demonstrated economic viability. There is no certainty that all or any part of the Mineral Resources will be converted to Mineral Reserves.*

3. *Calculated brine volumes only include Measured, Indicated, and Inferred Mineral Resource volumes above cut-off grade.*
4. *The Mineral Resource Estimate has been classified in accordance with CIM Mineral Resource definitions and best practice guidelines (2012 and 2014).*
5. *Comparisons of values may not add due to rounding of numbers and the differences caused by use of averaging methods.*

TABLE 1.2
SUMMARY OF UPDATED MINERAL RESOURCE ESTIMATE FOR LITHIUM REPRESENTED AS LCE

Classification	LCE (tonnes)
Measured Resource	3,554,700
Indicated Resource	16,298,000
Measured + Indicated	**19,852,700**
Inferred	4,722,700

Notes:
1. *Lithium carbonate equivalent ("LCE") is calculated using mass of LCE = 5.322785 multiplied by the mass of Lithium reported in Table 1.1. The Mineral Resource Estimate represented as LCE has an effective date of May 7, 2019 and is expressed relative to the Resource Evaluation Area and a lithium grade cut-off of greater than or equal to 300 mg/L.*
2. *The Mineral Resource Estimate is not a Mineral Reserve Estimate and does not have demonstrated economic viability. There is no certainty that all or any part of the Mineral Resources will be converted to Mineral Reserves.*
3. *Volumes only include Measured, Indicated, and Inferred Mineral Resource volumes above cut-off grade.*
4. *The Mineral Resource Estimate has been classified in accordance with CIM Mineral Resource definitions and best practice guidelines (2012 and 2014).*
5. *Comparisons of values may not add due to rounding of numbers and the differences by use of averaging methods.*

The Updated Mineral Reserve Estimate for lithium incorporates the Updated Resource Estimate and additional drilling and testing through an effective date of May 7, 2019. To obtain the Updated Mineral Reserve Estimate, the previous hydrostratigraphic and numerical models and the expanded database were analyzed and updated by Montgomery & Associates. Once formulated and calibrated, the updated numerical model used a simulated production wellfield to project extraction from the brine aquifer and verify the feasibility of producing sufficient brine for processing a minimum target of 40,000 tonnes per year (tpa) LCE for a 40-year operational period. After verifying the capability of the simulated wellfield to produce sufficient brine for the minimum 40,000 tpa LCE process target, the model was then used to predict a maximum production rate for assessment of a Total Mineral Reserve Estimate for a 40-year production and process period of LCE.

The Proven and Probable Mineral Reserve Estimate is summarized in Table 1.3 without factoring estimated LCE process efficiency (pre-processing). The Measured and Indicated Mineral Resources (Table 1.1 and Table 1.2) correspond to the total amount of lithium enriched brine estimated to be available within the aquifer while the Proven and Probable Mineral Reserves represent a portion of the Mineral Resource Estimate that can be extracted under the proposed pumping schedule and wellfield configuration. Therefore, the Mineral Reserve Estimate is not "in addition" to the Mineral Resource Estimate, and instead, it simply represents a portion of the total Mineral Resource that is extracted during the life of mine plan. A cut-off value was not employed in the Mineral Reserve Estimate because the average calculated lithium concentration after 40 years of simulated mine life was significantly above the processing constraint.

TABLE 1.3
SUMMARY OF ESTIMATED PROVEN AND PROBABLE MINERAL RESERVES
(WITHOUT PROCESSING EFFICIENCY)

Mineral Reserve Classification	Production Period (Years)	Brine Pumped (m^3)	Average Lithium Concentration (mg/L)	Lithium Metal (tonnes)	LCE (tonnes)
Proven	0 through 5	156,875,201	616	96,650	514,450
Probable	6 to 40	967,767,934	606	586,270	3,120,590
Total	**40**	**1,124,643,135**	**607**	**682,920**	**3,635,040**

Notes:

1. *The Mineral Reserve Estimate has an effective date of May 7, 2019.*
2. *Lithium carbonate equivalent ("LCE") is calculated using mass of LCE = 5.322785 multiplied by the mass of Lithium Metal.*
3. *The conversion to LCE is direct and does not account for estimated processing efficiency.*
4. *The values in the columns for "Lithium Metal" and "LCE" above are expressed as total contained metals.*
5. *The Production Period is inclusive of the start of the model simulation (Year 0).*
6. *The average lithium concentration is weighted by per well simulated extraction rates.*
7. *Tonnage is rounded to the nearest 10.*
8. *Comparisons of values may not be equivalent due to rounding of numbers and the differences caused by use of averaging methods.*

The authors believe the Mineral Reserve Estimate has been conservatively modeled and represents a Proven Mineral Reserve for Year 1 through 5 of full-scale extraction wellfield pumping and a Probable Mineral Reserve for Years 6 to 40 of extraction wellfield pumping. The division between Proven and Probable Mineral Reserves is based on: 1) sufficiently short duration of wellfield extraction to allow a higher degree of predictive confidence yet long enough to enable significant production, and 2) a duration long enough to enable accumulation of a strong data record to allow subsequent conversion of Probable Mineral Reserves to Proven Mineral Reserves.

1.7 BRINE PROCESSING

In 2019, Minera Exar implemented a Feasibility Study based on new tests work and the 2012 Feasibility Study. With additional test information, Minera Exar developed a process for converting brine to high-purity lithium carbonate. The proposed process follows industry standards: pumping brine from the salar, concentrating the brine through evaporation ponds, and taking the brine concentrate through a hydrometallurgical facility to produce high-grade lithium carbonate. While the 2012 process model employed proprietary, state-of-the-art physiochemical estimation methods and process simulation techniques for electrolyte phase equilibrium, the 2019 model uses a process model that has been further refined using the results of lab scale and pilot scale testing from Minera Exar, Ganfeng Lithium, and equipment suppliers, the results of which are reflected in this current Feasibility Study. The basis of the anticipated process methods has been tested and supported by laboratory test work, pilot testing facilities, and equipment vendor testing and design to support equipment guarantees.

1.7.1 Lithium Carbonate Production

The process route simulated for the production of lithium carbonate from Cauchari brines resembles the flowsheet presented in Figure 17.1. Primary process inputs include evaporated brine, water, lime, soda ash, HCl, NaOH, and natural gas. The evaporation ponds produce salt tailings composed of Na, Mg, Ca, K, and borate salts. The brine concentrate from the terminal evaporation pond is further processed, through a series of polishing and impurity removal steps. Soda ash is then added with the purified brine concentrate to produce lithium carbonate that is dried, micronized, and packaged for shipping.

Design criteria for the Lithium Carbonate plant is presented Table 1.4.

TABLE 1.4
LITHIUM CARBONATE PLANT DESIGN CRITERIA

Description	Unit	Value
Li_2CO_3 production	tonnes per year	40,000
Annual operation days	days	292
Annual operation hours	hours	7008
Availability	%	80
Utilization (22 h/d)	%	97.2
Plant Overall Efficiency	%	53.7

1.8 SITE INFRASTRUCTURE AND BUILDINGS

1.8.1 Wells

1.8.1.1 Well Production Equipment Selection

Screened wells will target the largest lithium brine aquifers. Submersible electric pumps are proposed for brine pumping. These pumps will send the brine to evaporation ponds through a network of pipelines and mixing pools.

1.8.2 Evaporation Ponds

An average evaporation rate of 6.05 mm per day (2,157 mm/year) was used as criterion to design the pond system. This rate corresponds to measured evaporation rates observed at the site where the ponds will be located.

Assuming the above-mentioned evaporation rate, the total evaporation area required for the production of 40,000 tpa of lithium carbonate is 1,200 ha when including consideration for harvesting of salt deposited in the ponds. The ponds are lined with multi-layer liner consisting of a polymer-based material and engineered granular bedding. The ponds configuration includes provision for uninterrupted production during salt harvesting and maintenance work.

Brine will be transferred between the successive evaporation ponds using self-priming pumps.

1.8.3 Salt Harvest Equipment

The ponds have been designed for the efficient removal of salt deposits formed at the bottom of the ponds. Salt removal will be conducted using typical earth moving machinery, such as bulldozers, front end loaders, and dump trucks.

1.8.4 Site Infrastructure and Support Systems

1.8.4.1 Natural Gas Pipeline

Natural gas will be obtained from the Rosario gas compression station, which is on the Gas Atacama pipeline, 52 km north of the project site.

Capital costs for this pipeline are currently estimated at US$10.9 million, including a contractor bid of US$10.6 million. This pipeline can supply natural gas at capacities that are sufficient for a 40,000 tpa LCE facility.

1.8.4.2 Power Supply

Electricity will be provided by a new 33 kV transmission line that will interconnect with an existing 345 kV transmission line located approximately 60 km south of the Project. The interconnection will consist of a sub-station with a voltage transformer (345/33 kV) and associated switchgear. Another substation at the Project site will consist of a voltage transformer (33/13.2 kV) and electrical room with associated switchgear and auxiliary equipment for a 13.2 kV local distribution system.

The 13.2 kV local electrical distribution system will provide power to the plant, camp, intermediate brine accumulation and homogenizing pools/lime pumps, wells, and evaporation ponds. In general, all distribution is aerial unless there are major restrictions, in which case underground distribution is adopted.

The estimated load for the Project is approximately 123,461 MWh/y or 16.4 MW/h, which includes a design safety factor of 1.2.

A stand-by dual diesel/gas generating station, located close to the main substation, will power selected equipment during grid outages.

1.8.4.3 Camp

The construction and permanent camps will be located approximately 8,000 m south of National Highway 52. The permanent camp is a full habitational and administrative complex to support all workforce activities, with a capacity for 360 people. The permanent camp covers a footprint of 8,500 m^2 of buildings and 35,700 m^2 of external facilities.

The permanent camp includes administration buildings, habitational area, dining facilities, medical room, spare parts warehouse, laboratory, lockers, gym, soccer field, helipad, and parking lots. The habitational area includes single bedrooms with private bathrooms, dormitories with private bathrooms, and large dorm rooms with shared bathrooms.

Temporary modules will be used during construction to accommodate a maximum construction crew capacity of approximately 1,000 people, and will be expanded and contracted during construction, as required.

1.8.4.4 Other Buildings

Other buildings include:

- A warehouse for spare parts and consumables;
- A steel building for the storage of soda ash;
- A steel building for the storage of solvent extraction plant chemicals designed with appropriate ventilation, safety, and security features;
- Operating facilities for sheltering operators, electrical equipment, and central control rooms; and,
- Product storage facility designed for protecting the product against contamination and staging it for shipment.

1.8.4.5 Security

A metallic perimeter fence will be built surrounding certain areas of the lithium carbonate plant, warehouses, administrative offices, and camp. Given the remote location of the facilities, it is not necessary to enclose the pond area. The pond area is to be illuminated to allow night work and improve security.

A metallic peripheral fence will be installed at each brine well facility, providing protection to the main equipment, instruments, and valves.

1.8.4.6 Access and Site Roads

Access to the plant site is via paved National Highways 9 and 52, which connect the site to San Salvador de Jujuy and Salta in Argentina. In addition, National Highway 52 connects to Paso Jama to the west, a national border crossing between Chile and Argentina, and provides connection to Chilean Route 27 and convenient access to Antofagasta, the likely embarkation port for the product.

Access within the site is possible through a gravel road, Route 70, which skirts the west side of the salars. This road is approximately 1 km from the plant site. Site roads to ponds, wells, and other infrastructure will be part of the overall construction.

1.8.4.7 Fuel Storage

The plant includes a diesel storage and dispensing station for mobile equipment and transport vehicles. Diesel fuel will also be used in stand-by generators and back up for dryers in the plant. The main fuel for equipment operation will be natural gas.

1.8.4.8 Water Supply

The estimated average consumption of brackish water for mining/industrial use is 105 (+/- 20%) liters per second ("L/s").

Water demands for industrial use will be supplied by groundwater wells adjacent to the salar and a water pipeline from the north.

1.8.4.9 Pond Solid Wastes

The evaporation process in the ponds leaves considerable amounts of salts on the bottom of the ponds. These salt piles may reach 15 m in height. It is estimated that approximately 740 ha of salt piles will be built over a 40-year period and these piles will be built near the pond areas.

These discarded salts are classified as inert waste. The salts are generated from brines already present in the salar and do not introduce foreign compounds. It is estimated that sodium chloride and sulphate make up over 87% of this waste.

1.8.4.10 Tailings Liquid Disposal

Several possible sites for the evaporation ponds for the plant's industrial liquid wastes were analyzed. Pond construction is similar to the evaporation ponds, complete with liner. A 50 ha parcel located close to the plant has been selected for the industrial waste evaporation ponds and presents no risks to distant populated areas.

1.9 MARKET STUDIES AND CONTRACTS

A market review was performed to establish three pricing scenarios for lithium carbonate (per tonne) used in the economic analysis: Low (US$10,000), Base Case (US$12,000) and High (US$14,000).

Production from the Project will be divided between the partners of Minera Exar according to the their ownership (Ganfeng Lithium 51% and LAC 49%). Accordingly, LAC is entitled to 19,600 tpa of LCE based on a full production rate of 40,000 tpa. LAC has entered into lithium carbonate offtake agreements with two counterparties, Ganfeng Lithium and BCP Innovation Pte Ltd.

("Bangchak"). These offtake agreements are related to strategic investment agreements by the counterparties, which include both debt facilities for Project construction and equity investments. Assuming a 40,000 tpa production rate and LAC maintaining its 49% interest in the Project, the Ganfeng offtake agreement entitles Ganfeng to acquire 9,800 tpa of LCE (80% of 49% of the first 25,000 tpa of production) at prevailing market prices, while the Bangchak offtake agreement entitles Bangchak to acquire 6,000 tpa of LCE (20% of 49% of the first 25,000 tpa plus 46.67% of production above that rate) at prevailing market prices. The remaining 3,800 tpa is unallocated, subject to certain rights of Bangchak to top-up its offtake entiltement to 6,000 tpa from this unallocated amount in certain circumstances.

For clarity at a production rate of 40,000 tpa, Ganfeng Lithium is entitled to its 51% share of production (20,400 tpa) and 80% of LAC's share of production up to 25,000 tpa (9,800 tpa) or, in aggregate, 75.5% of 40,000 tpa (30,200 tpa).

1.10 PERMITTING, ENVIRONMENTAL STUDIES AND SOCIAL OR COMMUNITY IMPACT

1.10.1 Permits and Authorities

Original domain of natural resources is recognized to each Province under the Argentinean National Constitution. Although the Mining Code is enacted by the National Congress, permitting and jurisdictional authority is vested in the provincial authorities. Therefore, the Province of Jujuy has the authority of all significant permits regarding the Project constructions and operations. In particular, the Mining and Energy Resource Directorate under the Mining and Hydrocarbons Secretariat leads the proceedings and issues the Environmental Permit – the most important permit related to mining exploitation activities. The Environmental Permit (called in Spanish "*Declaración de Impacto Ambiental"* or "DIA") approval process includes review of several provincial offices, including the Provincial Directorate of Water Resources, the Environmental Ministry, which has supervisory authority for environmental and natural resources, and the Secretariat of Tourism and Culture, which regulates operating permits in areas of potential archaeological and paleontological interest. It also includes consultation and use of land agreements with any aboriginal community in the Project area of influence. Other provincial entities are responsible for specific industrial/service permits.

The Cauchari-Olaroz Salar is a Protected Area for Multiple Use (Law No. 3820/81), which allows mining activities, but has a specifically designed control system that aims to protect the local vicuña population.

These authorities have granted, or are evaluating, the authorizations and permits required for the exploration and test work and the construction to be carried out by Minera Exar on its mining properties in Cauchari-Olaroz. An Environmental Impacts Report for the exploitation phase was presented in December 2011 to the Provincial Government of Jujuy (Direccion Provincial de Mineria y Recursos Energeticos) and approved by Resolution 29/2012 on 08 November 2012 based on an initial annual production rate of 20,000 tonnes of lithium carbonate with a second expansion phase to 40,000 tonnes/year. A report for the renewal of the permit was submitted in March 2015 based on the same Project description as the initial 2011 filing. A further renewal application was submitted in February 2017 based on updated Project parameters. It was agreed with the Authority that this would replace and supercede the March 2015 submission (which was archived) and was approved by Resolution N° 010/2017 (DIA) of the Mining and Energy Resources Directorate of the Province of Jujuy.

A further update to the Environmental Impacts Report for Exploitation for the Cauchari-Olaroz Project was submitted in September 2019 and is in the process of approval by the Authority. This new document includes the new environmental studies carried out and information collected during the last two years as well as taking account of the new Project layout (relocation of the process plant, camp, industrial solid waste deposits (“RISES”) and industrial liquid waste pools (“RILES”), relocation of control ponds C1 and C2, and lithium pools L1 and L2. The relocation of the dumps for harvested salts was partially authorized by the Directorate of Mining (Rs. 003/2019), since the approval for the disposal of salts on the salt crust was the subject of a resolution by the the Unidad Ambiental de Gestión Minera Provincial (UGAMP), with the approval hearing to be held during the IIA 2019 Exploitation (currently in the process of approval). The increase of the production capacity from a previously conceived 25,000 TPA (Phase 1) and 50,000 TPA (Phase 2) to a 40,000 TPA (expanded Phase1) project is also in the IIA 2019 Exploitation approval process.

The Provincial Mining and Energy Resource Directorate, under the Mining and Hydrocarbons Secretariat, approved Minera Exar’s EIR for the exploration work on the Cauchari-Olaroz Project (Resolution No. 25/09 on August 26, 2009). Subsequent updates have been made to accurately reflect the ongoing exploration program (some are awaiting approval).

Minera Exar also pays the Jujuy Provincial Directorate of Water Resources on an annual basis a canon for the water used in the exploration program for the extraction of brackish water for mining/industrial use. The relevant fees have been paid through 2018. Provincial Directorate of Water Resources issued permit 449-DPRH-2020 for 45 Lts/sec. for exploration activities. Minera Exar has filed a request for additional capacity under such permit sufficient for the Project needs.

1.10.2 Minera Exar’s Environmental and Social Policy

Minera Exar’s adhered firmly to the Equator Principles[1] (“EP”) even before exploration operations began. These principles are a voluntary commitment, which arose from an initiative of the International Finance Corporation (IFC), member of the World Bank Group, to stimulate sustainable private sector investment in developing countries. Financial institutions that adopt these principles are bound to evaluate and consider environmental and social risks of the projects they finance in developing countries and, therefore, to lend only to those who show the proper administration of its social and environmental impacts such as biodiversity protection, use of renewable resources and waste management, protection of human health and population movements.

[1] EP: Credit risk management framework for determining, assessing and managing environmental and social risk in Project Finance transactions.

In this context, Minera Exar established from the beginning that the Equator Principles will be the minimum standards for developing the Project, taking the measures that are described in the corresponding section of the report.

1.10.3 Environmental Baseline Studies

Minera Exar engaged Ausenco to carry out baseline environmental and social studies and associated impact assessments required to complete the permit applications.

Ausenco's team carried out environmental baseline field surveys between September 2010 and July 2011. Three subsequent biannual renewals to the EIA for Exploitation were presented to the authorities, the latest being in July 2019, that required Ausenco to update the environmental baseline database in March 2015, October 2016 and in 2018-2019 which also included participatory monitoring.

These surveys contain all the environmental attributes that could be affected by a future mining project, including both inert (air, soil, water, geology) and biotic (flora, fauna, and limnology) components. In addition, socio-economic and cultural assessments were also conducted.

1.10.4 Evaluation of Impacts

Environmental and social impacts of the project, both positive and negative, were assessed for each of the various stages of the lithium brine exploitation project, including construction, operations, and closure.

During the Construction and Operation stages of the project, moderate impacts on the environment will occur, which can be reversed or mitigated in the short, medium, and long term. These potential impacts have been reassessed and updated in the subsequent updates to the IIA (Environmental Impact Indicator, or Indicador de Impacto Ambiental) for exploitation as the understanding of the project and the environment has developed.

The area of direct influence (ADI) is defined as the physical space where project activities are seen to affect specific social and/or environmental components. The environmental ADI for the Environmental Impact Report for exploitation for the Project is considered to be the area comprising the housing camp, evaporation ponds, sector where harvested salts are stored, drill platforms, access roads and other easements where there is a greater likelihood of interaction due to Project actions.

The social ADI was considered to be the inhabited sectors or those sectores that have communities, such as Puesto Sey, Pastos Chicos, Huáncar, Catua, Olaroz Chico and Susques. These communities are located in watersheds different from those of the Salar de Olaroz - Cauchari, except for Olaroz Chico, which is the only community located on the eastern slope of the Olaroz mountains. It is within the territory of these communities that the salt flats and mining properties are located and where the activities related to exploitation will be carried out.

The area of indirect influence (AII) is defined as the physical space where an action related to the project activity could influence the social and environmental components. For the Environmental Impact Report for exploitation for the Project, the area that is outside the limits established for the environmental ADI was considered as the environmental AII. It should be clarified that for each of the environmental factors particular areas were considered based on the possibility that effects could manifest. The extent of these areas was defined based on each action that will be implemented.

For the social aspects, the rest of the localities of the department of Susques were considered as being the social AII: Jama, El Toro, San Juan de Quillaques and Coranzuli.

Should further easements be required for the Project, the areas of influence for the Project could change.

1.10.5 Community Relations Program

Minera Exar has developed a plan that promotes social and economic development within a sustainable framework. Minera Exar began work on the Communities Relations Program with the Susques Department in 2009. This plan was created to integrate local communities into the Project by implementing programs aimed at generating positive impacts on these communities.

The Communities Relations Program has been divided into several sub-programs: one dealing with external and internal communications to provide information and transparency; a second is a consultation program that allows Minera Exar to acknowledge community perceptions of their mining activities; a third program deals with service and supply contracts to be signed with the communities. The intended outcome of the program is to deliver social, cultural, and environmental initiatives.

Minera Exar has signed formal contracts with neighbouring communities that own the surface rights where the Project will be developed. According to these contracts, the communities agree to grant Minera Exar traffic and other rights in exchange for cash payments to be used based on decisions made at community assemblies.

1.11 CAPITAL AND OPERATING COST ESTIMATE

1.11.1 Capital Cost Estimate

Capital expenditures are based on a project operating capacity of 40,000 tpa of lithium carbonate. Since the project is in construction, capital equipment costs have been determined based on over 100 Class 1 and Class 2 purchase orders, contracts awarded, quotes, and firm proposals for equipment items and construction services for the current project capacity; in addition, an in-house database maintained by an engineering consultancy was used for minor items. Minera Exar and its consultants have verified the validity of these estimated capital expenditures.

The estimates are expressed in current US dollars on a 100% project equity basis. LAC will need to contribute or secure 49% of these costs, matching its current shareholding in Minera

Exar. No provision has been included to offset future cost escalation since expenses, as well as revenue, are expressed in constant dollars.

Capital costs include direct and indirect costs for:

- Brine production wells;
- Evaporation and concentration ponds;
- Lithium carbonate plant;
- General site areas, such as electric, gas, and water distribution;
- Stand-by power plant, roads, offices, laboratory and camp, and other items;
- Off-site infrastructure, including gas supply pipeline and high voltage power line and water pipeline; and
- Contingencies, salaries, construction equipment mobilization, and other expenses.

The capital investment for the 40,000 tpa lithium carbonate project, including equipment, materials, indirect costs and contingencies during the construction period is estimated to be US$564.7 million. This total excludes interest expense that might be capitalized during the same period. Disbursements of these expenditures started in 2017 as part of the 25,000 tpa lithium carbonate project. These capital expenditures are summarized in Table 1.5.

TABLE 1.5
CAPITAL COSTS SUMMARY

Item	US$ M
Direct Cost	
Salar Development	50.1
Evaporation Ponds	145.3
Lithium Carbonate Plant and Aux.	174.9
Reagents	12.4
On-Site Infrastructure	72.5
Off-site Services	13.3
Total Direct Cost	**468.5**
Indirect Cost	
Total Indirect Cost	**86.8**
Total Direct and Indirect Cost	
Total Direct and Indirect	555.3
Contingencies (1.7%)	9.4
Total Capital	**564.7**
Expended to date	**304.2**
Estimate to complete	**260.5**

1.11.2 Estimate Confidence Range

Expected confidence range for a Feasibility Study estimate is typically ±15% but as a result of the progress made by EXAR placing most of the equipment purchase orders and most of the major contracts (75.6% of US$525M has already been committed and 53.9% already spent on the construction of ponds, wells, camps, and other purchase orders and contracts), the level of confidence for this report will be below ±10%. Contingencies are estimated at 1.7%.

1.11.3 Exclusions

The following items are not included in this estimate:

- Legal costs;
- Special incentives and allowances;
- Mineral license costs;
- Escalation; and
- Start-up costs beyond those specifically included.

1.11.4 Currency

All values are expressed in current US dollars; the exchange rate between the Argentine peso and the US dollar as at September 30, 2020 was AR$79/US$. Argentine peso denominated costs follow the exchange rate as a result of inflation, and there is no expected impact of the exhange rate fluctuation on CAPEX and OPEX; no provision for currency escalation has been included.

1.11.5 Operating Cost Estimate

The operating cost estimate (±15% expected accuracy) for the Project is estimated at US$3,579 per tonne of lithium carbonate (Table 1.6). This estimate is based upon vendor quotations for main costs such as reagents, fuel (diesel and natural gas), electricity, maintenance, halite harvesting, transport, and catering and camp services. Reagents consumption rates were determined by pilot plant and laboratory work, as well as detailed process mass and energy balances. Energy consumption was determined on the basis of the specific equipment considered in each sector of the facilities and their utilization rate. Labour requirements are based on Minera Exar's management's industry expertise. Labour costs have been estimated using the results of a salary survey, carried out on behalf of Minera Exar in Argentina, on mining companies with similar conditions and actual salaries paid by Minera Exar. Consumables costs were estimated on the basis of quotes obtained from potential suppliers.

TABLE 1.6 OPERATING COSTS SUMMARY			
Description	**Total (US$ 000s /Year)**	**Li_2CO_3 (US$/Tonne)**	**Allocation of Total OPEX (%)**
Direct Costs			
Reagents	72,535	1,813	50.7
Maintenance	16,143	404	11.3
Electric Power	6,408	160	4.5
Pond Harvesting & Tailing Management	13,334	333	9.3
Water Treatment System	356	9	0.2
Natural Gas	5,818	145	4.1
Manpower	12,809	320	8.9
Catering, Security & Third Party Services	4,534	113	3.2
Consumables	959	24	0.7
Diesel	101	3	0.1
Bus-in/Bus-out Transportation	213	5	0.1
Product Transportation	5,072	128	3.5
Direct Costs Subtotal	**138,282**	**3,457**	**96.6**
Indirect Costs			
G&A	4,884	122	3.4
Indirect Costs Subtotal	**4,884**	**122**	**3.4**
Total Operating Costs	**143,166**	**3,579**	**100**

1.12 ECONOMIC ANALYSIS

A sophisticated economic analysis of the Project was conducted to determine its financial viability. Capital and Operational Expenditures have been used in this model. The forecasted tax schedules, both payments and rebates, were researched using internal and external taxation experts. Prices for lithium carbonate were based on a market study carried out by a qualified third party.

Results obtained include Net Present Values (NPV) for a range of discount rates, and Internal Rate of Return (IRR), as well as Payback (PB) periods. In order to determine the influence of different input parameters on projected results, a sensitivity analysis has also been carried out. Parameters considered in this analysis were CAPEX, selling prices, production levels, and OPEX.

The model assumes the current charges for royalties, taxes and payments obligations and a 2.5% return on export value.

1.12.1 Capital Expenditures (CAPEX)

The capital expenditures schedule is presented in Table 1.7, which contains consolidated expenditures from 2017. The March 2019 Technical Report (Burga, et al., 2019) presented projected CAPEX expenditures from the 2017 Feasibility Study (Burga, et al., 2017).

TABLE 1.7
CAPEX EXPENDITURE SCHEDULE

Description	2017 (US$ 000s)	2018 (US$ 000s)	2019 (US$ 000s)	2020 (US$ 000s)	2021 (US$ 000s)	Total (US$ 000s)
Brine Extraction Wells	1,199	3,135	18,148	19,404	8,257	50,144
Evaporation Ponds	-	17,974	59,434	53,994	13,890	145,292
Lithium Carbonate Plant	-	-	22,597	54,559	110,156	187,312
Infrastructure & General	6,005	19,101	39,582	81,508	26,316	172,511
Total	**7,204**	**40,210**	**139,761**	**209,464**	**158,619**	**555,259**
Expended to date (June 2020)	**7,204**	**40,210**	**139,761**	**117,060**	**-**	**304,235**
Estimate to complete	**-**	**-**	**-**	**92,405**	**158,619**	**251,023**

1.12.2 Production Revenues Schedule

The production revenues schedule is presented in Table 1.8.

TABLE 1.8
PRODUCTION AND REVENUE SCHEDULE

Year	Total Revenues (US$ 000s)	Accumulated Revenues (US$ 000s)	Li_2CO_3 (tonnes)
-2 (2020)	0	0	0
-1 (2021)	0	0	0
1 (2022)	156,933	156,933	19,617
2 (2023)	366,620	523,553	36,662
3 (2024)	480,000	1,003,553	40,000
4 (2025)	480,000	1,483,553	40,000
5 (2026)	480,000	1,963,553	40,000
6 (2027)	480,000	2,443,553	40,000
10 (2031)	480,000	4,363,553	40,000
16 (2037)	480,000	7,243,553	40,000
22 (2043)	480,000	10,123,553	40,000

TABLE 1.8 PRODUCTION AND REVENUE SCHEDULE			
Year	**Total Revenues (US$ 000s)**	**Accumulated Revenues (US$ 000s)**	**Li_2CO_3 (tonnes)**
30 (2051)	480,000	13,963,553	40,000
40 (2061)	480,000	18,763,553	40,000
Total		**18,763,553**	**1,576,279**

Note: *Li_2Co_3 price US$/tonne: $12,000.*

1.12.3 Other Expenses

Other expenses and cash flow items considered in the model include Argentinian transaction tax, Jujuy and private royalties, licenses and permits, export refunds, easement rights, equipment depreciation, sustaining capital, exploration expenses amortization and remediation allowances.

1.12.3.1 Economic Evaluation Results

The economic evaluation results are presented in Table 1.9.

TABLE 1.9 PROJECT EVALUATION RESULTS SUMMARY				
Price Case	**Units**	**High US$14,000**	**Medium US$12,000**	**Low US$10,000**
Key statistics				
Project capacity	tonnes	40,000	40,000	40,000
CAPEX	US$ mln	261	261	261
OPEX	US$/tonne	3,579	3,579	3,579
Max negative cash flows	US$ mln	(228)	(228)	(228)
Lithium price LCE	US$/tonne	14,000	12,000	10,000
Average yearly values				
Revenue	US$ mln	545	469	393
OPEX	US$ mln	(141)	(141)	(141)
Other Expenses	US$ mln	(4)	(4)	(4)
EBITDA	US$ mln	380	308	235
Before taxes				
NPV (6%)	US$ mln	4,950	3,966	2,981
NPV (8%)	US$ mln	3,695	2,955	2,215
NPV (10%)	US$ mln	2,845	2,270	1,696
IRR	%	57%	52%	46%
DCF 8% Payback	Years	2 Y, 2 M	2 Y, 2 M	2 Y, 3 M
After taxes				
NPV (6%)	US$ mln	3,259	2,623	1,986

TABLE 1.9 PROJECT EVALUATION RESULTS SUMMARY				
Price Case	**Units**	**High US$14,000**	**Medium US$12,000**	**Low US$10,000**
NPV (8%)	US$ mln	2,435	1,957	1,479
NPV (10%)	US$ mln	1,874	1,504	1,133
IRR	%	49%	45%	40%
DCF 8% Payback	Years	2 Y, 2 M	2 Y, 2 M	2 Y, 3 M

1. *Presented on a 100% project equity basis. As of the date of this report, LAC currently owns 49% of the project.*
2. *Measured from the end of the capital investment period.*

1.13 CONCLUSIONS AND RECOMMENDATIONS

1.13.1 Conclusions

- Brine: The Mineral Resource and Mineral Reserves described in this report occur in subsurface brine. The brine is contained within the pore space of salar deposits that have accumulated in a structural basin.

- Hydrostratigraphic Model, Mineral Resource Block Model, and Updated Mineral Resource Estimate: Comparing the prior 2012 Mineral Resource Estimate to the Updated Mineral Resource Estimate, the percent change is a decrease of less than 1% for total average lithium concentration of Measured + Indicated; the percent change is an increase of 69% for total LCE Measured + Indicated (11,752,000 tonnes LCE vs. 19,852,700 tonnes LCE). The large increase in overall estimated mass of LCE can be attributed to the expansion and deepening of the Resource Evaluation Area based on exploration results obtained between 2017 and 2019. The small decline in total average concentration can be attributed to the Updated Mineral Resource Estimate affected by the 2017, 2018, and 2019 spatial range of samples collected in the Salar de Orocobre and Archibarca alluvial fan areas of the Project.

- Numerical Model and Mineral Reserve Estimate: A numerical groundwater model was updated in 2019 for an expanded area of the basin to calculate the Updated Mineral Reserve Estimate. The model simulates long-term wellfield extraction from the Cauchari-Olaroz brine aquifer, and is based on a rigorous assembly of groundwater flow and solute transport parameters.

- Updated Mineral Reserve Estimate: The total Updated Mineral Reserve Estimate for Proven and Probable Mineral Reserves is 3,635,040 tonnes of LCE for 40-year life of mine plan. Assuming a processing efficiency of 53.7 percent for forecasting an economic reserve over the 40-year life of mine plan, the total Mineral Reserve Estimate for Proven and Probable Mineral Reserves is 1,952,020 tonnes of LCE.

- Lithium Industry: Market studies indicate that the lithium industry has a promising future. The use of lithium ion batteries for electric vehicles and renewable energy storage applications are driving lithium demand.

- Project Capital Cost: The capital investment for the 40,000 tpa lithium carbonate Cauchari-Olaroz Project, including equipment, materials, indirect costs and contingencies during the construction period is estimated to be US$564.7 million. Costs have been estimated using consulting engineering services for facilities definition and supplier quotations for all major items. A production increase to 40,000 tpa of lithium carbonate, which is a 60% production increase from the previous study, was obtained with a 30% CAPEX increase.

- The main CAPEX driver is pond construction and the lithium carbonate plant, which represent 57% of total project capital expenditures.

- Operating Costs: The operating cost estimate (+/-15% accuracy) for the 40,000 tpa lithium carbonate facility is US$3,579 per tonne. This figure includes pond and plant chemicals, energy/fuel, labour, salt waste removal, maintenance, camp services, and transportation.

- Sensitivity Analysis: The Project is forecast to generate positive cash flow even under unfavourable market conditions for key variables. The sensitivity analysis indicated that lithium carbonate price and annual production have the highest impact on economic performance results (NPV and IRR). Economic performance is less sensitive to capital expenditures and total operating costs.

- Project Economic Viability: Project cash flow analysis for the base case and alternative cases indicates the project is economically viable based on the assumptions used.

1.13.2 Recommendations

- Updates to models representing Mineral Resources and Reserves: conceptual and Mineral Resource and Reserve models should be updated following installation and testing of the new production wells and any additional monitoring wells. The domain of the Resource Evaluation Area should be evaluated so that additional areas can be included as potential new sources for Mineral Resource and Mineral Reserve Estimates. Future modeling activities should include:

    - Comparison of the model hydrostratigraphy against any new borehole data;
    - Comparison of produced brine concentrations against predicted concentrations;
    - Comparison of measured production and monitor well drawdown levels against predicted levels; and
    - Comparison of measured production well flow rates against predicted rates; derivation of updated K (hydraulic conductivity), Ss (specific storage), and Sy (specific yield) estimates from analysis of pumping and drawdown information,

and comparison with the values used in the model; and incorporation of third party brine pumping from adjacent properties if appropriate and if any occurs in the future.

- New Well Testing: In addition to the long-term evaluation components recommended above, each new production well should undergo an initial pumping test, on the order of one month of constant-rate pumping, for assessment of long-term performance.

- Based on the conceptual hydrogeologic system and results of the numerical model, the authors believe it is appropriate to categorize the Proven Mineral Reserve as what we believe is feasible to be pumped to the evaporation ponds and recovered at the end of the first five years of operations as currently modeled for the Updated Mineral Reserve Estimate. During the initial five years of operation and wellfield build-out, the numerical model should be recalibrated based on demonstrated results and new projections should be done for re-examination of the Proven Mineral Reserve and potential for conversion of part of Probable to Proven classification.

- Improving the certainty of the Proven and Probable Mineral Reserves could be gained with scheduled water level measurements along with brine density measurements at production wells and nearby monitoring wells (representing shallow, intermediate, and deep monitoring of the brine aquifer), validation of the water balance and characterization of any changes in inflow to the salar, and additional controlled, long-term aquifer testing to more accurately represent aquifer parameters for calibrating hydraulic parameters in the numerical model. Changes to the hydrostratigraphic unit model based on additional exploration drilling and production well drilling should also be incorporated into future numerical flow and transport modeling.

- Additional certainty in predictive simulations of wellfield extraction and capture of lithium mass could be gained by re-examination of the water balance using measured data at aquifer boundaries, model sensitivity analysis for critical aquifer parameters such as hydraulic conductivity and specific yield, and potentially including effects of off-property production of lithium by adjacent mining operations. Furthermore, variable-density flow and transport should be considered in future model updates given the domain has expanded considerably compared to prior groundwater modeling efforts and now includes larger regions of freshwater inflow. Along with these recommended refinements to improve certainty of the predictive capabilities of the groundwater model, the numerical model should be used as an operational tool to optimize pumping rates at production wells, maximize lithium concentrations, and control the overall wellfield capture.

- Pumping Test Manual: A formal manual should be compiled and followed for execution of construction phase pumping tests.

- Monitoring Activities Manual: A formal manual should be compiled and followed for all long-term monitoring activities.

- Project Database: All existing and new site data should be compiled in a formal database, updated regularly.

- Drainable porosity or S_y estimates relied upon the prior 2012 model estimates because the 2017 and 2018 exploration results lacked S_y estimates. In order to address the uncertainty of S_y estimates for the different stratigraphic groups, ongoing exploration work should include analysis of S_y by use of laboratory methods such as RBRC or similar techniques for core samples, and field methods using calibrated nuclear magnetic resonance ("NMR") borehole logging in open boreholes or in wells with PVC casing installed.

- Lime supply: We recommend that efforts to firm up lime supply source be pursued. The area producer will require support for increasing production capacity as other local producers are depending on the same source. Minera Exar intends to obtain lime from this source and discussions for providing additional support are underway.

- QA/QC: The database should be continually updated and monitored in real time. Personnel should be dedicated to the maintenance of the project database.

- QA/QC: The QA/QC program, using regular insertions of blanks, duplicates, and standards should be continued. All exploration samples should be analyzed at a certified, independent laboratory.

2.0 INTRODUCTION AND TERMS OF REFERENCE

2.1 TERMS OF REFERENCE

Lithium Americas Corp. retained Andeburg Consulting Services Inc. ("ACSI") and Montgomery & Associates ("Montgomery" or "M&A") to complete an independent NI 43-101 compliant Updated Feasibility Study for the Cauchari-Olaroz Project, located in the Province of Jujuy in Argentina. The supervising Independent Qualified Person ("QP") for the Report is Mr. Ernie Burga, P.Eng. of ACSI.

The Updated Feasibility Study considers lithium brine at the Cauchari-Olaroz Project that is potentially amenable to pumping using production wells. The current Mineral Resource and Mineral Reserve Estimates presented in this report has been prepared in compliance with the "CIM Standards on Mineral Resources and Reserves – Definitions and Guidelines" as referred to in NI 43-101 and Form 43-101F, Standards of Disclosure for Mineral Projects and in force as of the effective date of this report. This is consistent with CIM Best Practice Guidelines for Resource and Reserve Estimation for Lithium Brine (dated November 1, 2012), in which it is stated that the CIM considers brine projects to be mineral projects, as defined in NI 43-101.

This report was prepared by the authors, at the request of Lithium Americas Corp., a Vancouver registered company, trading under the symbol of "LAC" on the Toronto Stock Exchange and the New York Stock Exchange with its corporate office at:

300 – 900 West Hastings St
Vancouver, BC
V6C 1E5

This report is considered current as of September 30th, 2019.

2.2 QUALIFIED PERSONS SITE VISITS

Mr. Ernie Burga, P.Eng. (ACSI), conducted a site visit of the Property on January 24, 2017 and June 10 to 12, 2019. (ACSI) to observe the evaporation ponds and interview engineering personnel. Mr. David Burga, P.Geo. (ACSI), conducted a site visit of the Property on January 24, 2017, February 19 and 21, 2019 and most recently between June 10 and 12, 2019 (ACSI) to review the drilling work from 2017 and 2018, the QA/QC procedures, interview geologists on site and conduct a verification sampling program. Mr. Daniel Weber, P.G. (M&A), visited the Project on September 8 and 9, 2018, to review site conditions and to verify 2017 and 2018 core logging and description methods. Mr. Anthony Sanford, Pr.Sci.Nat. visited the Project on February 14 and 15, 2017 and July 23 and 24, 2019 to observe site conditions and interview key environmental personnel.

2.3 SOURCES OF INFORMATION

This report is based, in part, on internal company technical reports maps, published government reports, company letters, memoranda, public disclosure and public information, as listed in the

References at the conclusion of this report. Sections from reports authored by other consultants have been directly quoted or summarized in this report and are so indicated where appropriate.

The Updated Mineral Reserve Estimate was developed for the Project using MODFLOW-USG, a control volume finite difference code, coupled with the Groundwater Vistas modeling interface. The groundwater modeling was supported by geological, hydrogeological, geochemical, and geophysical data collected through field programs at the site.

2.4 UNITS AND CURRENCY

Unless otherwise stated all units used in this report are metric. Salt contents in the brine are reported in weight percentages or mass per volume.

All values are expressed in current US dollars; the exchange rate between the Argentine peso and the US dollar as at September 30, 2020 was AR$79/US$. Argentine peso denominated costs follow the exchange rate as a result of inflation, and there is no expected impact of the exhange rate fluctuation on CAPEX and OPEX; no provision for currency escalation has been included.

The coordinate system used by Cauchari for locating and reporting drill hole information is the UTM system. The property is in UTM Zone 19K and the WGS84 datum is used. Maps in this Report use either the UTM coordinate system or Gauss Kruger-Posgar 94 datum coordinates that are the official registration coordinates of the local registry.

The following list shows the meaning of the abbreviations for technical terms used throughout the text of this report, Table 2.1.

TABLE 2.1
ABBREVIATIONS TABLE

Abbreviation	Meaning
”	inches
1D	One dimensional
3D	Three dimensional
°C	Celsius degrees
A	Altitude, in masl
ADT	Average Daily Traffic
AET	Actual evapotranspiration
α	alpha, the fitting coefficient of the capillary head curve
Ah	Ampere-hour
Amsl	above mean sea level
AR$	Argentine Pesos
ARAWP	ARA WorleyParsons
ASA	Alex Stewart Argentina
ASL	Alex Stewart Laboratories S.A.
ASTM	American Society of Testing and Materials
AT	After Tax
B	Boron

BIT	Before Interest and Tax
Bls	Below land surface
CIM	Canadian Institute of Mining, Metallurgy and Petroleum
Ca	Calcium
$CaCl_2$	Calcium Chloride
$CaCO_3$	Calcium Carbonate
CAGR	Compound Annual Growth Rate
CaO	Calcium Oxide
CAPEX	Capital Expenditure
$CaSO_4 \cdot 2H_2O$	Gypsum
CC	Curvature coefficient
CEO	Chief Executive Officer
CFR	Cost and Freight
CHP	Combined Heat and Power Unit
CIS	Commonwealth of Independent States
Cl	Chloride
CIM	Canadian Institute of Mining, Metallurgy and Petroleum
cm	Centimeter(s)
COMIBOL	Corporacion Minera de Bolivia (Bolivian Mining Corporation)
CSAMT/MT	Controlled source audio-magnetotellurics/
CU	Uniformity coefficient
δ	delta, the exponent for the relative permeability curve
DC + IC	Direct Costs plus Indirect Costs
DD	Diamond drilling
DDH	Diamond drill hole
Deg	Degrees
DEM	Digital Elevation Model
Dep, Amort & RA	Depreciation, Amortization and Remediation Allowance
DFS	definitive feasibility study, 2017 Burga et al. report
DL	Longitudinal Dispersivity
DT	Transverse Dispersivity
Ebitda	Earnings before interest, taxes, depreciation and amortization
EIA	Estudio de Impacto Ambiental (Environmental Impacts Report)
Elevb	Elevation of site b in masl
EP	Exploration Permit
Ep’	Equator Principles
Epan	Pan Evaporation, mm/yr
ET	Evapotranspiration
ETp	potential evaporation
EV	Electric vehicles
FOB	Free on Board
FS	Feasibility study
G&A	General and Administration
g/cm^3	grams per cubic centimeter
g/L	grams per liter
GEC	Geophysical Exploration Consulting

GFL	Jiangxi Ganfeng Limited
GIS	Geographic Information System
h	Hour
h/d	hours per day
H_2S	Hydrogen sulphide
H_3BO_3	Boric acid
ha	hectares
HCO_3	Bicarbonate
HDPE	High Density Polyethylene
HEV	Hybrid electric vehicles
HMS	Hydrologic Modeling System
HSU	Hydrostratigraphic Unit
hPa	hectopascal (100 pascals)
I	Inflow
ICE	Internal combustion engine
ICP	Inductively Coupled Plasma
IFC	International Finance Corporation
IIA	Indicador de Impacto Ambiental (Environmental Impact Indicator)
IIT	Instituto de Investigaciones Tecnológicas (Technology Investigations Institute)
ILO	International Labour Organization
in or ”	inches
INTA	Instituto Nacional de Tecnología Agropecuaria (National Institute of Agricultural Technology)
IRR	Internal Rate of Return
IT	Information Technology
ITT	Instituto de Investigaciones Tecnológicas (Technology Investigations Institute) of the Universidad de Concepción
IUCN	International Union for Conservation of Nature
K	Potassium
K	hydraulic conductivity
$K_2Mg(SO_4)_2{\cdot}4H_2O$	Leonite
$K_2Mg(SO_4)_2{\cdot}6H_2O$	Schoenite
K_2SO_4	Potassium sulfate
$K_2SO_4.CaSO_4{\cdot}H_2O$	Syngenite
$K_3Na(SO_4)_2$	Glaserite
KCl	Potash
kg	kilograms
kg/cm^2	kilograms per square centimeter
Kh	Horizontal Hydraulic Conductivity
Kh,SAND	Sand Horizontal Hydraulic Conductivity
km	kilometers
km^2	square kilometers
km/h	kilometers per hour
KR	Recession constant, h
kt	kilotonne

kt/yr	1,000 tonnes per year
Kv	Vertical Hydraulic Conductivity
kWh	kilo watt hour
kriging	a Gaussian process regression method of interpolation governed by prior covariances
Kx	Hydraulic Conductivity in the X direction
Ky	Hydraulic Conductivity in the Y direction
Kz	Hydraulic Conductivity in the Z direction
L/s	Liters per second
L/min	Liters per minute
LAC	Lithium Americas Corp.
LC	Least concern
LCE	Lithium carbonate equivalent
Li	Lithium
Li_2CO_3	Lithium Carbonate
LiBOB	Lithium bis(oxalate)borate
LiOH	Lithium hydroxide
$LiOH\text{-}H_20$	lithium hydroxide monohydrate
LOM	Life of Mine
lpm	Litres per minute
LSGC	Lower Salt Generation Cycle meters
m	the second fitting exponent for the capillary head curve
m	meters
m/d	meters per day
m/ka	meters every thousand years
masl	meters above sea level
m/s	meters per second
m-1	1/meter
m^2	square meters
m^2/s	square meters per second
m^3	cubic meters
m^3/d	cubic meters per day
m^3/MWh	cubic meter per mega watt hour
m^3/yr	cubic meters per year
mbtc	metres below top of casing
Ma	millions of years
Max	maximum
mbgs	metres below ground surface
Minera Exar	Minera Exar S.A.
ml	milliliters
Mg	Manganese
mg/L	Milligrams per liter
mGal	10^{-3} gal, also called galileo (10^{-3} cm/s^2)
$MgCl_2$	Magnesium chloride
$MgCl_2 \cdot 6H_2O$	Bischofite
$MgCl_2 \cdot KCl \cdot 6H_2O$	Carnalite

$Mg(OH)_2$	Magnesium hydroxide
$MgSO_4 \cdot 7H_2O$	Epsomite
$MgSO_4 \cdot KCl \cdot 3H_2O$	Kainite
MIBC	Methyl Isobutyl Carbinol
mm	millimeters
MMBTU	million(s) British Thermal Units (BTU)
mm/d	millimeters per day
mm/yr	millimeters per year
mm/yy	month/year
Montgomery	Montgomery & Associates
MP	Mining Permit
MR	Mud Rotary
Msl	mean sea level
MT	Million tonnes
Mton	Million U.S. short ton (s)
MW	Mega Watt
n	the fitting exponent for the capillary head curve
n/a	Not Applicable
Na	Sodium
$Na_2Mg(SO_4)_2 \cdot 4H_2O$	Astrakanite
NaCl	Sodium chloride
Na_2CO_3	Sodium carbonate, soda ash
NaOH	Sodium Hydroxide or Caustic Soda
NI	CanadianNational Instrument
NMR	Nuclear Magnetic Resonance
NPV	Net Present Value
φe	Transport properties include effective porosity
OPEX	Operating Costs
Pe	effective porosity
PEA	Preliminary Economic Assessment
PFS	Preliminary Feasibility Study
PoO	Plan of Operations
ppm	parts per million
Project	The Cauchari-Olaroz Lithium Brine Project, Jujuy Province, Argentina
PVC	Polyvinyl Chloride
RBRC	relative brine release capacity
RC	reverse circulation
Ss	specific storage
Sr	residual saturation
SX	solvent extraction
Sy	specific yield
TDS	total dissolved solids
tpa	tonnes per annum (tonnes per year)
US$ 000s	thousands of US dollars

3.0 RELIANCE ON OTHER EXPERTS

Although copies of the tenure documents, operating licenses, permits, and work contracts were reviewed, an independent verification of land title and tenure was not performed. ACSI has not verified the legality of any underlying agreement(s) that may exist concerning the licenses or other agreement(s) between third parties but has relied on the client's lawfirm, Alfaro Abogados, to have conducted the proper legal due diligence for the claims discussed in Section 4.2.

The Updated Mineral Resource and Mineral Reserve Estimate was conducted as a collaborative effort between Montgomery and the Minera Exar project team. The on-site field visit to the Project area was led by Minera Exar representative, Ms. Marcela Casini, and associated field hydrogeologists from Minera Exar. Ms. Casini provided results of the 2017 to 2019 exploration drilling and to Montgomery in digital format, as well as associated data and historical background for prior Resource Estimates. Montgomery visited the site in 2018 prior to updating the Mineral Resource model.

A draft copy of this Report has been reviewed for factual accuracy by LAC, and ACSI has relied on LAC's historical and current knowledge of the Property in this regard.

Any statements and opinions expressed in this document are given in good faith and in the belief that such statements and opinions are not false and misleading at the date of this Report.

4.0 PROPERTY DESCRIPTION AND LOCATION

4.1 PROPERTY DESCRIPTION

The Cauchari and Olaroz Salars are located in the Department of Susques in the Province of Jujuy in northwestern Argentina. The salars extend in a north-south direction from S 23º 18’ to S 24º 05’, and in an east-west direction from W 66º 34’ to W 66º 51’. The average elevation of both salars is approximately 3,950 m.

Figure 4.1 shows the locations of both salars, approximately 270 km northwest of San Salvador de Jujuy, the provincial capital. The midpoint between the Olaroz and Cauchari Salars is located directly on National Highway 52, 55 km west of the Town of Susques where the Project field offices are located. The nearest port is Antofagasta, Chile, located 530 km west of the Project by road.

Figure 4.1 Location of the Cauchari-Olaroz Project

Source: *Minera Exar*

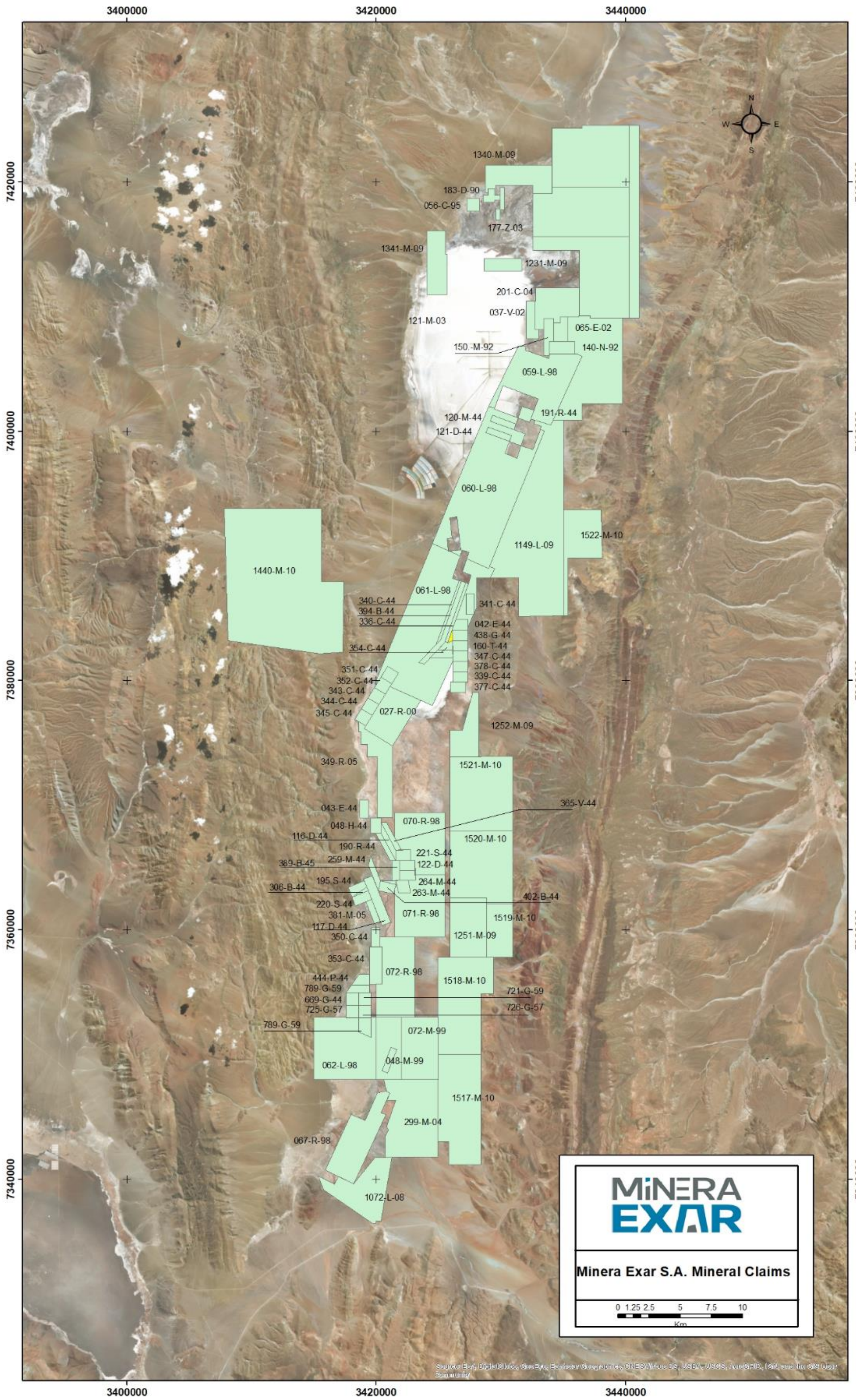
4.2 PROPERTY AREA

Minera Exar has acquired mining and exploration permits applications through acquisition of such permits appications, direct request of permits from the applicable provinicial mining authority and/ or through brines usufruct agreements in the Province of Jujuy. Argentina covering a total of 60,712 ha in the Department of Susques, of which 28,717 ha can support the entire project, presented on Table 4.1. Some of the claims are still in the process of being granted by the Jujuy Mining Court and in order to present a conservative figure, the smaller figure in the 'received' column was used to calculate the property area. Figure 4.2 shows the location of the Minera Exar claims in the Cauchari-Olaroz Project. As shown in the figure, the claims are contiguous and cover most of the Cauchari Salar and the eastern portion of the Olaroz Salar.

The aggregate annual property payment required by the Argentine Mining Code to the Province of Jujuy that Minera Exar needs to attend in order to maintain the tenements claims referenced in Figure 4.2 in good standing is approximately US$268,346 per year.

Under Minera Exar's usufruct agreement with Borax Argentina S.A. ("Borax Argentina") signed on May 15th 2011, Minera Exar acquired Borax Argentina's usufruct rights on properties in the area in exchange for an annual royalty of US$200,000 payable in May of each year plus annual canon rent property payments to Jujuy Province.

Figure 4.2 Minera Exar Property Claims at the Cauchari-Olaroz Project



Source: *Minera Exar*

TABLE 4.1
MINERA EXAR S.A. MINERAL CLAIMS

Claim	File	Owner	Claim Type	Requested	Received	Claim Status	Contract Status
LA YAVEÑA	27-R-00	Minera Exar S.A.	Pedido de Mina	1482/1119	1119	Active	Rights acquired
LUISA	61-I-98	Grupo Minero Los Boros S.A.	Mina	4706	4076/3500	Active	Rights acquired
ARTURO	60-I-98	Grupo Minero Los Boros S.A.	Mina	5100	5049/3500	Active	Rights acquired
ANGELINA	059-I-98	Grupo Minero Los Boros S.A.	Mina		2346	Active	Rights acquired
CAUCHARI ESTE	1149-L-09	Minera Exar S.A.	Pedido de Mina	5860	5856,98//3500	Active	Rights acquired
IRENE	140-N-92	Triboro S.A.	Mina	200	200	Active	Rights acquired
MINERVA	37-V-02	Minera Exar S.A.	Pedido de Mina	250	229	Active	Rights acquired
CHIN CHIN CHULI II	201-C-04	Vicente Costa y otros	Pedido de Mina	941	910	Active	Opted/Usufruct agreement
Hekaton	150-M-92	Electroquimica El Carmen	Mina	200	200	Active	Rights acquired
Victoria I	65-E-02	Electroquimica El Carmen	Mina	300	300	Active	Rights acquired
SAENZ PEÑA (Grupo Minero Boroquímica)	354-C-44	Borax Argentina S.A.	Mina	300	100	Active	Ususfruct Rights acquired
DEMASIA SAENZ PEÑA (Grupo Minero Boroquímica)	354-C-44	Borax Argentina S.A.	Mina	100	59	Active	Ususfruct Rights acquired
LINDA (Grupo Minero Boroquímica)	160-T-44	Borax Argentina S.A.	Mina	100	100	Active	Ususfruct Rights acquired
MARIA TERESA (Grupo Minero Boroquimica)	378-C-44	Borax Argentina S.A.	Mina	100	100	Active	Ususfruct Rights acquired
ARCHIBALD (Grupo Minero Boroquimica)	377-C-44	Borax Argentina S.A.	Mina	100	100	Active	Ususfruct Rights acquired
San Nicolas (Grupo Minero Boroquimica)	191—R-44	Borax Argentina S.A.	Mina	100	100	Active	Ususfruct Rights acquired

Table 4.1 Minera Exar S.A. Mineral Claims							
Claim	**File**	**Owner**	**Claim Type**	**Requested**	**Received**	**Claim Status**	**Contract Status**
Mina Vacante CLOTILDE	121-D-44 // 1642-M-10	Minera Exar S.A.	Pedido de Mina Vacante	100	100	Active/ Under Dispute	Opted
EDUARDO DANIEL	120-M-44	Minera Exar S.A.	Pedido de Mina Vacante	100	100	Active	Purchased
CAUCHARI NORTE	349-R-05	Minera Exar S.A.	Pedido de Cateo	998	998	Active	Purchased
DELIA (Grupo Minero Boroquimica)	42-E-44	Borax Argentina S.A.	Mina	100	100	Active	Usufruct Rights acquired
GRAZIELLA (Grupo Minero Boroquimica)	438-G-44	Borax Argentina S.A.	Mina	100	100	Active	Usufruct Rights acquired
MONTES DE OCA (Grupo Minero Boroquimica)	340-C-44	Borax Argentina S.A.	Mina	100	99	Active	Usufruct Rights acquired
JUANCITO (Grupo Minero Boroquimica)	339-C-44	Borax Argentina S.A.	Mina	100	100	Active	Usufruct Rights acquired
UNION (Grupo Minero Boroquimica)	336-C-44	Borax Argentina S.A.	Mina	300	100	Active	Usufruct Rights acquired
JULIA (Grupo Minero Boroquimica)	347-C-44	Borax Argentina S.A.	Mina	300	100	Active	Usufruct Rights acquired
MASCOTA (Grupo Minero Boroquimica)	394-B-44	Borax Argentina S.A.	Mina	300	300	Active	Usufruct Rights acquired
UNO (Grupo Minero Boroquimica)	345-C-44	Borax Argentina S.A.	Mina	100	100	Active	Usufruct Rights acquired
TRES (Grupo Minero Boroquimica)	343-C-44	Borax Argentina S.A.	Mina	100	100	Active	Usufruct Rights acquired
DOS (Grupo Minero Boroquimica)	344-C-44	Borax Argentina S.A.	Mina	100	100	Active	Usufruct Rights acquired
CUATRO (Grupo Minero Boroquimica)	352-C-44	Borax Argentina S.A.	Mina	100	100	Active	Usufruct Rights acquired
CINCO (Grupo Minero Boroquimica)	351-C-44	Borax Argentina S.A.	Mina	100	100	Active	Usufruct Rights acquired
ZOILA (Grupo Minero Boroquimica)	341-C-44	Borax Argentina S.A.	Mina	100	100	Active	Usufruct Rights acquired
SARMIENTO (Grupo Minero Boroquimica)	190-R-44	Borax Argentina S.A.	Mina	100	100	Active	Usufruct Rights acquired
PORVENIR (Grupo Minero Boroquimica)	116-D-44	Borax Argentina S.A.	Mina	100	100	Active	Usufruct Rights acquired
ALICIA (Grupo Minero Boroquimica)	389-B-44	Borax Argentina S.A.	Mina	100	100	Active	Usufruct Rights acquired

Table 4.1
Minera Exar S.A. Mineral Claims

Claim	File	Owner	Claim Type	Requested	Received	Claim Status	Contract Status
CLARISA (Grupo Minero Boroquimica)	402-B-44	Borax Argentina S.A.	Mina	100	100	Active	Usufruct Rights acquired
DEMASIA CLARISA (Grupo Minero Boroquimica)	402-B-44	Borax Argentina S.A.	Mina	19	19	Active	Usufruct Rights acquired
INES (Grupo Minero Boroquimica)	220-S-44	Borax Argentina S.A.	Mina	100	100	Active	Usufruct Rights acquired
MARIA CENTRAL (Grupo Minero Boroquimica)	43-E-44	Borax Argentina S.A.	Mina	100	100	Active	Usufruct Rights acquired
MARIA ESTHER (Grupo Minero Boroquimica)	259-M-44	Borax Argentina S.A.	Mina	100	100	Active	Usufruct Rights acquired
SAHARA (Grupo Minero Boroquimica)	117-D-44	Borax Argentina S.A.	Mina	300	300	Active	Usufruct Rights acquired
PAULINA (Grupo Minero Boroquimica)	195-S-44	Borax Argentina S.A.	Mina	100	100	Active	Usufruct Rights acquired
SIBERIA (Grupo Minero Boroquimica)	306-B-44	Borax Argentina S.A.	Mina	24	24	Active	Usufruct Rights acquired
SAN ANTONIO	72-M-99	Minera Exar S.A.	Mina	2165	2165 Registro, pero luego libre 2400//900	Active	Rights acquired
TITO	48-P-98	Minera Exar S.A.	Mina	200	100	Active	Rights acquired
MIGUEL	381-M-05	Minera Exar S.A.	Pedido de Mina	100	100	Active	Rights acquired
VERANO I	299-M-04	Luis Austin Cekada and Camilo Alberto Morales	Mina	2448	2448/2094 (Servidumbre de Electroducto)	Active	Rights acquired
CHICO	1231-M-09	Minera Exar S.A.	Pedido de mina	300	Probable Rechazo	Active	Interés/Derechos Adquiridos
CHICO 3	1251-M-09	Minera Exar S.A.	Pedido de Mina	1400	1400	Active	Interés/Derechos Adquiridos
CHICO 4	1252-M-09	Minera Exar S.A.	Pedido de Mina	1100	1100/62	Active	Interés/Derechos Adquiridos

TABLE 4.1
MINERA EXAR S.A. MINERAL CLAIMS

Claim	File	Owner	Claim Type	Requested	Received	Claim Status	Contract Status
SULFA 6	70-R-98	Minera Exar S.A.	Mina	2000/1395	1683Peticion de Mensura	Active	Rights acquired
SULFA 7	71-R-98	Minera Exar S.A.	Mina	2000/1667	1824Peticion de Mensura	Active	Rights acquired
SULFA 8	72-R-98	Minera Exar S.A.	Mina	2000/1417	1841 Petición de Mensura	Active	Rights acquired
SULFA 9	67-R-98	Minera Exar S.A.	Mina	1336	1570 Petición de Mensura//1582 Ultimo Informe Reg. Grafico	Active	Rights acquired
BECERRO DE ORO (Grupo Minero Osiris 104-I-90)	264-M-44	Minera Exar S.A.	Mina	100	100	Active	Rights acquired
OSIRIS (Grupo Minero Osiris 104-I-90)	263-M-44	Minera Exar S.A.	Mina	100	100	Active	Rights acquired
ALSINA (Grupo Minero Osiris 104- I-90)	48-H-44	Minera Exar S.A.	Mina	100	100	Active	Rights acquired
JORGE	62-L-98	Minera Exar S.A.	Mina	2461	2351	Active	Rights acquired
LA INUNDADA (GRUPO LA INUNDADA)	669-G-56	Minera Exar S.A.	Mina	100	100/137 Grupo Minero	Active	Rights acquired
Inundada Este (Grupo Minero La Inundada)	721-G-57	Minera Exar S.A.	Mina	100	100	Active	Rights acquired
Jujuy (Grupo Minero La Inundada)	725-G-57	Minera Exar S.A.	Mina	100	100	Active	Rights acquired
Inundada Sud (Grupo Minero La Inundada)	789-G-57	Minera Exar S.A.	Mina	100	100	Active	Rights acquired
Susques (Grupo Minero La Inundada)	726-G-57	Minera Exar S.A.	Mina	100	100	Active	Rights acquired
ALEGRIA I	1337-M-09	Minera Exar S.A.	Pedido de Mina	3000	Likely Rejected	Active /Under Review	Interest

TABLE 4.1
MINERA EXAR S.A. MINERAL CLAIMS

Claim	File	Owner	Claim Type	Requested	Received	Claim Status	Contract Status
ALEGRIA 2	1338-M-09	Minera Exar S.A.	Pedido de Mina	3000	Likely Rejected	Active /Under Review	Interest
ALEGRIA 3	1339-M-09	Minera Exar S.A.	Pedido de Mina	3000	Likely Rejected	Active/With Recourse	Interest
ALEGRIA 4	1340-M-09	Minera Exar S.A.	Pedido de Mina	999	Likely Rejected	Active /Observations to be Resolved	Interest
ALEGRIA 5	1341-M-09	Minera Exar S.A.	Pedido de Mina	793	Rejected	Active/with Recourse	Interest
ALEGRIA 7	1343-M-09	Minera Exar S.A.	Pedido de Mina	1277	1036	Active/Recourse to be Resolved	Interest
Alegría 6	1342-M-09	Minera Exar S.A.	Pedido de Mina	31	Rejected	Active/with Recourse	Interest
CAUCHARI SUR	1072-L-08	Minera Exar S.A.	Cateo	1559	1499//612 (Servidumbre de Electoducto)	Active	Interest
CAUCHAR OESTE	1440-M-10	Minera Exar S.A.	Cateo	9751	9479	Active	Interest
JULIO A. ROCA (Grupo Minero Boroquimica)	444-P-44	Borax Argentina S.A.	Mina	100	100	Active	Usufruct Rights acquired
ELENA (Grupo Minero Boroquimica)	353-C-44	Borax Argentina S.A.	Mina	300	301	Active	Usufruct Rights acquired
EMMA (Grupo Minero Boroquimica)	350-C-44	Borax Argentina S.A.	Mina	100	100	Active	Usufruct Rights acquired
URUGUAY (Grupo Minero Boroquimica)	89-N-44	Borax Argentina S.A.	Mina	100	100	Active	Usufruct Rights acquired
AVELLANEDA (Grupo Minero Boroquimica)	365-V-44	Borax Argentina S.A.	Mina	100	100	Active	Usufruct Rights acquired

Table 4.1 **Minera Exar S.A. Mineral Claims**							
Claim	**File**	**Owner**	**Claim Type**	**Requested**	**Received**	**Claim Status**	**Contract Status**
BUENOS AIRES (Grupo Minero Boroquimica)	122-D-44	Borax Argentina S.A.	Mina	100	100	Active	Ususfruct Rights acquired
MORENO (Grupo Minero Boroquimica)	221-S-44	Borax Argentina S.A.	Mina	100	100	Active	Ususfruct Rights acquired
Payo III	1517-M-10	Minera Exar S.A.	Pedido de Mina	2905	2890/2388 (Servidumbre de Electroducto)	Active	Rights acquired
Payo IV	1518-M-10	Minera Exar S.A.	Pedido de Mina	3003	2981	Active	Rights acquired
Payo V	1519-M-10	Minera Exar S.A.	Pedido de mina	896	896	Active	Rights acquired
Payo VI	1520-M-10	Minera Exar S.A.	Pedido de Mina	2800	2800	Active	Rights acquired
Payo VII	1521-M-10	Minera Exar S.A.	Pedido de Mina	2999	2999	Active	Rights acquired
Payo VIII	1522-M-10	Minera Exar S.A.	Pedido de Mina	1343	1337	Active	Rights acquired
Nelida	56-C-95	Electroquimica El Carmen	Pedido de Mina Vacante	100	100	Active	Rights acquired
Eduardo	183-D-90	Electroquimica El Carmen	Mina	100	100	Active	Rights acquired
Maria Angela	177-Z-03	Ceballos Oscar	Pedido de Mina	100	100	Active	Rights acquired

4.3 SQM JOINT VENTURE

On March 28, 2016, SQM made a US$25M capital contribution in the Company for a 50% interest in Minera Exar, and the parties executed a Shareholders Agreement that established the terms by which the parties plan to develop the Cauchari-Olaroz Project. Following receipt of the contribution, Minera Exar repaid loans and advances from Lithium Americas in the amount of US$15M. The remaining US$10M was for project development costs in the Joint Venture.

4.4 GANFENG JOINT VENTURE

On October 31, 2018, the Company announced the closing of a transaction with Ganfeng Lithium and SQM. Under the transaction Ganfeng Lithium agreed to purchase SQM's interest in the Cauchari-Olaroz Project. LAC increased its interest in the Project from 50% to 62.5% with Ganfeng holding the remaining 37.5% interest. Ganfeng Lithium also provided the Company with a US$100 million unsecured, limited recourse subordinated loan facility to fund its 62.5% share of the project expenditures.

On August 19, 2019 the Company anounced that it had closed the previously announced Project Investment in which a subsidiary of GFL subscribed for newly issued shares of Minera Exar, the holding company for the Cauchari-Olaroz lithium brine project. The parties executed an updated Shareholders Agreement that established the terms by which the parties plan to develop the Cauchari Project.

In consideration for the newly issued shares, Minera Exar received US$160 million in cash to continue to fund the Project's construction activities. Upon closing, Ganfeng Lithium increased its interest in Cauchari-Olaroz from 37.5% to 50%, with Lithium Americas holding the remaining 50% interest.

On August 27, 2020, LAC and Ganfeng closed a transaction whereby Ganfeng increased its participating interest in Minera Exar to 51% by completion of US$16 million capital contribution in Minera Exar. At such transaction closing, GFL owned a 51% equity interest in Minera Exar and LAC a 49%. The parties made certain consequential amendments to the shareholders agreement governing their relationship to refer to the new equity ownership structure in Minera Exar.

4.4.1 Los Boros Option Agreement

On September 11, 2018 the Joint Venture exercised a purchase option agreement ("Option Agreement") with Grupo Minero Los Boros ("Los Boros"), entered into on March 28, 2016, for the transfer of title to the Joint Venture for certain mining properties that comprised a portion of the Cauchari-Olaroz project.

Under the terms of the Option Agreement, the Joint Venture paid US$100,000 upon signing and exercised the purchase option for the total consideration of US$12,000,000 to be paid in sixty quarterly instalments of US$200,000. The first installment becomes due upon occurrence of one of the following two conditions, whichever comes first: the third anniversary of the purchase option exercise date or the beginning of commercial exploitation with a minimum production of 20,000 tons of lithium carbonate equivalent. As security for the transfer of title to the mining properties, Los Boros granted to the Joint Venture a mortgage over those mining properties for US$12,000,000. In accordance with the Option Agreement, on November 27, 2018 Minera Exar paid Los Boros a US$300,000 royalty which was due within 10 days of the commercial plant construction start date.

According to the Option Agreement, a 3% net profit interest royalty will have to be paid to Los Boros by the Joint Venture for 40 years, payable in Argentinian pesos, annually within the 10 business days after calendar year end.

The Joint Venture can cancel the first 20 years of net profit interest royalties in exchange for a one-time payment of US$7,000,000 and the next 20 years for an additional payment of US$7,000,000.

4.4.2 Borax Argentina S.A. Agreement

Under Minera Exar's usufruct agreement with Borax Argentina S.A. ("Borax Argentina"), on May 19th, 2011 Minera Exar acquired its usufruct rights to Borax Argentina's properties in the area. On execution, the agreement requires Minera Exar to pay Borax Argentina an annual royalty of US$200,000 in May of each year.

4.4.3 JEMSE Arrangement

On August 26, 2020 GFL, LAC and Exar entered into a Share Acquisition Option Execution Agreement with Jujuy Energía y Minería S.E. ("JEMSE") a Province of Jujuy state company, setting the guidelines of JEMSE acquisition of an 8,5% participating interest in Minera Exar, propotionally diluting GFL and LAC participating interest accordingly. JEMSE incorporation is expected to close during October 2020. JEMSE will acquire the Minera Exar shares for a consideration of US$1 plus an amount equal to 8.5% of the capital contributions in Minera Exar. JEMSE will pay for this amount to the shareholders through the assignment of one-third of the dividends to be received by JEMSE from Minera Exar after taxes. In accordance with the agreement, for future equity contributions GFL and LAC are obliged to loan to JEMSE 8.5% of the contributions necessary for JEMSE to avoid dillution, which loans also would be repayable from the same one-third dividends assignment, after taxes.

The above-mentioned agreements with private mineral rights owners are independent of, and do not impinge upon the Provincial Government royalty of up to 2% of the value of the mineral at well head. A summary of royalties and payments is presented in Table 4.2.

Table 4.2 **Annual Royalties and Payments**	
Royalties	**Value**
Borax Argentina S.A.	US$200,000
Los Boros	3% Net Profit or US$7MM payment every 20 years
Provincial Government of Jujuy	2% Value of Mineral at Well Head
Aboriginal Program Payments	**US$**
2017-2019 Total Payment	**239,417**
2020 – Onwards Annual Payments (estimated)	**552,000**

4.5 TYPE OF MINERAL TENURE

There are two types of mineral tenure in Argentina: Mining Permits and Exploration Permits (“cateos”). Mining Permits are licenses that allow the property holder to exploit the property, provided environmental approval is obtained. Exploration Permits are licenses that allow the property holder to explore the property for a period of time that is proportional to the size of the property (approximately 3 years per 10,000 ha). Exploration activity under Exploration Permits also require Environmental Permits. An Exploration Permit can be transformed into a Mining Permit any time before the expiry date of the Exploration Permit by filing a mineral discovery claim. Mining or Exploration can start only after obtaining the environmental impact assessment permit for the activity such permit is required.

Minera Exar acquired its interests in the Cauchari and Olaroz Salars through either direct staking or exploration/usufruct of brines contracts with third party property owners (mainly Borax Argentina S.A.).

4.6 PROPERTY BOUNDARIES

The Minera Exar claims follow the north-northeast trend of the Cauchari and Olaroz Salars. Figure 4.2 shows that the boundaries of the claims are irregular in shape (a reflection of the mineral claim law of the Province of Jujuy). All coordinates are recorded in the Gauss Krueger system with the WGS 84 datum. The coordinates of the boundaries of each claim are recorded in a file in the claims department of the Jujuy Provincial Ministry of Mines and are also physically staked on the ground with metallic pegs in concrete pillars. The entire area of exploitation has been surveyed and physically staked.

4.7 ENVIRONMENTAL LIABILITIES

Minera Exar has developed a plan that promotes social and economic development within a sustainable framework. Minera Exar began work on the Communities Relations Program with the Susques Department in 2009. This plan was created to integrate local communities into the Project by implementing programs aimed at generating positive impacts on these communities.

The Communities Relations Program has been divided into several sub-programs: one dealing with external and internal communications to provide information and transparency; a second is a consultation program that allows Minera Exar to acknowledge community perceptions of their mining activities; a third program deals with service and supply contracts to be signed with the communities. The intended outcome of the program is to deliver on social, cultural, and environmental initiatives.

Minera Exar has signed formal contracts with neighbouring communities that own the surface rights where the Project will be developed. According to these contracts, the communities agree to grant Minera Exar traffic and other rights in exchange for cash payments to be used based on decisions made at community assemblies.

The potential impacts to local fauna due to mine development must be managed to ensure they are minimal. Vicuñas are common in the region. The vicuña was traditionally exploited by local inhabitants for its wool. Past unrestricted hunting resulted in near extinction of the vicuña, which is now protected under a 1972 international agreement signed between Argentina, Chile, Bolivia, Peru, and Ecuador. It has been observed that vicuñas are present on the Archibarca Fan, part of which would be partially affected by Project development. The impact to vicuñas can be minimized by implementing the actions provided in the Project management plan in the IIA ("Estudio de Impacto Ambiental").

With regard to potential development effects on other species in the area, such as ocultos, small lizards, and birds, a primary concern is the danger associated with accidental confinement in the large processing ponds. This potential should be minimized by methods such as: devices to ward animals away from the ponds, rescuing animals that may become entrapped, and relocation of animals to appropriate areas nearby.

Minera Exar has prepared an inventory of known archaeological sites in the Department of Susques. An archeological survey of the property identifies all findings that will need to be managed in order to minimize any impact from the Project. This information is also filed with the authorities. Additional information is provided in Section 20.1.

The IIA expressly considers the closing mechanism and the post-closure monitoring of the proposed mine. The federal environmental legislation in Argentina and the provincial environmental legislation in Jujuy do not require any closure bonding or guarantees.

4.8 PERMITS

The Provincial Government of Jujuy (Direccion Provincial de Mineria y Recursos Energéticos) approved the Minera Exar Environmental Impacts Report (the "IIA") for the Cauchari-Olaroz Project exploration work, by Resolution No. 25/09 on August 26, 2009. Updates are required every two years to accurately reflect the ongoing exploration program. For the Cauchari-Olaroz Project these included a 2009 update for IIA reports ("Actualización de Impacto Ambiental") incorporating topographic and geophysical studies, opening supply wells and new exploration wells. In addition, there was an IIA for the installation of a brine enrichment pilot plant, and in 2011 the renewal of the IIA was presented for the exploration stage, specifying all activities undertaken, and planned exploration activities for the 2012-2013 period. An addendum to the IIA for Exploration was submitted in May 2014 for the installation, implementation and subsequent operation of a Posco lithium phosphate plant which was approved in July 2014 (Resolution No. 011/2014). And in June 2015 and June 2016 two separate IIA exploration permit addenda were submitted for on-going exploration work (see table below). These remained in the approval process and, in agreement with the authority, were replaced in the approval process by the update of the IIA for exploration submitted in February 2017, and was approved for exploration works, by Resolution No. 008/17 on September 19, 2017. The IIA and its updates have been presented to accurately reflect the ongoing exploration program and are detailed in Table 4.3.

TABLE 4.3
EXPLORATION PERMITS FOR CAUCHARI-OLAROZ PROJECT EXPLORATION WORK

Report Submitted	Date Presented	Approvals	Observations
Environmental Impacts Report for Exploration (IIA Exploration)	2009	Resolution No. 25/09, August 26, 2009	Original exploration permit for Project
Environmental Impacts Report for Exploration (AIIA Exploration 2009)	2009		Included topographic and geophysical studies, opening supply wells and new exploration wells
Environmental Impacts Report for Exploration (AIIA Exploration 2011)	September 2011	Resolution No. 29/2012, November 08, 2012	All activities undertaken to date, and planned exploration activities for the 2012-2013 period
Addendum to Environmental Impacts Report for Exploration, Posco Pilot Plant	May 2014	Resolution No. 011/2014, July 15, 2014	Installation, implementation and subsequent operation of the POSCO lithium phosphate plant
Environmental Impacts Report for Exploration (AIIA Exploration 2015)	June 2015	Update cancelled and filed: DMyRE Note No. 101/2019	Operation of the pilot-scale POSCO plant and the continuation of exploration including perforation of brine well field for the trial to test the hydraulic properties of the different aquifers. A drilling plan for the drilling of 49 wells was also presented as well as the update of the 4 wells drilled up to the time of the presentation of the report.

TABLE 4.3 **EXPLORATION PERMITS FOR CAUCHARI-OLAROZ PROJECT EXPLORATION WORK**			
Report Submitted	**Date Presented**	**Approvals**	**Observations**
Environmental Impacts Report for Exploration	June 2016	Update cancelled and filed: DMyRE Note No. 101/2019	Presentation of the proposed work to be carried out over the following months: Phase 1: measurement of hydrogeological variables; Phase 2: pond construction and impermeability tests; Phase 3: drilling of deep wells; Phase 4: pilot plant tests and trials.
Update to Environmental Impacts Report for Exploration	February 2017	Resolution No.008/2017, September 19, 2017	It was agreed with the Authority that the Environmental Impacts Report for exploration (June 2016) would not be evaluated by the Authority and that this latest Environmental Impacts Report (Exploration, February 2017) would replace it. Update of the proposed works to be carried out during next years. This consisted of: seismic reflection, SEV, trenches, measurement of hydrogeological variables; pond construction, impermeability tests; drilling of deep wells; pilot plant tests, construction of embankments, auxiliary roads and drilling platforms, drilling of wells, construction of facilities and camp. It also described the exploration works that were to be developed, consisting of geochemical sampling and exploration wells.
Update to Environmental Impacts Report for Exploration 2019 -2021	In process		This up-dated biannual IIA for exploration has been submitted to the authority for approval. The IIA is being presented to accurately reflect the ongoing exploration program and details the activities the Minera Exar will carry out during the 2019-2021 period.

An Environmental Impacts Report ("IIA") for the exploitation phase was presented in December 2011 and approved by Resolution No. 29/2012 on 08 November 2012 based on an initial annual production of 20,000 tonnes of lithium carbonate with a second expansion phase to 40,000 tonnes/year.

A report for the update of the permit was submitted in March 2015 (AIIA Exploitation March 2015) based on the same Project description as in the initial 2011 filing. A further update was submitted in February 2017 based on updated Project parameters (AIIA Exploitation February

2017) and it was agreed with the Authority that this would replace the AIIA Exploitation March 2015 submission and was approved by Resolution No. 010/2017 on 05 October 2017.

The permit for exploitation issued in 2012 for the Project (IIA Exploitation December 2011) was still valid during this approval process, as ratified by a letter issued by the Gobierno de Jujuy (NOTA SMeH No 043/20179, issued 16 March 2017), which stated that “construction may commence on the necessary infrastructure approved in this permit, without prejudice to future adaptations and updates that the mining operator performs with respect to the mining project, which are subject to the analysis of this authority.”

A further biannual update to the Environmental Impacts Report for Exploitation (AIIA Exploitation 2019) for the Cauchari-Olaroz Project has been submitted for evaluation by the Authority. This new document includes the new environmental studies carried out and information collected during the last two years as well as taking account of the current Project layout.

Exploitation permits and reports submitted are summarized in Table 4.4.

The IIA expressly considers the closing mechanism and the post-closure monitoring of the proposed mine. The federal environmental legislation in Argentina and the provincial environmental legislation in Jujuy do not require any closure bonding or guarantees and as a result, there are no bond, closure or remediation requirements, however, the cash flow model includes estimated closure and remediation cost of US$32.5 million in the end of the mine life for Minera Exar’s environmental and closure obligations in order to comply with the considerations in the IIA.

Minera Exar has paid the water fee through 2018. The water concession permit (45 L/s) was approved and on 18 September 2020 Minera Exar requested an amendment to the permit for 150 (L/s).

TABLE 4.4
EXPLOITATION PERMITS FOR CAUCHARI-OLAROZ PROJECT

Report Submitted	Date Presented	Approvals	Observations
Environmental Impacts Report for Exploitation (IIA Exploitation December 2011)	December 2011	Resolution No. 29/2012, November 08, 2012	Production of 20,000 tonnes/year of lithium carbonate with a second expansion phase to 40,000 tonnes/year
Biannual Environmental Impacts Report for Exploitation (AIIA Exploitation March 2015)	March 2015	Update cancelled and filed: DMyRE Note No. 101/2019	Biannual update of the Environmental Impacts Report (AIIA) approved in 2012, based on exactly the same project approved in 2012

TABLE 4.4 EXPLOITATION PERMITS FOR CAUCHARI-OLAROZ PROJECT			
Report Submitted	**Date Presented**	**Approvals**	**Observations**
Biannual Environmental Impacts Report (Exploitation) (AIIA Exploitation February 2017)	February 2017	Resolution No. 010/2017, October 05, 2017	It was agreed with the Authority that the Environmental Impacts Report for exploitation (AIIA March 2015) would not be evaluated by the Authority and that this document (AIIA Exploitation, February 2017) would replace it Production of 25,000 tonnes/year of lithium carbonate with a second expansion phase to 50,000 tonnes/year
Biannual Environmental Impacts Report (Exploitation) (AIIA Exploitation 2019)	September 2019	In process	The AIIA 2019, exploitation stage, was completed in June 2019 and approval is expected by November 2020.

4.9 ABORIGINAL COMMUNITIES

The surface rights of the area subject to exploitation are owned by the aboriginal communities of Pastos Chicos (10-23-2011), Olaroz Chico (12-20-2011), Huancar (12-20-2011), Puesto Sey (12-14-2011), and a part of El Toro (as an easement for the water and gas pipelines), some locations are shown in Figure 5.1. Ownership of the ground that is not currently proposed for exploitation also includes Portico de los Andes and Catua (2-23-2012).

Minera Exar has completed contracts with each aboriginal community to have the right to develop the mine and use local water resources and transit. The arrangements vary between communities, but they all include the following (see Section 20.1.7.2 Community Relations Program):

- Aggregate payments of approximately US$239,417 per year between 2017-2019;
- Aggregate payments of approximately US$552,000 per year in 2020 and after;
- Joint environmental monitoring programs;
- Priority rights for any job for which a person from the community is qualified;
- Training on site to qualify for employment;

- A school of business training in each community to assist in setting up businesses for the provision of services during construction; and

- Individual infrastructure programs in each community.

5.0 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE, AND PHYSIOGRAPHY

5.1 TOPOGRAPHY

The Cauchari and Olaroz Salars are bounded on the east and west by mountains that range in elevation from 4,600 m to 4,900 m (Figure 5.1). The Cauchari Salar forms an elongated northeast-southwest trending depression extending 55 km in a north-south direction and approximately 6 km to 10 km in an east-west direction. The Olaroz Salar extends 40 km north-south and 10 km to 15 km east-west. The elevation of the floor of the salars ranges from 3,910 m to 3,950 m. There is negligible vegetation on the surface of the salars.

5.2 ACCESS

The main access to the Olaroz and Cauchari Salars from San Salvador de Jujuy is via paved National Highways 9 and 52, as shown in Figure 4.1. The midpoint between the two salars is located along National Highway 52 (Marker KM 192). Paso Jama, a national border crossing between Chile and Argentina (also on National Highway 52) is 100 km west of the Project. These highways carry significant truck traffic, transporting borate products to market from various salars in northern Argentina. Access to the interior of the Olaroz and Cauchari Salars is possible through a gravel road, Highway 70, which skirts the west side of the salars.

5.3 POPULATION

The Town of Susques, (population of 1,611 according to a 2010 census), 45 km east of the Olaroz Salar, is the nearest population centre (Figure 5.1). Further east lies the provincial capital of San Salvador de Jujuy (population of 257,000 according to a 2010 census) and the settlement of Catua (population of 427 according to a 2010 census) to the sou.+thwest. Minera Exar intends to hire local employees for the Project and transports them to and from the site by bus.

Figure 5.1 Regional Topography and Population Centres Near the Cauchari-Olaroz Project

Source: *Minera Exar*

5.4 CLIMATE

The climate in the region of the Cauchari-Olaroz Salares is severe as a result of its geographical position bordering elevations of 4,000 masl, and due to the effect of two semi-permanent high-pressure systems. The Pacific anticyclone, which operates mainly in winter, provides very dry air to the region, and the Atlantic anticyclone, which brings warm and moist air to the region, mainly in the summer.

The climate favors the recovery of some minerals such as lithium through processes that depend on the evaporation caused by the severe conditions and a large amount of solar radiation available all year in the region.

In the project area, Minera Exar installed two weather stations in 2010 and 2018.

The first was Vaisala, model MAWS301 and the second DAVIS model Vantage Pro (www.davisinstruments.com/solution/vantage-pro2/).

The Vaisala weather station collected reliable data from May 18, 2010, to December 2015, The Davis Weather Station began recording data on September 25, 2018 until the effective date of this report. Data from this station have not yet met one year of records, so they are not presented in this report.

5.4.1 Vaisala Station

Parameters recorded by Vaisala station are in Table 5.1.

The parameters of temperature, dew point, Net radiation and Evaporation are estimated are by Vaisala but are not direct measurements.

TABLE 5.1
MEASURED PARAMETERS - VAISALA WEATHER STATION

Parameter	Units
Air Temperature (Tamb)	°C
Relatively Humidity (RH):	%
Temperature dew point (DP):	°C
Atmopheric pressure (Patm)	hpa
Wind Speed (VV)	m/s
Maximum Wind Speed (VMV)	m/s
Minimum Wind Speed (VmV)	m/s
Wind Direction (DV)	
Maximum Wind Direction (DMV)	
Minimum Wind Direction (DmV)	
Solar Radiation (SR)	W/m2

TABLE 5.1 MEASURED PARAMETERS - VAISALA WEATHER STATION	
Parameter	**Units**
Net Radiation (NR)	W/m2
Precipitation (PR)	mm
Evaporation (Evap)	mm

5.4.2 Regional Meteorological Stations

Several regional meteorological stations are located in surrounding communities and provide historical temperature and precipitation records that are used to validate site-collected data and assess the potential long-term variability of climate at the site. The period of record and location of the most representative of these weather conditions are shown in Table 5.2. A map illustrating the location of the stations closest to the project site (Susques, Olacapato and San Antonio de los Cobres) is presented in Figure 7.10, the black dot with a number beside it represents the meteorological station.

TABLE 5.2 CLIMATE RECORDS IN NORTHWEST ARGENTINA				
Station	**Latitude**	**Longitude**	**Elevation**	**Period**
Coranzuli	23.03 S	66.40 W	4,100 m	1972/96
Castro Tolay	23.35 S	66.08 W	3,430 m	1972/90
Susques	23.43 S	66.50 W	3,675 m	1972/96
Mina Pan de Azucar	23.62 S	66.03 W	3.690 m	1982/90
Olacapato	24.12 S	66.72 W	3,820 m	1950/90
San Antonio de Los Cobres	24.22 S	66.32 W	3,775 m	1949/90
Salar de Pocitos	24.38 S	67.00 W	3,600 m	1950/90

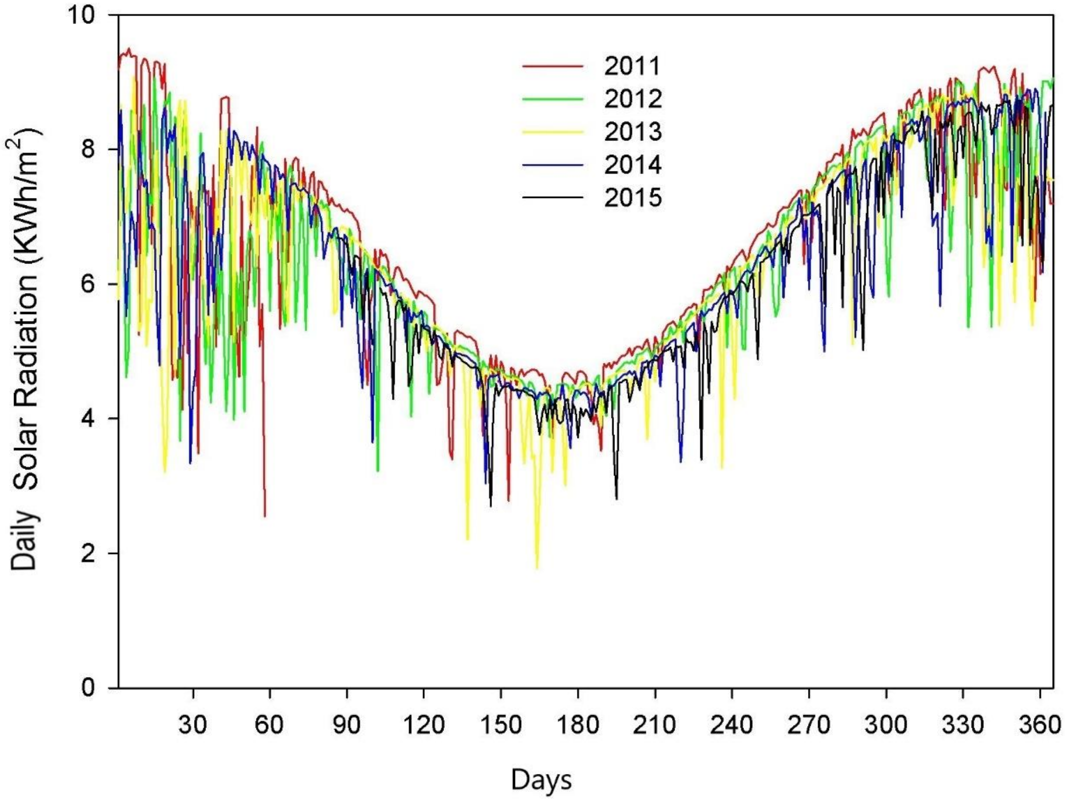
5.4.2.1 Solar Radiation

Statistical data analysis indicates that monthly hourly values through all of the years of measurements are decreasing in amplitude (day duration) and maximum value, from summer to winter. Then the values increase, from winter to summer (Figure 5.2).

Data dispersion is greater in the summer months. This is due to the effect of cloud cover, which appears to be greater in summer and spring (November to February).

Solar Radiation, being seasonal, has an average daily value in November, of 8.31 kWh/m^2 (daily) and minimum in June of 4.30 kWh/m^2 (daily).

Figure 5.2 Solar Radiation, 2011-2015



Source: *Salazar (2019)*

5.5 TEMPERATURE

As the Olaroz-Cauchari Salars are located in a plateau at approximately 4,000 masl, the temperature varies considerably between day and night, over 20 °C on many days.

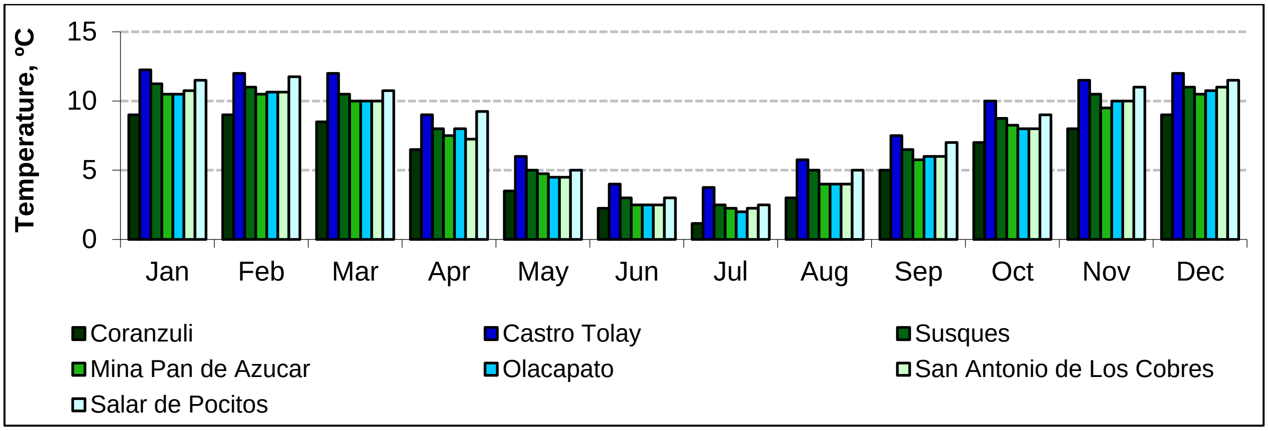
Temperature in the Puna Region is also affected by the seasons, with winter minimum temperatures dropping to between -25 °C and -30 °C, while summer maximum temperatures reach between 15 °C and 25 °C.

Meteorological stations are located in many surrounding communities (Figure 7.10) providing additional historical records for assessing the potential variability of climate at the site. The period of record and location of the most representative of these weather conditions are shown in Table 5.3.

The mean temperatures recorded by the stations in Table 5.3, are shown in Figure 5.3. The 2012 values are taken from King, Kelley, Abbey (2012) and the 2011-2015 Vaisala Station values are taken from Salazar (2019).

TABLE 5.3 **TEMPERATURE DATA**		
Temperature (ºC)	**2012 Feasibility Study**	**Vaisala Station (2011-2015)**
Average	6.3	6.4
Absolute Minimum	-14.6	-18
Absolute Maximum	25.9	25.9

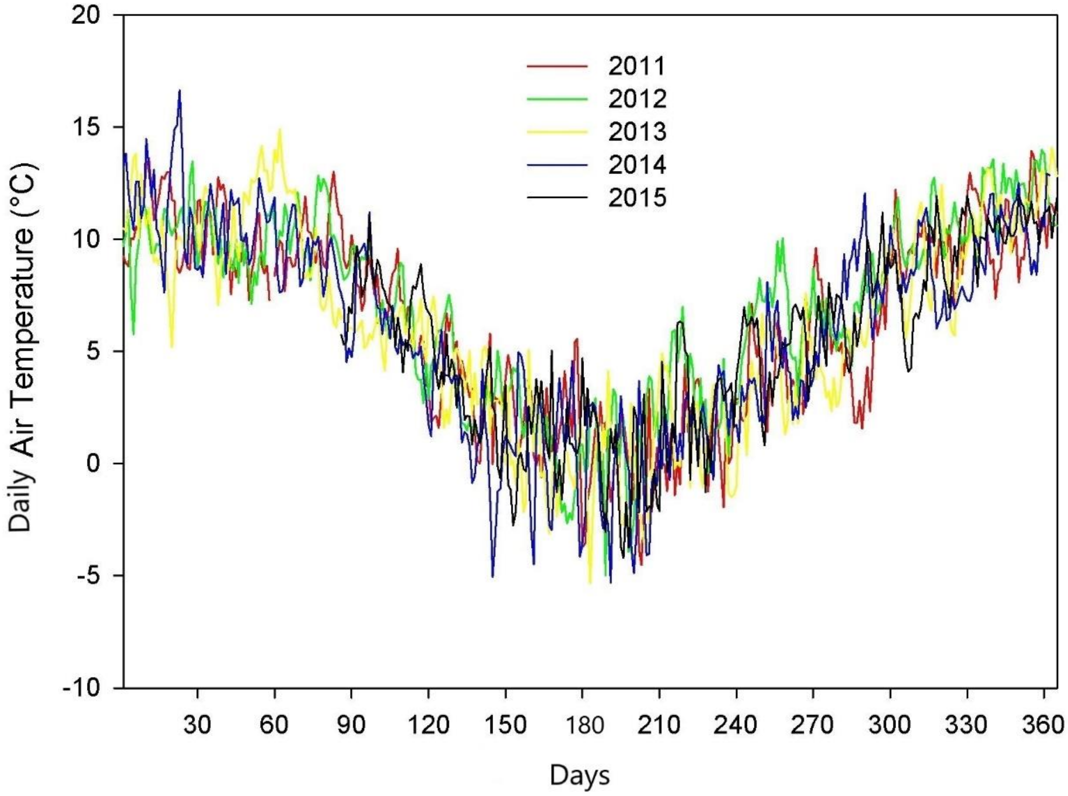
Figure 5.3 Mean Monthly Temperature Recorded by Regional Meteorological Stations



Source: *King, Kelley, Abbey, (2012).*

Figure 5.4.shows the temperature from Vaisala Station in the project area averaging every month of the five-year period.

Figure 5.4 Daily Temperature, Vaisala Station, Cauchari, 2011-2015



***Source**: Salazar (2019)*

The observed temperature fluctuations in Cauchari by the Vaisala weather station show similar trends to the regional meterological stations. The average of these oscillations during the period recorded shows Extreme temperatures during this period had an absolute maximum of 25.9 °C (January 11, 2011) and an absolute minimum of -16.3 °C (July 29, 2014).

The records for Vaisala Station 2011-2015 shows that:

- The lowest temperature of the day is at sunrise; and
- The highest temperature of the day occurs after solar noon.

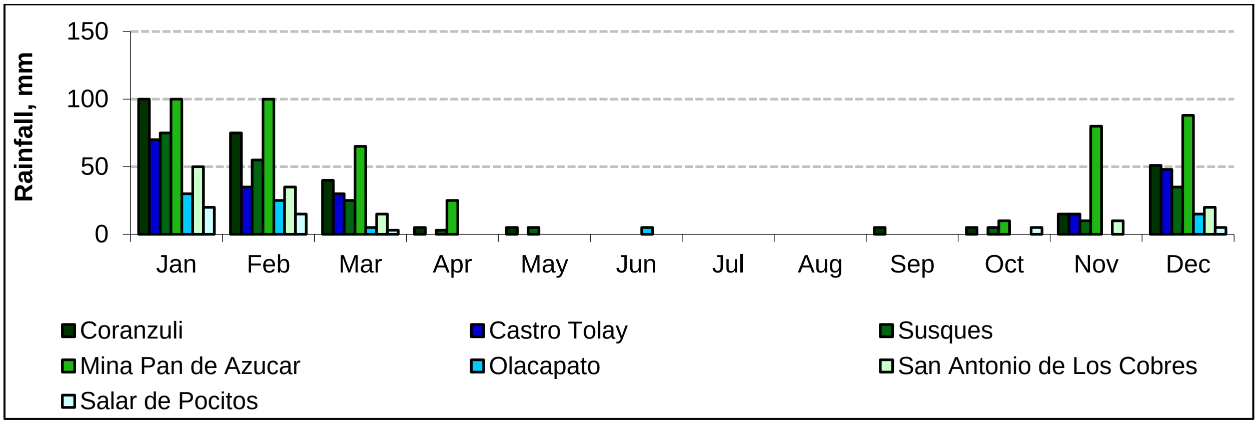
5.6 PRECIPITATION

The desert climate of Cauchari and Olaroz is also known as the Puna climate (Hoffmann, 1971). The Puna region is exposed to substantial warming due to the enormous amount of radiation received and the limited availability of moisture to use this energy in the atmosphere. These extreme conditions make the location very attractive for the use of processes that depend on evaporation at the region of the project; rainfall is usually less than 50 mm during the year (Cabrera, 1976).

Rainfall originates during the summer season, between December and March when the South American Continental Low approaches the region of the salt flats, bringing hot and humid air from the jungles of the Amazon, causing very active convective cloud development with abundant storm-type rainfall.

The rainfall in the region according to the stations are shown in Figure 5.5.

Figure 5.5 Average Monthly Rainfall Recorded by Regional Meteorological Stations Near the Cauchari- Olaroz Salars

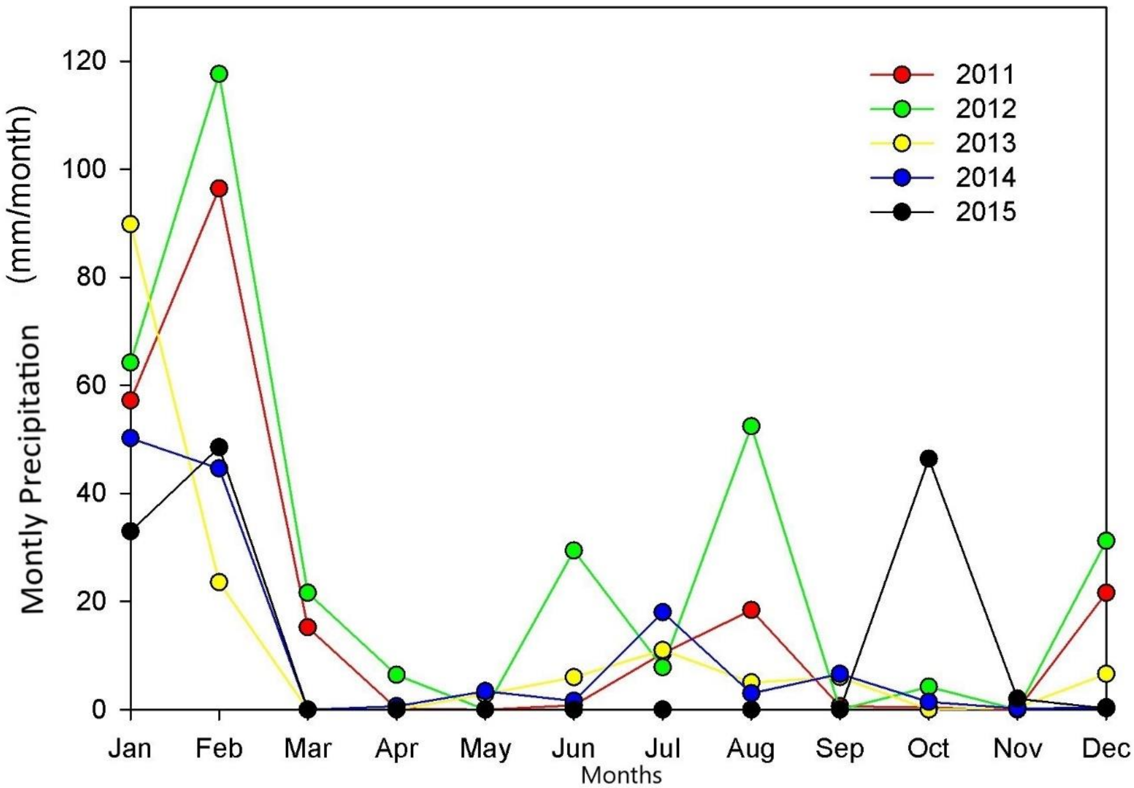


Source: *King, Kelley, Abbey, (2012).*

Precipitation occurs in the summer months (December, January and February), being almost nil for the rest of the year (Figure 5.6).

January averages 59 mm/month of precipitation, and February averages 66 mm/month of precipitation (year-on-year). The lowest precipitation values occur in April, May and November with 1 mm/month.

Figure 5.6 Rainfall Data Collected at the Cauchari Salar, 2011-2015



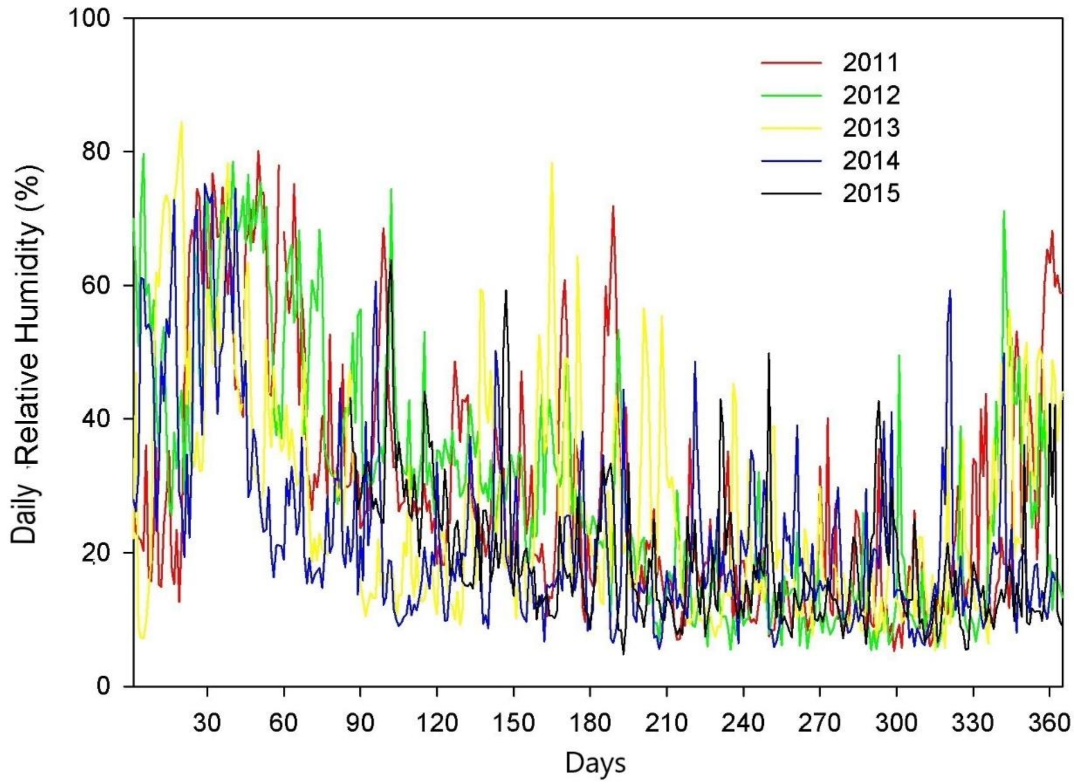
Source: *Salazar (2019)*

5.7 HUMIDITY

Puna desert climate is extremely dry for most of the year. However, in summer, due to the incursion of the South American Continental Low, the air is changed by acquiring high moisture content that sometimes causes heavy precipitation as described above. The average daily records show these changes in moisture during the year 2011-2015, Figure 5.7.

For relative humidty, taking into account the monthly average, the maximum values are in summer, 69% in February. In November, during the spring, the relative humidty drops to 5%.

Figure 5.7 Daily Humidity Collected at Cauchari Salar, 2011-2015



Source: *Salazar (2019)*

5.8 WINDS

The Puna desert is usually visited by a low-level jet stream current, which arises as a secondary branch of the subtropical jet stream that is generated as a result of the horizontal surface and intertropical convergence of trade winds on the cell (Hadley, Holton, 2004), which pushes the air molecules to higher levels of the atmosphere. The air transported to the upper atmosphere, due to the high potential energy gained by the elevation, acquires great speed during the descents, and converts the potential energy into kinetic energy. This allows the molecules to reach high speeds within the jet streams.

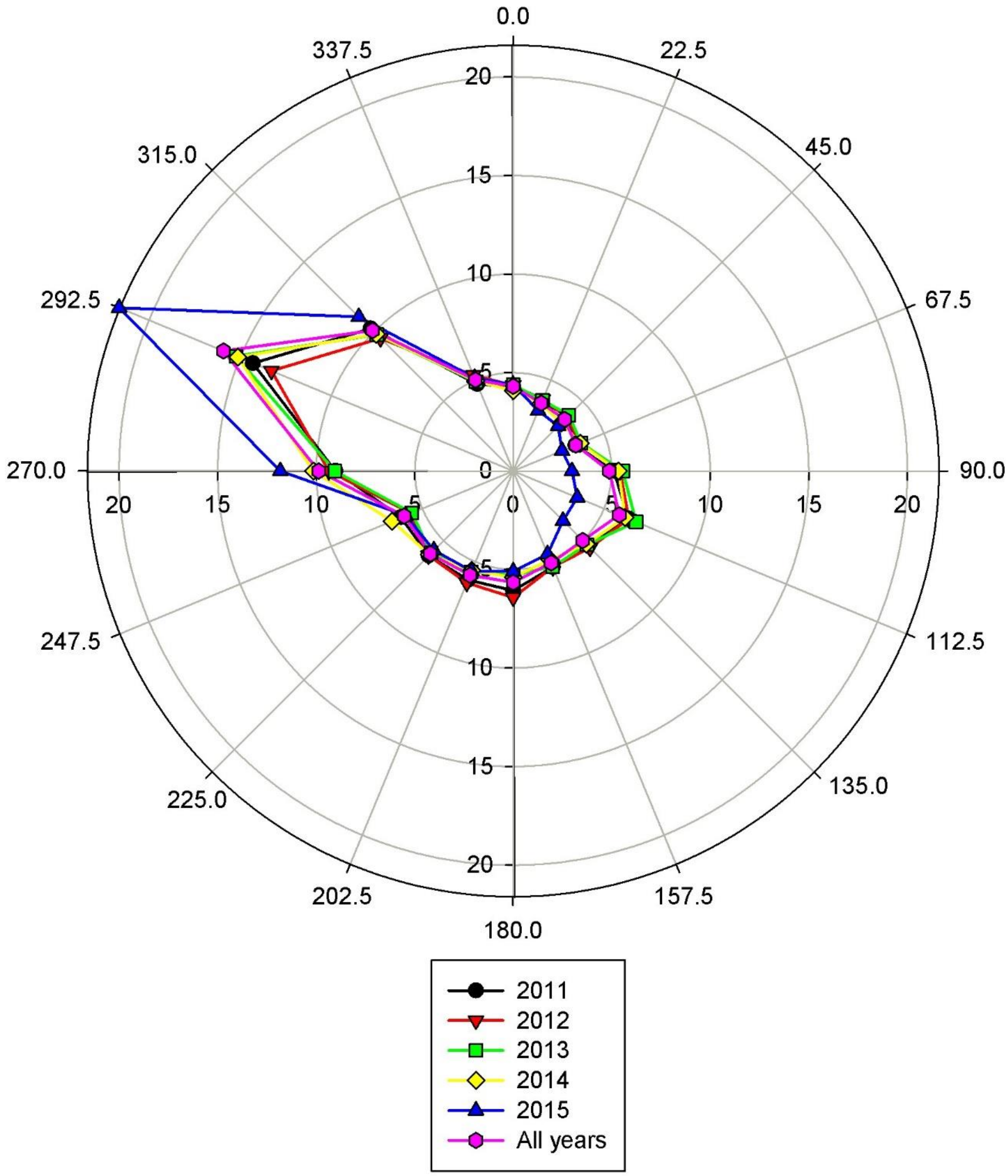
The intensities of these low flows reach speeds of 35.9 m/s (129 km/h) and are often observed in the salt flats of Olaroz and Cauchari.

The daily monthly average of wind velocity values is higher during winter and spring (July to November), reaching the highest values in September. There is no manifest seasonality.

Wind direction values indicate that during ten months of the year, the predominant wind direction is West-North West. Only in January and February does the predominant wind direction change to East-South East.

The Rose plot in Figure 5.8 shows the prevailing wind dirctions for the the 2011-2015.

Figure 5.8 Prevailing Wind Directions, Vaisala Station, Cauchari, 2011-2015



Source: *Salazar (2019)*

5.9 EVAPORATION

Records of water evaporation are more complex to perform in the Puna desert because the water tanks of evaporimeters freeze most of the year during the night. Therefore, most readings, including those from remote sensors, have a large associated error (WMO, 1971) which is another added difficulty. Because of these difficulties, the Vaisala station installed on the Cauchari Salar uses an indirect method to calculate evaporation, which in practice is very effective because of the adjustments to the curve that assesses the evaporation rate works well.

However, extreme climate conditions favour evaporation because the air in the Puna is extremely dry, so the large input of solar radiation is the most relevant factor in the evaporation process. Additionally, wind frequently intensifies the kinetic energy that is delivered through the transfer of momentum between molecules facilitating the process of evaporation.

It should be noted that the information presented in this section is collected from the Vaisala station. The Evaporation Rate used for the Project is based on a 12-month evaporation test conducted by Minera Exar are elaborated upon in Section 13.2.2.

5.9.1 Evaporation Measurements

To avoid errors that could affect indirect estimates of the Vaisala weather station, two cylindrical tanks were installed, the type Class A or PAN evaporimeters (WMO No. 168, 1994), for direct measurements of evaporation of water and brine. The persons responsible for carrying out evaporation observations were trained to make daily observations, which also allowed for the control of the evaporation measurements from the Vaisala meteorological station.

The correlations obtained were used to establish some climatic extrapolations, using tight correlations between the Vaisala automatic weather station and PAN evaporimeters at the Pilot Plant.

Annual seasonality can be seen in the average of the monthly values.

Based on the information in Figure 5.9, evaporation rates from the Vaisala station shows:

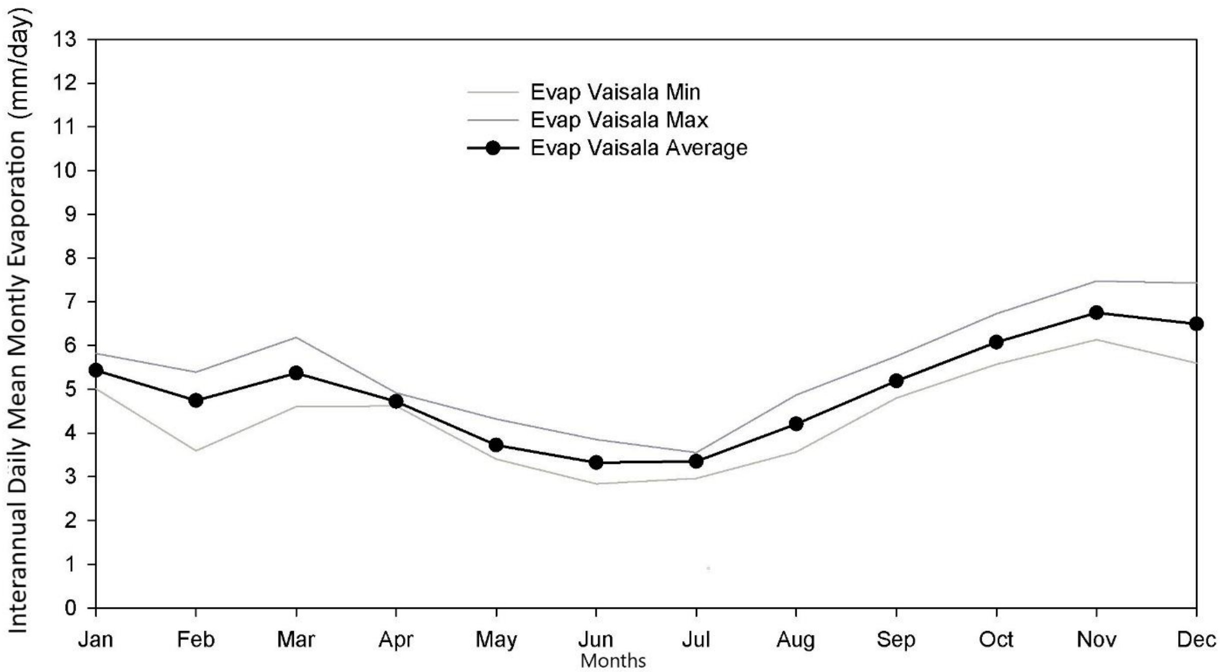
- Annual, monthly average: 4.95 mm/day;
- The monthly minimum value (June): 3.32 mm/day; and
- The maximum monthly daily value (November): 6.75 mm/day.

5.9.2 Calculated Evaporation Using Site-Collected Parameters

Monitoring of evaporation from pans is complex to perform in the Puna desert because the water in the pans is subject to freezing during the night, which can introduce error (WMO, 1971). Therefore, to validate the evaporation pan data, evaporation was calculated using surrogate meteorological parameters collected at the Vaisala station installed on the Cauchari Salar. The dominating processes controlling evaporation (and considered in the equation) are solar radiation, humidity, wind speed and temperature.

The daily calculated record of evaporation for 2011to 2015 are shown in Figure 5.9.

Figure 5.9 Daily Calculated Evaporation From Vaisala Weather Station at the Cauchari Salar, 2011-2015

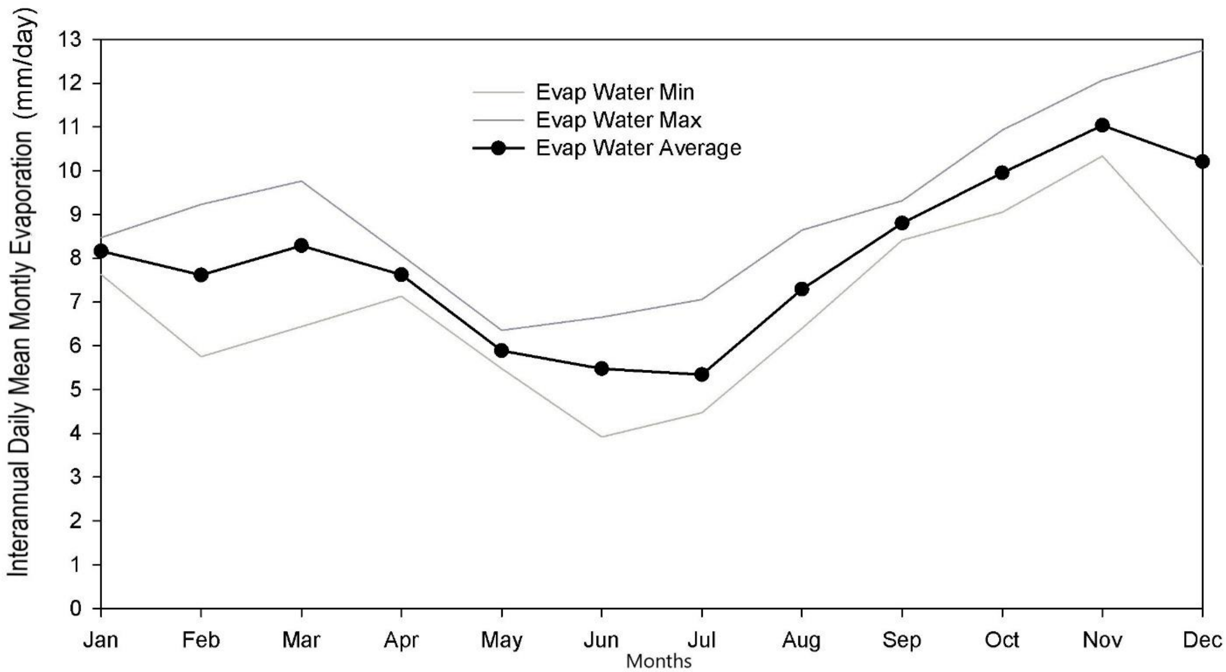


Source: *Salazar (2019)*

Evaporation for water is summarized below and in Figure 5.10:

- Annual, monthly average: 8.00 mm/day;
- The monthly minimum value (July): 5.34 mm/day; and
- Maximum monthly value (November): 11.03 mm/day.

Figure 5.10 Minimum and Maximum Daily Water Evaporation at the Cauchari Salar, 2011-2015



Source: *Salazar (2019)*

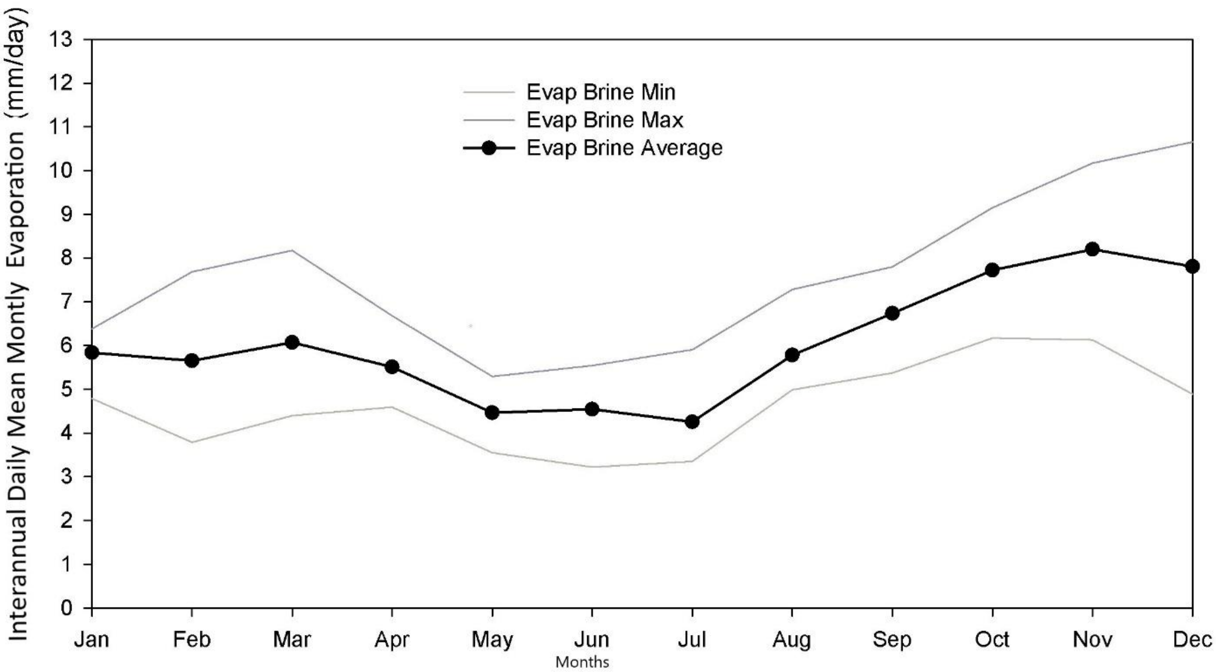
Evaporation for brine is summarized below and in Figure 5.11:

- Average annual monthly: 6.05 mm/day;
- The monthly minimum value (July): 4.25 mm/day; and
- Maximum monthly value (November): 8.20 mm/day.

The annual mean evaporation values are:

- Vaisala: 1,806 mm per year (Min: 1,605 mm per year; Max: 2,017 mm per year);
- Water (PAN Evaporators): 2,910 mm per year (Min: 2,520 mm per year; Max: 3,324 mm per year); and
- Brine (PAN Evaporators): 2,208 mm per year (Min: 1,682 mm per year; Max: 2,759 mm per year).

Figure 5.11 Minimum and Maximum Daily Brine Evaporation at the Cauchari Salar, 2011-2015



Source: *Salazar (2019)*

5.10 EXISTING INFRASTRUCTURE

National Highway 52, a paved, well-maintained highway, passes through the Property. A high-pressure natural gas pipeline is located 52 km south of the Project. An existing 345 kV transmission line is located approximately 60 km south of the Project. Currently a 300 MW solar powered plant, which will be linked to the Argentine Interconnection System ("SADI"), is under construction and expected to be commissioned during the second half of 2019.

Facilities at the site include a construction camp (capacity for 554 persons), modular offices for operation and project management activities to support the activities of hydrogeology, drilling, site management, health and safety, the pilot plant, maintenance, human resources and community relations, amongst others. Additionally, a storage building (720 m^2 covered area), contractors' facilities, a pilot plant, and laboratory. The aforementioned facilities have water supply, a site generated power supply, and an effluents treatment plant. Several production wells are operative and others under construction together with the roads and platforms to move around the different areas of the property and project as well as internal roads and platforms to develop the in-progress production wells. At the time of this report, four solar evaporation ponds were completed and are fed by nine production wells. Construction of the other evaporation ponds is underway and some are pending liner installation.

6.0 HISTORY

Historically, Rio Tinto has mined borates on the western side of the Cauchari salar, at Yacimiento de Borato El Porvenir. Grupo Minero Los Boros S.A. mines a few thousand tonnes per year of ulexite on the east side of the Olaroz Salar. No other mining activity (including lithium production) has been recorded at the properties comprising the Cauchari-Olaroz Project. Minera Exar acquired Mining and Exploration Permits across the Cauchari and Olaroz Salars during 2009 and 2010. The Company completed a resource exploration program in 2009 and 2010 targeting both lithium and potassium.

In 2010, the Company filed a Measured, Indicated, and Inferred Mineral Resource report for both lithium and potassium (King, 2010b). An amended Inferred Mineral Resource report was filed later that year (King, 2010a). In 2012, the Company filed a NI 43-101 complaint feasibility study that presented a Mineral Resource and Mineral Reserve Estimate, proposed processing technology, environmental and permitting assessment, costing and economic analysis. In 2017, LAC filed a NI 43-101 compliant Feasibility Study, with an updated Mineral Reserve Estimate. In April of 2019, LAC filed a NI 43-101 compliant Updated Mineral Resource Estimate with an updated Mineral Resource Estimate which is used in Section 14. For reference purposes, the 2012 Mineral Resource Estimate is provided in Table 6.1. All past Mineral Resource and Mineral Reserve Estimates are no longer considered current and are superseded by the Mineral Resource Estimate presented in Section 14 and the Mineral Reserve Estimate presented in Section 15 of this Report.

TABLE 6.1
LITHIUM MINERAL RESOURCE SUMMARY

Classification	Average Lithium Concentration (mg/L)	Mass Cumulated[1] (cut-off 354 mg/L)		Brine Volume (m^3)
		Li (tonne)	Li_2CO_3 (tonne)	
2012 Measured Mineral Resource	630	576,000	3,039,000	9.1×10^8
2012 Indicated Mineral Resource	570	1,650,000	8,713,000	2.9×10^9
Total	**585**	**2,226,000**	**11,752,000**	**3.8×10^8**

Note:

1. *The 2012 Mineral Resources are expressed relative to a lithium grade cut-off of ≥ 354 mg/L, which was identified as a brine processing constraint by LAC engineers, and with an effective date of July 11, 2012.*
2. *Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability. There is no certainty that all or any part of the Mineral Resource will be converted to Mineral Reserves.*
3. *Lithium carbonate equivalent ("LCE") is calculated based the following conversion factor: Mass of LCE = 5.323 x Mass of lithium metal.*
4. *The values in the columns on Lithium Metal and Lithium Carbonate Equivalent above are expressed as total contained metals within the relevant cut-off grade.*

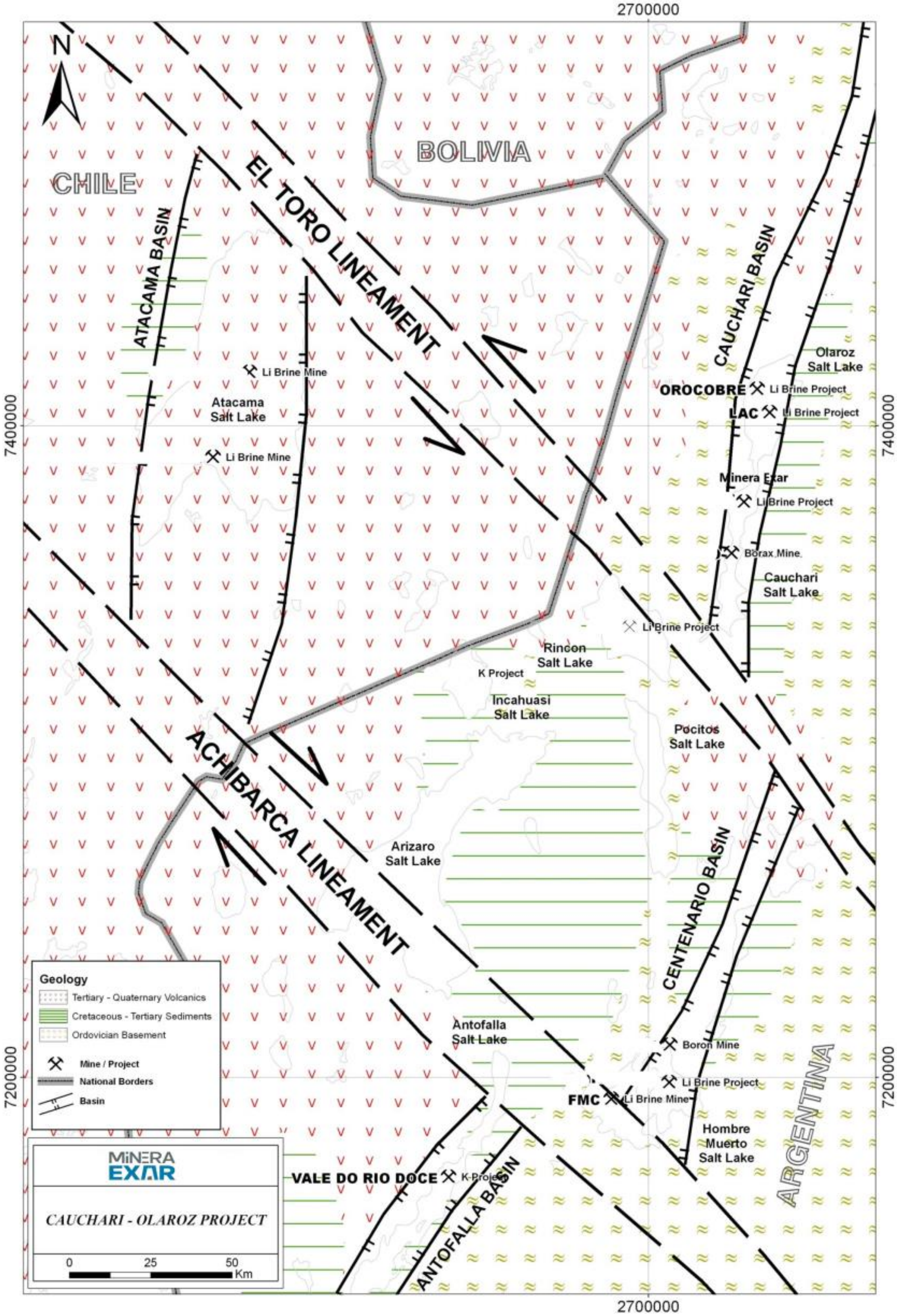
7.0 GEOLOGICAL SETTING AND MINERALIZATION

7.1 REGIONAL STRUCTURAL FEATURES

There are two dominant structural features in the region: north-south trending, high-angle normal faults and northwest-southeast trending lineaments. The high-angle north-south trending faults form narrow and deep horst-and-graben basin systems (Figure 7.1). These basins have formed primarily in the eastern and central sectors of the Puna Plateau, through compressional Miocene-age orogeny (Helvaci and Alonso, 2000), and have been accumulation sites for numerous salars, including Olaroz and Cauchari.

The northwest-southeast trending lineaments cause displacement of the horst-and-graben basins. The El Toro Lineament and the Archibarca Lineament occur in the vicinity of the Minera Exar Project. The Cauchari Basin, which contains the Olaroz and Cauchari Salars, is located north of the El Toro Lineament in the northeast of the Figure 7.1 map area. Between the El Toro and Archibarca Lineaments, the basin is displaced to the southeast and is known as the Centenario Basin. South of the Archibarca Lineament, the basin is displaced to the northwest and is known as the Antofalla Basin. Collectively, these three displaced basin segments contain a lithium brine mine (in Salar Hombre Muerto) and several lithium brine exploration projects (Figure 7.1). Two additional lithium brine mines are located in the Atacama Basin, approximately 150 km west of the Cauchari Basin, between the El Toro and Archibarca Lineaments.

Figure 7.1 Regional Geology in the Vicinity of the Minera Exar Project



Source: *Minera Exar.*

7.2 REGIONAL GEOLOGY

The regional geology of the Olaroz and Cauchari Salars is shown in Figure 7.1. The basement rock in this area is composed of Lower Ordovician turbidites (shale and sandstone) intruded by Late Ordovician granitoids. It is exposed to the east, west, and south of the two salars, and generally along the eastern boundary of the Puna Region.

Throughout the Puna Region, a wide range of rock types unconformably overlies the basement rock. In some areas, including to the south and east of the Project area, the basement rock is overlain by Cretaceous-Tertiary continental and marine sedimentary rocks such as conglomerates, sandstones, and siltstones, as well as tuffs and oolitic limestones. In most of the Chilean and Argentina-Chile border area of the region, the basement rock is overlain by Tertiary-Quaternary volcanics. In the Project area, the basement rock is overlain by andesites (six to three million years) and recent basaltic flows (0.8 - 0.1 million years) ranging up to several tens of metres in thickness. In addition, Neogene dacitic to rhyolitic ignimbrites (20 – 0.1 million years) sourced from calderas to the north and south of the Cauchari and Olaroz salars overlie basement strata. In some cases, these ignimbrites flowed into the salars and are intercalated with the basinal stratigraphies. These ignimbrites are the presumed sources for the lithium contained in the brines of the Lithium Triangle.

Salars formed in the basins of the Puna region have thick layers of Pleistocene halite beds. Jordan et al. (2002) studied the Atacama Salar in Chile and found high rates of sedimentation and accumulation for halite and clastic material (around 0.6 m/ka).

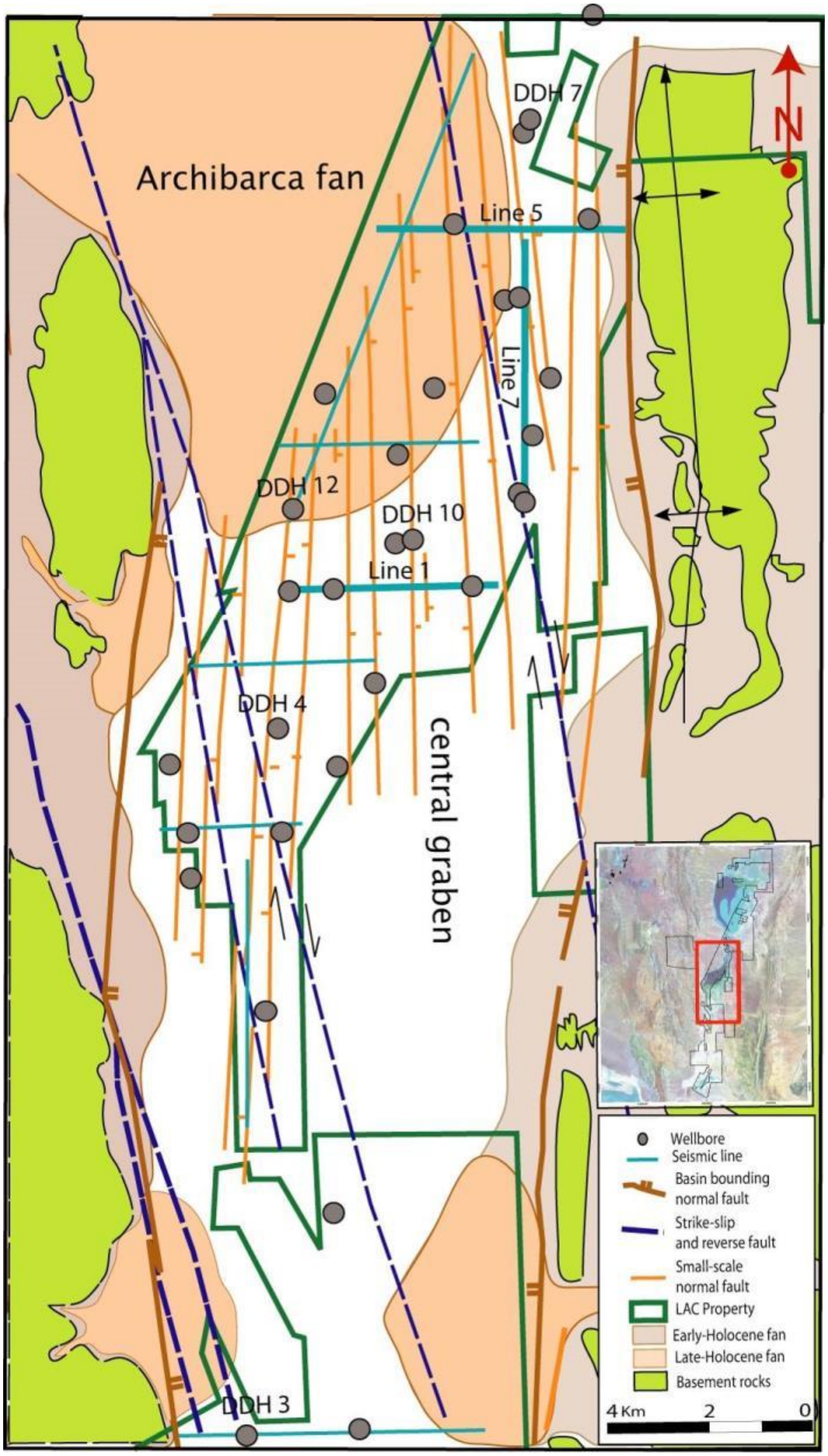
7.3 GEOLOGY OF THE OLAROZ AND CAUCHARI SALARS

7.3.1 Salar Structural Setting

Figure 7.2 shows structural features in the central area of the Cauchari Basin (northern area of the Cauchari Salar), which is the focus of this Mineral Reserve Estimate. These features are interpreted from the seismic lines and boreholes shown in the figure.

Several small-scale, north-south trending, normal faults occur within the Cauchari Salar, between the basin border normal faults. These intra-salar features form a series of small-scale horst-and-graben domains within the larger horst-and-graben basin formed by the basin border normal faults. Cutting across the salar basin is a series of out-of-sequence, south-southeast trending, reverse faults that have a strong right-lateral component in the Minera Exar Project area. These reverse faults are likely related to displacement along the El Toro Lineament.

Figure 7.2 Structural Features in the Central Area of the Cauchari Basin



Source: *King, Kelley, Abbey, (2012).*

7.4 SALAR SURFACE SEDIMENTS AND MINERALIZATION

The surface distribution of alluvium, salar sediments, and basement rock in the central zone of the Cauchari Basin is shown in Figure 7.3. This zone is shown because it is the focus of the Mineral Reserve Estimate (Section 15). Flat-lying salar deposits occur throughout the salars, at the lowest ground surface elevation in the basin. Alluvial deposits intrude into these salar deposits to varying degrees, depending on location. The alluvium surface slopes upward from the salar surface and extends outside the basin perimeter. Raised bedrock exposures also occur outside the salar basin.

The most extensive intrusion of alluvium into the basin occurs on the Archibarca Fan (Figure 7.2), which partially separates the Olaroz and Cauchari Salars. Route 52 is constructed across this alluvial fan. The Archibarca Fan developed during the late-Holocene. In addition to this major fan, much of the perimeter zone of both salars exhibits encroachments of alluvial material forming fans of varying sizes. Alluvium deposition is interpreted to range from early- to late-Holocene.

A range of dominant sediment types and characteristic mineral assemblages are found across the surface of the Olaroz and Cauchari Salars. In the Olaroz Salar and the southern part of the Cauchari Salar, particularly in marginally elevated areas, buff clays occur, interlayered with dirty calcite travertine sand with irregular calcite cementation produced mainly by hydrothermal activity (calcareous sinters). Ulexite concretions with or without gypsum and mirabilite are occasionally associated with the carbonate deposits.

Borax is common throughout both salars. It occurs as small rounded concretions in red and brown clays along a narrow and discontinuous strip on the western border of Cauchari Salar and in the eastern and central area of Olaroz Salar. In some areas of central Olaroz Salar, surficial borax alters to form evaporitic ulexite. When this mineral occurs in significant concentrations it forms large ulexite concretions or “papas” that expand the associated black or red clays, creating a hummocky surface. In the subsurface, borax commonly occurs as concretions and as an in-filling of corrosion holes in halite. In some locations, borax has been replaced by ulexite and/or tincal.

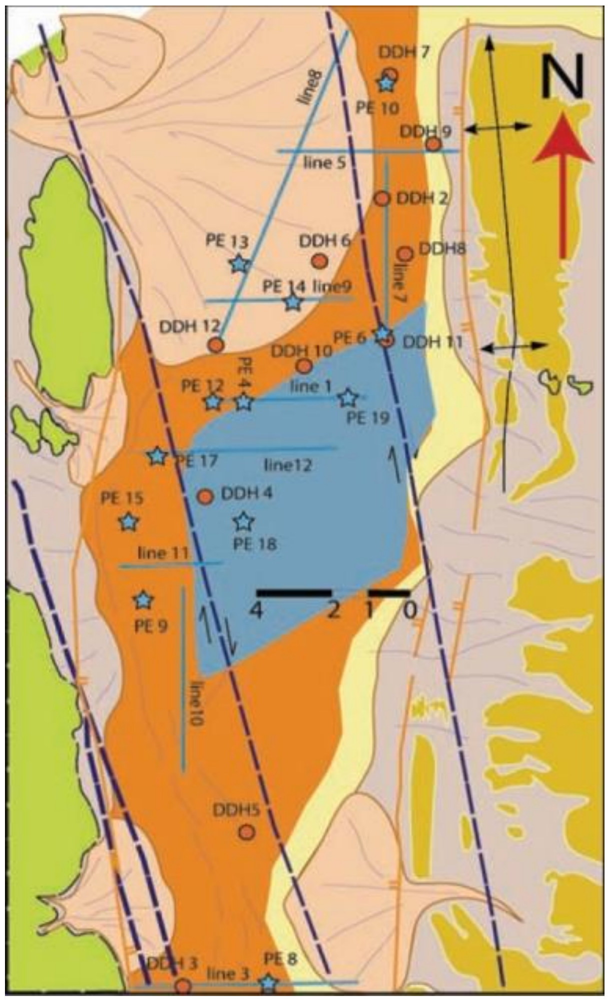
Gypsum is the primary sulphate mineral in the surficial muds and the crystals commonly have a small bladed habit. In some locations, mirabilite and trona are associated with the gypsum-bearing layers. Trona is more abundant in the Cauchari Salar, although neither salar is known to contain exploitable amounts.

Halite occurs throughout the surface of both salars but is more dominant on the Olaroz Salar where a well-formed, polygonal-cracked, salt hardpan is present. In contrast, the surface layer across much of the Cauchari Salar consists of a thin, red silt / halite, polygonal-cracked crust over brine-saturated red plastic silt.

Distinctive accessory minerals occur within the red surface silt of the Cauchari Salar. Gypsum and minor glaserite are the main accessory phases in the southern area of the salar. In the central area, halite is a primary accessory mineral and gypsum is secondary. Ulexite, mirabilite, and trona are the primary accessory phases in the northern area of Cauchari.

In the zone where the recent alluvial fans merge with the salar sediments, the salar sediments often exhibit evidence of biological activity (bioturbation and rootlets) and are typically devoid of borate concretions and gypsum.

Figure 7.3 Surficial Geology in the Central Area of the Cauchari Basin



	Recent sediments (mainly salted muds with a halite rough polygon crust)
	Mud flat with borates and gypsum
	Young alluvial fans
	Old bahadas and alluvial fans
	Cenozoic volcanics and pyroclastic rocks
	Ordovician thin bedded fine sands and shales

Source: *King, Kelley, Abbey, (2012).*

7.5 SALAR LITHOSTRATIGRAPHIC UNITS

The following five informal lithological units are interpreted from the drill core:

- Unit 1. Red silts with minor clay and sand;
- Unit 2. Banded halite beds with clay, silt, and minor sand;
- Unit 3. Fine sands with minor silt and salt beds;
- Unit 4. Massive halite and banded halite beds with minor sand; and
- Unit 5. Medium and fine sands.

These units are described briefly in the following sections.

7.5.1 Unit 1 – Red Silts with Minor Clay and Sand

This unit consists of layers of massive red to grayish-brown silt with some clay, alternating with layers of fine sand with minor clay and medium to coarse sands, and trace gravel. At the surface, this unit exhibits mud cracks, as well as bioturbation and mottled structures with organic matter. At depth, the silt layers contain phreatic carbonate concretions, mottled structures, bioturbation, and occasional gypsum crystals. These layers are relatively thin, typically ranging from less than one metre up to four metres.

Borate concretions often occur throughout this unit. Halite crystals occur at some locations (for example in DDH4 and DDH10) but are absent in others (DDH12). X-ray diffraction ("XRD") analysis of the clays in this unit (Cravero, 2009a and 2009b) shows that they are predominantly illite with minor kaolinite, smectite, and chlorite. Glass shards and magnetite are also present, indicating that the dominant source for this unit is the Neogene volcanic rocks.

7.5.2 Unit 2 – Banded Halite Beds with Clay, Silt and Minor Sand

This unit is characterized by banded halite with reddish clay or silt partitions alternating with massive fine-grained sand beds. The sand beds may contain halite crystals or may be cemented by halite. This unit may also contain occasional layers of thinly bedded clays, evaporites, silts, and sands. The individual beds of this unit vary in thickness from a few centimetres to a few metres. Unit 2 is generally more clayey than Unit 1. The evaporites in Unit 2 are comprised mainly of halite and occasionally halite with gypsum. Borehole logs show that Unit 2 is typically between 50 m and 60 m in thickness.

Some of the thick sand beds in this unit are friable and devoid of halite cement. These sands were likely deposited in water, and may have been mobilized from the surrounding old alluvial fans. The green color of some sand beds is characteristic of material derived from volcanic sources. While this unit is relatively thin in some locations (e.g., DDH12), it is well-developed and dominated by massive and banded salt beds in boreholes located in the central area of the salar. The relatively thin occurrence of Unit 2 in DDH12 (see Figure 7.3) is due to the close proximity of the Archibarca Fan clastic source (see Figure 7.2).

7.5.3 Unit 3 – Fine Sands with Minor Silt and Salt Beds

This unit is composed of massive light grey to grayish-brown, fine-grained, clean sand inter-layered with evaporite (primarily halite) beds. The layers are tens of metres thick and are typically friable. This unit also contains occasional thin red silt horizons (20 cm to two metres thick). Structures indicating biological activity are uncommon in this unit, although some of the silt layers are mottled (e.g., in DDH10).

The sand composition in this unit is a mixture of quartz, feldspar, and mafic minerals (pyroxene, biotite, and amphibole), with abundant magnetite and volcanic glass. Other minerals commonly present in the sand include halite and gypsum, with lesser amounts of borate, ulexite, and narrow beds of tincal. The sand beds of this unit often contain a component of well-sorted aeolian sand (identifiable as rounded particles) mixed with sub-angular finer sand. The aeolian sands were likely re-worked and mixed with alluvial materials and dispersed into the basin by surface water.

7.5.4 Unit 4 – Banded and Massive Halite Beds with Minor Sandy Beds

This unit is dominated by banded halite beds and dark to light grey massive halite beds alternating with sandy layers. These primary layers typically range from 1 to 3 m in thickness, although a continuous 100 m layer of halite beds was observed at the DDH3. Layers of red clay and irregular halite mixes are also common in this unit. Thin silt horizons between 0.25 m and 1 m in thickness are occasionally observed.

The banding in the banded halite beds is caused by layers of grey or brownish-grey silts or sands that are typically cemented by halite and contain halite and gypsum crystals. The massive halite layers of this unit occasionally occur as a sintered sponge of halite crystals, with high porosity due to crystal corrosion. Borate concretions are common in the upper section of this unit. In the southern Cauchari Salar, several carbonate horizons ranging up to six metres in thickness were observed in this unit, with karstic solution cavities in-filled with loose sand.

7.5.5 Unit 5 – Medium and Fine Sands

This unit is composed of massive, thick-bedded, fine-grained, light to dark-green sand layers, alternating with massive light-red silt layers. The grain size of the sand is coarser in the lower levels of the unit. The sand mineralogy indicates volcanic source rocks.

Bioturbation by invertebrates is observed at some locations in this unit. Halite and gypsum crystals occur infrequently. Only boreholes DDH4, DDH10, and DDH12 penetrated deep enough to encounter this unit.

Refer to Section 14.2.1 and Section 15.4 for a more detailed breakdown of the stratigraphic and hydrostratigraphic units used in the Mineral Resource Estimate and Mineral Reserve Estimate, respectively. Cross sections can be viewed in Section 14.3.2 and Section 15.8.

7.5.6 Sedimentation Cycles

Sedimentation cycles were evaluated for the salar sediments, as a supportive step for understanding, delineating, and grouping the important hydrostratigraphic units. The energy level and RBRC curves help to explain the vertical variations observed in the salar sediments. The RBRC curves show the distribution of measured RBRC, expressed over 10 m intervals. The collection and analysis of the RBRC samples are described in Sections 11.9.2. The energy level curves represent a qualitative measure of depositional energy, expressed over five metre intervals. The lithology-based scale used to rank the energy level is summarized below:

- 0 - Massive halite beds (> 5 cm thick);
- 1 - Halite in thin beds (< 5 cm), including banded halite with thin sand, silt, or clay partitions;
- 3 - Silt with root marks or bioturbation; silty clay beds with or without halite crystals and borate concretions; silt or clay with plant remains; thin and irregular clay or halite bedding;
- 4 - Silt with or without halite crystals and borate concretions;
- 5 - Fine-grained sands;
- 7 - Medium-grained sands; and
- 8 - Coarse-grained sand with or without gravel.

This scale is qualitative and was developed as an aid for interpreting sedimentary cycles in the salar. The exclusion of Levels 2 and 6 is intended to represent a large energy level increase between Levels 1 and 3, and Levels 5 and 7, relative to the other levels.

The energy level measurements in DDH10 exhibit a repeating pattern, between the upper 130 m of the borehole and the lower part of the borehole. This pattern is considered to represent two distinct sedimentation cycles: an Upper Salt Generation Cycle ("USGC") and a Lower Salt Generation Cycle ("LSGC"), with the division between the two occurring at approximately 130 mbgs. These cycles are used as an aid to interpret the progression of sediment deposition throughout the Project area, and to support the development of a hydrostratigraphic model.

7.5.7 Sedimentary Facies Analysis and In-filling History

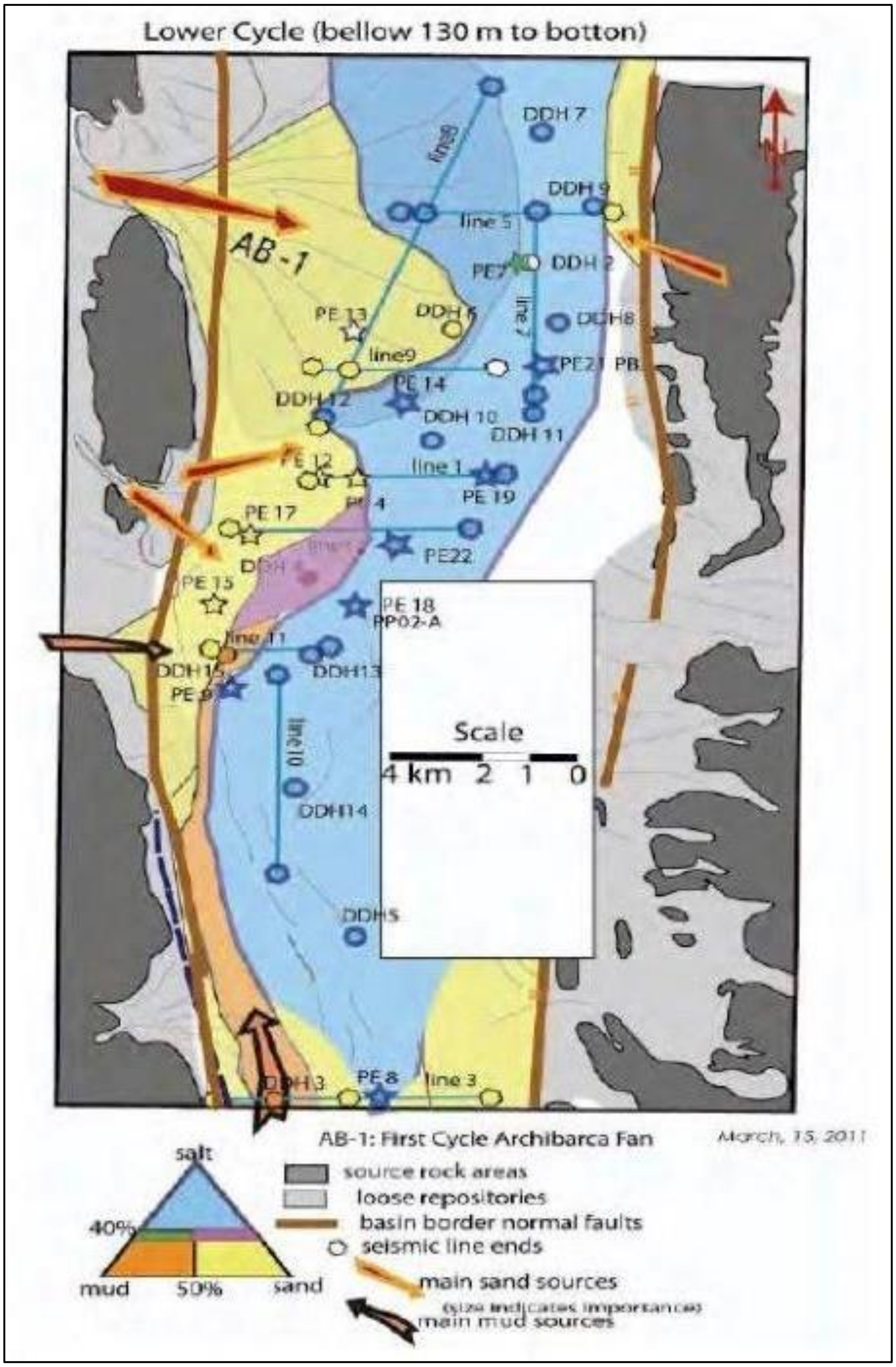
The figures referred to in this subsection are from a sedimentology report prepared on behalf of Lithium Americas (Bossi, 2011).

The distribution of dominant geologic materials within the LSGC (defined as > 130 mbgs) is shown in Figure 7.4. Materials are divided into fractions of three end members that exhibit unique porosity profiles: sand, silt, and halite. Isopleth maps of salt and sand thickness within the LSGC are shown in Figure 7.5 and Figure 7.6, respectively. These maps were used to infer the primary locations where salt deposition occurred within the basin, and where sand entered the basin.

A central elongated salt deposition zone dominates the LSGC, as shown in Figure 7.4. This salt body is continuous, but irregular in the fraction that it comprises of the LSGC. As shown in

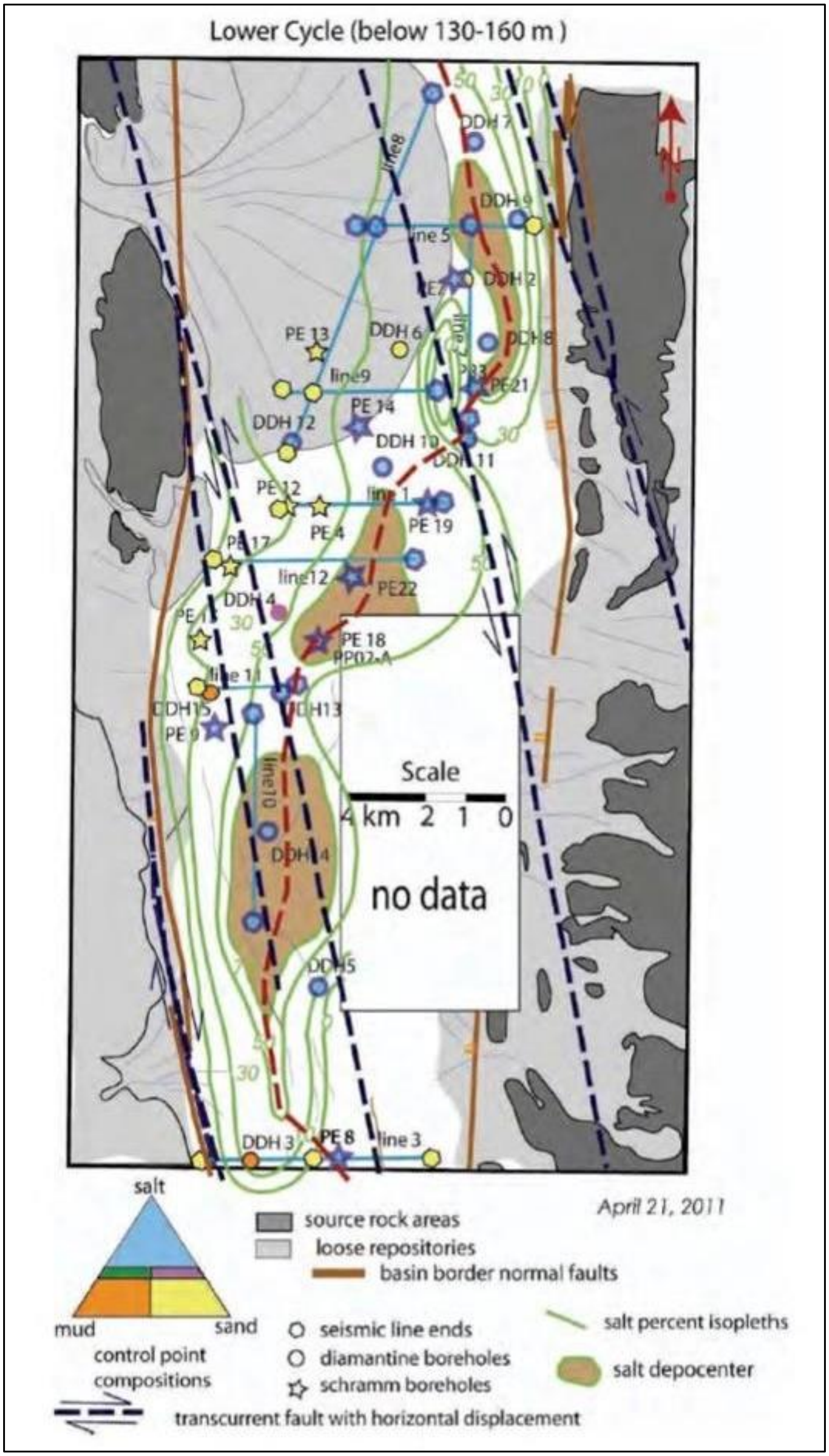
Figure 7.5, elongated zones of relatively more dominant salt deposits occur in the southern, central, and northern areas of the salar. The northern zone is displaced towards the east, due to the strong influence of clastic sedimentation associated with the Archibarca Fan.

Figure 7.4 Facies Map of the Lower Salt Cycle showing Line 1 Crossing a Thick Salt Succession



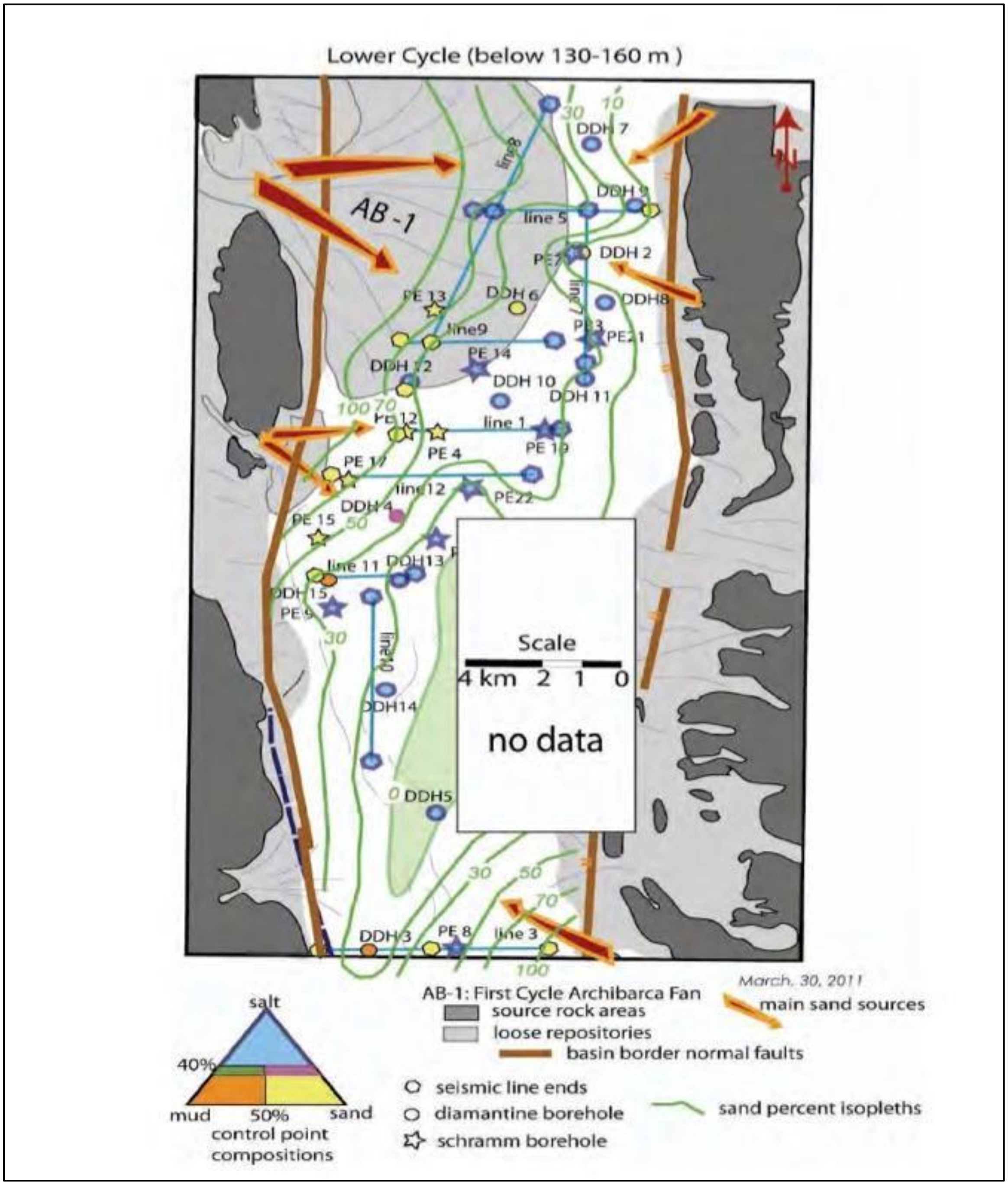
***Source**: Bossi, (2011)*

Figure 7.5 Isopleth Curves of Salt Percent in the Facies Triangle



***Source**: Bossi, (2011)*

Figure 7.6 Main Salt Sources of the Lower Cycle



Source*: Bossi, (2011)*

Clastic contributions to the LSGC originated from various locations around the salar (Figure 7.6). However, the main sand source was located in the mountains to the west of the salar, and is responsible for the LSGC occurrence of the Archibarca Fan. The influence of this source is indicated by the increasing sand fraction in the vicinity of the fan (Figure 7.6). The main mud source is south of the salar, with an additional source located to the west.

The distribution of materials in the LSGC is related to the equilibrium between subsidence and clastic supply. Brine became concentrated in the dropped zones, and extensive halite beds were formed through evaporation. Conversely, the horsts were relatively elevated and primarily received muds (silts) or sands. LSGC deposits were formed during the Late/Middle Pleistocene when the Puna region was situated at lower altitudes. At that time, cooler climatic conditions and rain-shadow effects associated with the eastern Pampean Ranges resulted in enhanced aridity. Climatic conditions cycled between relatively wet and dry periods.

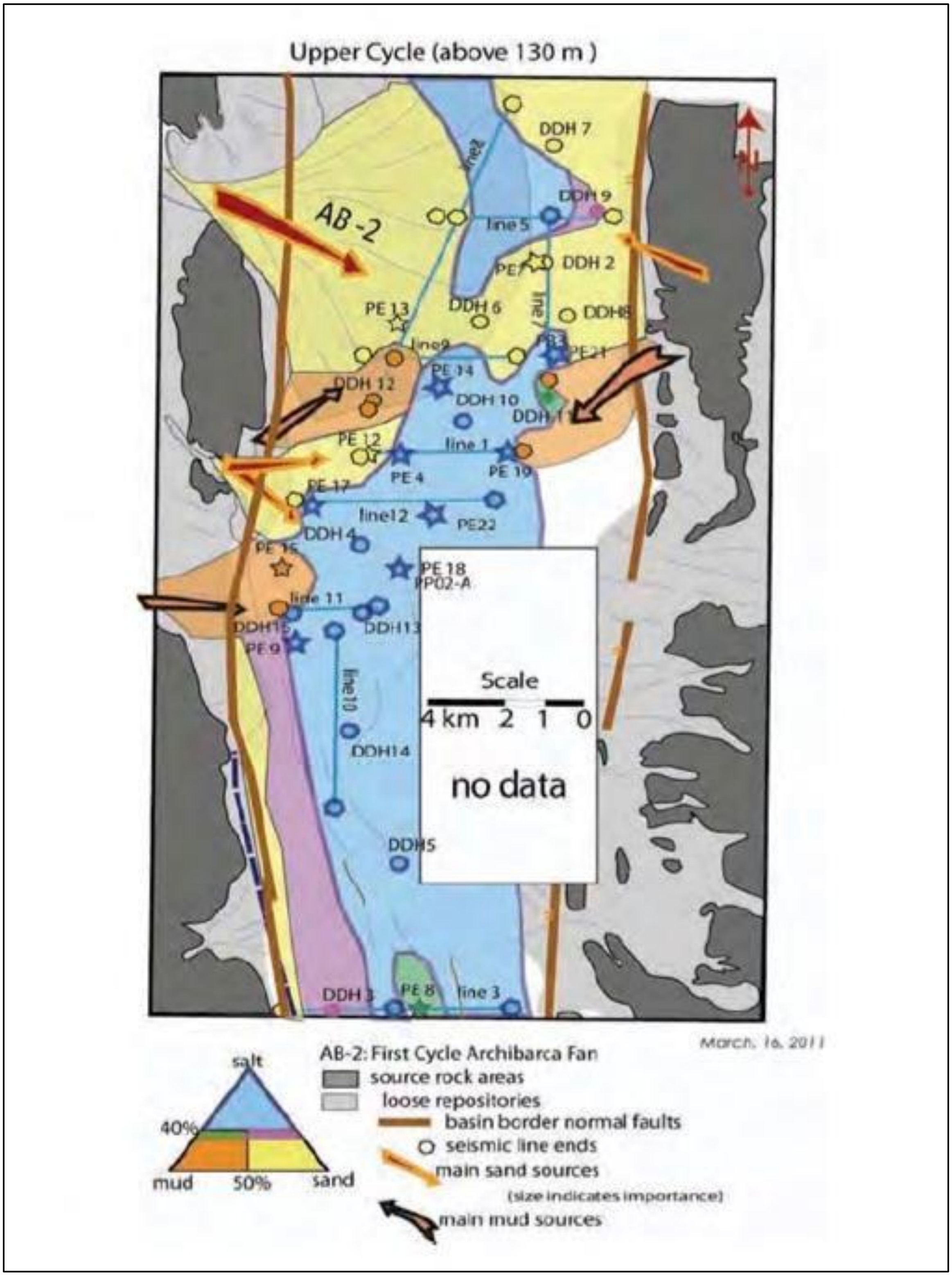
The wet periods were characterized by the development of permanent shallow lakes with high evaporation rates and the dry periods by ephemeral lagoons. Saltpan formation was enhanced during the wet periods, and the salt deposited at these times tends to be white to grey in colour and lacking in clastic components. Conversely, banded halite and associated reddish-coloured clastic materials were likely crystallized and deposited in drier periods.

The distribution of materials in the USGC (defined as <130 mbgs) is shown in Figure 7.7. For these more recent deposits, the supply of clastic sediments is greater, particularly in association with the Archibarca Fan. Consequently, the saltpan is located mainly in the southern area of the salar with a minor isolated zone in the north, probably connected with the Olaroz Basin.

The distribution of salt in the LSGC follows a relatively regular pattern (Figure 7.8), probably due to the smoothing effect of the final subsidence stage. The two southern loci of salt deposits in the LSGC (Figure 7.5) unify into one in the USGC (Figure 7.8,) that occupies a broader zone in the central area of the basin. A remnant small salt zone persists in the northeastern area of the salar close to the eastern border and in front of the Archibarca Fan.

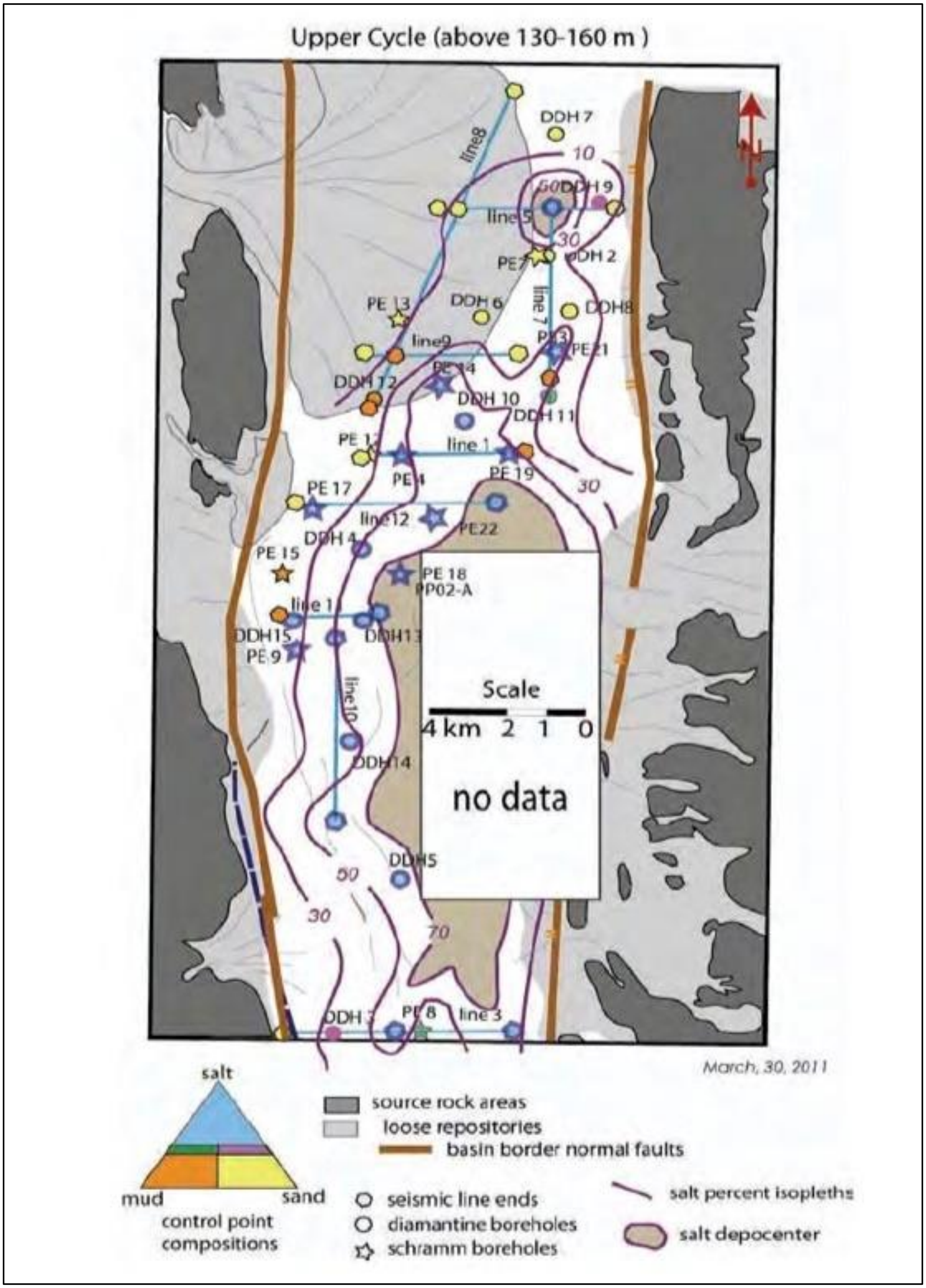
Figure 7.9 shows locations where sand entered the salar basins during the USGC deposition period. Similar to the LSGC, the primary location is at the Archibarca Fan (below the present-day fan), as indicated by the high sand fraction extending into the salar. Secondary locations occur at another fan system originating from the eastern mountains, and at two locations along the western basin border south of the Archibarca Fan. Penetration of the Archibarca Fan into the basin reaches a maximum during the period represented by the USGC. During this period, most mud still originated from the south with minor contributions from the mountains located on the western border.

Figure 7.7 Facies Map of the Upper Cycle



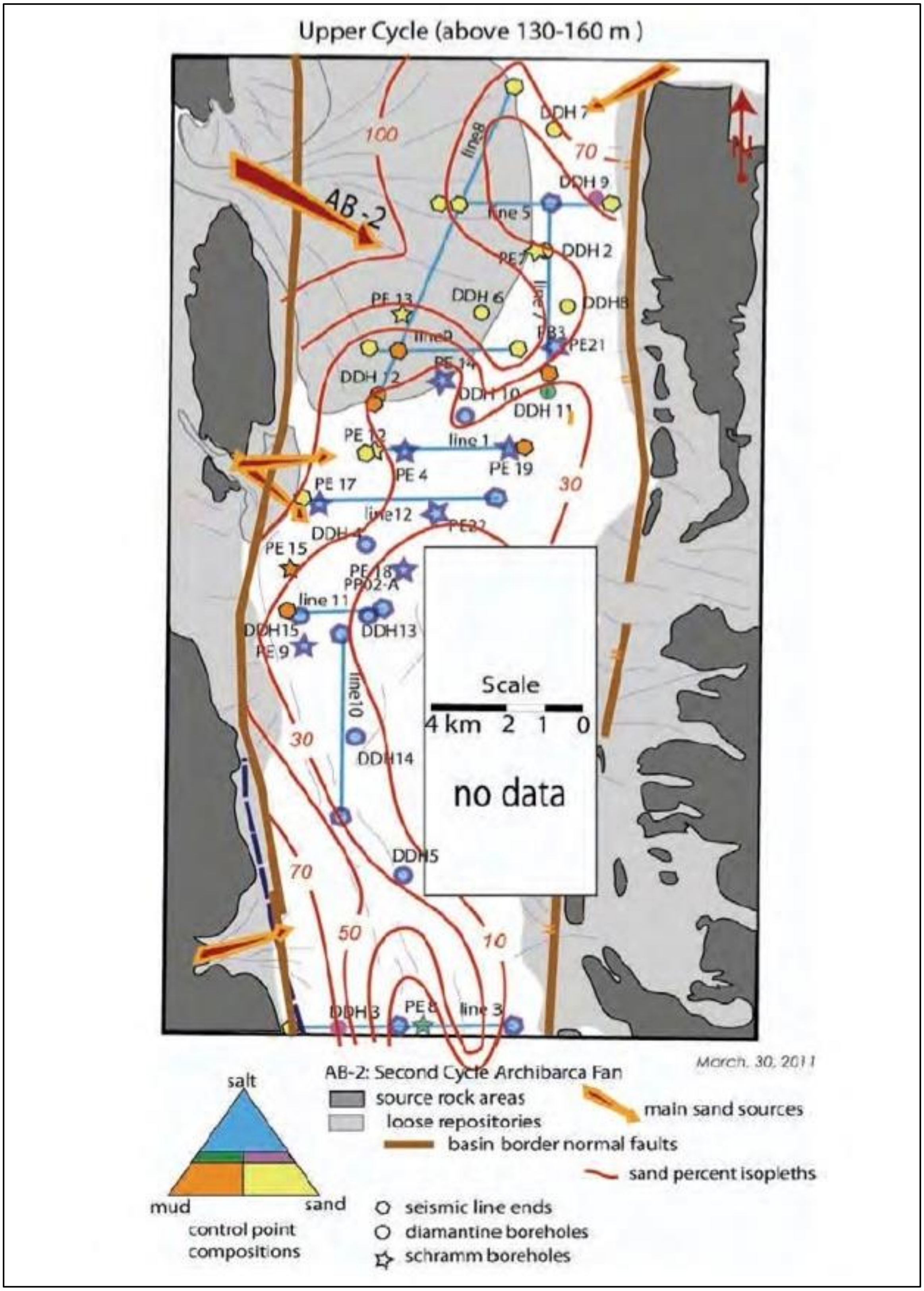
***Source**: Bossi, (2011)*

Figure 7.8 Salt Percent Isopleths of the Upper Cycle



__Source__: Bossi, (2011)

Figure 7.9 Isopleth Map of Sand Percents of the Upper Cycle Sedimentation Stage



***Source**: Bossi, (2011)*

7.6 SURFACE WATER

The Cauchari-Olaroz watershed is shown in Figure 7.10. The watershed is an elongated depression with a length of approximately 150 km in a north-south direction and a width of 30 to 40 km in an east-west direction and covering approximately 4,500 km^2. The surface water network within the watershed eventually flows into the Olaroz or Cauchari Salars. There is no surface water outflow from the salars. These rivers are the main freshwater inflows into the salar and have been monitored since 2009.

The primary surface waterways within the watershed basin are Rios El Rosario, Ola, and Tocomar. Rio Rosario, which is locally called Rio El Toro, originates in the northern part of the watershed, at an elevation of 4,500 m. The river flows south-southeast for 55 km, past the village of El Toro, before it enters into the Olaroz Salar.

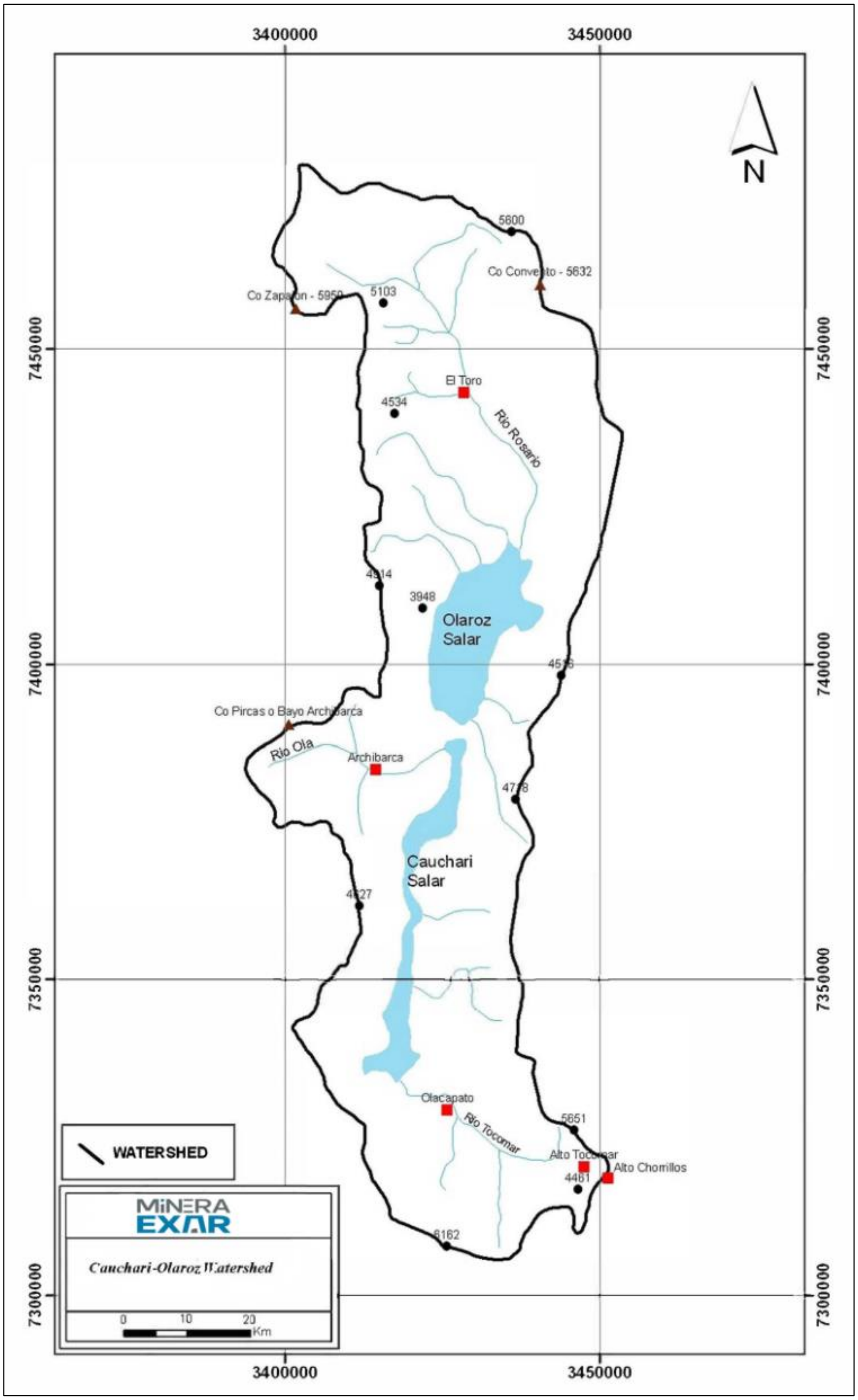
Rio Ola, which is locally called Rio Lama, originates just south of Cerro Bayo Archibarca, at an elevation of around 4,500 m, and flows east for 20 km. It enters the salars on top of the Archibarca Fan that separates Olaroz from Cauchari on the western flank of the basin.

Rio Tocomar, which is locally called Rio Olacapato, originates some 10 km west of Alto Chorillo at an elevation of around 4,360 m. The river flows west for approximately 30 km before it enters the Cauchari Salar from the southeast.

In addition to the surface waterways noted above which enter the salars, there is an area in the central southern part of the Cauchari Salar some 15 km north of the village of Cauchari, where surface water originates from an array of springs. Discharge from these springs is naturally channelled into a central stream that flows north for several kilometres and then gradually seeps back underground.

Chemistry and flow monitoring results from the Surface Water Sampling Program conducted throughout the Cauchari-Olaroz watershed are presented in Section 9.8.

Figure 7.10 Caucharri-Olaroz Watershed



Note: *black dot with a number beside it = meteorological station, red square = town.*
Source: *Minera Exar*

7.7 MINERALIZATION

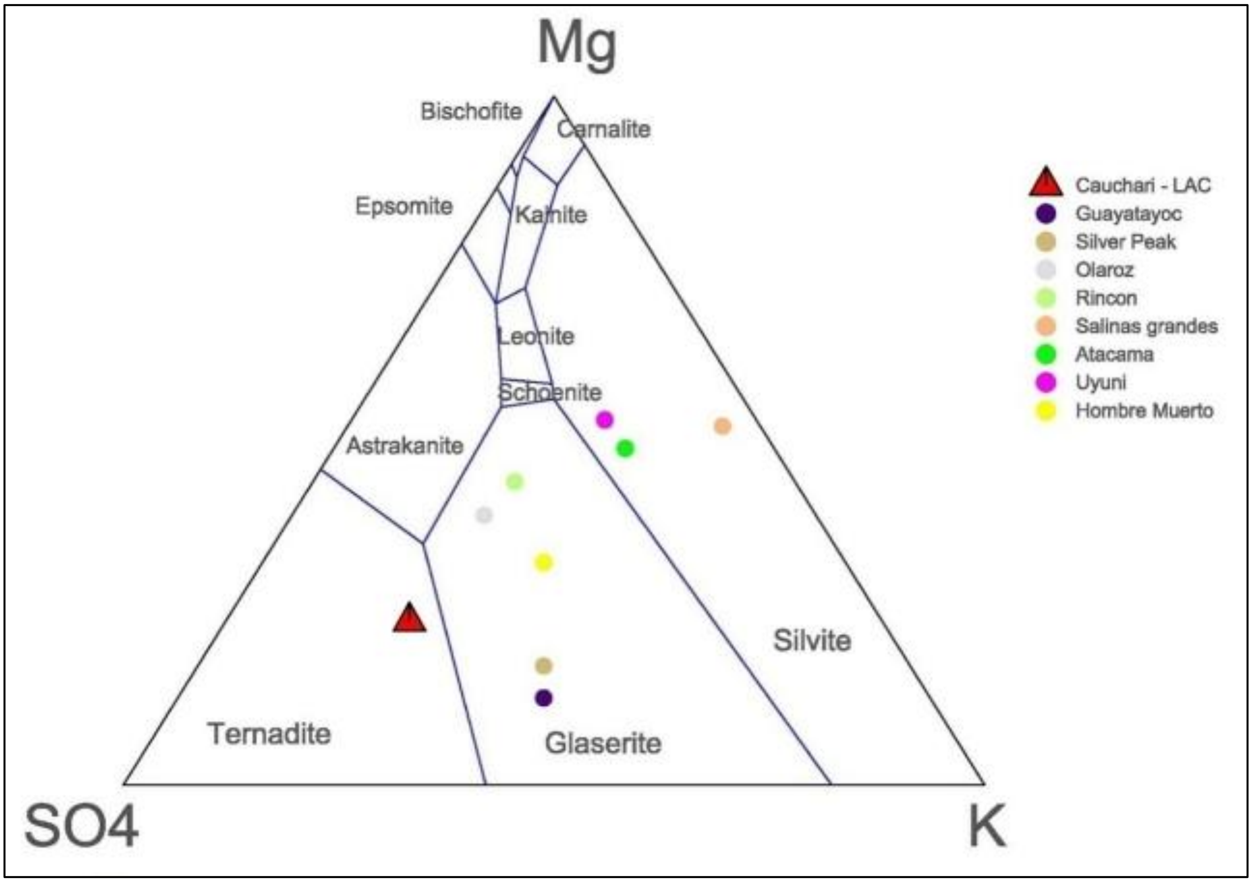
The brines from Cauchari are saturated in sodium chloride with total dissolved solids (TDS) on the order of 27% (324 to 335 g/L) and an average density of about 1.215 g/cm^3. The other primary components of these brines are common to brines in other salars in Argentina, Bolivia, and Chile, and include potassium, lithium, magnesium, calcium, sulphate, HCO_3, and boron as borates and free H_3BO_3.

A Janecke Projection comparing the chemistry of several brine deposits is shown in Figure 7.11. This type of figure can be used as a visualization tool for mineral crystallization. The diagram represents an aqueous five-component system (Na+, K+, Mg++, SO_4=, and Cl–) saturated in sodium chloride. The aqueous system can be represented in this simplified manner, due to the higher content of the ions Cl–, SO_4=, K+, Mg++, Na+ compared with other elements (e.g., Li, B, Ca). In Figure 7.11, each corner of the triangle represents one of three pure components (Mg, SO_4 and K_2), in mol%. The sides of the triangle represent sodium chloride-saturated solutions, with two reciprocal salt pairs ($MgCl_2$ + Na_2SO_4), (Na_2SO_4+KCl) and a quaternary system with a common ion ($MgCl_2$+KCl+NaCl).

The inner regions of the diagram show expected crystallization fields for minerals precipitating from the brine. Since the brines are saturated in NaCl, halite precipitates during evaporation in all the cases. In addition, the Cauchari brine is predicted to initially precipitate ternadite (Na_2SO_4). The brines of Guayatayoc, Silver Peak, Hombre Muerto, Olaroz, and Rincon would initially precipitate glaserite ($K_3Na(SO_4)_2$). Atacama, Uyuni, and Salinas Grandes brines would initially precipitate silvite (KCl).

In addition to the primary minerals indicated in the diagram, a wide range of secondary salts may precipitate from these brines, depending on various factors including temperature and dissolved ions. The additional salts could include: astrakanite ($Na_2Mg(SO_4)_2 \cdot 4H_2O$), schoenite ($K_2Mg(SO_4)_2 \cdot 6H_2O$), leonite ($K_2Mg(SO_4)_2 \cdot 4H_2O$), kainite ($MgSO_4 \cdot KCl \cdot 3H_2O$), carnalite ($MgCl_2 \cdot KCl \cdot 6H_2O$), epsomite ($MgSO_4 \cdot 7H_2O$), and bischofite ($MgCl_2 \cdot 6H_2O$).

Figure 7.11 Janecke Classification of Brines



References as per Table 8.1, with the addition of information from Houston (2010b) for Salinas Grandes and Guayatayoc.
Source: *King, Kelley, Abbey, (2012).*

8.0 DEPOSIT TYPES

The Cauchari and Olaroz Salars are classified as "Silver Peak, Nevada" type terrigenous salars. Silver Peak, Nevada in the USA was the first lithium-bearing brine deposit in the world to be exploited. These deposits are characterized by restricted basins within deep structural depressions in-filled with sediments differentiated as inter-bedded units of clays, salt (halite), sands and gravels. In the Cauchari and Olaroz Salars, lithium-bearing aquifers have developed during arid climatic periods. On the surface, the salars are presently covered by carbonate, borax, sulphate, clay, and sodium chloride facies. A detailed description of the geology of the Olaroz and Cauchari Salars is provided in Section 7.

Cauchari and Olaroz have relatively high sulphate contents and therefore both salars can be further classified as "sulphate type brine deposits". Section 10 provides detailed further discussion of the chemistry of Cauchari and Olaroz.

Table 8.1 compares the average Cauchari brine composition measured in weight percent with other natural brine deposits. It should be noted that the Qualified Person has been unable to verify the information for other properties listed in Table 8.1 and that the information is not necessarily indicative of the mineralization on the Property that is the subject of the Technical Report but is presented for reference purposes only.

TABLE 8.1
COMPARATIVE CHEMICAL COMPOSITION OF NATURAL BRINES

Company	Location	Classification	Weight Percent (wt %)					Density (g/cm^3)	Ratios				
			Li	K	Mg	SO_4	B		Mg: Li	K: Li	SO_4: Li	SO_4: Mg	SO_4: K
Albemarle	Atacama, Chile (A)	Proven/ Probable	0.15	1.85	0.96	1.65	0.064	1.223	6.4	12.33	11	1.72	0.89
SQM	Atacama, Chile (B)	Probable / Proven	0.15	1.85	0.96	1.65	0.064	1.223	6.4	12.33	11	1.72	0.89
Lithium Americas	Cauchari – Olaroz, Argentina (C)	Proven	0.06	0.45	0.13	1.58	0.09	1.22	2.37	8.08	28.28	11.96	3.5
		Probable	0.05	0.44	0.13	1.56	0.09	1.22	2.37	8.11	28.49	12	3.51
Livent	Hombre Muerto, Argentina (A)	Proven/ Probable	0.06	0.62	0.09	0.85	0.04	1.21	1.37	9.95	13.76	10.04	1.38
Minera Salar Blanco S.A.	Maricunga, Chile (D)	Proven / Probable	0.09	0.69	0.61	0.06	0.05	1.20	6.55	7.35	0.64	0.10	0.09
Orocobre	Olaroz, Argentina (E)	Measured/ Indicated	0.07	0.57	0.23	n.a.	0.33	1.21	2.40	8.30	n.a.	n.a.	n.a.
Albemarle	Silver Peak, USA (A)	Proven/ Probable	0.02	0.53	0.03	0.71	0.01	n.a.	1.30	23.04	30.87	23.67	1.34
Comibol (state)	Uyuni, Bolivia (A)	Inferred	0.04	0.72	0.65	0.85	0.02	1.21	18.57	20.57	24.29	1.31	1.18
Neo Lithium	3Q, Argentina (F)	Measured/ Indicated	0.10	0.86	0.17	0.38	0.13	1.21	1.71	8.58	0.38	2.24	0.45

Notes:
(A) *Data from Roskill, 2009*
(B) *SQM: US SEC report Form 20 F 2009*
(C) *Present NI 43-101 Report*
(D) *Salar Blanco NI 43-101 report, 2019*
(E) *Orocobre NI 43-101 report, 2011*
(F) *Neo Lithium NI 43-101 report, 2019.*

9.0 EXPLORATION

9.1 OVERVIEW

The following exploration programs have been conducted to evaluate the lithium development potential of the Project area:

- Surface Brine Program – Brine samples were collected from shallow pits throughout the salars to obtain a preliminary indication of lithium occurrence and distribution.
- Seismic Geophysical Program – Seismic surveying was conducted to support delineation of basin geometry, mapping of basin-fill sequences, and siting borehole locations.
- Gravity Survey – A limited gravity test survey was completed to evaluate the utility of this method for determining depths to basement.
- TEM Survey – TEM surveying was conducted to attempt to define fresh water / brine interfaces around the salar perimeter.
- VES Survey – A VES survey was conducted to attempt to define fresh water and brine interfaces, and extensive fresh water occurrences.
- Surface Water Sampling Program – An ongoing program is conducted to monitor the flow and chemistry of surface water entering the salars.
- Pumping Test Program – Pumping and monitoring wells were installed and pumping tests were conducted at five locations, to estimate aquifer properties related to brine recovery and fresh water supply.
- Reverse Circulation (RC) Borehole Program – Dual tube reverse circulation drilling was conducted to develop vertical profiles of brine chemistry at depth in the salars and to provide geological and hydrogeological data.
- Diamond Drilling (DD) Borehole Program – This program was conducted to collect continuous cores for geotechnical testing (RBRC, grain size and density) and geological characterization. Some of the boreholes were completed as observation wells for future brine sampling and monitoring.

Samples were representative and no known biases were introduced due to sampling procedures. Details of the drilling programs are discussed in Section 10.

9.2 SURFACE BRINE PROGRAM

In 2009, a total of 55 surface brine samples were collected from shallow hand-dug test pits excavated throughout the Project area. Results from this early program indicated favourable potential for significant lithium grades at depth. Additional exploration work was initiated on the basis of these results. A full description of the Surface Brine Program is provided in the Inferred Mineral Resource Estimate Report for the Project (King, 2010a).

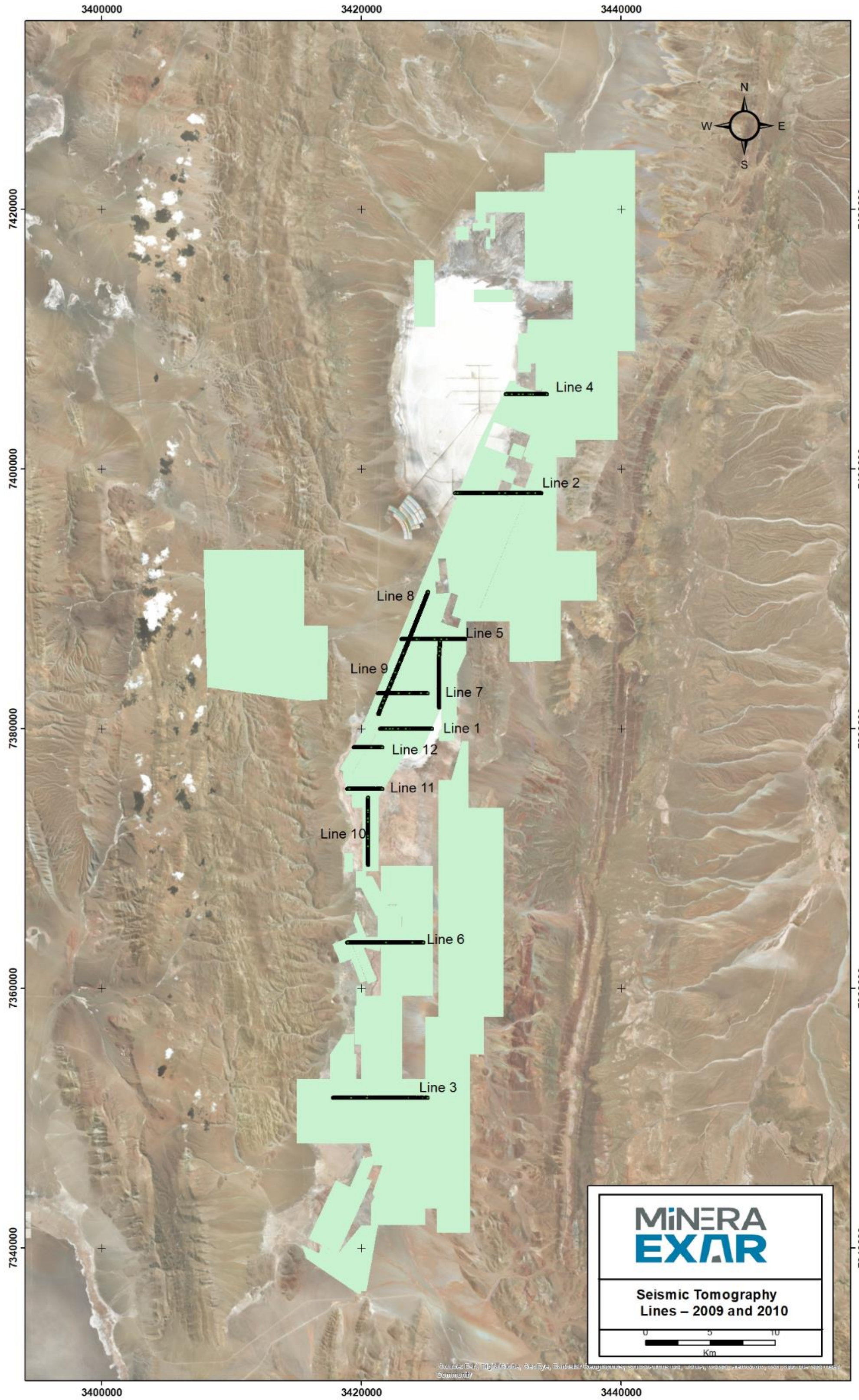
9.3 SEISMIC GEOPHYSICAL PROGRAM

A high-resolution seismic tomography survey was conducted primarily on the Cauchari Salar and to a lesser extent on the Olaroz Salar, during 2009 and 2010. The survey was contracted to Geophysical Exploration Consulting (GEC) of Mendoza, Argentina. Measurements were conducted along 12 survey lines, as shown in Figure 9.1. Nine lines are oriented east-west (1, 2, 3, 4, 5, 6, 9, 11, and 12), two lines (7 and 10) have a north-south orientation, and Line 8 is a northeast trending diagonal line parallel to the western property boundary and covering the Archibarca Fan. A total of 62,500 m of seismic survey data was acquired.

The survey configuration utilized a five-metre geophone separation, and a semi-logarithmic expanding drop-weight source array symmetrically bounding the central geophone array. The geophone array comprised 48 mobile measurement sites utilizing Geode Geoelectrics 8 Hz geophones. Symmetrically surrounding the 48 geophones were accelerated, 150 kg drop-weight sites moving away from the geophone array as follows: 15, 30, 60, 90, 120, 150, 250, 500, 750, and 900 m. Based on standard methods for depth resolution, the outer drop-weight positions would provide sufficient velocity detail to depths on the order of 500 to 600 m. The seismic survey data supported the identification of drilling sites for the RC and DD Programs in 2009 and into 2010. The seismic inversions are shown in Figure 9.2.

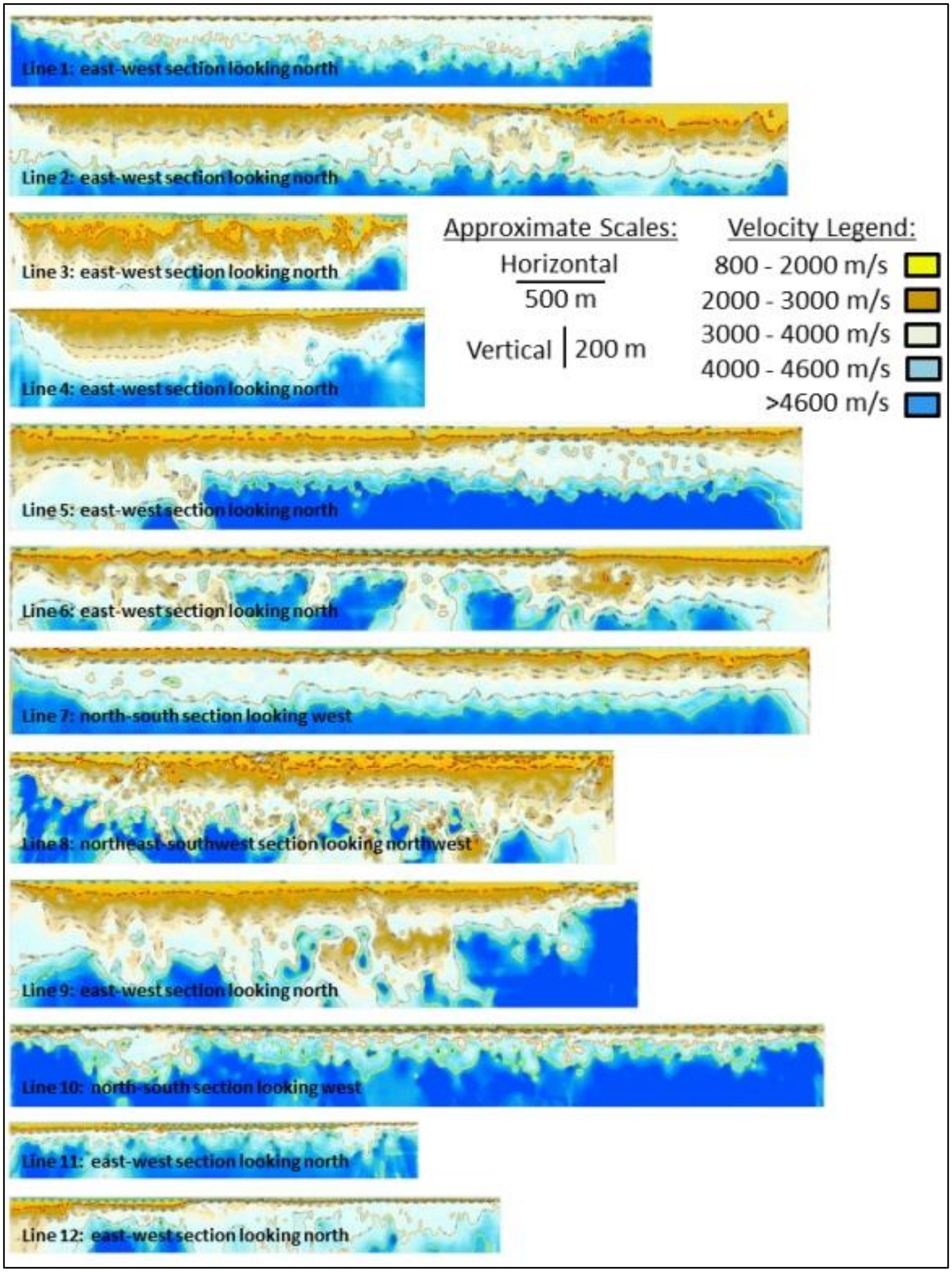
The maximum interpreted depth of the salars for each of the twelve seismic lines ranged from approximately 300 to 600 m. This variance in the apparent depth of the basin is attributed to two factors: 1) actual basin depth, and 2) property limitations which restricted the placement of the source hammer, and therefore the depth of exploration.

Figure 9.1 Seismic Tomography Lines – 2009 and 2010



Source: *Minera Exar.*

Figure 9.2 Seismic Tomography Results for the 12 Survey Lines in Figure 9.1



Source: *King, Kelley, Abbey, (2012).*

9.4 GRAVITY SURVEY

A reconnaissance gravity survey was completed at the Cauchari Salar during July of 2010. The survey was a test to evaluate the effectiveness of the gravity method to define basement morphology and grabens that could represent favourable settling areas for dense brine. Data were collected at 200 m intervals along the two survey profiles shown in Figure 9.3. These profiles extended to outcrop locations outside the salar limits, to facilitate final gravity data processing and inversion.

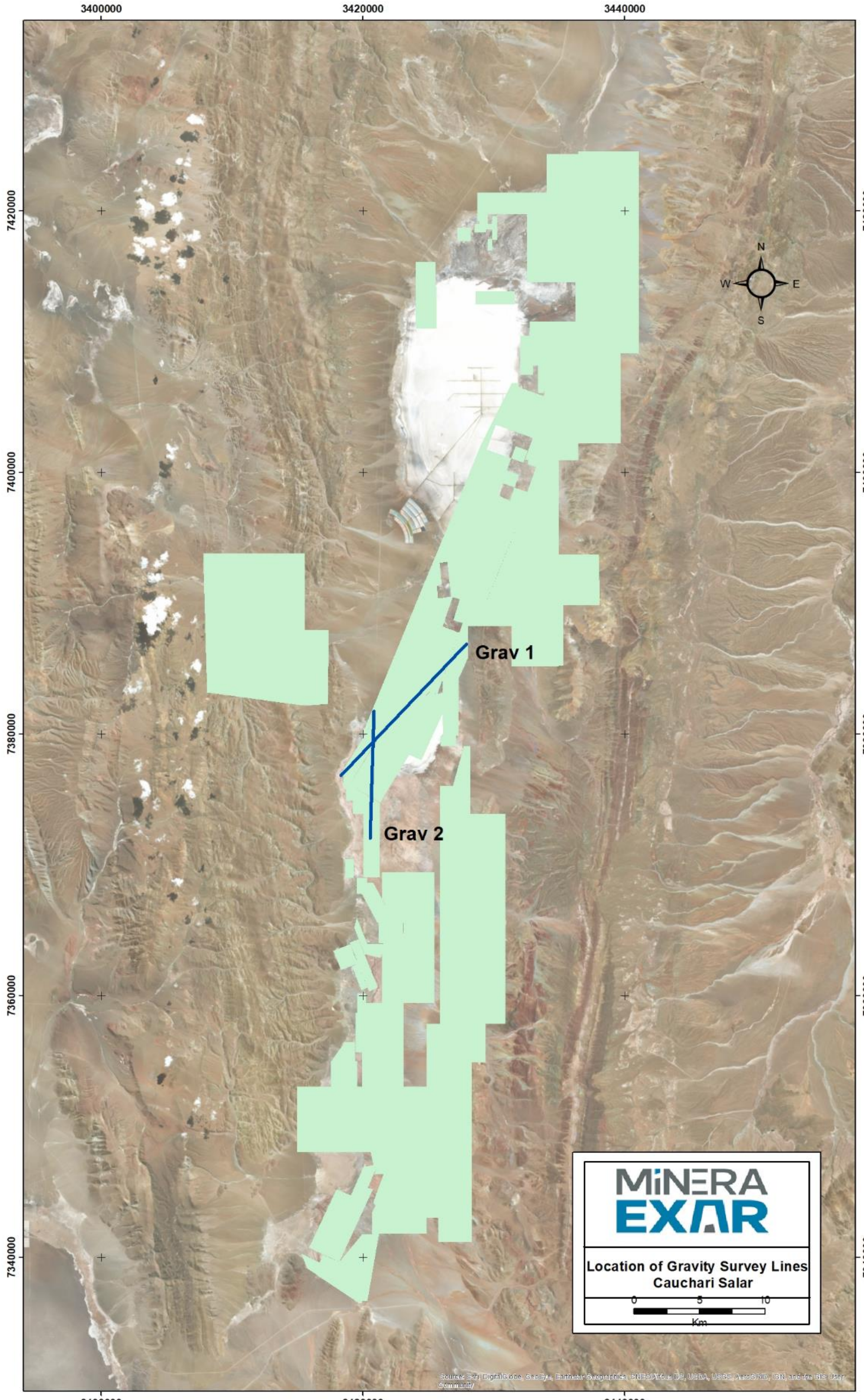
Instrumentation used for the survey was a La Coste and Romberg #G-470 gravimeter with an accuracy of ± 0.01 mGal. The gravity survey field procedure included repetition of survey control points at intervals of less than five hours, to minimize instrument drift control errors. Initial gravity data processing was completed with Oasis software, using the Gravity and Terrain Correction module. Inversions were also produced with Oasis software, using the gravity module GM-SYS.

Differential GPS measurements provided the station control with an accuracy level of ± 1 cm. A GPS base station using a Trimble DGPS 5700 model was employed in two locations within five kilometres of the survey lines and operated continuously during the measurement of the survey GPS points along the gravity traverses. A Trimble model R3 was used for the gravity station placement.

Modelling results for the northeast oriented gravity survey line (GRAV 1) are shown in Figure 9.4. The image shows the location of boreholes, the input densities used for model generation, and the calculated Bouger results from the field data. The upper profiles indicate an excellent fit of observed and modeled data based on the coloured model shown in the lower part of the figure. The lower red portion is the modeled depth to basement, or denser lithologies, using the starting model densities and the observed field data. There is good correlation between the gravity and seismic results which indicate changes in density and velocity, respectively, at approximately 300 m depth. It is interpreted that this approximate depth represents an increase in compaction of the sand-salt mix encountered during drilling.

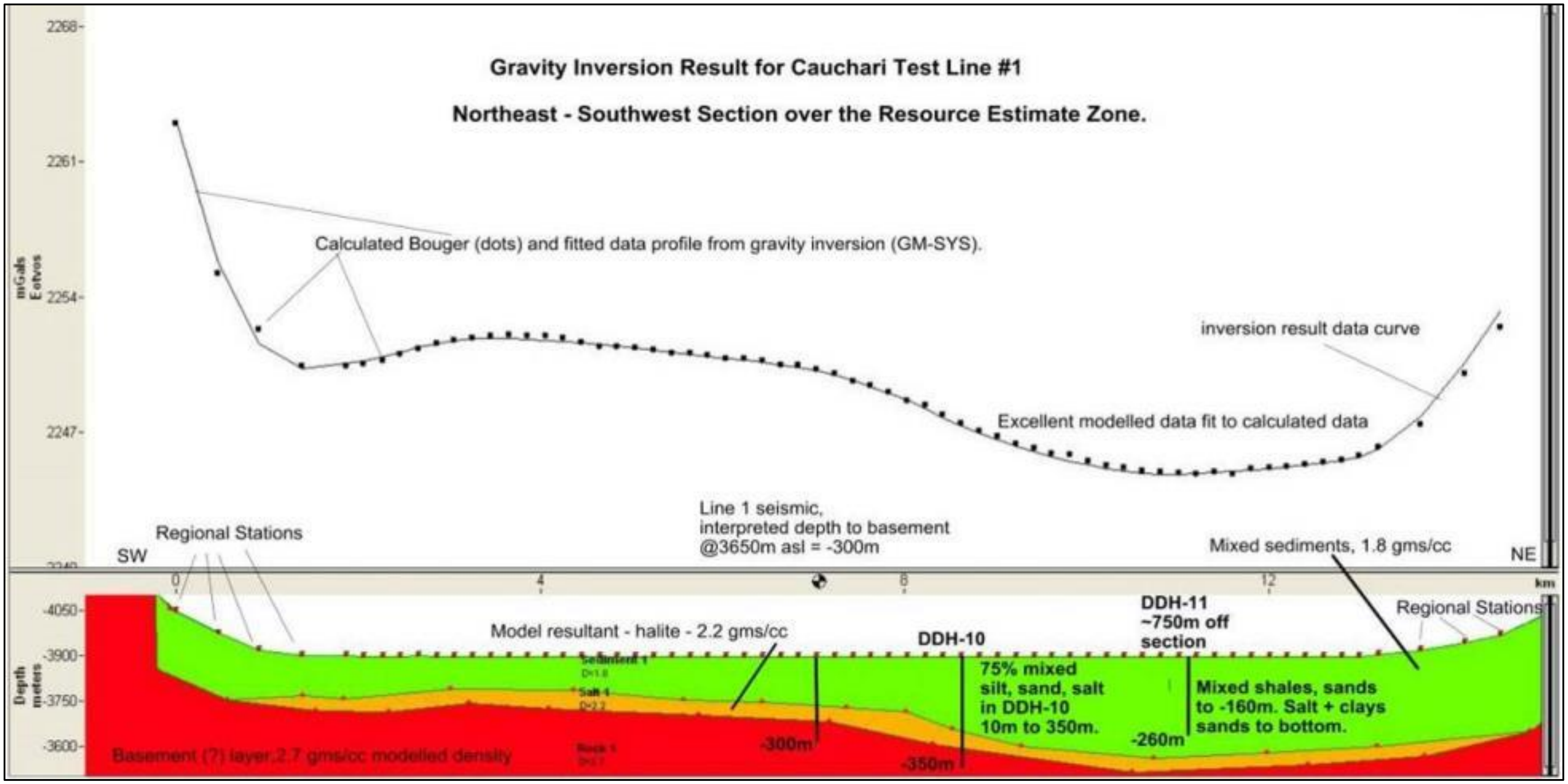
Modelling results for the north-south gravity profile (GRAV 2) across the southwest portion of the Mineral Resource Estimate zone are shown in Figure 9.5. Drilling results for DDH-4 show a change at 160 m depth to thick and dense halite with low porosity. This is marginally higher than the red area indicated by the gravity inversion modelling program. Similarly, for DDH-12, the intersection of the massive halite is slightly different from the model results but is within acceptable limits. Overall an excellent fit is apparent between the observed and modeled data as seen in the profile on the upper section of the figure. This image demonstrates that the gravity method is effective for identifying relative density changes associated with different lithologies or increased compaction with depth in the salar.

Figure 9.3 Location of Gravity Survey Lines at the Cauchari Salar



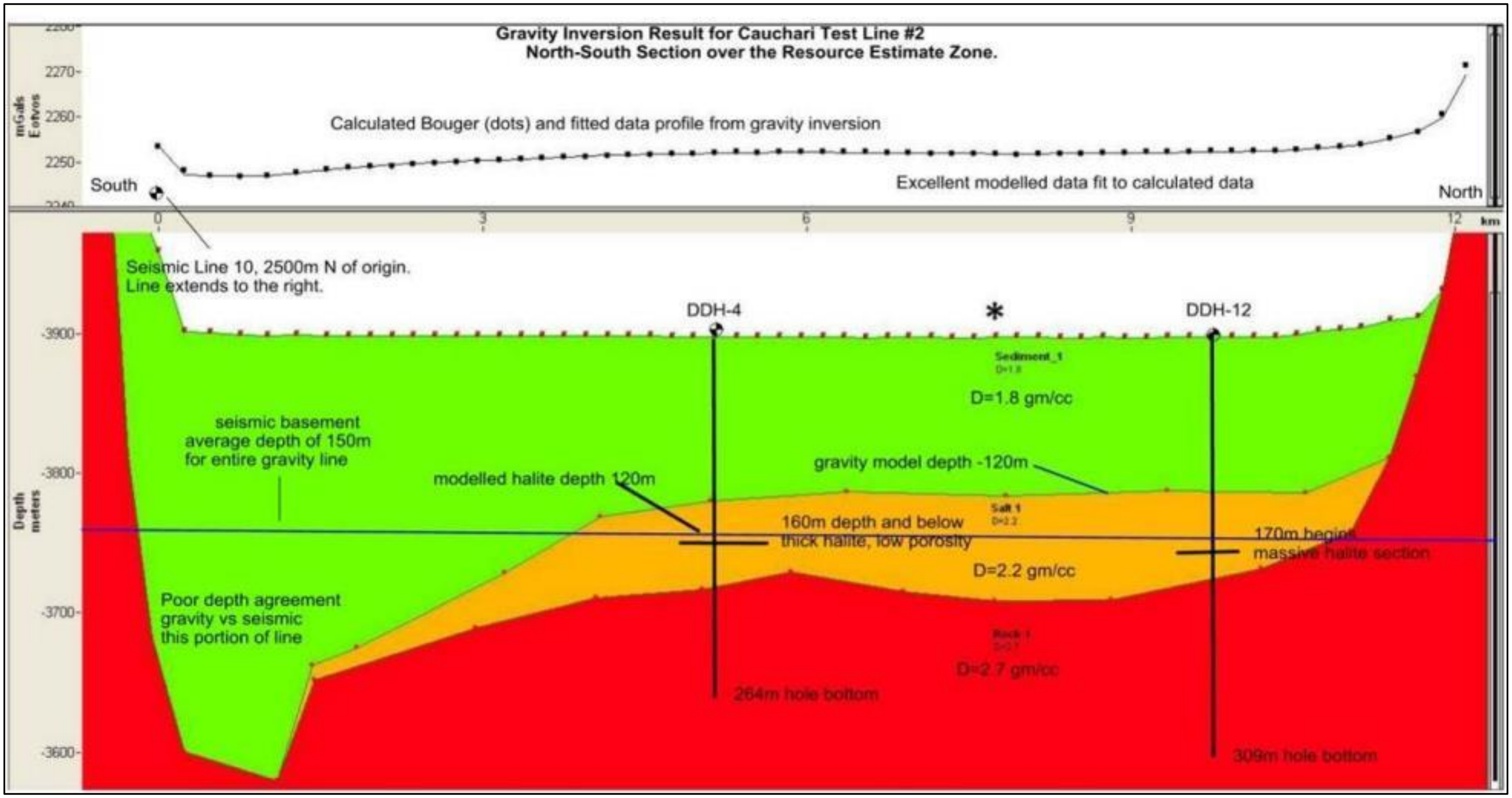
Source: *Minera Exar.*

Figure 9.4 Modeling Results for the Northeast Oriented Gravity Line (Grav 1) Over the Mineral Resource Estimate



Source: *King, Kelley, Abbey, (2012).*

Figure 9.5 Modeling Results for the North-South Gravity Line (Grav 2) Across the Southwest Portion of the Mineral Resource Estimate



Source: *King, Kelley, Abbey, (2012).*

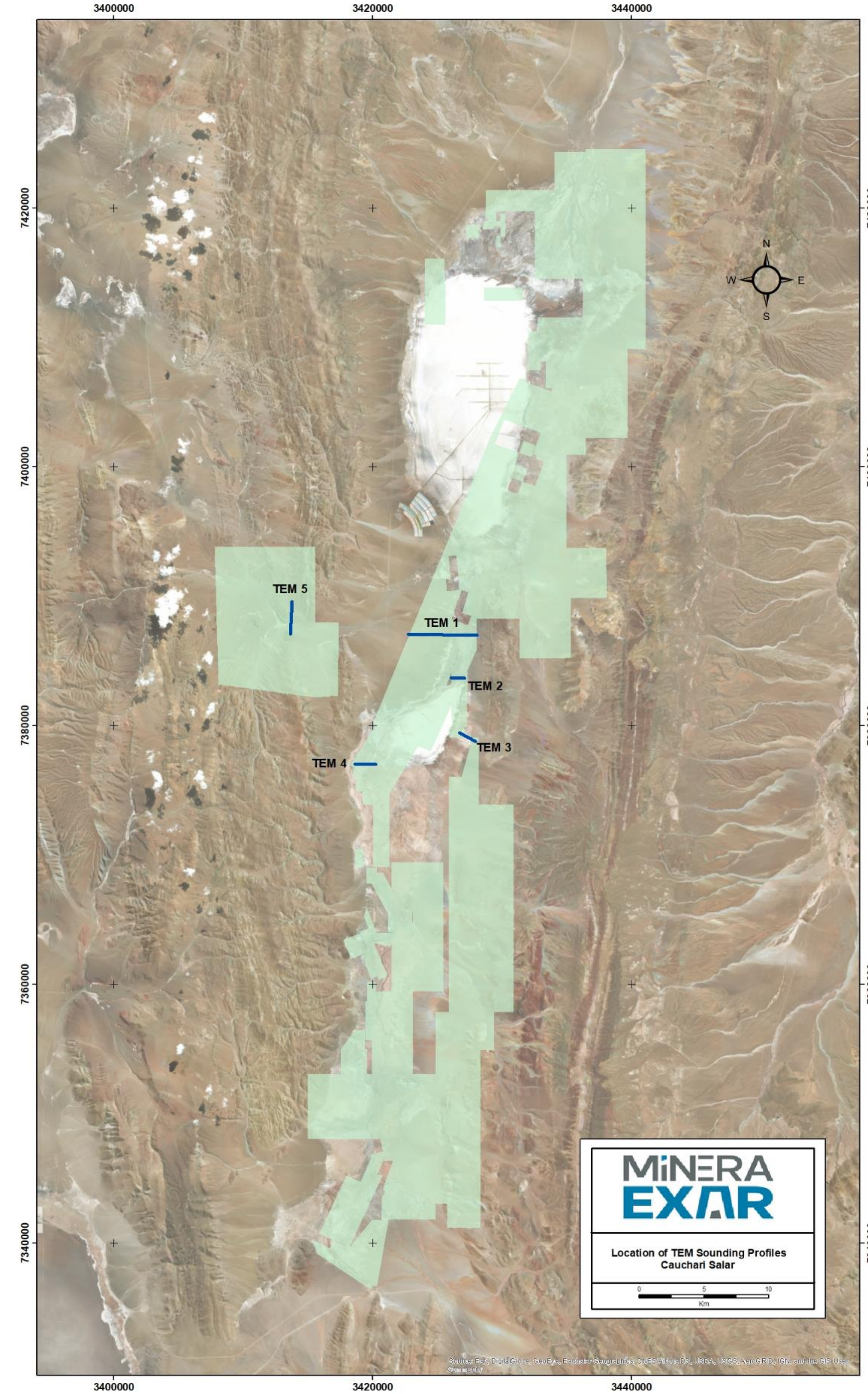
9.5 TEM SURVEY

A Time Domain Electromagnetic (TEM) survey was conducted in the Cauchari Salar during July, 2010, along the five TEM lines shown in Figure 9.6. The main objective of the survey was to test the applicability of this method for determining resistivity contrasts that may relate to changes in groundwater salinity. In general, it is expected that saline brines will be more conductive (lower resistivity), whereas areas of fresh water will be less conductive (higher resistivity). The TEM survey parameters included:

- The use of Zonge GDP-16 Rx and GGT-20 Tx instrumentation;
- In-loop sounding configuration using 200 m × 200 m square transmitting loops and a base transmitting frequency of 4 Hz;
- Soundings completed at 100 m station intervals from 45 ms to 48 ms; and
- Completion of a total of 12.6 linear survey kilometres.

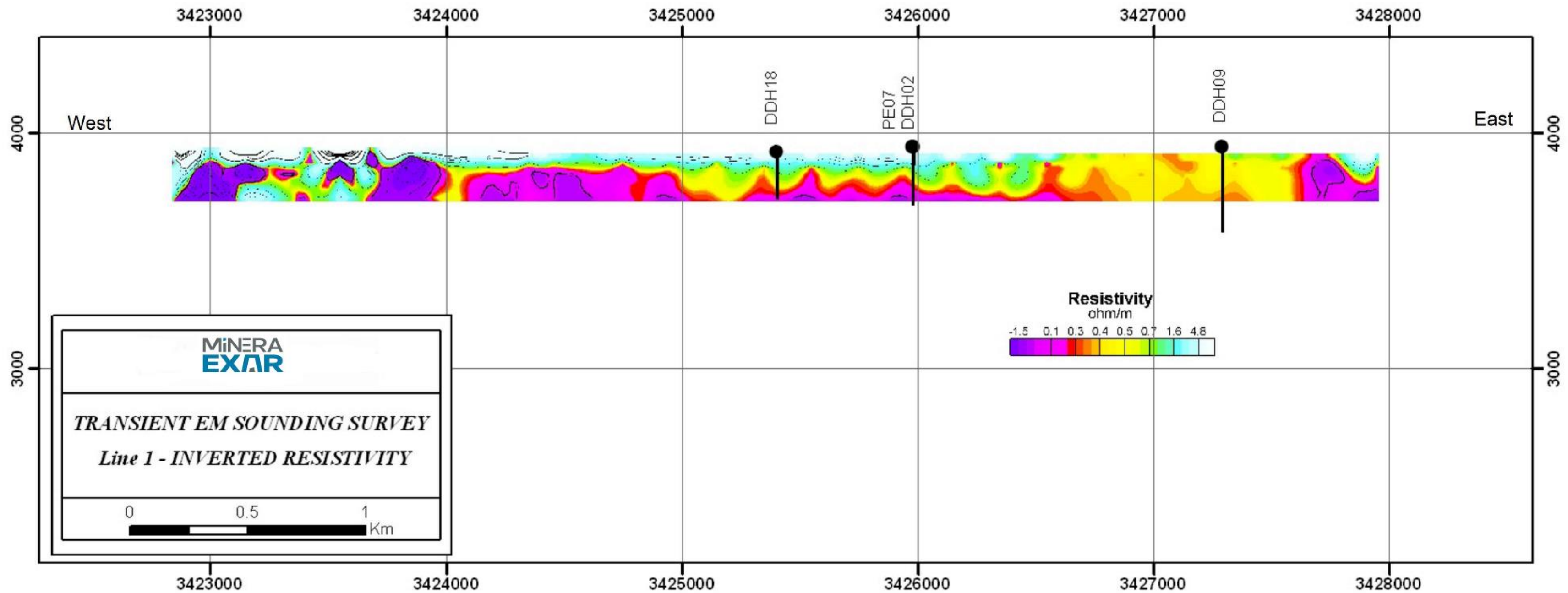
Line TEM 1 (Figure 9.7) – Borehole logs and brine sampling results for PE-07 and DDH-02 indicate that the top of the brine aquifer is at approximately 40 m depth. This is reasonably consistent with the low resistivity values seen in the inversion at this location where the resistivity drops in the presence of brine. For DDH-09, there is sand present to approximately 60 m depth, followed by variable salt, silt, and sand past the bottom of the TEM inversion depth. The resistivity section is supported by the logging results. Notably on this TEM line is the area on the west (left) side of the image, which corresponds to a portion of the alluvial Archibarca Fan, where freshwater inflow occurs. The higher resistivity values in this area are consistent with the inflow of freshwater. The profile also shows two low resistivity anomalies that may be attributable to occurrence of brines at depth, possibly related to structures that intersect the TEM profile orthogonally at these locations.

Figure 9.6 Location of TEM Sounding Profiles Conducted at the Cauchari Salar



Source: *Minera Exar.*

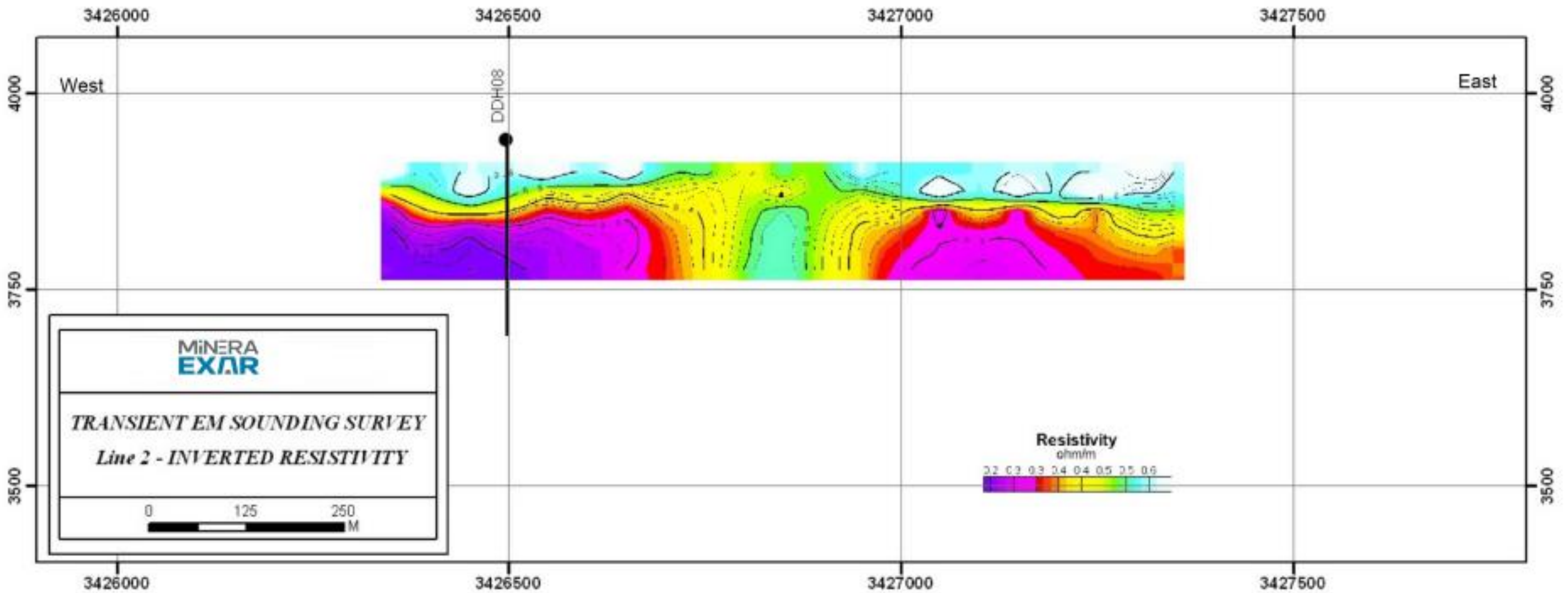
Figure 9.7 Survey Results for Line TEM 1



***Source: :** Minera Exar.*

Line TEM 2 (Figure 9.8) – This TEM image shows a typical layered model in the vicinity of DDH-08 where sandy layers containing the brine resource are situated at 20 m depth. The deeper, low resistivity region associated with DDH-08 is associated with the sandy brine-containing layers continuing to depth. Further to the east (right) there is indication of another low resistivity, high conductivity source. The higher resistivity values in the center of the image may be associated with compacted halite, possibly related to a horst.

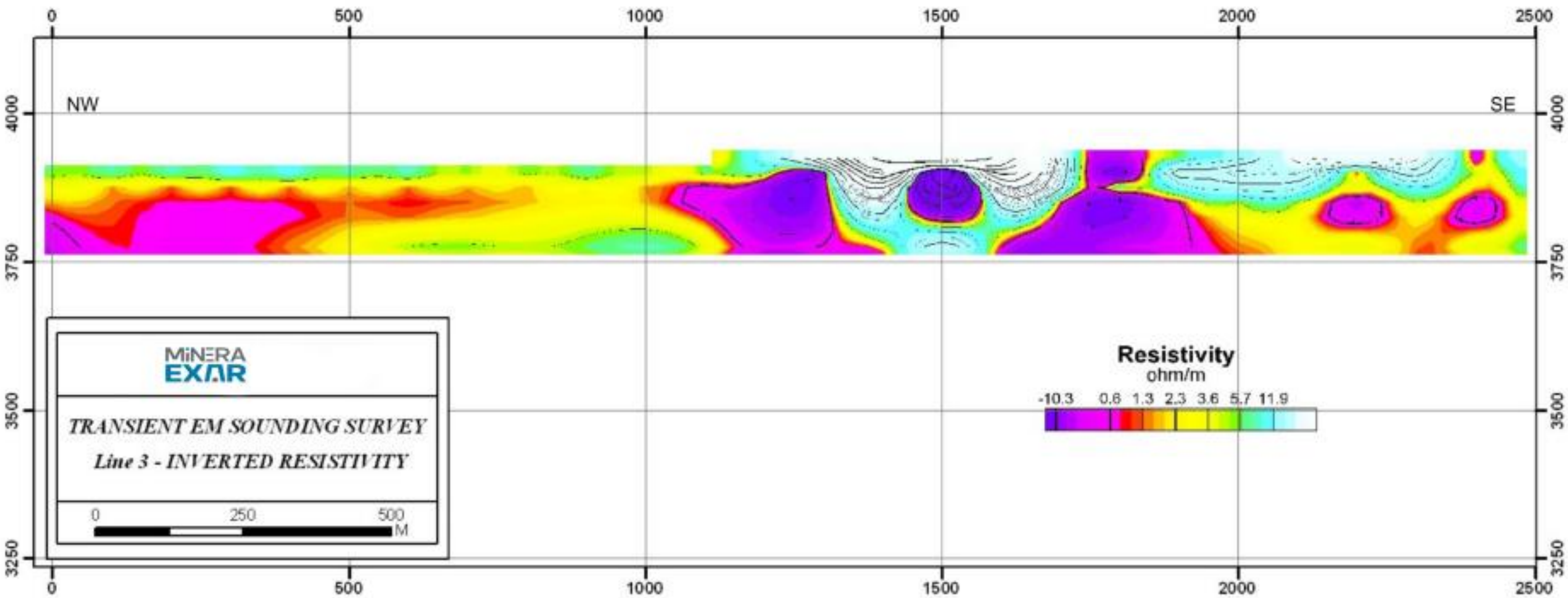
Figure 9.8 Survey Results for Line TEM 2



Source: *Minera Exar.*

Line TEM 3 (Figure 9.9) – This northwest-southeast oriented line is situated in the eastern sector of the Cauchari Salar, where no drilling has occurred. It was selected to investigate the possibility of fresh water inflow and/or the presence of brine. The resistivity data suggest that both scenarios occur. Higher resistivity values are likely attributable to fresh water inflow from one of the alluvial fans in the area. The lower resistivity values may be related to brines, with typical resistivity values of < 1.0 ohm/m, associated with interpreted structural features within the basin.

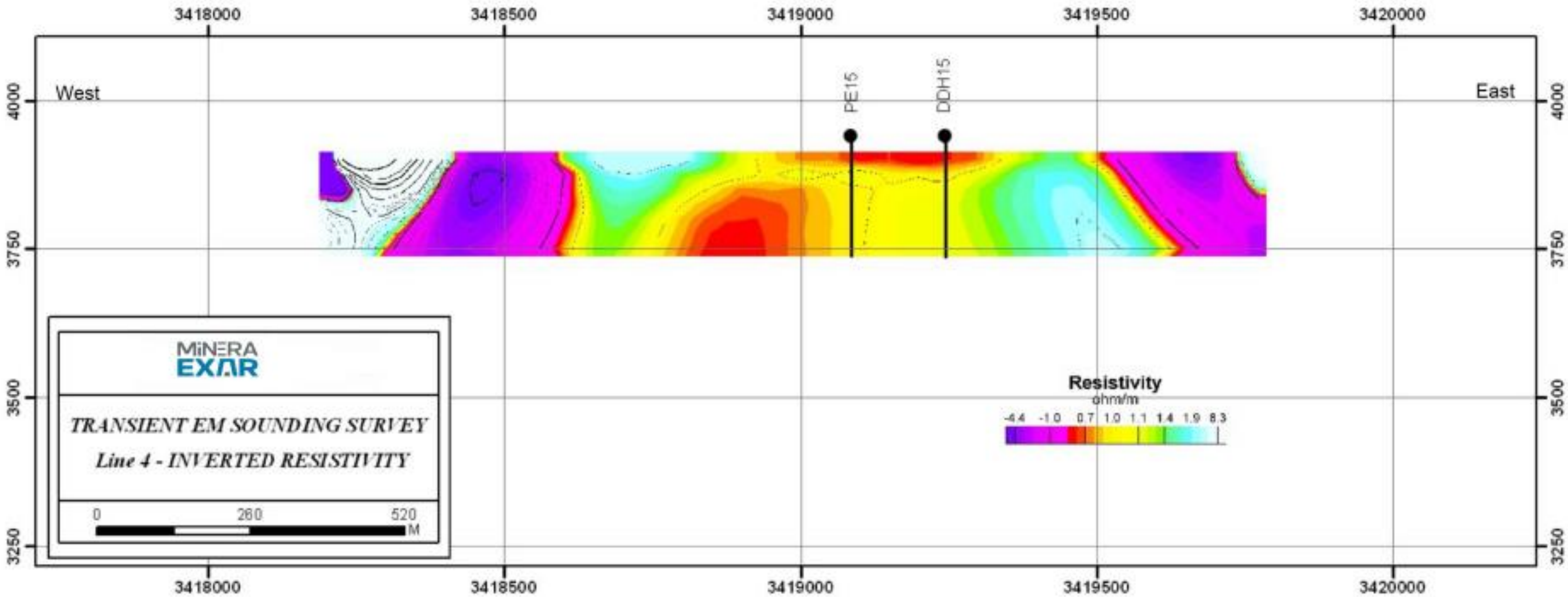
Figure 9.9 Survey Results for Line TEM 3



Source: *Minera Exar.*

Line TEM 4 (Figure 9.10) – This line is situated along the western margin of the Cauchari Salar. PE-15 is cased from the surface to a depth of 65 m. Sampling results indicate the presence of a brine aquifer at the bottom of the casing. The resistivity values suggest continuity of the brine to surface. Below 65 m the lithology is characterized by high halite content. The resistivity values at this point are around 1 ohm/m, which is slightly more resistive than sandy brine responses, and consistent with high halite content. Further to the west (left) of the boreholes, a low resistivity zone may indicate brine in a structural feature along the margin of the salar. The higher resistivity at the left end of the section may indicate fresh water moving into the salar.

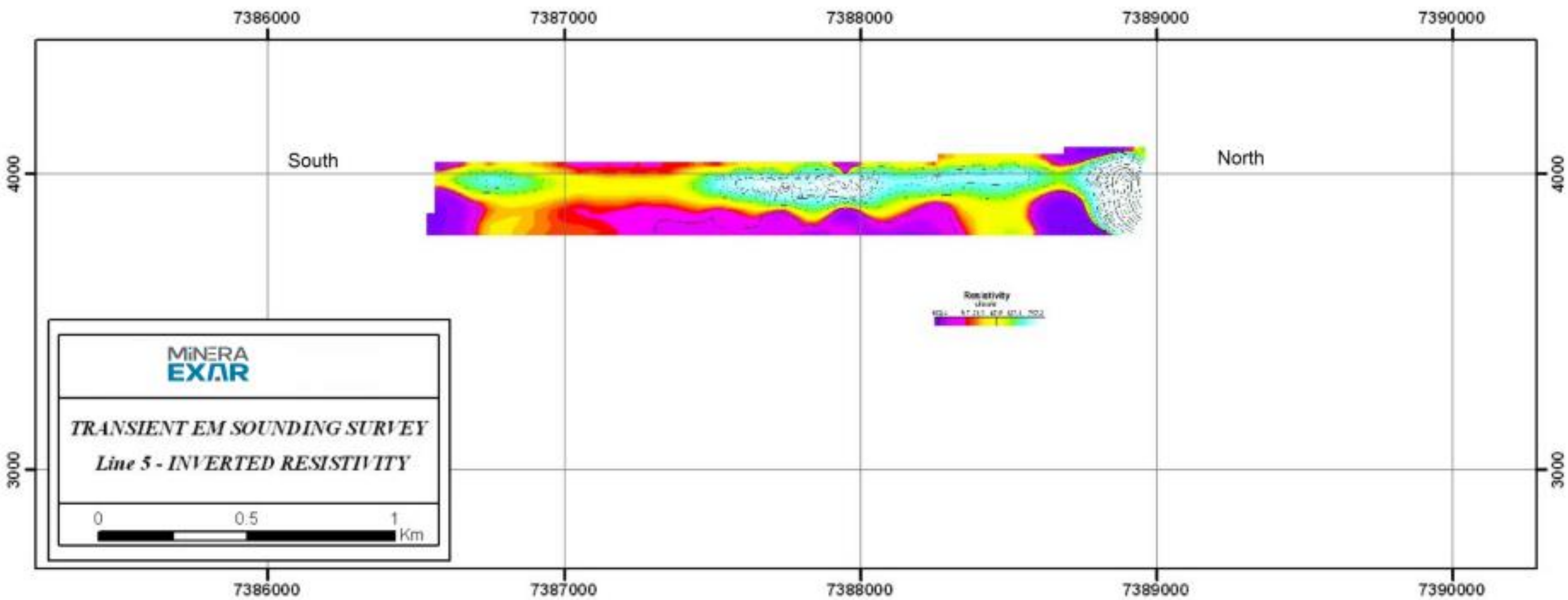
Figure 9.10 Survey Results for Line TEM 4



Source: *Minera Exar.*

Line TEM 5 (Figure 9.11) – This line was located to investigate groundwater composition under the Archibarca Fan. The central portion of the inversion shows an area of higher resistivity extending from the surface to a depth of approximately 75 m. Laterally, this zone could approach one kilometre in width. The resistivity values decrease under this interpreted body of fresh water, but not to the degree that would indicate brine presence. They may represent either background resistivity, or the transition to more saline water at depth. Some of the resistivity zones on this TEM line are greater than 1,000 ohm/m, clearly indicating a highly resistive environment that is in contrast with the conductive brines of Cauchari. The higher resistivity values on the right side of the section may relate to the near-surface occurrence of bedrock.

Figure 9.11 Survey Results for Line TEM 5



Source: *Minera Exar.*

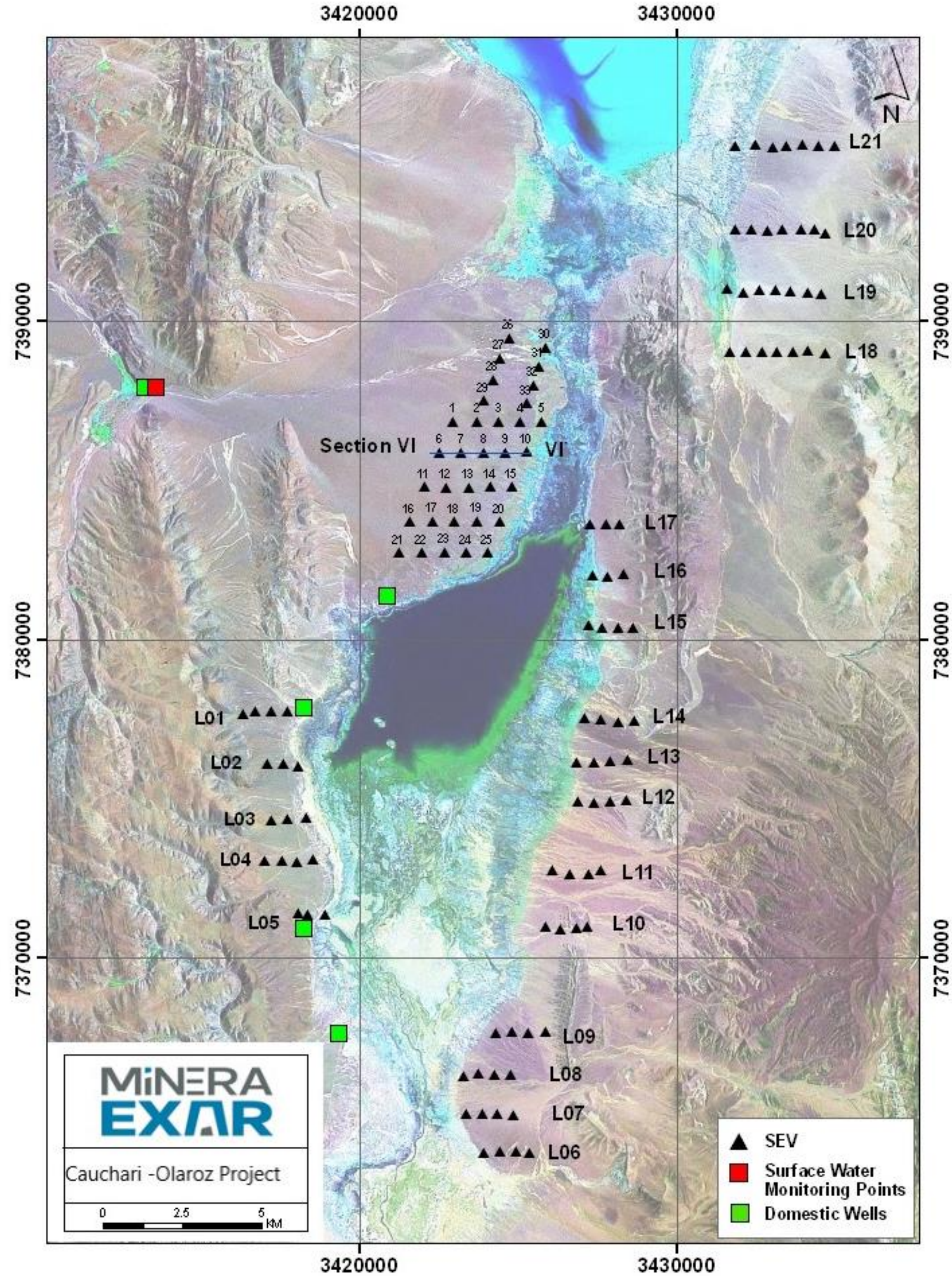
In conclusion, the TEM survey results indicate that the method can be used to determine resistivity contrasts within the salar. However, resolution may be limited to depths on the order of 75 m – 100 m, due to the broad presence of low resistivity materials, as indicated by ambient resistivity values of near sub-ohm/m in many areas of the salar.

9.6 VERTICAL ELECTRICAL SOUNDING SURVEY (VES)

A Vertical Electrical Sounding (VES) survey was conducted at perimeter locations on the Cauchari-Olaroz Salar, from November 2010 to May 2011. The extended survey period was due to recurring weather conditions that were unfavourable for surveying. The objectives of this program were to: 1) explore potential shallow fresh water sources on the Archibarca Fan, for future industrial purposes; and 2) evaluate salar boundary conditions related to the configuration of the brine/fresh water interface.

The survey was conducted using a 4-point light HP, which provides a simultaneous reading of intensity and potential that directly yields apparent resistivity. Data collected in the field were interpreted using RESIX 8.3 software, producing a graph of points representing the field measurements, and a solid line curve corresponding to the physical-mathematical model. Survey locations are shown on Figure 9.12.

Figure 9.12 Map of VES Survey Area



Source: *Minera Exar.*

The VES results enable the differentiation of the following five zones on the Archibarca Fan and the salar perimeter locations, as shown in Figure 9.13 through to Figure 9.16:

- An upper unsaturated layer, with relatively high resistance;
- An upper saturated aquifer containing fresh water;
- A lower conductive layer, interpreted as containing brine;
- An interface or mixed zone, grading from fresh water to brine; and
- A lower resistive zone, only detected in three VES lines and in which the degree of saturation and water salinity is unknown.

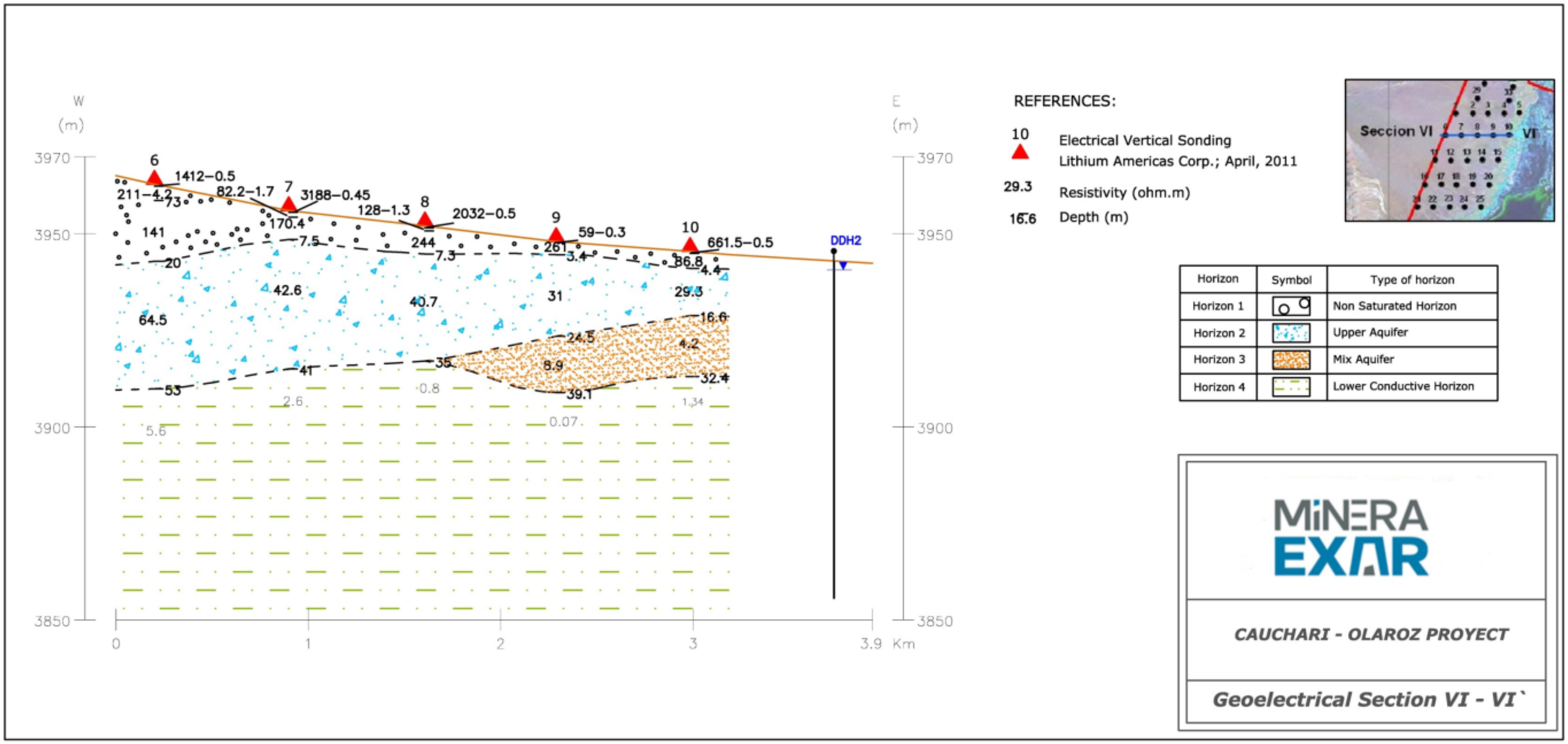
The first three of these were encountered on most lines and are interpreted to be relatively continuous on the Archibarca Fan and the salar perimeter. The latter two were discontinuous. On the Archibarca Fan, the VES results indicate the occurrence of fresh water to an average depth of 50 m below surface. Below the fresh water layer, a gradational interface often occurs between shallow fresh water and deeper brine, from approximately 20 to 70 m depth.

The upper zone, interpreted as fresh water, is present throughout the investigated area of the fan and has potentially favourable characteristics for water supply. This zone is a target for expansion of the freshwater supply at PB-I (see Section 9.10). The occurrence of freshwater on the Archibarca Fan indicates with the inflow of fresh water into the shallow sandy fan sediments from upgradient areas. The VES results are consistent with existing drilling results and are useful for evaluating the potential thickness of the freshwater wedge.

Additional potential zones of freshwater were also identified on other smaller alluvial fans and also other non-fan perimeter locations (e.g., Figure 9.13, Figure 9.14, Figure 9.15 and Figure 9.16). The water supply potential of these additional zones appears to be lower than that of the Archibarca, due to more limited lateral and/or vertical extent of the interpreted fresh water zone. Nevertheless, these occurrences may yield useful quantities of fresh water, and would be worthwhile to evaluate further, depending on final water supply results from the Archibarca Fan.

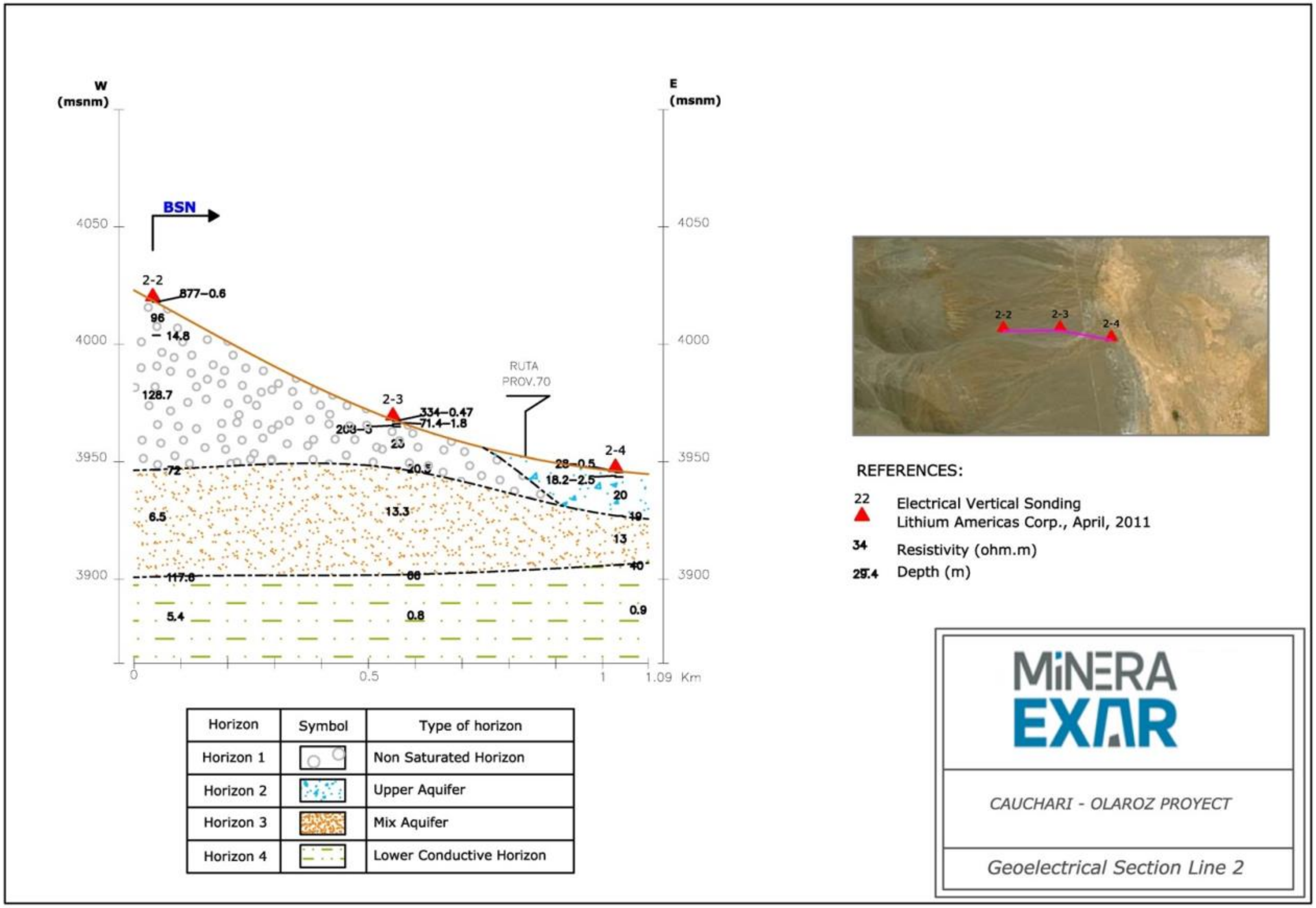
The VES results are also useful for general delineation of the fresh water/brine interface on the salar boundary. They were used to identify follow-up sampling locations at perimeter drilling and test pitting locations (see Section 9.7). Subsequently, the VES results and the follow-up sampling were used to define grade boundary conditions along the salar perimeter.

Figure 9.13 VES Survey Interpretation on the Archibarca Fan, Along Line VI



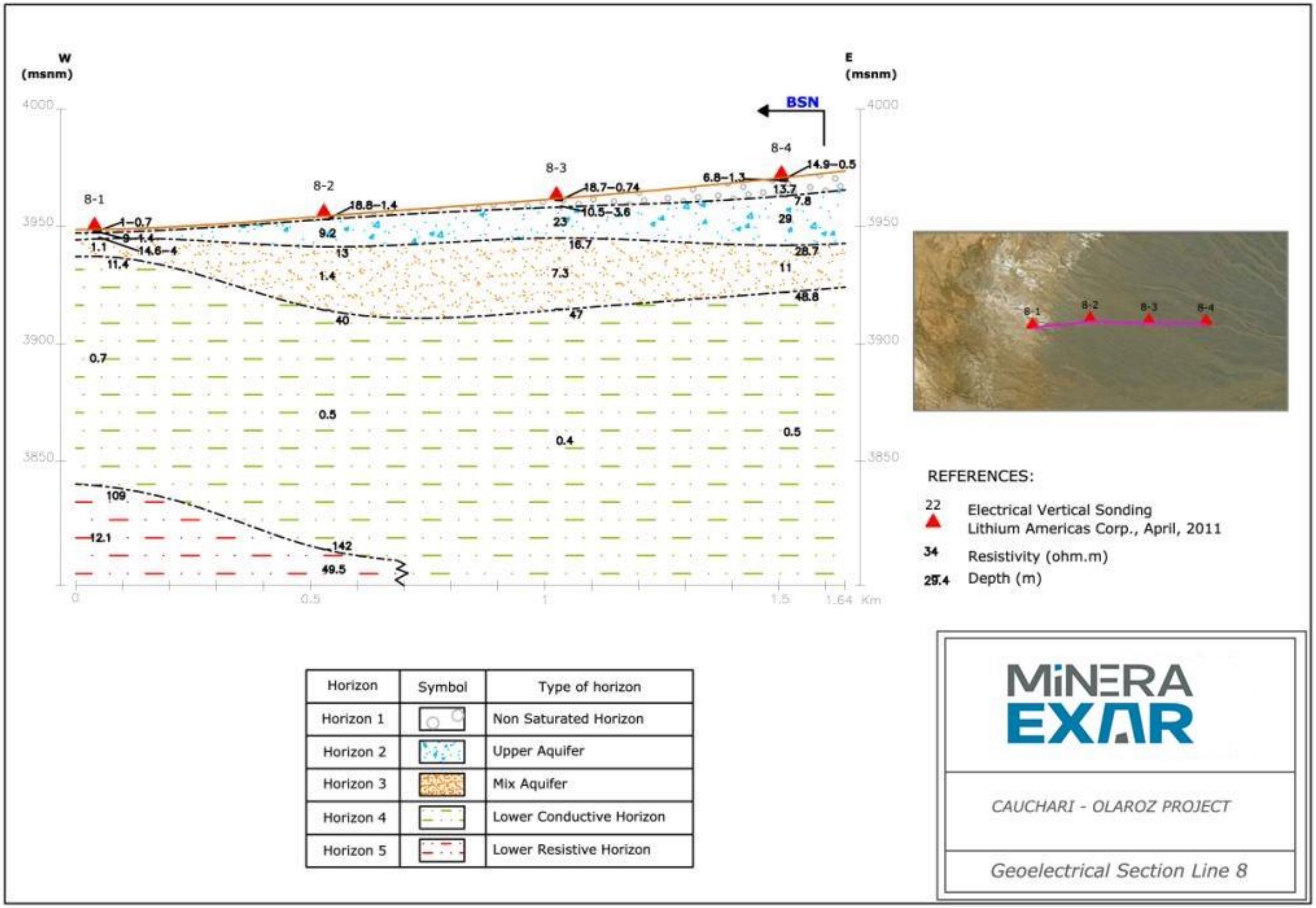
Source: *Minera Exar.*

Figure 9.14 VES Survey Interpretation Along Line 2



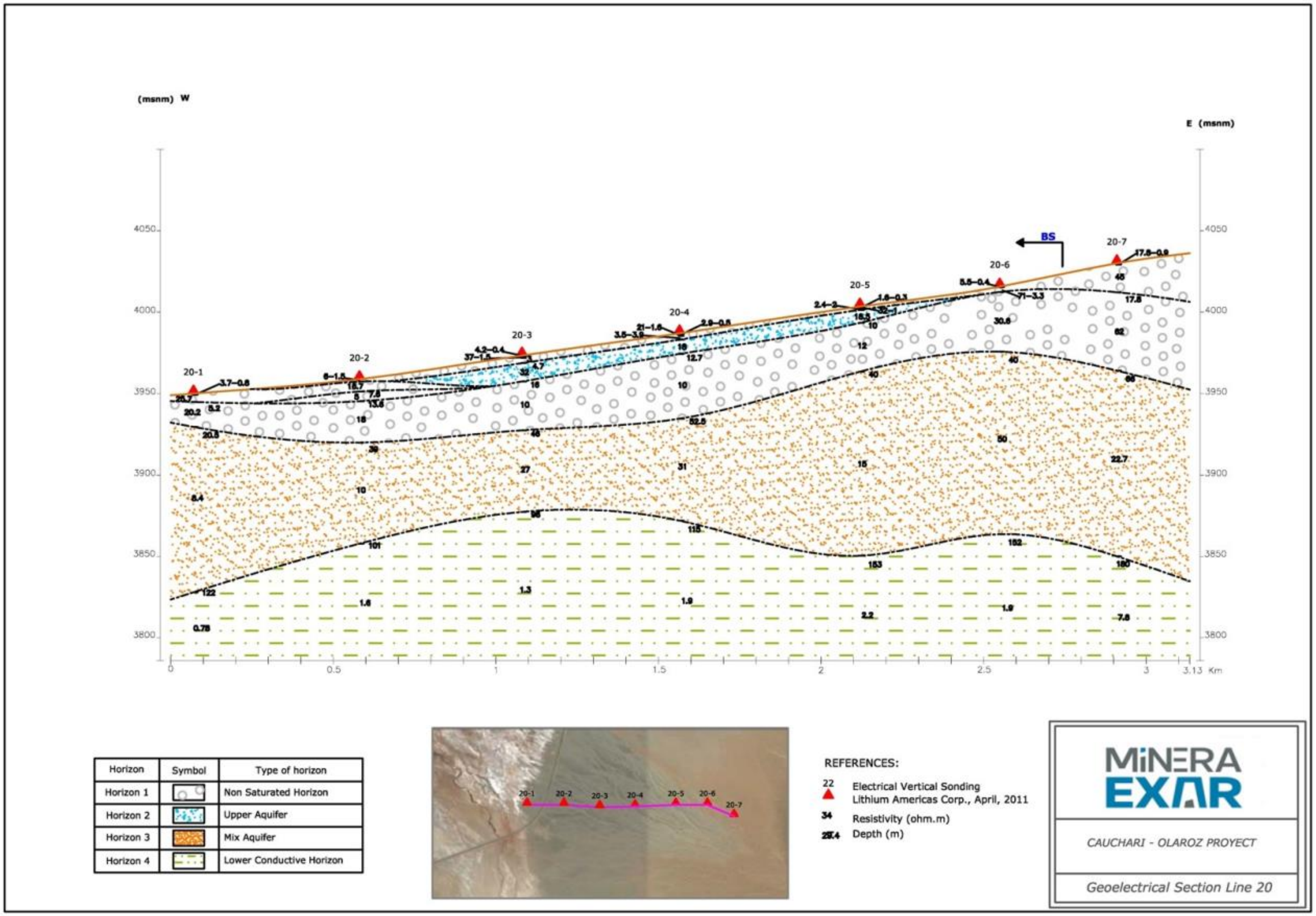
Source: *Minera Exar.*

Figure 9.15 VES Survey Interpretation Along Line 8



Source: *Minera Exar.*

Figure 9.16 VES Survey Interpretation Along Line 20



Source: *Minera Exar.*

9.7 BOUNDARY INVESTIGATION

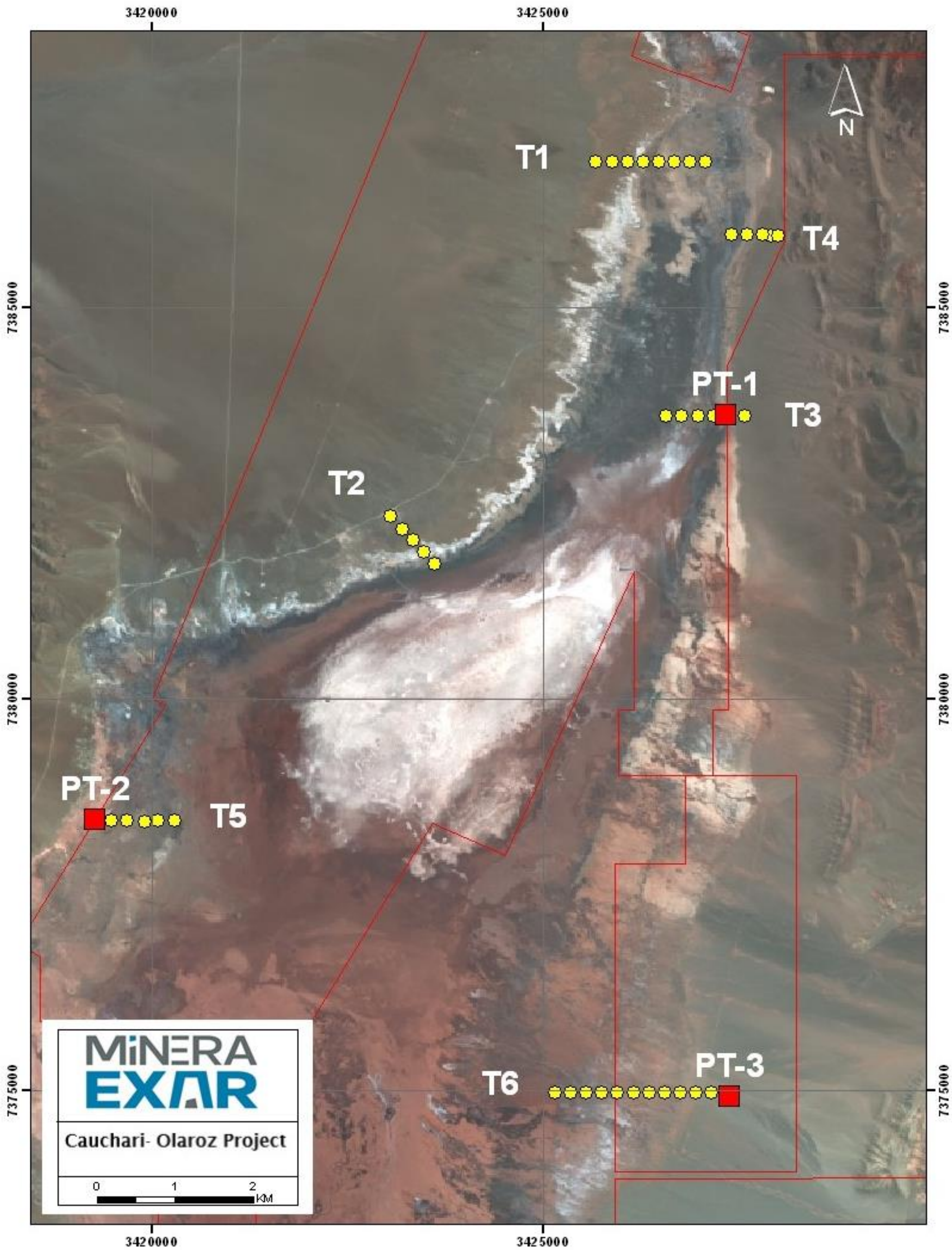
The Boundary Investigation was conducted to further assess the configuration of the fresh water/brine interface, at the salar surface and at depth, at selected locations on the salar perimeter. Data from this program were interpreted in conjunction with the VES survey (described in the previous section). Information from these two programs supported the extension of the hydrostratigraphic model and the lithium grade interpolation to the outer boundaries of the salar, and the evaluation of numerical model boundary conditions for lithium (Section 15).

Test pits and monitoring wells advanced for the Boundary Investigation are shown in Figure 9.17, and were advanced in two successive steps. In the first step, test pits were excavated along lateral transects at salar boundary locations (T3 through T6) or on the edge of the Archibarca Fan (T1 and T2). The purpose of the test pits was to identify the shallow transition zone from brine to fresh water. Test pits were excavated until water was reached, and water samples were collected from the bottom of the pits.

Water samples were sent to Alex Stewart Laboratory for major ion analysis. Field parameters, including conductivity, density, and temperature, were also measured and were used for assessing if the transition zone was captured by the transect in real time. For the salar perimeter transects, the capability to fully capture the transition zone was limited by the edge of the Minera Exar claim boundary (T3, T4, and T5) or by difficult access conditions (T6). A summary of test pit transect data for Total Dissolved Solids (TDS) and lithium is provided in Table 9.1.

The goal of the second step of the investigation was to install multi-level monitoring well nests at the locations identified as central to the fresh water/brine transition zone. In execution, the nests could not be installed directly on the shallow transition zones, due to access restrictions. Well nests were installed on three of the test pit transects and, within each nest the wells were screened at different levels, to enable an evaluation of depth trends in brine strength and lithium grade. Drilling was completed by Andina Perforaciones SRL using rotary methods. A summary of well specifications and sampling results for TDS and lithium is provided in Table 9.2.

Figure 9.17 Boundary Investigation Map Showing Test Pit Transects and Multi-level Monitoring Well Nests



Source: *Minera Exar.*

TABLE 9.1
TEST PIT TRANSECT RESULTS FOR TDS AND LITHIUM

Transect Test Pit	TDS (mg/L)	Lithium (mg/L)	Transect Test Pit	TDS (mg/L)	Lithium (mg/L)
T1-1	1,120	ND	T4-3	23,260	33
T1-2	1,420	ND	T4-4	110,980	175
T1-3	720	ND	T4-5	215,740	402
T1-4	64,860	112	T5-1	12,560	18
T1-5	114,740	194	T5-2	30,220	52
T1-6	175,340	328	T5-3	106,080	240
T1-7	256,540	631	T5-4	128,500	261
T1-8	182,680	327	T5-5	227,200	442
T2-1	1,100	ND	T5-6	292,580	619
T2-2	3,640	ND	T6-1	No water	
T2-3	2,780	ND	T6-2	4,200	ND
T2-4	2,300	ND	T6-3	6,280	ND
T2-5	59,500	101	T6-4	7,580	ND
T3-1	No water		T6-5	21,,640	25
T3-2	33,300	45	T6-6	26,860	29
T3-3	84,260	140	T6-7	26,980	34
T3-4	207,920	301	T6-8	22,460	26
T3-5	251,160	362	T6-9	22,200	26
T3-6	237,180	472	T6-10	26,000	35
T4-1	No water		T6-11	No water	
T4-2	No water		ND – below detection limit.		

TABLE 9.2 TEST PIT TRANSECT RESULTS FOR TDS AND LITHIUM WITH DEPTHS					
Drill Hole ID	**Depth of Screened Interval (m)**	**Casing Diameter (in)**	**Lithology of Screened Interval**	**TDS[1] (mg/L)**	**Lithium[1] (mg/L)**
PT1	59.0–63.0	4.0	Medium to fine sand	265,380 263,120 267,920	559 541 545
PT1A	39.5–43.5	4.0	Sand and Gravel	243,520 243,140 246,260	471 464 457
PT2	39.0–49.0	4.5	Medium to fine sand	190,120 190,640 189,520	372 365 365
PT2A	21.5–29.5	4.5	fine gravel sandy clay matrix	119,280 128,040 123,400	230 250 237
PT2B	11.5–15.5	4.0	fine gravel sandy clay matrix	39,160 39,100 46,040	76 76 87
PT2C	3.5–5.5	4.0	clay	99,600 55,540	197 111
PT3	47.5–77.5	2.0	Inter-bedded sand and clay	19,940 18,920	38 36
PT3 2”	11.5–33.5	4.5	Coarse sand and gravel	18,700	35
PT3 4”				Dry well	

(1) Triplicate, duplicate or single samples were collected.

9.8 SURFACE WATER MONITORING PROGRAM

A Surface Water Monitoring Program was initiated in early 2010 to record the flow and chemistry of surface water in the vicinity of the Cauchari-Olaroz Salars. Measurements were taken at each monitoring location for pH, conductivity, dissolved oxygen, and temperature. A subsequent Surface Water Monitoring Program, measuring identical parameters was initiated in 2017 with the new drilling and was ongoing as of the effective date of this report. Flow rates are being monitored monthly. Measurements were made by monitoring flow velocity across a measured channel cross-sectional area at each site. Where the flow was too small to measure, it was estimated qualitatively. Monitoring locations are shown in Figure 9.18. Table 9.3 shows the results of this program for every month and the results with different methodologies used to measure the flows. The following methods were used to estimate the flow rates:

- Volumetric Method - consisting in a section of a known volume and measurement of time;

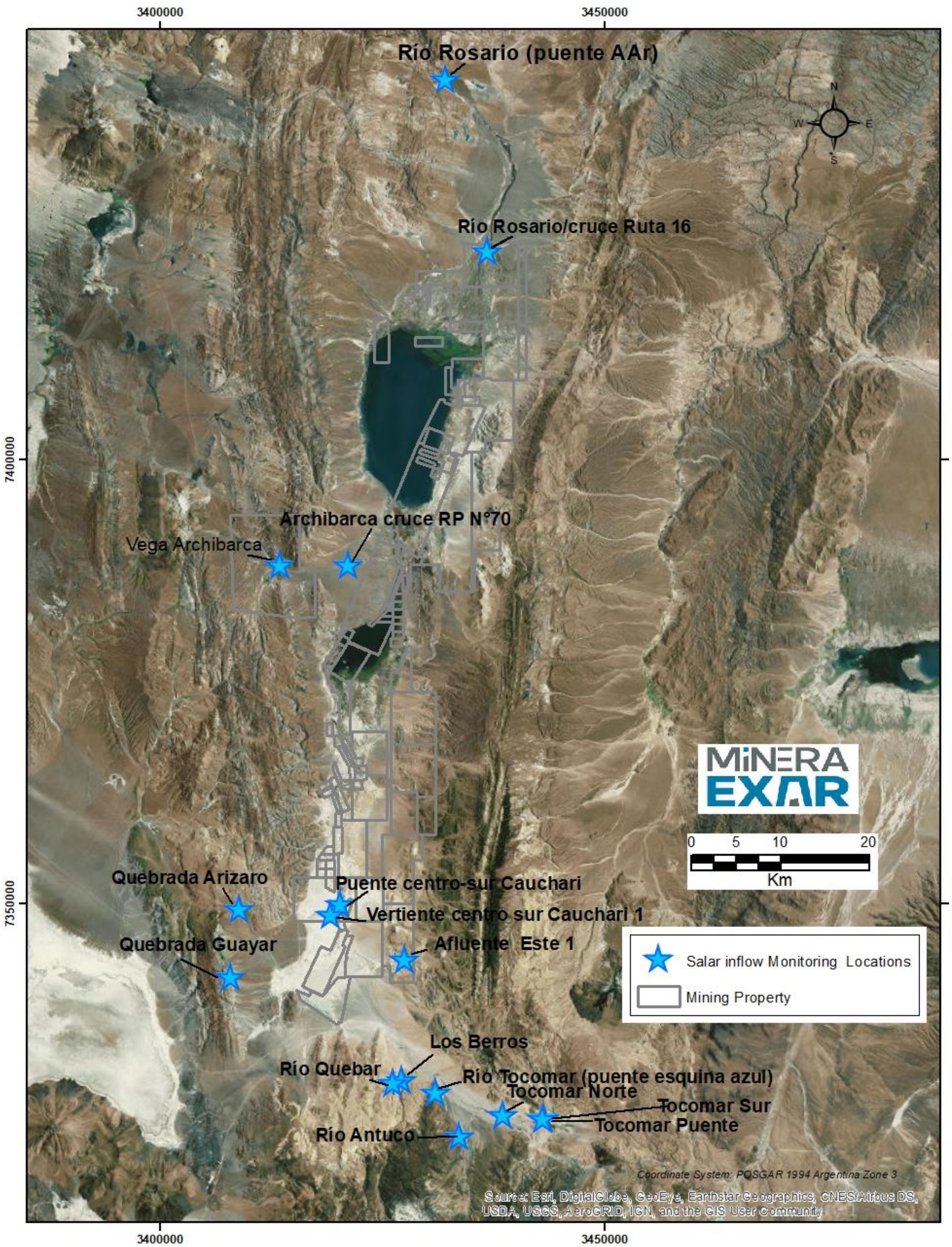
- Float Method - recording the time it takes a float to pass along a known volumetric section of stream; and

- Flow meter - a mechanical spinner tool which measuring the velocity of surface water passing through a known section of stream width.

These parameters are somewhat elevated in surface water inflows at the north and south ends of the salars, relative to other surface water inflows.

The data acquired from this program supported the water balance calibration and numerical groundwater modeling.

Figure 9.18 Surface Water Flow Monitoring Sites



Source: *Minera Exar.*

TABLE 9.3 AVERAGE SURFACE WATER FLOW RATES										
Year	**2017**			**2018**			**2019**			
Month	**Volume-tric (L/s)**	**Float (L/s)**	**Flow Meter (L/s)**	**Volume-tric (L/s)**	**Float (L/s)**	**Flow Meter (L/s)**	**Volume-tric (L/s)**	**Float (L/s)**	**Flow Meter (L/s)**	**Monthly Average (L/s)**
Tocomar Norte										
April				9.46	8.8		9,14			9.13
May				7.25	7.34			7,00		7.19
June	11.30	13.47	3.33	6.43	9.52					8.81
July			6.62		4.53	3.335				4.83
August	8.65	13.36		7.80	5.33					8.78
September			9.77	26.14	20.21					18.71
October	8.93	8.65	15.61	18.13	12.78					12.82
November	7.58	10.21	14.88	8.71						10.35
December	5.92	9.74		8.34	14.87					9.72
January					9.67			20.83		15.25
February				7.92	8.6		7.66	3.47		6.91
March				8.4	8.8		7,11			8.10
Tocomar Sur										
April					51.40	49.40		35,09		45,29
May					24.62	29.42		30,50		28,18
June		66.83	62.66		29.27	28.53				46.82
July					45.08	44.01				44.55
August		46.00	29.02		46.89					40.64
September			46.12		40.64	40.27				42.34
October		36.14	34.37		22.28	28.49				30.32
November		30.32	23.84		23.34	21.45				24.74
December			8.03		33.55	31.97				24.51

TABLE 9.3 AVERAGE SURFACE WATER FLOW RATES										
Year	**2017**			**2018**			**2019**			
Month	**Volume-tric (L/s)**	**Float (L/s)**	**Flow Meter (L/s)**	**Volume-tric (L/s)**	**Float (L/s)**	**Flow Meter (L/s)**	**Volume-tric (L/s)**	**Float (L/s)**	**Flow Meter (L/s)**	**Monthly Average (L/s)**
January					38.29	45.30				41.80
February					28.08	33.60		46.22	62.66	42.64
March					64.30	48.90		29,96		47.72
Tocomar Puente										
April					102.8	96.45		103,74	116,54	104,88
May					84	63.46		102,69		83,33
June		194.15	40.64		81.45	81.22				99.36
July			234.99		161.6	135.07				177.22
August		82.28	62.17		147.34	152.9				111.17
September			113.10		44.07	49.33				68.83
October			73.11		42.90	49.86				55.29
November			64.59		43.75	43.02				50.45
December		30.68	51.68		25.75	26.61				33.68
January					55.49	82.88		41.01	40.64	55.01
February					37.36	27.8		47.62		37.59
March					90.42	60.2		25,12		58,58
Afluente Este 1										
April					4.99	4.15		0,65		3,26
May					2.65			4,89		3,77
June		16.55	11.45		2.74					10.25
July			6.18							6.18
August		27.33			5.38					16.36
September	6.47	8.34	4.15		7.98					6.74
October		11.31	7.37		7.75					8.81

TABLE 9.3 AVERAGE SURFACE WATER FLOW RATES										
Year	**2017**			**2018**			**2019**			
Month	**Volume-tric (L/s)**	**Float (L/s)**	**Flow Meter (L/s)**	**Volume-tric (L/s)**	**Float (L/s)**	**Flow Meter (L/s)**	**Volume-tric (L/s)**	**Float (L/s)**	**Flow Meter (L/s)**	**Monthly Average (L/s)**
November		9.54	9.58		5.21					8.11
December		5.37			7.72					6.54
January					11.05			26.13		18.59
February					1.84	1.38		5.86		3.03
March					1.33			6,46		3,89
Afluente Este 1R										
April				0.75			1,68			1,21
May				0.54			1,04			0.79
June	0.60			0.52						0.56
July	0.92			0.59						0.76
August	0.67			0.56						0.62
September	1.17			1.59						1.38
October	0.81			1.33						1.07
November	0.87			0.85						0.86
December	0.68			1.53						1.10
January				0.57						0.57
February				0.53						0.53
March				0.43			0,65			0.54
Los Berros										
April				2.40		1.74		26,34		10.16
May				0.60						0.60
June	10.53			8.77						9.65
July						27.22				27.22
August	11.76	11.76			23.43					15.65

Table 9.3 Average Surface Water Flow Rates										
Year	**2017**			**2018**			**2019**			
Month	**Volume-tric (L/s)**	**Float (L/s)**	**Flow Meter (L/s)**	**Volume-tric (L/s)**	**Float (L/s)**	**Flow Meter (L/s)**	**Volume-tric (L/s)**	**Float (L/s)**	**Flow Meter (L/s)**	**Monthly Average (L/s)**
September	4.65			6.15						5.40
October	1.33		1.74	3.78						2.28
November	0.16			1.08						0.62
December	0.19			0.17						0.18
January										
February				5.97				4.68	4.83	5.16
March				7.29			12,05			9,67
Puente Centro Sur Cauchari										
April					11.36	10.98				11.17
May				1.70						1.70
June			0.33		20.45					10.39
July						16				16.00
August					11.03					11.03
September	6.96		15.29		15.91					12.72
October	0.77				18.16					9.46
November					3.35					3.35
December					2.23					2.23
January					2.73			9.66		6.19
February				10.60	2.90					6.75
March				5.29	5.85			11,67		7.60
Quebrada Arizaro										
April				0.33			0,61			0.47
May				0.52			0,27			0.39
June	0.92			0.85						0.88

Table 9.3 **Average Surface Water Flow Rates**										
Year	**2017**			**2018**			**2019**			
Month	**Volume-tric (L/s)**	**Float (L/s)**	**Flow Meter (L/s)**	**Volume-tric (L/s)**	**Float (L/s)**	**Flow Meter (L/s)**	**Volume-tric (L/s)**	**Float (L/s)**	**Flow Meter (L/s)**	**Monthly Average (L/s)**
July										
August	0.83	0.83		1.35						1.00
September	0.96			1.20						1.08
October	0.60			1.35						0.97
November	0.199203 19			0.25						0.22
December	0.12			0.12						0.12
January				2.94						2.94
February				1.35			2.55			1.95
March				0.53			0,31			0.42
Quebrada Guayar										
April				0.38			0,53			0.45
May				0.40			0,24			0.32
June	1.28			0.33						0.80
July	1.79			0.24						1.01
August	1.15	1.15		0.22						0.84
September	0.38			0.22						0.30
October	0.39			0.21						0.30
November	0.29			0.29						0.29
December	0.31			0.24						0.27
January				0.27						0.27
February				0.46						0.46
March				0.31			0,43			0.37

TABLE 9.3 AVERAGE SURFACE WATER FLOW RATES										
Year	**2017**			**2018**			**2019**			
Month	**Volume-tric (L/s)**	**Float (L/s)**	**Flow Meter (L/s)**	**Volume-tric (L/s)**	**Float (L/s)**	**Flow Meter (L/s)**	**Volume-tric (L/s)**	**Float (L/s)**	**Flow Meter (L/s)**	**Monthly Average (L/s)**
Río Antuco										
April					12.00	11.19		85,21		36.13
May					4.58	7.5		16,18		9,42
June		29.46	7.6		4.00					13.69
July			15.53		8.53	9.8				11.29
August		27.91			13.89					20.90
September			10.62		12.03					11.32
October		16.36	15.28		17.05					16.23
November			12.88		12.78					12.83
December		12.60	13.45		11.15	14.11				12.83
January						9.44		10.64	7.60	9.23
February					15.4	13.27		11.15		9.42
March					9.35	5.9		9,28		8.17
Río Quebar										
April					56.37	39.80				48.09
May					35.40	29.32				32.36
June		85.50	22.08		66.04	77.42				62.76
July			76.56		67.63	65.20				69.80
August		86.32	33.86		38.61	42.90				50.42
September			65.09		44.85	44.15				51.36
October		51.86	52.57							52.22
November		51.05	55.63		41.71					49.46
December		20.1	33.82		20.82	22.68				24.36
January					20.39	39.81		34.71		31.64

TABLE 9.3
AVERAGE SURFACE WATER FLOW RATES

Year	**2017**			**2018**			**2019**			
Month	**Volume-tric (L/s)**	**Float (L/s)**	**Flow Meter (L/s)**	**Volume-tric (L/s)**	**Float (L/s)**	**Flow Meter (L/s)**	**Volume-tric (L/s)**	**Float (L/s)**	**Flow Meter (L/s)**	**Monthly Average (L/s)**
February					57.80	35.47				46.64
March					76.65	89.25				82.95
Río Rosario (Puente Aar)										
April					334	255		277,49	309,25	293,93
May			276.67		288.95	228.811		208,38	244,32	249.42
June					427.33	338.56				382.95
July					393.19	418.76				405.98
August		331.18	224.52		577.86					377.85
September			114.36		391.75	380.72				295.61
October		33.15	42.37		229.39	235.13				135.01
November		32.27	36.61		131.01	119.09				79.75
December		704.3	459.59		96.87	73.03				333.45
January					92.40	67.90				80.15
February					439	426.17		548.11	216.15	407.36
March					973	781		903,16		885.72
Río Tocomar (Puente Esquina Azul)										
April					114.75	117.55				116.15
May					159.6	159.79				159.70
June										
July						12.67				12.67
August										
September										
October										
November										

TABLE 9.3
AVERAGE SURFACE WATER FLOW RATES

Year	2017			2018			2019			
Month	**Volume-tric (L/s)**	**Float (L/s)**	**Flow Meter (L/s)**	**Volume-tric (L/s)**	**Float (L/s)**	**Flow Meter (L/s)**	**Volume-tric (L/s)**	**Float (L/s)**	**Flow Meter (L/s)**	**Monthly Average (L/s)**
December										
January										
February								14.43		14.43
March					151.2	157.6				154.40

9.9 BRINE LEVEL MONITORING PROGRAM

The static level of subsurface brine was monitored every month from an array of accessible wells within the salars. Monitoring was also conducted at domestic water wells just outside the Cauchari Salar. Measurements were taken with a Solinst Model 101 Water Level Meter. Some wells with difficult access used a Solinst Levelogger, model 3001, which records brine levels once a day.

Table 9.4 shows the average depth to static levels observed in the monitoring wells between 2010-2019. Variations in average fluid density and electrical conductivity monitored during sampling and testing were found to be negligible.

The data from the Brine Level Monitoring Program was used to calibrate the numerical groundwater model to long-term static conditions. Extensive monitoring of dynamic brine levels (i.e., in response to pumping) was also conducted, for the Pumping Test Program described in Section 9.10.

TABLE 9.4
STATIC WATER LEVEL MEASUREMENTS FOR THE PERIOD FROM JANUARY 2010 TO FEBRUARY 2019

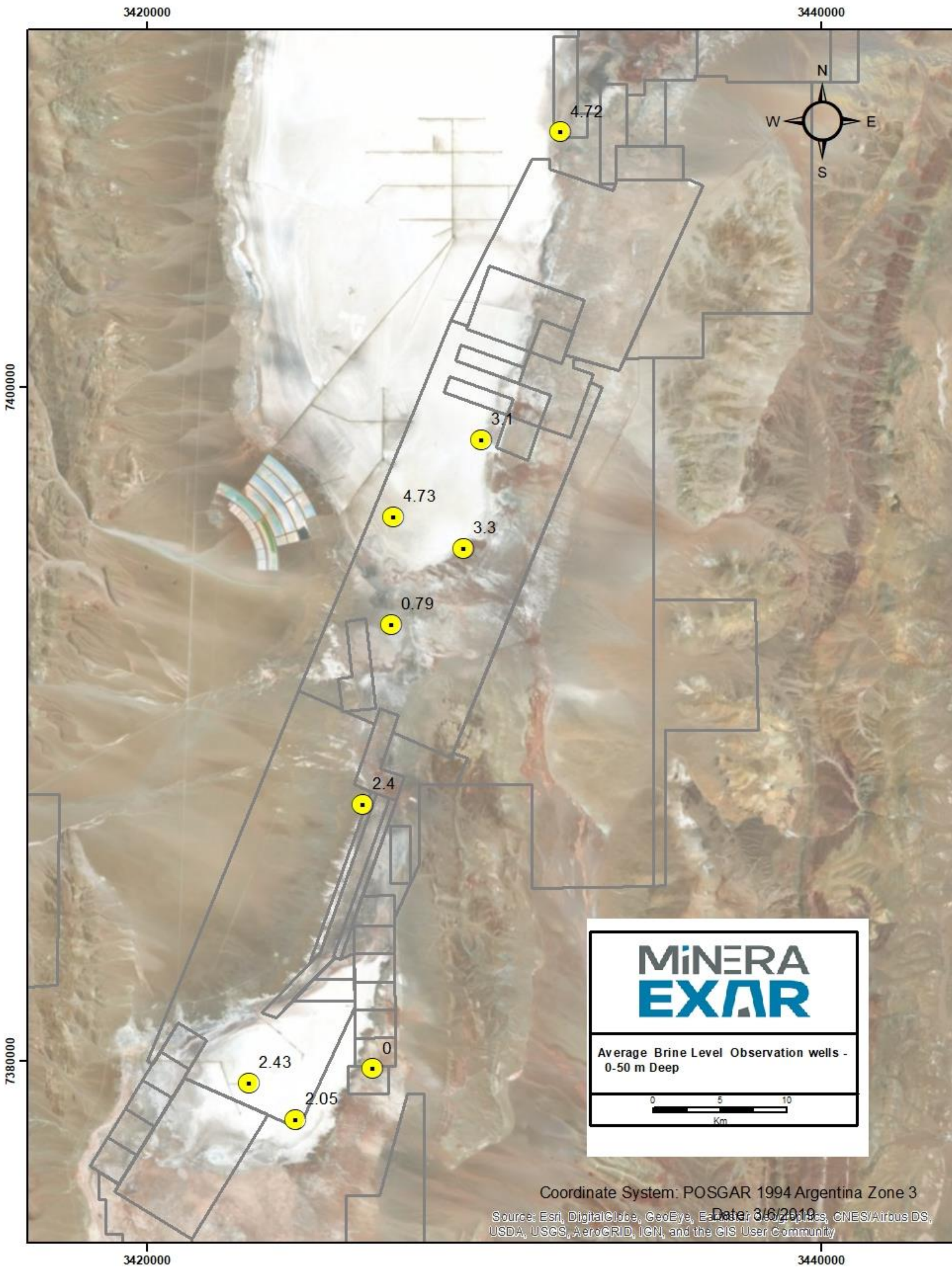
Borehole ID	Monitoring Period (mm/yy)	Average Water Level (m below ground surface)
DL-001	12/17 - 02/19	6.02
ML-001	10/17 - 02/19	7.98
SL-001	09/17 - 02/19	2.05
W-01	02/18 - 02/19	7.95
DL-002	12/17 - 02/19	14.43
ML-002	01/18 - 02/19	12.56
SL-002	10/17 - 02/19	4.73
W-02	02/18 - 02/19	13.34
ML-003	09/17 - 02/19	11.96
DL-003	09/17 - 02/19	14.51
DL-003B	01/18 - 02/19	26.39
DL-004B	03/18 - 02/19	12.47
ML-004	09/17 - 02/19	4.52
SL-004	09/17 - 02/19	2.35
SL-004B	03/18 - 02/19	2.43
DL-005	03/18 - 02/19	17.22
ML-005	12/17 - 02/19	16
W-05	02/18 - 02/19	23.81

TABLE 9.4 STATIC WATER LEVEL MEASUREMENTS FOR THE PERIOD FROM JANUARY 2010 TO FEBRUARY 2019		
Borehole ID	**Monitoring Period (mm/yy)**	**Average Water Level (m below ground surface)**
DL-006	12/17 - 02/19	11.46
ML-006	11/17 - 02/19	3.11
SL-006	09/17 - 02/19	0.79
SL-007	09/17 - 02/19	3.11
ML-007	12/17 - 02/19	8.67
DL-007	12/17- 02/19	15.90
DL-008	03/18 - 02/19	14.1
ML-008	10/17 - 02/19	Artesian
DL-009	12/17 - 02/19	18.42
ML-009	12/17 - 2/19	7.68
SL-009	09/17 - 02/19	4.72
DL-010	01/18 - 02/19	8.66
ML-010	09/17 - 02/19	5.39
SL-010	12/17 - 11/18	3.3
DL-011	01/18 - 02/19	13.01
ML-011	10/17 - 02/19	5.46
DL-012	01/18 - 02/19	5.70
ML-012	04/18 - 02/19	11.96
DL-013	01/18 - 02/19	8.85
ML-013	01/18 - 02/19	7.06
SL-013	01/18 - 02/19	Artesian
SL-014	01/18 - 02/19	2.41
ML-014	01/18 - 02/19	9.53
DL-014	01/18 - 02/19	12.72
DDH-04A	01/10 - 01/19	3.22
DDH-05	01/09 - 01/19	1.92
DDH-06A	02/10 - 02/19	3.69
DDH-07	01/10 - 02/19	1.54
DDH-08	02/10 - 02/19	1.05
DDH-09A	04/10 - 02/19	2.64
DDH-11	06/10 - 02/19	9.36
DDH-12A	05/10 - 02/19	5.72

TABLE 9.4 **STATIC WATER LEVEL MEASUREMENTS FOR THE PERIOD FROM JANUARY 2010 TO FEBRUARY 2019**		
Borehole ID	**Monitoring Period (mm/yy)**	**Average Water Level (m below ground surface)**
DDH-13	06/10 - 01/19	4.23
DDH-14	07/10 - 12/18	7.39
DDH-15	08/10 - 12/18	2.09
DDH-16	07/10 - 02/19	10.90
DDH-17	08/10 - 02/19	Artesian
DDH-18	08/10 - 02/19	4.21
DDH-1	08/10 - 02/29	11.40
PP-20	03/14 - 02/19	18.00

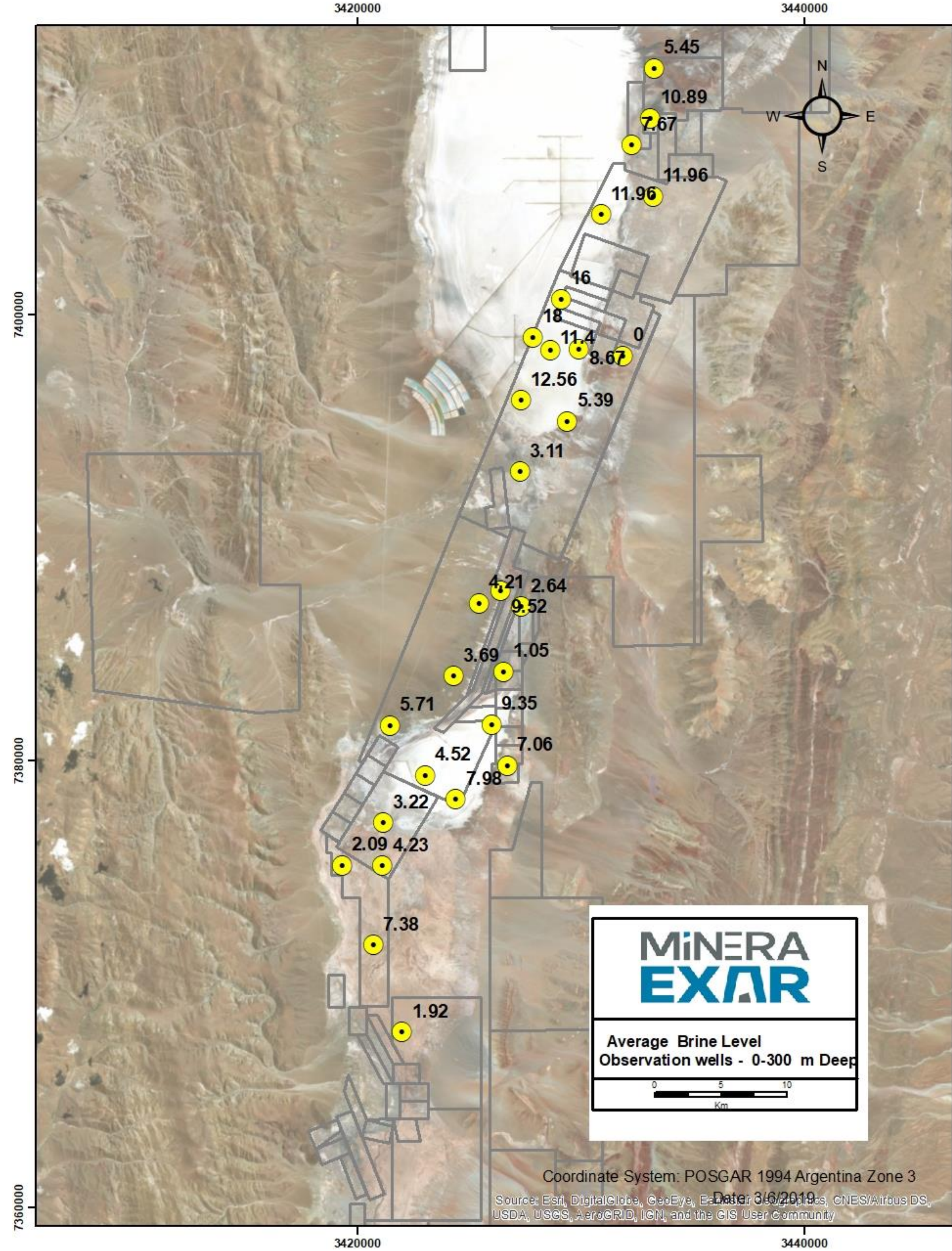
Figure 9.19, Figure 9.20 and Figure 9.21 show the average depth of water levels for observation wells drilled in the shallow part of the aquifer (50 m deep), intermediate parts of the aquifer (250 to 300 m deep) and in the deeper parts of the aquifer (450 and 600 m deep).

Figure 9.19 Average Depth to Static Water Levels in Shallow Wells (50 m)



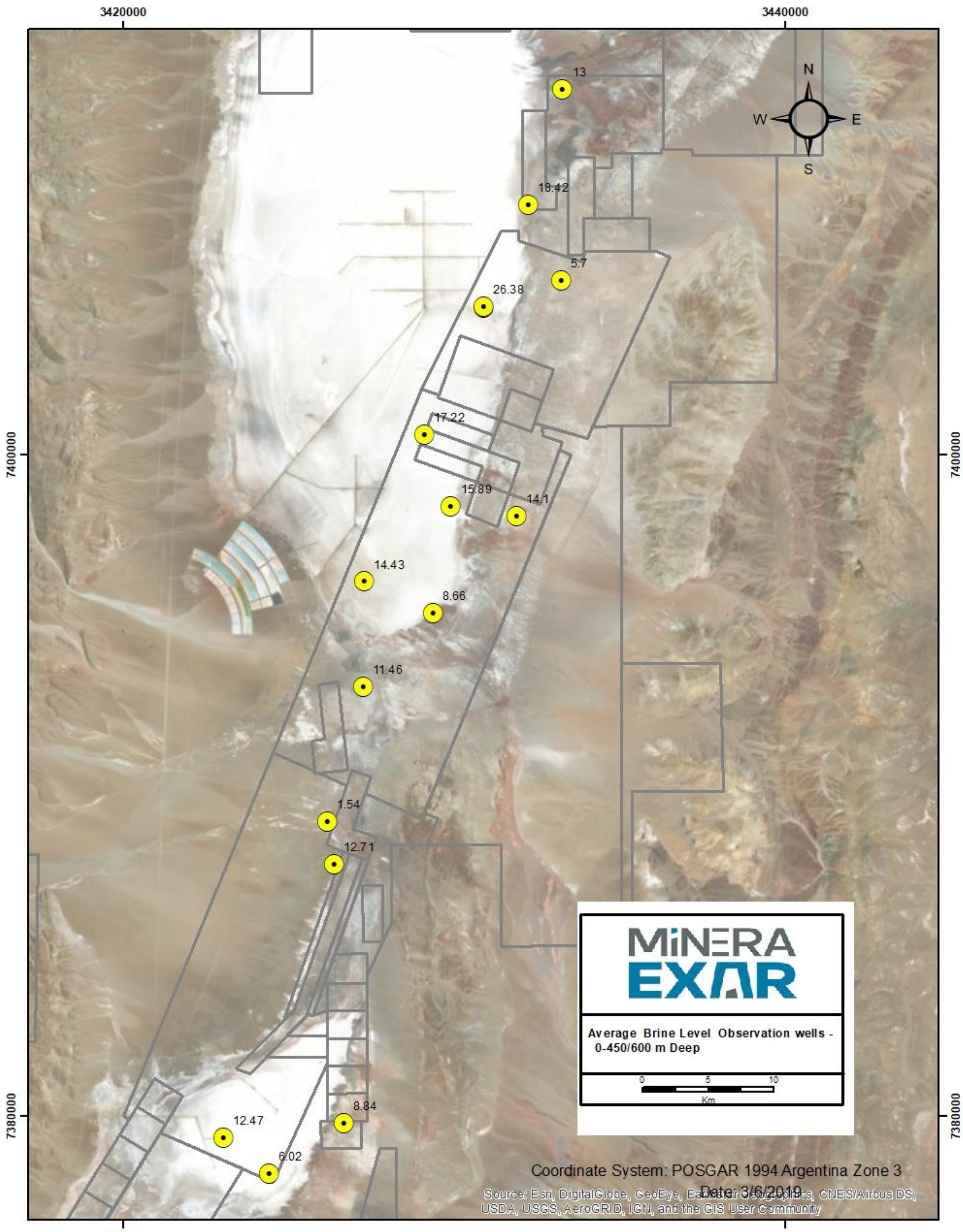
Source: *Minera Exar.*

Figure 9.20 Average Depth to Static Water Levels in Intermediate Depth Wells (250 - 300 m)



Source: *Minera Exar.*

Figure 9.21 Average Depth to Static Water Levels in Deep Wells (450 - 600 m)



Source: *Minera Exar.*

9.10 PUMPING TEST PROGRAM

9.10.1 Overview

Based on exploration results in 2017-2019, production wells drilled after the 2011 production wells penetrate deeper parts of the aquifer. Deeper production wells increases the depth of the extractable part of the aquifer. A total of ten pumping wells and associated observation wells were installed at the site from 2011 to 2019 at the locations shown in Figure 9.22.

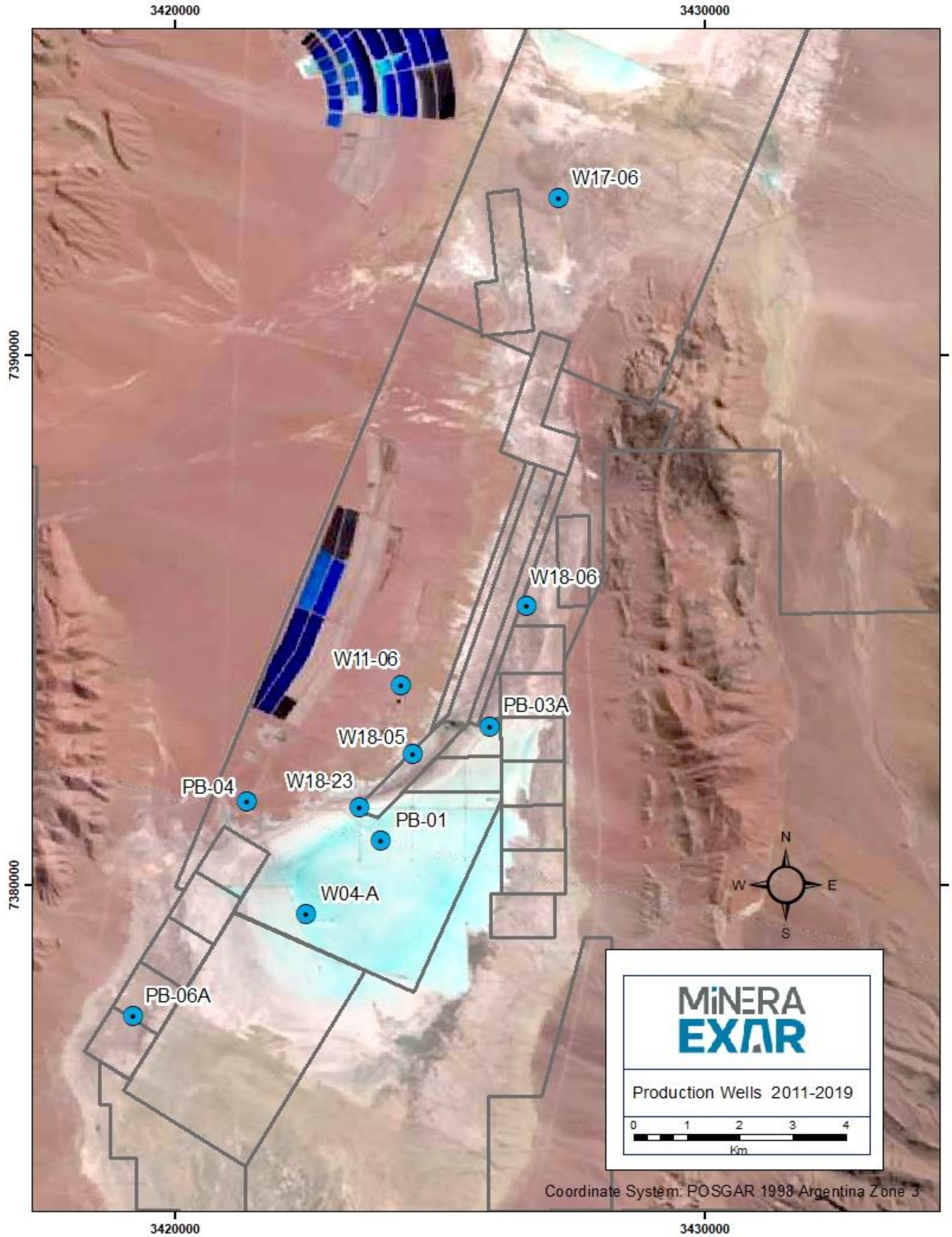
The pumping tests were conducted with two main objectives. The first objective was to develop broad-scale estimates of K (from Transmissivity (T)) and Ss (from Storativity (S)), for use in the numerical groundwater model. The second objective was to assess hydraulic interconnections between hydrostratigraphic units, to assist in understanding the overall flow system and in developing the groundwater model.

Drilling and testing in 2011 was conducted by Andina Perforaciones of Salta, Argentina, under field supervision by Conhidro of Salta, Argentina; in 2018-2019 by Hidrotec Perforaciones and Wichi Toledo. The drilling method was direct rotary. Field supervision of the pumping tests was provided by Minera Exar personnel. The constant rate pumping tests were preceded by step tests, to determine appropriate pumping rates for the constant rate tests.

The 2011 pumping test analysis was conducted independently by both Conhidro and Matrix Solutions Inc.; in 2018-2019 the pumping test analysis is being conducted by Minera Exar with technical review by Montgomery.

A summary of the pumping tests carried out during 2011-2019 is provided in Appendix 1.

Figure 9.22 Production Wells

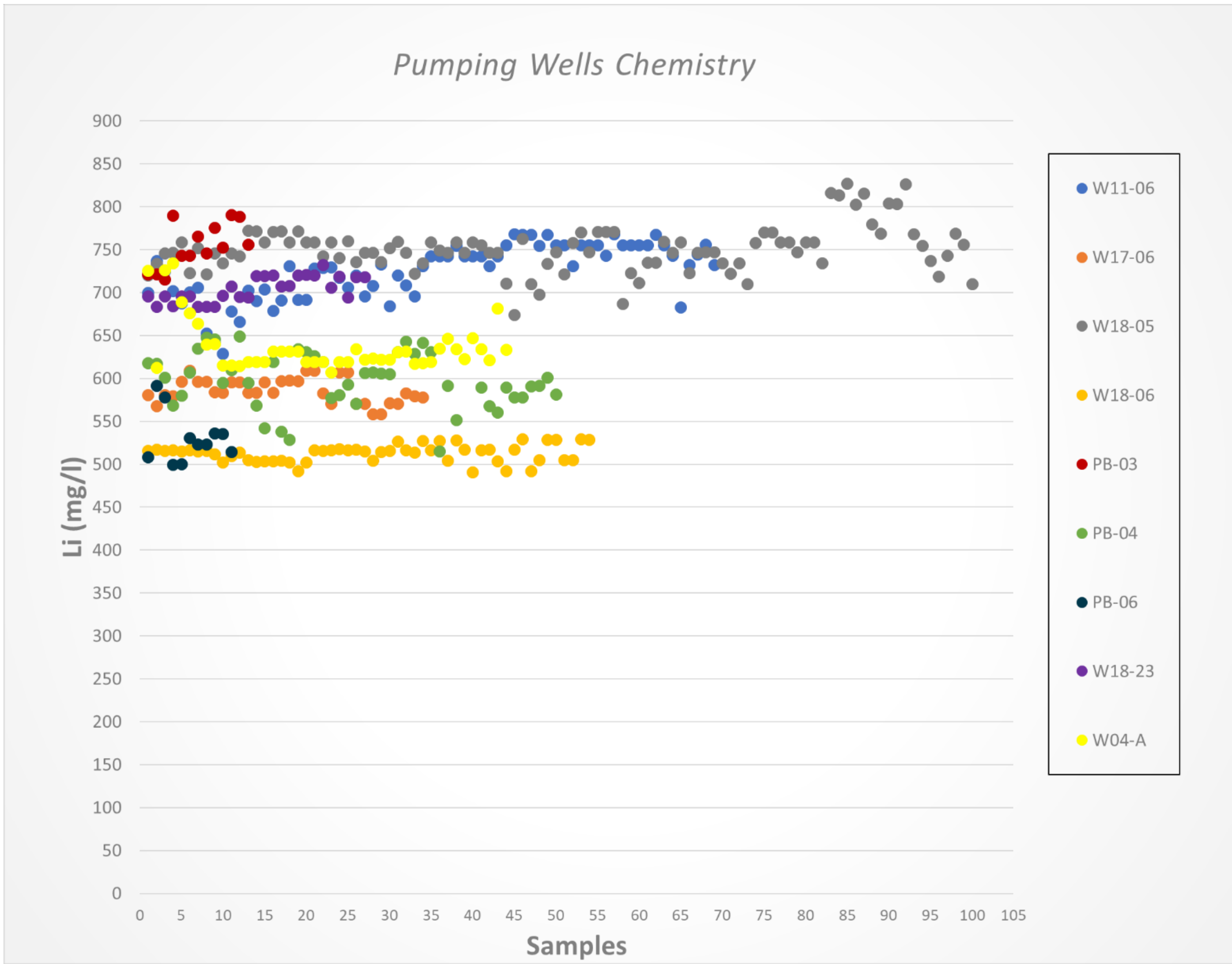


Source: *Minera Exar*

9.11 CHEMISTRY OF SAMPLES COLLECTED DURING PUMP TESTS

A plot of lithium results for samples collected during 2018-2019 pumping tests is provided in Figure 9.23. The record of concentration is relatively stable for each well.

Figure 9.23 Lithium Concentrations in Samples Collected During Pump Tests



* *Data points show samples taken hourly at the beginning of the pumping test and daily after two days. In some cases, the pumping test stopped due to mechanical reasons and the sampling resumed when the pumping re-started.*

Source: *Minera Exar.*

10.0 DRILLING

10.1 REVERSE CIRCULATION (RC) BOREHOLE PROGRAM 2009-2010

The objectives of this program were to: 1) develop vertical profiles of brine chemistry at depth in the salars, and 2) provide geological and hydrogeological data. This program was conducted between September 2009 and August 2010 and the drilling is summarized in Table 10.1. Twenty-four RC boreholes (PE-01 through PE-22, plus two twin holes) were completed during this period, for total drilling of 4,176 m. Borehole depths range from 28 m (PE-01) to 371 m (PE-10).

TABLE 10.1
BOREHOLE DRILLING SUMMARY FOR THE RC BOREHOLE PROGRAM CONDUCTED IN 2009 AND 2010

RC Borehole	Drilling Interval		Drilling Length (m)	RC Borehole	Drilling Interval		Drilling Length (m)
	From (m)	To (m)			From (m)	To (m)	
PE-01	-	28	28	PE-13	-	209	209
PE-02	-	40	40	PE-14	-	144	144
PE-03	-	90	90	PE-14A	144	228	84
PE-04	-	187	187	PE-15	-	205	205
PE-05	-	210	210	PE-16	-	64	64
PE-06	-	165	165	PE-17	-	246	246
PE-07	78.9	249	170.1	PE-17A	-	220	220
PE-08	-	194	194	PE-18	-	312	312
PE-09	-	198	198	PE-19	-	267	267
PE-10	-	371	371	PE-20	-	204	204
PE-11	-	80	80	PE-21	-	222	222
PE-12	-	36	36	PE-22	-	230	230
Total Boreholes: 24 / Total drilling: 4,176 m							

Note: *RC = reverse circulation.*

Major Drilling, a Canadian drilling company with operations in Argentina, was contracted to carry out the RC drilling using a Schramm T685W rig and support equipment. The holes were initially drilled using ODEX and open-hole RC drilling methods at 10”, 8”, and 6” diameters. No drilling additives were used. A change was later made from ODEX and open-hole RC drilling to tri-cone bits of 17½” 16”, 9½”, 7⅞”, 6”, and 5½” diameters. Bit diameters were selected based on ambient lithological conditions at each borehole, with the objective of maximizing the drilling depth.

During drilling, chip and brine samples are collected from the cyclone at one-metre intervals. Occasionally, lost circulation resulted in the inability to collect samples from some intervals. Brine sample collection is summarized in Table 10.2. A total of 1,487 brine samples were collected from 15 of the RC boreholes, and submitted for laboratory chemical analyses. For each brine sample, field measurements were conducted on an irregular basis, for potassium (by portable XRF analyzer), and regularly for electrical conductivity, pH and temperature. Sample collection, preparation and analytical methods are described in Section 11.

TABLE 10.2
SUMMARY OF BRINE SAMPLES COLLECTED AND SUBMITTED FOR LABORATORY ANALYSIS FROM THE RC AND DDH BOREHOLE PROGRAMS

Description	Brine Samples
Total Field Samples	1,614
Total RC Borehole Program Field Samples	1,487
Total DDH Borehole Program Field Samples	127
Total Samples (Including QC)	2,390
Total Field Duplicates	260
Total Blanks	263
Total Standards	253

Note: *RC = reverse circulation, DDH = diamond drill hole.*

Air-lift flow measurements were conducted at six-metre intervals in six RC boreholes, when circulation was adequate. Daily static water level measurements were carried out inside the drill string at the start of each drilling shift, using a water level tape. Boreholes were completed with steel surface casing, a surface sanitary cement seal, and a lockable cap.

Average concentrations and chemical ratios of brine samples are shown in Table 10.3, for sampled intervals in 14 of the 15 sampled RC boreholes. Results for PE-3 (a flowing artesian well) are not included in the table because it receives freshwater from the alluvial cone adjacent to its position on the eastern margin of the Olaroz Salar. The sampled brines have a relatively low Mg/Li ratio (lower than most sampling intervals), indicating that the brines would be amenable to a conventional lithium recovery process. RC borehole logs are provided by King (2010b), including available brine sampling results.

TABLE 10.3
BRINE CONCENTRATIONS (MG/L) AND RATIOS AVERAGED ACROSS SELECTED DEPTH INTERVALS FOR RC PROGRAM BOREHOLES

Borehole	Depth (m)	Length (m)	B	K	Li	Mg	SO_4	Mg/Li	K/Li	SO_4/Li
PE-04	11-32	21	795	5,987	692	2,458	20,498	4	8.652	29.621
	59-79	20	1,033	7,225	759	1,993	24,114	3	9.519	31.770
	83-187	89	935	6,226	623	1,844	22,568	3	9.994	36.246
PE-06	18-21	3	729	7,060	834	2,737	18,234	3	8.465	21.872
	54-165	111	1,261	6,982	870	2,031	16,731	2	8.025	19.240
PE-07	78-108	20	824	3,520	380	907	14,388	2	9.263	37.867
	109-113	4	1,078	5,328	768	1,924	16,961	3	6.938	22.075
	117-136	19	1,019	3,887	448	1,151	13,238	3	8.676	29.530
	145-205	54	1,054	4,558	579	1,461	16,420	3	7.872	28.351
	207-248	38	1,030	4,205	490	1,080	15,326	2	8.582	31.247
PE-09	72-105	33	921	4,229	530	1,482	17,379	3	7.979	32.800
	109-163	54	809	4,998	646	2,126	23,746	3	7.737	36.755
	164-197	33	827	5,998	741	1,734	16,445	2	8.094	22.196
PE-10	60-152	92	1,041	4,051	396	174	17,495	0	10.230	44.183
	152-234	82	1,398	6,072	598	1,144	20,401	2	10.154	34.106
PE-13	102-105	3	655	3,963	505	1,383	16,225	3	7.848	32.129
	108-120	12	751	4,433	533	1,379	20,465	3	8.317	38.431
PE-14	147-179	32	860	6,572	733	1,918	23,359	3	8.966	31.853
	179-192	13	874	6,287	681	1,821	20,763	3	9.232	30.499
	192-228	36	861	6,152	712	1,842	21,222	3	8.640	29.813
PE-15	62-92	30	981	5,096	527	1,174	16,079	2	9.670	30.527
	103-132	29	762	3,719	465	1,066	16,639	2	7.998	35.758
	144-156	12	883	4,794	582	1,238	13,966	2	8.237	24.017

Table 10.3 **Brine Concentrations (mg/L) and Ratios Averaged Across Selected Depth Intervals for RC Program Boreholes**										
Borehole	**Depth (m)**	**Length (m)**	**B**	**K**	**Li**	**Mg**	**SO_4**	**Mg/Li**	**K/Li**	**SO_4/Li**
	168-189	21	888	5,079	606	1,224	12,575	2	8.381	20.744
PE-17	78-84	6	968	3,910	537	1,623	17,021	3	7.281	31.716
	87-91	4	901	3,572	481	1,442	16,137	3	7.426	33.531
	103-107	4	669	4,229	482	1,121	18,481	2	8.774	38.322
	110-111	1	863	5,446	648	1,702	23,544	3	8.404	36.333
	154-156	2	1,044	4,026	472	935	12,167	2	8.530	25.805
	171-174	3	968	4,269	507	1,109	12,965	2	8.420	25.573
PE-18	140-260	120	1,396	7,216	717	1,489	27,284	2	10.064	38.064
PE-19	26-30	4	1,154	5,152	404	761	17,275	2	12.752	42.733
	42-62	20	1,182	7,601	911	3,050	20,347	3	8.344	22.343
	64-132	68	817	6,347	738	2,456	18,160	3	8.600	24.604
	145-267	122	757	5,957	655	1,906	21,467	3	9.095	32.755
PE-20	18-30	12	717	6,712	747	2,706	21,407	4	8.985	28.644
	60-127	64	821	5,759	650	1,778	22,117	3	8.860	34.013
	129-150	19	794	6,389	698	2,183	21,572	3	9.153	30.887
	155-204	49	795	6,193	691	2,193	21,464	3	8.962	31.040
PE-21	92-112	20	1,255	5,619	661	1,298	22,085	2	8.501	33.389
	113-134	21	1,235	5,587	735	1,412	22,605	2	7.601	30.761
	135-222	87	1,233	7,162	825	1,694	22,086	2	8.681	26.769
PE-22	72-89	17	1,095	6,414	656	1,456	26,397	2	9.777	40.248
	90-197	107	1,136	7,216	696	1,482	26,604	2	10.368	38.232
	198-230	32	1,051	7,036	733	1,913	24,928	3	9.599	34.002

Note: *RC = reverse circulation.*

10.2 DIAMOND DRILLING (DDH) BOREHOLE PROGRAM 2009-2010

The objectives of this program were to collect: 1) continuous cores for mapping and characterization, 2) geologic samples for geotechnical testing, including Relative Brine Release Capacity (RBRC), grain size and density, 3) brine samples using low-flow pumping methods, and 4) information for the construction of observation wells for future sampling and monitoring. The drilling reported herein was conducted between October 2009 and August 2010. DD Borehole Program drilling is summarized in Table 10.4. Twenty-nine boreholes (DDH-1 through DDH-18, plus twin holes) were completed, for a total of 5,714 m of drilling. Borehole depths range from 79 m (DDH-2) to 449.5 m (DDH-7).

TABLE 10.4
BOREHOLE DRILLING SUMMARY FOR THE DDH PROGRAM CONDUCTED IN 2009 AND 2010

DDH Borehole	Drilling Interval		Drilling Length (m)	DDH Borehole	Drilling Interval		Drilling Length (m)
	From (m)	To (m)			From (m)	To (m)	
DDH-1	-	272.45	272.45	DDH-10B	-	36.80	36.80
DDH-2	-	78.90	78.90	DDH-11	165.00	260.80	95.80
DDH-3	-	322.00	322.00	DDH-12	-	309.00	309.00
DDH-4	-	264.00	264.00	DDH-12A	-	294.00	294.00
DDH-4A	-	264.00	264.00	DDH-13	-	193.50	193.50
DDH-5	-	115.50	115.50	DDH-13A	-	20.50	20.50
DDH-6A	-	338.50	338.50	DDH-13B	-	20.50	20.50
DDH-6	-	129.00	129.00	DDH-13C	-	20.50	20.50
DDH-7	371.00	449.50	78.50	DDH-13D	-	20.50	20.50
DDH-8	-	250.50	250.50	DDH-14	-	254.50	254.50
DDH-8A	-	252.50	252.50	DDH-15	-	206.50	206.50
DDH-9	-	362.50	362.50	DDH-16	-	270.00	270.00
DDH9A	-	352.00	352.00	DDH-17	-	79.00	79.00
DDH-10	-	350.50	350.50	DDH-18	-	203.50	203.50
DDH-10A	-	258.00	258.00				
Total Boreholes: 29 / Total Drilling: 5,714 m							

Note: *DDH = diamond drill hole.*

Major Drilling, a Canadian drilling company with operations in Argentina, was contracted to carry out the drilling using a Major-50 drill rig and support equipment. The boreholes were drilled using triple tube PQ and HQ drilling methods. During drilling, core was retrieved and stored in boxes for subsequent geological analysis. Borehole logs are provided by King (2010b). Undisturbed samples were taken from the core in PVC sleeves (two inch diameter and five inch length) at selected intervals, for laboratory testing of geotechnical parameters including: RBRC, grain size, and particle density. A total of 832 undisturbed samples were tested.

On completion of exploration drilling, selected DD boreholes were converted to observation wells to enable brine sample collection as a means of supplementing the brine data collected through the RC Borehole Program. The observation wells were prepared by installing Schedule 80, 2-inch diameter, PVC casing and slotted (1 mm) screen in the boreholes. The wells were completed with steel surface casing, a surface sanitary cement seal and lockable cap. Brine sampling was conducted from March to August, 2010. Samples were initially collected with a low-flow pump. However, later samples were collected with a bailer, due to technical difficulties with the low-flow setup. Analytical results are summarized in Table 10.5.

TABLE 10.5
BRINE CONCENTRATIONS (MG/L) AVERAGED ACROSS SELECTED DEPTH INTERVALS FOR DDH PROGRAM BOREHOLES

Borehole	Depth (m)	Length (m)	B	K	Li	Mg	SO_4	Mg/Li
DDH-01	15-55	40	610	4.847	523	1.147	9.039	2.20
	70-105	40	765	5.253	596	1.399	10.901	2.35
	140-170	30	832	5.518	634	1.528	11.694	2.41
	205-260	55	839	5.558	636	1.463	11.572	2.30
DDH-04	15-190	175	668	4.968	544	1.039	23.038	1.91
DDH-06	100-115	15	674	3.961	515	1.100	15.934	2.14
	118-136	18	667	5.860	627	1.353	18.552	2.16
	140-190	51	719	6.698	732	1.579	20.853	2.16
DDH-08	20-75	50	611	3.735	408	1.409	10.537	3.46
	80-205	125	822	5.232	588	1.223	16.971	2.08
DDH-12	65-70	5	696	4.120	464	927	16.834	2.00
	170-185	10	800	5.050	545	1.161	17.888	2.13
	225-285	25	827	5.249	565	1.223	17.819	2.16
DDH-13	50-140	90	872	5.940	650	1.921	20.955	2.96

10.3 DIAMOND DRILLING (DDH) BOREHOLE PROGRAM 2017-2019

The objectives of this program were to collect: 1) continuous cores for mapping and characterization of the shallow, intermediate and deeper parts of the aquifer; 2) geologic samples for geotechnical testing and grain size analysis; 3) brine samples using a bailer; and 4) information for the construction of observation wells for future sampling and monitoring. The drilling reported in Table 10.6 was conducted between July 2017 and June 2019. It should be noted that the lithium resource is contained in brines and is not affected by the drill core recovery.

The 2017, 2018, and 2019 programs included drilling 50 m, 200 m and 450 to 600 m deep, smaller diameter wells from the same drilling platform. Shallow and intermediate depth boreholes were competed in the same borehole. The shallowest wells use 1" diameter PVC casing. The deeper borehole was drilled 15 m away from the shallow and intermediate well locations. The intermediate and deep wells were cased using Schedule 80, 2-inch or 2.5-inch diameter, PVC casing and slotted (1 mm) screen in the boreholes. The wells were completed with steel surface casing, a surface sanitary cement seal and lockable cap. Brine sampling was conducted prior to pump testing. Sample collection, preparation and analytical methods are described in Section 11.

Major Drilling, a Canadian drilling company with operations in Argentina, and Ideal Drilling, a Bolivian company, were contracted to carry out the drilling program.

The deep boreholes were drilled using HQ-diameter size, triple-tube core recovery methods. During drilling, core was retrieved and stored in metal boxes for subsequent geological analysis. The shallow and medium depth boreholes were drilled with tricone 5 ½" diameter rotary methods. Description of continuous core from the deep borehole served as overall characterization of lithologies for the location of the platform. A photo of the black sand targeted in DDH19D-001 is shown in Figure 10.1.

All borehole locations and their associated platforms are presented in Figure 10.2. Brine concentrations averaged across select intervals are presented in Table 10.7 Brine sample collection is summarized in Section 11.4.

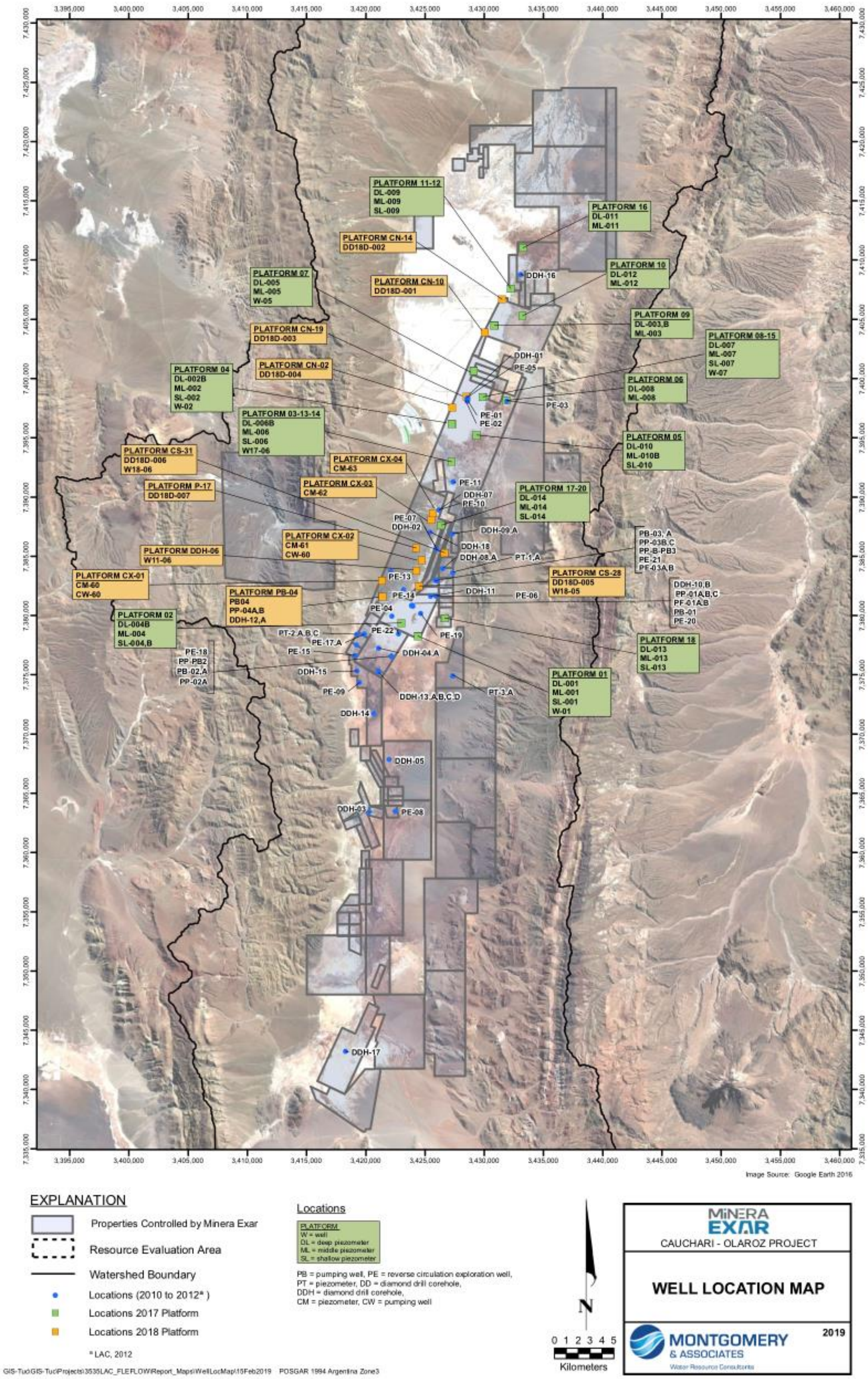
TABLE 10.6 BOREHOLE DRILLING SUMMARY FOR THE DDH PROGRAM CONDUCTED IN 2017 AND 2019									
DD Borehole ID	**Piezometer Name**	**Screen Diameter**	**Plataform**	**Contractor**	**Total Depth (m)**	**Screen Top (mbtw)**	**Screen Base (mbtw)**	**X Coordinate**	**Y Coordinate**
DD17S-001	ML-001	2"	1	IDEAL	200	109.40	174.80	3424377.00	7378282.00
DD17S-001	SL-001	1"	1	IDEAL	50	23.80	47.73	3424377.00	7378282.00
DD17D-001	DL-001	2.5"	1	IDEAL	450	265.50	444.00	3424392.00	7378275.00
DD17D-002B	DL-002	2"	4	IDEAL	450	343.36	444.24	3427266.00	7396185.00
DD17S-002	ML-002	2"	4	IDEAL	189.1	109.20	168.70	3427273.00	7396180.00
DD17S-002	SL-002	1"	4	IDEAL	50	23.80	47.73	3427273.00	7396180.00
DD17S-003	ML-003	2"	9	IDEAL	200	151.72	193.30	3430870.00	7404487.00
DD17D-003	DL-003	2.5"	9	IDEAL	650	292.60	636.10	3430861.00	7404476.00
RC17D-003	DL-003 B	2.5"	9	Major	648	221.20	642.00	3430859.00	7404497.00
RC17S-004	ML-004	2"	2	Major	200	122.75	194.00	3422991.00	7379367.00
RC17S-004	SL-004	1"	2	Major	50	23.80	47.73	3422991.00	7379367.00
DD17D-004	DL-004	2.5"	2	IDEAL	650	427.68	617.57	3423010.00	7379367.00
RC17D-004 B	DL-004 B	2.5"	2	Major	550	196.92	547.30	3423006.00	7379355.00
RC17S-004 B	SL-004B	2.5 "	2	IDEAL	50	14.30	50.00	3423001.00	7379362.00
DD17D-005	DL-005	2.5"	7	IDEAL	604.55	309.25	576.77	3429086.00	7400627.00
RC17S-005	ML-005	2"	7	Major	192	115.00	186.40	3429092.00	7400696.00
RC17S-006	ML-006	2"	3 13 14	Major	200	122.70	194.00	3427230.00	7392980.00
RC17S-006	SL-006	1"	3 13 14	Major	50	23.80	47.73	3427230.00	7392980.00
DD17D-006B	DL-006	2.5	3 13 14	IDEAL	450	255.90	443.95	3427245.00	7393001.00
RC17S-007	SL-007	1"	8 15	Major	50	23.80	47.73	3429894.00	7398465.00
RC17S-007	ML-007	2"	8 15	Major	200	110.10	175.50	3429894.00	7398465.00
DD17D-007	DL-007	2.5"	8 15	IDEAL	450	217.10	436.70	3429885.00	7398456.00
RC17S-008	ML-008	2.5"	6	Major	160	86.10	151.50	3431846.00	7398167.00
DD17D-008	DL-08	2"	6	Major	447	267.30	439.56	3431865.00	7398168.00
RC17S-009	SL-009	2"	11 12	Major	50	23.80	47.73	3432230.00	7407612.00
RC17S-009	ML-009	2.5"	11 12	Major	200	122.90	194.00	3432230.00	7407612.00

Table 10.6 **Borehole Drilling Summary for the DDH Program Conducted in 2017 and 2019**									
DD Borehole ID	**Piezometer Name**	**Screen Diameter**	**Plataform**	**Contractor**	**Total Depth (m)**	**Screen Top (mbtw)**	**Screen Base (mbtw)**	**X Coordinate**	**Y Coordinate**
DD17D-009	DL-09	2.5"	11 12	Major	450	218.00	444.05	3432221.00	7407596.00
RC17S-010 B	ML-010	2.5"	5	Major	200	115.97	187.1	3429367.00	7395232.00
RC17S-010 B	SL-010	2"	5	Major	50	23.80	47.73	3429367.00	7395232.00
DD17D-010	DL-10	2.5"	5	Major	450	230.10	444.40	3429348.00	7395235.00
RC17S-011	ML-011	2.5"	16	Major	200	101.00	166.00	3433260.00	7411045.00
DD17D-011	DL-011	2.5"	16	IDEAL	450	235.80	444.00	3433255.00	7411065.00
RC17S-012	ML-012	2.5"	10	Major	200	128.94	194.39	3433213.00	7405310.00
DD17D-012	DL-012	3"	10	Major	451.65	204.34	436	3433225.00	7405308.00
RC17S-13	SL-13	1"	18	IDEAL	50	23.8	47.6	3426671.00	7379792.00
RC17S-13	ML-013	2"	18	IDEAL	200	122.7	194	3426671.00	7379792.00
DD17D-013	DL-013	2.5"	18	IDEAL	450	279.18	443	3426658.00	7379792.00
DD17D-014	DL-014	2.5"	17 20	IDEAL	431.35	238	425.03	3426361.00	7387640.00
RC17S-014	ML-014	2.5"	17 20	IDEAL	200	104.75	194.9	3426381.00	7387647.00
RC17S-014	SL-014	1"	17 20	IDEAL	26.7	2.9	26.7	3426361.00	7387640.00
DD18D-001	Cemented	2.5"	CN-10	IDEAL	300	Cemented	Cemented	3430069.00	7403904.00
DD18D-002	Cemented	2.5"	CN-14	IDEAL	300	Cemented	Cemented	3431478.00	7406690.00
DD18D-003	Abandoned	2.5"	CN-19	IDEAL	13	Abandoned	Abandoned	3428499.00	7398500.00
DD18D-004	Cemented	2.5"	CN-02	IDEAL	300	Cemented	Cemented	3427303.00	7397557.00
DD18D-005	Cemented	2.5"	CS-28	IDEAL	300	Cemented	Cemented	3424500.00	7382499.00
DD18D-006	Cemented	2.5"	CS-31	IDEAL	300	Cemented	Cemented	3426650.00	7385299.00
DD18D-007	Cemented	2.5"	P-17	IDEAL	300	Cemented	Cemented	3424250.00	7385700.00
DD19D-001	DD19D-001	-	1	Hidrotec	632	-	-	3424376.00	7378282.00
DD19D-PE09	DD19D-PE09	2”	PE-09	Hidrotec	358	42	352	3419473.00	7374367.00

Note: *DD = diamond drilling, DDH = diamond drill hole, mbtw = metres below top of well.*

Figure 10.1 Black Sand in DD19D-001

Figure 10.2 Borehole Locations and Associated Drilling Platforms



Source: *Montgomery & Associates.*

TABLE 10.7
BRINE CONCENTRATIONS (MG/L) AVERAGED ACROSS SELECTED DEPTH INTERVALS FOR DDH PROGRAM BOREHOLES 2017-2019

DD Borehole ID	From – To (m)	Lenth (m)	Li (mg/L)	K (mg/L)	Mg (mg/L)	H_3BO_3 (mg/L)	SO_4 (mg/L)	Mg/Li
DL-001	0-100	100	574.0	5465.0	1584.0	5953.0	18996.0	2.8
DL-001	100-200	100	549.0	5368.0	1645.8	5782.8	20878.7	3.0
DL-001	200-300	100	502.3	4661.1	1674.6	6076.0	24260.6	3.3
DL-001	300-400	100	585.2	5186.1	1230.1	4477.4	22927.4	2.1
DL-001	400-450	50	579.4	4897.2	1230.1	5273.0	24900.6	2.1
DD19D-001	450-632	182	559.7	4768.0	1309.4	4604.7	18795.7	2.3
DL-002	0-100	100	528.0	3867.0	1182.0	6404.0	15717.0	2.2
DL-002	100-200	100	519.0	4129.0	1168.0	6355.0	15695.0	2.3
DL-002	200-300	100	588.0	4113.0	1172.0	6397.0	15578.0	2.0
DL-002	300-400	100	515.0	4208.0	1208.0	6781.0	15785.0	2.3
DL-002	400-450	50	511.6	4214.3	1315.4	6820.8	15955.8	2.6
DL-003B	0-250	250	805.9	6349.2	1271.1	9181.9	20757.0	1.6
DL-003B	250-300	50	770.5	5760.3	1289.0	9417.1	22503.2	1.7
DL-003B	300-400	100	807.2	5907.1	1235.2	9502.7	23114.7	1.5
DL-003B	400-500	100	767.3	4774.6	1609.0	7210.6	16808.4	2.1
DL-003B	500-600	100	730.8	4409.2	1814.8	6747.7	16686.6	2.5
DL-004B	0-200	200	652.9	4400.8	1594.7	4775.6	21278.4	2.4
DL-004B	200-300	100	679.0	5426.6	1831.9	4771.0	22094.8	2.7
DL-004B	300-400	100	733.2	5499.0	1936.9	4900.2	24440.0	2.6
DL-004B	400-500	100	757.0	5653.2	1871.8	4859.6	24786.3	2.5
DL-005	0-100	100	686.0	6100.5	1127.0	9205.9	31482.5	1.6
DL-005	100-200	100	685.4	5887.4	1101.6	8821.4	30967.2	1.6
DL-005	200-300	100	696.5	5938.9	1124.2	8645.7	31649.8	1.6
DL-005	300-375	75	766.1	6688.0	1349.8	8519.3	24563.2	1.8

Table 10.7 **Brine Concentrations (mg/L) Averaged Across Selected Depth Intervals for DDH Program Boreholes 2017-2019**								
DD Borehole ID	**From – To (m)**	**Lenth (m)**	**Li (mg/L)**	**K (mg/L)**	**Mg (mg/L)**	**H_3BO_3 (mg/L)**	**SO_4 (mg/L)**	**Mg/Li**
DL-006	0-100	100	534.6	4775.0	1275.8	6196.5	17131.5	2.4
DL-006	100-200	100	552.0	4601.0	1299.0	6990.0	15762.0	2.4
DL-006	200-300	100	561.0	4627.0	1352.0	6782.0	14510.0	2.4
DL-006	300-400	100	534.0	4627.0	1357.0	7034.0	15607.0	2.5
DL-007	0-100	100	446.0	3741.8	434.9	11671.4	46958.1	1.0
DL-007	100-200	100	481.7	4223.7	705.2	9843.0	43842.5	1.5
DL-007	200-300	100	459.9	3766.3	422.6	11646.9	51584.5	0.9
DL-007	300-400	100	448.9	3865.7	425.2	11771.7	54743.3	0.9
DL-008	0-100	100	315.1	2240.6	1260.4	3517.3	11319.9	4.0
DL-008	100-200	100	315.9	2281.5	1275.3	3201.1	11115.0	4.0
DL-008	200-300	100	237.0	1968.0	1172.0	2468.0	9528.0	4.9
DL-008	300-400	100	267.0	2064.0	1236.0	3837.0	10212.0	4.6
DL-009	0-100	100	782.0	5295.0	1170.0	10505.0	19910.0	1.5
DL-009	100-200	100	769.9	5205.7	1054.6	10680.3	20040.8	1.4
DL-009	200-300	100	689.0	4034.0	685.0	11400.0	43208.0	1.0
DL-009	300-400	100	765.0	5299.0	1325.0	10586.0	21966.0	1.7
DL-010	0-19	19	411.1	3566.6	943.0	6913.1	23817.3	2.3
DL-010	19-250	231	462.1	3733.1	766.1	8028.0	25049.6	1.7
DL-010	250-300	50	463.2	3803.3	792.4	8014.9	25964.7	1.7
DL-010	300-400	100	433.3	3379.7	520.0	10683.9	44196.6	1.2
DL-011	0-100	100	549.9	3165.0	1061.9	9470.5	17963.4	1.9
DL-011	100-200	100	523.7	3191.2	1082.8	8854.9	17539.2	2.1
DL-012	0-100	100	653.9	5788.6	1421.7	4861.0	15258.6	2.2
DL-012	100-200	100	690.8	6035.8	1452.0	5708.5	15150.0	2.1

TABLE 10.7 **BRINE CONCENTRATIONS (MG/L) AVERAGED ACROSS SELECTED DEPTH INTERVALS FOR DDH PROGRAM BOREHOLES 2017-2019**								
DD Borehole ID	**From – To (m)**	**Lenth (m)**	**Li (mg/L)**	**K (mg/L)**	**Mg (mg/L)**	**H_3BO_3 (mg/L)**	**SO_4 (mg/L)**	**Mg/Li**
DL-012	200-275	75	663.7	5825.5	1428.1	4621.0	15485.4	2.2
DL-013	0-100	100	631.0	5351.0	1547.0	8882.0	25501.0	2.5
DL-013	100-200	100	585.6	4977.6	1450.6	8479.0	21838.0	2.5
DL-013	200-260	60	476.6	4545.8	1242.8	8541.8	25662.0	2.6
DL-014	0-225	225	476.0	5224.0	1094.0	4008.0	23495.0	2.3
DL-014	225-300	75	458.0	4705.0	1092.0	7155.0	24746.0	2.4
DL-014	300-400	100	453.0	4790.0	1073.0	6424.0	25694.0	2.4
ML-001	0-50	50	715.0	6104.0	2067.0	5291.0	37239.0	2.9
ML-001	50-100	50	679.0	7422.0	1701.0	5972.0	40111.0	2.5
ML-001	100-150	50	580.0	6357.0	1232.0	5904.0	29900.0	2.1
ML-002	0-50	50	641.0	4850.0	1264.0	6255.0	17492.0	2.0
ML-002	50-100	50	623.0	5164.0	1328.0	6240.0	18615.0	2.1
ML-002	100-150	50	557.1	5074.1	1093.5	4747.1	19376.0	2.0
DD19D-PE09	286-301	15	545.05	4552.8	1385.4	5168.7	19077.0	2.5
DD19D-PE09	325-340	15	532.4	4573.8	1458.05	4917.4	20328.0	2.7

10.4 PRODUCTION WELL DRILLING

Information from the exploration drilling and pump tests was used to select the locations of the production wells that will be used to pump lithium brine to the evaporation ponds. Since 2011 a total of 10 production wells have been drilled on the Property.

The production well field uses three wells drilled in 2011, these wells had a smaller diameter (8 inches). The wells drilled in 2018/2019 were drilled deeper and used a larger diameter according the expected flow. The production wells were drilled with conventional rotary rigs and a surface casing at the top of the wells to ensure the stability of the well head over time. The design of the deeper wells used larger diameter casing in the upper 200/250 m, continuing with smaller diameter casing below. This telescopic design saves costs and drilling time. An example of brine being pumped from a well is shown in Figure 10.3.

The production wells use stainless steel screen, which guarantees a long life and avoids corrosion. The Stanley steel screen casing is inserted in each well at different intervals and is inserted facing the productive horizonts of the aquifer. As a rule, the minimum length used is two meters. The solid screen casing is generally used in front of massive halite and clay layers (aquicludes and aquitards). The solid and screen casing alternate through the aquifer.

Details of the production wells and length of screened casing and solid casing used in each well are provided in Table 10.8.

Figure 10.3 Pumping Well W18-05

TABLE 10.8
PRODUCTION WELL DRILLING AND CONSTRUCTION DETAILS

Pumping Well	Year	Total Depth (m)	Coordinates		Drilling Method	Drilling Diameter (Inches)	Well Construction		Construction Material	
			X	Y			Total Length of Casing Inserted (m)	Total Length of Screen Casing Inserted (m)	Solid Casing	Screen Casing
PB-03A	2011	204	7383015	3425965	Rotary	22" (0-39 m) 13.25" (39-205 m)	8" (122.9 m)	8" (77.89 m)	Carbon Steel	Galvanized Steel
PB-04	2011	201	7381604	3421378	Rotary	22" (0-57 m) 12.25" (57-305 m)	8" (220.7 m)	8" (80.88 m)	Carbon Steel	Galvanized Steel
PB-06A	2011	305	7377554	3419220	Rotary	18" (0-47 m) 12.25" (47-194 m)	8" (114.5 m)	8" (79.0 m)	Carbon Steel	Galvanized Steel
W18-05	2018	270	7382499	3424500	Rotary	17" (0-273.7 m) 13" (273.7-278 m)	10" (138.0 m)	10" (132.4 m)	Carbon Steel	Stainless Steel
W17-06	2018	455	7392988	3427261	Rotary	27"(0-12 m) 17"(12-229.5 m) 13"(229.5-455 m)	20" (12 m) 10" (123.5 m) 6" (35.5 m)	 10" (99.0 m) 6" (187.0 m)	Carbon Steel	Stainless Steel
W18-06	2019	460	7385299	3426650	Rotary	27 " (0-44.5 m) 17" (44.5-253 m) 12.25" (253-450 m)	20" (44 m) 10" (104.0 m) 6" (51 m)	 10" (146.0 m) 6" (149.0 m)	Carbon Steel	Stainless Steel
W11-06	2019	434	7383792	3424279	Rotary	27" (0-41.3 m) 17" (41.3-212.7 m) 12.25" (212.7-434 m)	20" 10" (127.5 m) 6" (59.5 m)	 10" (74.0 m) 6" (167.0 m)	Carbon Steel	Stainless Steel
W18-23	2019	484	7381500	3423500	Rotary	27" (0-36 m) 18.5" (36-230 m) 12.25" (230-486 m)	20" 10" (91.5 m) 6" (73.5 m)	 10" (134.0 m) 6" (185.0 m)	Carbon Steel	Stainless Steel
W-04A	2019	478	7379360	3423300	Rotary	27" (0-51 m) 17" (51-478 m)	10" (292.0 m)	10" (181.0 m)	Carbon Steel	Stainless Steel

11.0 SAMPLE PREPARATION, ANALYSES AND SECURITY

11.1 SAMPLING METHOD AND APPROACH

Minera Exar established the following procedures for sample preparation, analyses and security at the Project from 2010 to 2012. These procedures are discussed in the 2017 Feasibility Study, authored by Burga et al. Drilling, brine sampling and pumping tests for the 2017-2019 campaigns were supervised by Minera Exar personnel.

Drilling was subject to daily scrutiny and coordination by Minera Exar geologists. On the drill site, the full drill core boxes are collected daily and brought to the core storage warehouse where the core is laid out, measured, logged for geotechnical and geological data, and photographed.

Core boxes are placed on core racks and covered with a black PVC sheet to protect the integrity of the core and stored outside. RBRC values were not measured during the 2017-2018 drilling but 33 drill samples were tested for RBRC during the 2019 drilling campaign and results were in line with other RBRC sampling. The core was well logged to include the lithological data required for the Mineral Resource Estimate.

11.2 ROTARY DRILLING SAMPLING METHODS

Rotary drilling was conducted by Hidrotec and Wichi Toledo for the purpose of installing pumping wells for testing purposes. Minera Exar personnel recorded the time it took to advance 1 m and sampled the cuttings by placing them in a rock chip tray (Figure 11.1) and brought back to the field office for logging. Samples were not taken during rotary drilling for chemical analysis.

Figure 11.1 Rock Chip Tray with Dry and Wet Samples

Source: *King, Kelley, Abbey, (2012).*

11.3 DIAMOND DRILLING BOREHOLE SOLIDS SAMPLING METHODS

Diamond drilling was performed by Major Drilling and Ideal Drilling. During diamond drilling, PQ or HQ diameter cores were collected through a triple tube sampler. The cores were taken directly from the triple tube and placed in wooden or metal core boxes for geologic logging, sample collection, and storage. During the 2009-2011 drilling, undisturbed geologic samples were collected by driving a two inch diameter, five inch long PVC sleeve sampler into the core at three metre intervals (Figure 11.2 and Figure 11.3). The DD boreholes were used to help select the pumping well locations.

During the 2009-2011 drilling campaigns, a total of 1,244 undisturbed samples were collected from the cores of DDH-1 through DDH18. Undisturbed samples were shipped to D.B. Stephens & Associates Laboratory in the USA for analysis of geotechnical parameters, including: RBRC (total of 865 samples), particle size (total of 58 samples), and dry bulk density (total of 36 samples). Geotechnical analytical methods are described in Section 11.8.

Figure 11.2 Collecting an Undisturbed Sample

Source: *King, Kelley, Abbey, (2012).*

Figure 11.3 Collecting an Undisturbed Sample from Core

Source: *Minera Exar*

11.4 DIAMOND DRILLING BOREHOLE BRINE SAMPLING METHODS

Samples were further analyzed in the field laboratory for confirmation of field parameters. After analysis of field laboratory parameters, brine samples were split into three clean 250 ml, clean, plastic sample bottles. The three bottles were tagged with pre-printed tag numbers. Two bottles were used per sample, one for density and one for geochemistry, which was shipped to ASL in Jujuy or sent to the onsite Exar laboratory. One sample was maintained in the Minera Exar field office, as a backup.

11.5 SAMPLING PREPARATION, ANALYSIS AND SECURITY

There is an established and firm chain of custody procedure for Project sampling, storage, and shipping. Samples were taken daily from the drill sites and stored at the on-site facility. All brine samples were stored inside a locked office, and all drill cores were stored inside the core storage area on site. Brine samples were taken by Minera Exar staff to the on-site laboratory or transported to Jujuy in a company truck. Solid samples were periodically driven in Project vehicles to Jujuy, approximately three hours from the site. In Jujuy, solid samples were delivered to a courier (DHL) for immediate shipment to the appropriate analytical laboratory.

Brine samples were analyzed by Alex Stewart Argentina S.A. (ASA) and the internal Exar laboratory. ASA is an ISO 9001 and ISO 14001 certified laboratory with facilities in Jujuy and Mendoza, Argentina and headquarters in England. The internal Exar laboratory handles samples from the pilot processing plant and hydrogeology and is not a certified laboratory.

Analytical methods for all brine samples are described in Section 11.6.1. Quality Assurance/Quality Control (QA/QC) for brine samples collected is discussed in Section 12.

D.B. Stephens and Associates Laboratory in Albuquerque, New Mexico, USA was used for the geotechnical property analyses of the undisturbed core samples from the DD Borehole Program in the 2009-2011 drilling campaigns. D.B. Stephens and Associates is certified by the U.S. Army Corps of Engineers and is a contract laboratory for the U.S. Geological Survey.

11.5.1 Brine Samples from the Piezometers

Piezometers were installed for sampling prior to pump testing. These samples were collected at 20 m intervals using bailers. Bailers would be manually lowered to the desired depth, pulled up one meter quickly to fill the bailer then lowered slowly to obtain a sample at the desired depth. Brine from the bailer would be used to rinse out a plastic bucket and then the remainder of the brine would be emptied into the bucket. Brine from the bucket would be used to rinse out three 250 ml bottles before being filled with a sample and marked with the borehole and depth. Back at the field office, samples would be logged into a field book and assigned a unique sample code and any identifying information about the borehole would be removed from the bottle using rubbing alcohol. Data from the logbook is then entered into the sampling database.

Samples were not filtered after collection because the pumping wells produced brine with negligible suspended solids.

11.5.2 Brine Samples from the Pumping Test Program

In 2017-2019 each well had a pump test to help define the pumping rate and lithium concentration. 2018 pumping production wells helped define the lithium concentration and flow rate in each location where the production wells are being drilled. The first test is well development which lasts for 7 days to clean the well, generally starting with 20 hz, then ramping up to clear the silt and sediment. Prior to taking samples the well is developed to clean all the fine sediments in the area immediately adjacent to the screen. The development lasts from 3 to 7 days. The well is considered developed when the percentage of solids during pumping is less than 0.1 ml measured in an Imhoff cone (Figure 11.4). Measurements are taken with the frequency shown in Table 11.1. The parameters measured include dynamic water level, flow (m^3/h), and turbidity. After the test is done, recovery is measured using a water level tape with readings being taken with the same frequency shown in Table 11.1 until 95% recovery is achieved. During and after the pumping tests, technicians measure the drawdown and recovery of nearby wells.

TABLE 11.1
SUMMARY PUMPING TEST MEASUREMENT FREQUENCY

Time	Frequency of Samping
0-5 minutes	Every 30 seconds
5-10 minutes	Every minute
10-30 minutes	Every 2 minutes
30-60 minutes	Every 5 minutes
1 – 2 hours	Every 10 minutes
2 – 3 hours	Every 20 minutes
3 – 4 hours	Every 30 minutes
4 hours – end	Hourly

Figure 11.4 Measuring Sediment in an Imhoff Cone

Source: *Minera Exar.*

Once the water level has recovered to 95%, a short sampling pump test (2-4 hours) is conducted. This test is to find the maximum pumping rate without draining the well. The well is allowed to recover afterwards.

An 8-12 hour, pumping rate test follows, which is broken up into 4 parts at 25% of the maximum pumping rate, 50% of the maximum pumping rate, 75% of the maximum pumping rate and 100% of the maximum pumping rate. This test is to see which rate the well stabilizes at. The well is allowed to recover afterwards.

The final pump test is a constant rate pump test that is conducted for a minimum of 7 days. Water measurements are taken with the same frequency listed on Table 11.1. Brine sampling is done at 10 min, 30 min, 60 min, 2 h, and then every 4 hours to the end of the test. Brine from a valve on the side of the hose coming out of the well would be used to rinse out a plastic bucket and then refilled. Brine from the bucket is used to rinse out three 250 ml bottles before being filled with a sample and marked with the borehole and date. Back at the field office, samples would be logged into a field book and assigned a unique sample code and any identifying information about the borehole is removed from the bottle using rubbing alcohol. Data from the logbook is then entered into the sampling database.

11.6 BRINE ANALYSIS

11.6.1 Analytical Methods

ASA in Jujuy and the on-site Exar laboratory were the primary laboratories for analysis of brine samples. In order to provide a quick response, ASA used Inductively Coupled Plasma ("ICP") as the analytical technique for the primary constituents of interest, including: sodium, potassium, lithium, calcium, magnesium, and boron. Samples were diluted by 100:1 before analysis. Density was measured via pycnometer and sulphates were measured using the gravimetric method. The argentometric method was used for assaying chloride and volumetric analysis (acid/base titration) was used for carbonates (alkalinity as $CaCO_3$).

In the internal Exar laboratory, a 20 g sample is taken from the 250 ml bottle. The sample is entered into the laboratory database. Sulphates were measured using the gravimetric method and volumetric analysis (acid/base titration) was used for calcium, magnesium and chloride. Brine samples were diluted before being passed through the AA spectrometer which analyzes Li, Na, and K.

The laboratory can process 40 samples per day. A Laboratory Information Management System is to be installed in the coming year.

11.6.2 Sample Security

There is an established and firm chain of custody procedure for Project sampling, storage and shipping. Samples were taken daily from the drill sites and stored at the core storage facility on site. Brine samples are taken by Exar personnel to the on-site analytical laboratory or by truck to the Alex Stewart facility in Jujuy.

11.7 SAMPLE PREPARATION ANALYSIS AND SECURITY CONCLUSIONS AND RECOMMENDATIONS

The field sampling, preparation, security, and analysis of drill core and brines from the piezometers and pumping tests are adequate and are being executed to industry standards. Security procedures are adequate for the sampling program. The recommendation is made that sample books with dedicated tickets be used for future sampling. It is also recommended that a separate building be dedicated to the storage of the duplicate sample bottles and that a selection of samples of low, medium, and high-grade lithium be submitted to Alex Stewart for analysis.

11.8 GEOTECHNICAL ANALYSIS

11.8.1 Overview

D.B. Stephens and Associates Laboratory carried out selected geotechnical analyses on undisturbed samples from the geologic cores (DDH-1 through DDH-18), from the 2009-2011 drilling campaigns as summarized in Table 11.2. RBRC results were used in the Resource

Estimate (King, 2010b) to estimate the volume of recoverable brine present in various geological materials. 33 RBRC samples were taken from DD19D_PE09 from the 2019 drilling campaigns.

TABLE 11.2
SUMMARY OF GEOTECHNICAL PROPERTY ANALYSES

Analysis	Procedure
Dry bulk density	ASTM D6836
Moisture content	ASTM D2216, ASTM D6836
Total porosity	ASTM D6836
Specific gravity (fine grained)	ASTM D854
Specific gravity (coarse grained)	ASTM C127
Particle size analyses	ASTM D422
Relative brine release capacity	Developed by D.B. Stephens (see Section 11.9.2)

11.9 ANALYTICAL METHODS

Results of dry bulk density, moisture content, and total porosity are geotechnical parameters and are not used in the Mineral Resource and Reserve Estimates. The results of those tests are not discussed here.

11.9.1 Specific Gravity

Specific gravity testing was conducted for four formation samples (012714, 012715, 012716, and 012743). Density results for these samples ranged from 2.47 g/cm^3 to 2.75 g/cm^3. It was subsequently determined that these values could be skewed due to the high salt content. Consequently, no attempt was made to apply these measured values to the remaining samples, and an assumed particle density of 2.65 g/cm^3 was used for all other samples.

11.9.2 Relative Brine Release Capacity (RBRC)

The RBRC method was developed by D.B. Stephens and Associates Laboratory, in response to some of the unique technical challenges in determining porosity for brine-saturated samples (Stormont, et al., 2010). The method predicts the volume of solution that can be readily extracted from an unstressed geologic sample.

According to the RBRC method, undisturbed samples are saturated in the laboratory using a site-specific brine solution. The bottom of the samples are then attached to a vacuum pump using tubing and permeable end caps, and are subjected to a suction of 0.2 to 0.3 bars for 18 to 24 hours. The top of the sample is fitted with a perforated latex membrane that limits atmospheric air contact with the sample, to avoid evaporation and precipitation of salts. Depending on the pore structure of the material, there may be sufficient drainage so that a continuous air phase is established through the sample. The vacuum system permits testing multiple samples simultaneously in parallel. After extraction, the samples are oven dried at 110 °C.

The volumetric moisture (brine) content of the sample is calculated based on the density of the brine, the sample mass at saturation, and the sample mass at "vacuum dry". The difference between the volumetric moisture (brine) content of the saturated sample and the volumetric moisture (brine) content of the 'vacuum dry' sample is the specific yield or "relative brine release capacity".

RBRC test samples are taken in the field during drilling. Mr. Burga was not present on site at the time that RBRC sampling was being conducted and could not obtain a sample for verification purposes. Once the samples dry and the salts in the brine precipitate, the characteristics of the sample change and cannot be relied upon. D.B. Stephens and Associates Laboratory is an independent laboratory and results were obtained directly from the laboratory for verification purposes. No errors were noted.

11.9.3 Particle Size Analysis

Particle size analyses were carried out on 58 undisturbed samples after the drainable porosity testing was completed. Uniformity and curvature coefficients (Cu and Cc) were calculated for each sample and samples were classified according to the USDA soil classification system.

11.9.4 Exar Porosity Test Lab

In addition to the on-site analytical laboratory, the project site also has a porosity test lab. This lab tests total porosity (as opposed to drainable porosity) which helps to distinguish between types of halites and clays and silts. Samples dried in an oven at 70 degrees Celsius, weighed, measured, and then put through a gas pycnometer. Volume, porosity, and density are obtained. Samples are photographed and given a bar code and the equipment is calibrated at the end of each day.

The lab also conducts grain size analysis on the gravel pack used by the drillers for well construction.

It should be noted that results from the Exar Porosity Test Lab have not been used for Mineral Reserve Estimate Purposes (porosity values are not considered in the Mineral Resource Estimate).

12.0 DATA VERIFICATION

12.1 OVERVIEW

The Data Verification for data obtained prior to the 2017-2019 drilling campaigns is elaborated in the 2017 Feasibility study (Burga et al., 2017).

12.2 SITE VISITS

Mr. D. Burga visited the site and the Minera Exar office on January 24 and 25, 2017, February 18-21, 2019 and June 10-12, 2019. Project features inspected and reviewed during these visits, which are relevant to data verification, included the following:

- Several drill hole locations were visited and several active pumps were observed;
- 27 brine samples were obtained from 13 wells;
- 5 duplicate samples were taken from the sample storage tent;
- 4 standard samples were collected for analysis;
- Review of Minera Exar sampling procedures;
- Inspection of the 2017-2019 Project database;
- Inspection of digital laboratory certificates for the Minera Exar brine dataset, and the Project database;
- The sample storage facility and security systems were observed and are considered appropriate; and
- Tours of the Exar Analytical Lab and the Exar Grain Size Analysis were conducted.

Mr. D. Burga conducted interviews with Minera Exar employees who were present during the drilling and pump testing of the new wells.

Digital copies of the lab certificates were obtained directly from Alex Stewart and compared to the Minera Exar database.

12.3 FEBRUARY 2019 SITE VISIT AND DUE DILIGENCE SAMPLING

Mr. D. Burga collected 23 brine samples during his site visit from 10 wells during the site visit. Each sample consisted of three 250 ml plastic bottles. 4 samples were taken from pumping well sites (PB-06, W18-05, W11-06, and PB-03). For the pumping well samples, a valve was opened on the main pipe coming out of the well, a plastic pail was rinsed with brine, filled again and then the brine was used to rinse out each sample bottle before being filled with the sample. 19 samples were taken from various depths in six different observation piezometers (DL-014, ML-014, DL-005, W-05, DL-09, and ML-09). A bailer was lowered to the desired depth, pulled up a meter and lowered again to obtain a sample at that depth then pulled back to the surface. A small amount of brine was used to rinse out a plastic pail and then dumped out and the remainder of the brine from the bailer was emptied into the pail. Each bottle was marked with the well and depth and brought back to field office where each sample was given a sample code, entered into a log book and identifying well information was removed from the sample bottles with rubbing alcohol.

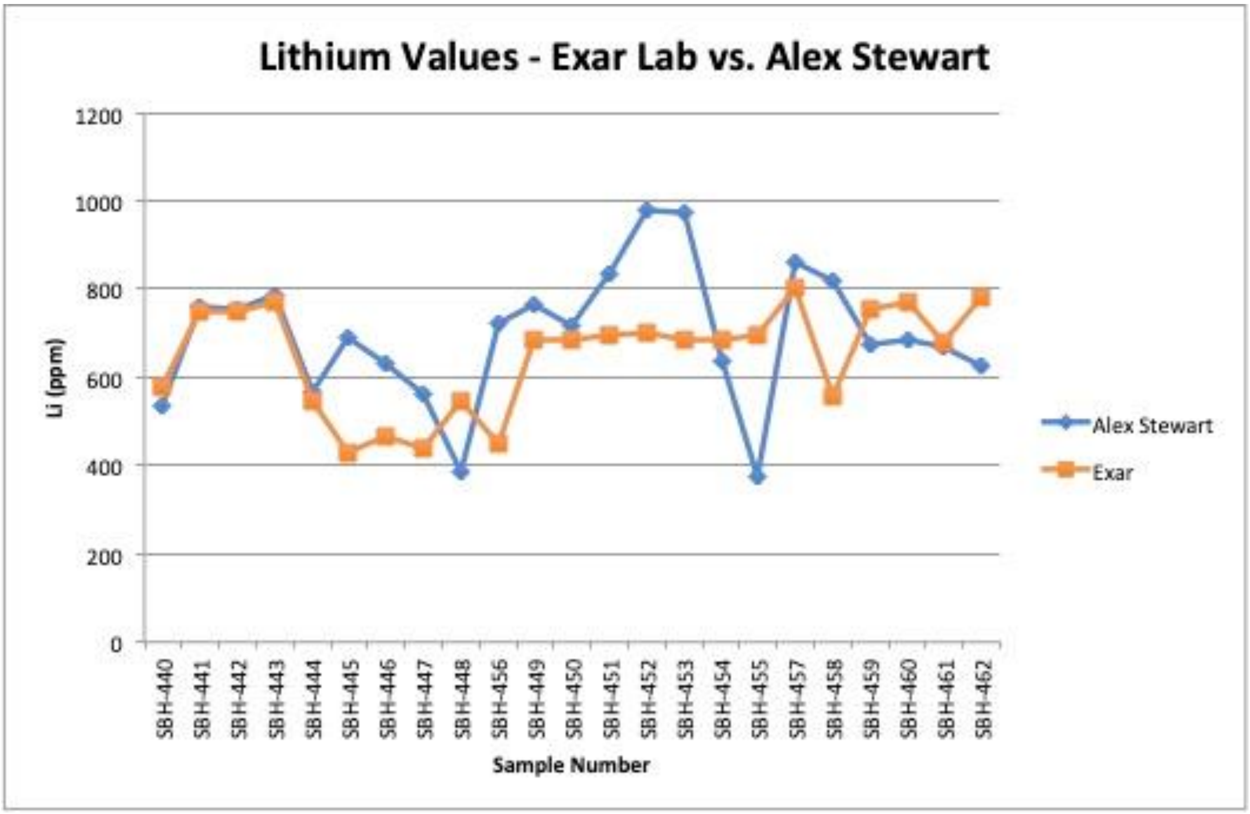
The samples were taken by Mr. Burga directly to Alex Stewart Laboratories in Jujuy for chemical analysis. The samples were analyzed for lithium using and ICP with an OES finish.

Results of the site visit due diligence samples are listed in Table 12.1 and presented graphically in Figure 12.1.

TABLE 12.1
RESULTS OF DUE DILIGENCE SAMPLING – FEBRUARY 2019

ACSI Sample No.	Well No.	Depth (m)	Li (mg/L) Alex Stewart	Li (mg/L) Minera Exar
SBH-440	PB-06A	-	537	580
SBH-441	W18-05	-	760	750
SBH-442	W11-06	-	753	750
SBH-443	PB-03A	-	784	772
SBH-444	DL-014	100	565	548
SBH-445	DL-014	200	689	430
SBH-446	DL-014	300	631	464
SBH-447	DL-014	370	564	440
SBH-448	ML-014	100	387	548
SBH-449	ML-014	115	721	449
SBH-450	DL-005	100	763	686
SBH-451	DL-005	200	717	685
SBH-452	DL-005	300	833	696
SBH-453	DL-005	320	979	699
SBH-454	W-05	100	973	686
SBH-455	W-05	200	639	685
SBH-456	W-05	300	375	696
SBH-457	ML-09	100	859	801
SBH-458	ML-09	200	817	559
SBH-459	DL-09	100	676	757
SBH-460	DL-09	200	685	769
SBH-461	DL-09	300	669	681
SBH-462	DL-09	400	626	780

Figure 12.1 Due Diligence Sample Results for Lithium: February 2019



The results for the due diligence sampling were similar in tenor between ASA and the internal Exar laboratories, with the samples from ASA being higher than the Exar labs in 16 of 23 samples. During the on-site interviews one of the hydrogeologists indicated that sample SBH456 was taken at the bottom of an observation well that had drillers mud in it that would have settled at the bottom, because of its density, thus diluting the sample. This is a possible explanation for the difference, the Minera Exar sample had 696 mg/L Li and the ASA sample taken by ACSI had 375 mg/L.

12.4 JUNE 2019 SITE VISIT AND DUE DILIGENCE SAMPLING

Mr. D. Burga collected 4 brine samples from 4 wells during his site visit. 5 samples were duplicate samples taken from the sample storage tent and 4 samples were taken of the standards used by the Exar laboratory. Each sample consisted of two 250 ml plastic bottles. 4 samples were taken from pumping well sites (W11-06, WR-10, W18-23, and W-04A). For the pumping well samples, a valve was opened on the main pipe coming out of the well, a plastic pail was rinsed with brine, filled again and then the brine was used to rinse out each sample bottle before being filled with brine.

The duplicate samples and standard samples were selected from the sample storage tent. It should be noted that the samples are stored on shelves and the area is not temperature controlled in any way. Older duplicate bottles, which have been exposed to colder temperatures for more time, showed evidence of sulphate precipitation. These samples would not be suitable for duplicate analysis.

The standard samples were created at the internal Exar laboratory as elaborated in Section 12.7.

All bottles were brought back to field office where each sample was given a sample code, entered into a log book and identifying well information was removed from the sample bottles with rubbing alcohol. In the case of the duplicates, the old stickers were removed from the bottles and replaced with a new sample number.

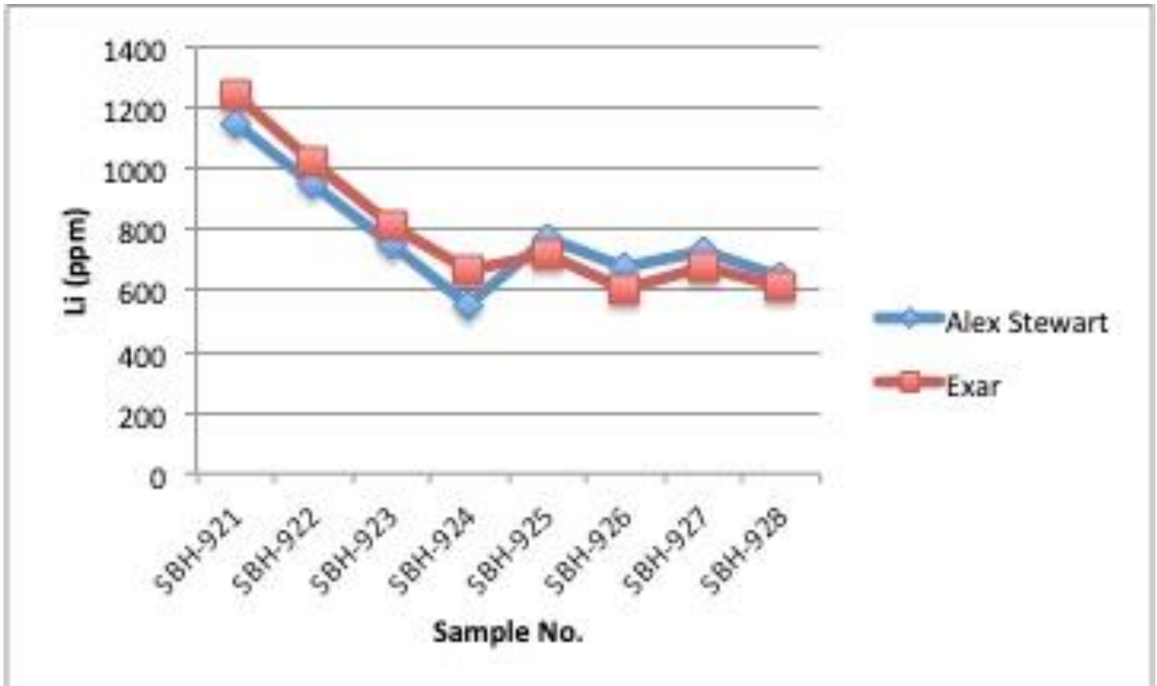
The samples were taken by Mr. Burga directly to Alex Stewart Laboratories in Jujuy for chemical analysis. The samples were analyzed for lithium using and ICP with an OES finish. For Sample SBH-921 and Sample SBH-925, values had not been received and entered into the database at the time of the report.

Results of the site visit due diligence samples are listed in Table 12.2 and presented graphically in Figure 12.2.

TABLE 12.2
RESULTS OF DUE DILIGENCE SAMPLING – JUNE 2019

ACSI Sample No.	Well No.	Depth (m)	Li (mg/L) Alex Stewart	Li (mg/L) Minera Exar
SBH-921	-	-	1	-
SBH-922	-	-	119	126.84
SBH-923	-	-	118	126.84
SBH-924	-	-	116	116.38
SBH-925	-	-	116	-
SBH-926	-	-	1151	1238.00
SBH-927	-	-	948	1027.00
SBH-928	-	-	752	815.00
SBH-929	-	-	553	671.00
SBH-930	W11-06	-	770	716.61
SBH-931	WR-10	-	680	604.18
SBH-932	W18-23	-	727	682.85
SBH-933	W-04A	-	647	615.06

Figure 12.2 Due Diligence Sample Results for Lithium: June 2019



12.5 QUALITY ASSURANCE/QUALITY CONTROL PROGRAM

Minera Exar implemented and monitored a thorough quality assurance and quality control program (QA/QC or QC) for the brine sampling undertaken at the Project over the 2017-2018 period. QA/QC protocol included the insertion of QC samples into every batch of samples. QC samples included one standard, one blank and one field duplicate. Check assaying is also conducted on the samples at a frequency of approximately 5%.

A total of 4,356 samples, including QC samples, were submitted during Minera Exar's brine sampling program at the Project (2017 through the end of 2018), as shown in Table 12.3. A total of 164 check samples were also submitted to an external laboratory for check assaying.

TABLE 12.3
QA/QC SAMPLING

Samples	No. of Samples	Precentage (%)
Blanks	63	1.5%
Standards	618	14.2%
Duplicates	285	6.5%
Normal	3,390	77.8%
Total	**4,356**	**100%**
Check Samples	164	2.51%

12.6 PERFORMANCE OF BLANK SAMPLES

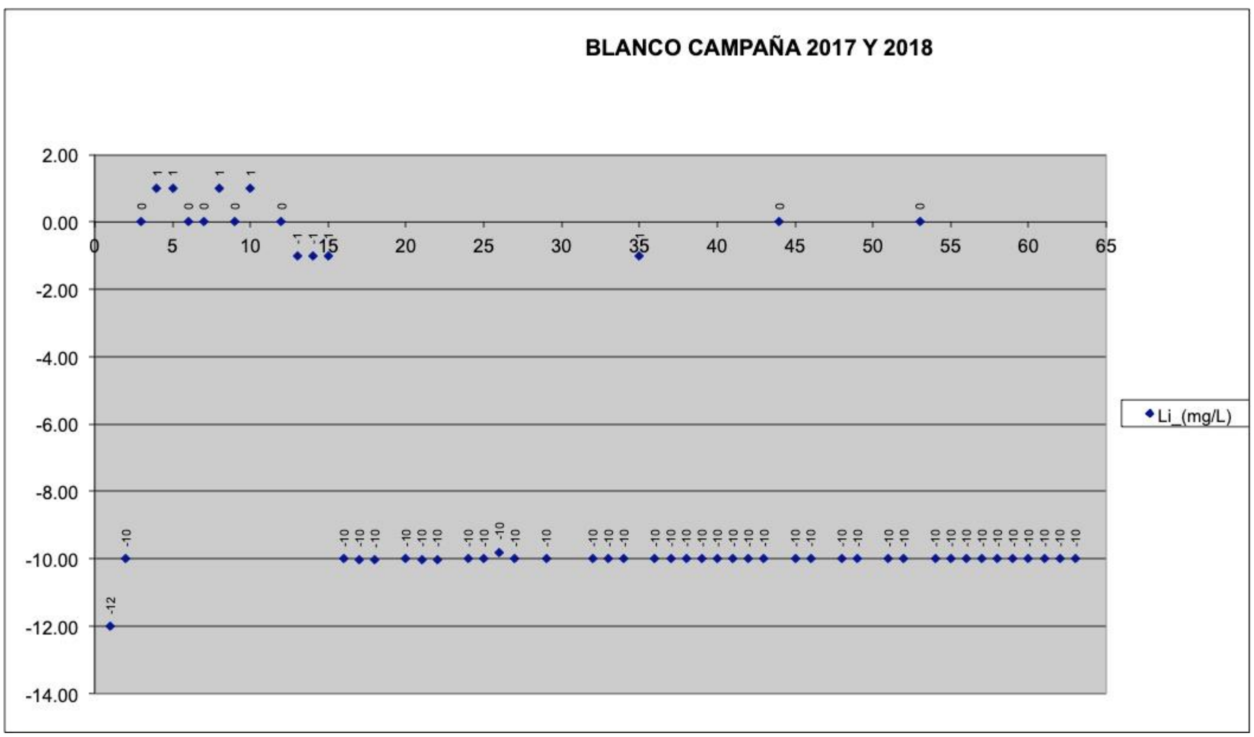
Blank samples were inserted to monitor possible contamination during both preparation and analysis of the samples in the laboratory. The blank material used was initially distilled water and then switched to tap water which is sourced from a fresh water well that contains trace amounts of lithium.

Blank samples should be inserted at an average rate of approximately 1 in 120 samples, with a total of 63 blank samples submitted accounting for 1.5% of the samples submitted. Three of the samples were submitted to ASA with the remainder of the samples submitted to the internal Minera Exar laboratory.

At the time of the site visit there was not a set of Standard Operating Procedures that set tolerance limits for QA/QC samples. It is recommended that the tolerance limit used for the blank samples be 2 times the minimum detection limit (mdl) for the internal Exar AA samples and 10 times the lower detection limit for ASA AA samples (the Exar lab uses AA with a mdl 10 mg/L and ASA uses AA with a mdl 1 mg/L). It should be noted that at times the Exar laboratory used 10, 1, 0 and -10 mg/l as the lower limit depending on dilution used. ASA used -1 mg/L denoting dilution at the sample preparation stage.

The results of the blank sampling are shown graphically in Figure 12.3. There were no failures for the blank samples.

Figure 12.3 Performance of Lithium Blank Samples



12.7 CERTIFIED REFERENCE MATERIALS

Certified Reference Materials ("CRM”) are used to monitor the accuracy of a laboratory. Minera Exar did not use CRM for their QA/QC sampling program. Standards (“Patrons”) were prepared at the uncertified on-site laboratory by Exar staff and were submitted at an average frequency of 1 in 7 samples. These Patrons were prepared by taking high-grade lithium brines and diluting it to prepare high, medium, and low-grade samples. These Patrons were prepared in 50 L batches and when they were used up a subsequent batch was prepared. The first round of Patron samples were analyzed solely at the Exar laboratory. The second and third rounds of Patron samples were analyzed at both the Exar and ASA laboratories. At the time of this report, the third round of Patron samples was being used. A total of 545 standards were used during the 2017-2019 drilling campaigns. The standards/Patrons results are summarized in Table 12.4.

TABLE 12.4
RESULTS OF DUE DILIGENCE SAMPLING

Round 1 – Created March 2017			
Name	**Target Value (mg/L)**	**Lab Exar Value (mg/L)**	**Avg of All Samples (mg/L)**
Patron A	1,500	1345	1382
Patron B	1,100	1144	1163
Patron C	850	876	894
Standard A	550	579	615
Round 2 – Created April 2018			
Name	**Target Value (mg/L)**	**Lab Exar Value (mg/L)**	**ASA Value (mg/L)**
Patron AA	1200	1151	1121
Patron BB	1,000	923	933
Patron CC	750	751	740
Patron DD	540	523	542
Round 3 – Created October 2018			
Name	**Target Value (mg/L)**	**Lab Exar Value (mg/L)**	**ASA Value (mg/L)**
Patron 1	540	528	-
Patron 2	770	804	-
Patron 3	1000	1152	-
Patron 4	1200	1296	-

For the purposes of the QA/QC review, all of the Exar samples for each Patron were averaged to find a mean value and standard deviation. Patrons were submitted randomly in the sample stream and were plotted as a different series to check bias with regards to the Exar results. The results for each Patron are shown graphically in Figure 12.4 through to Figure 12.11.

Figure 12.4 Performance of Patron A

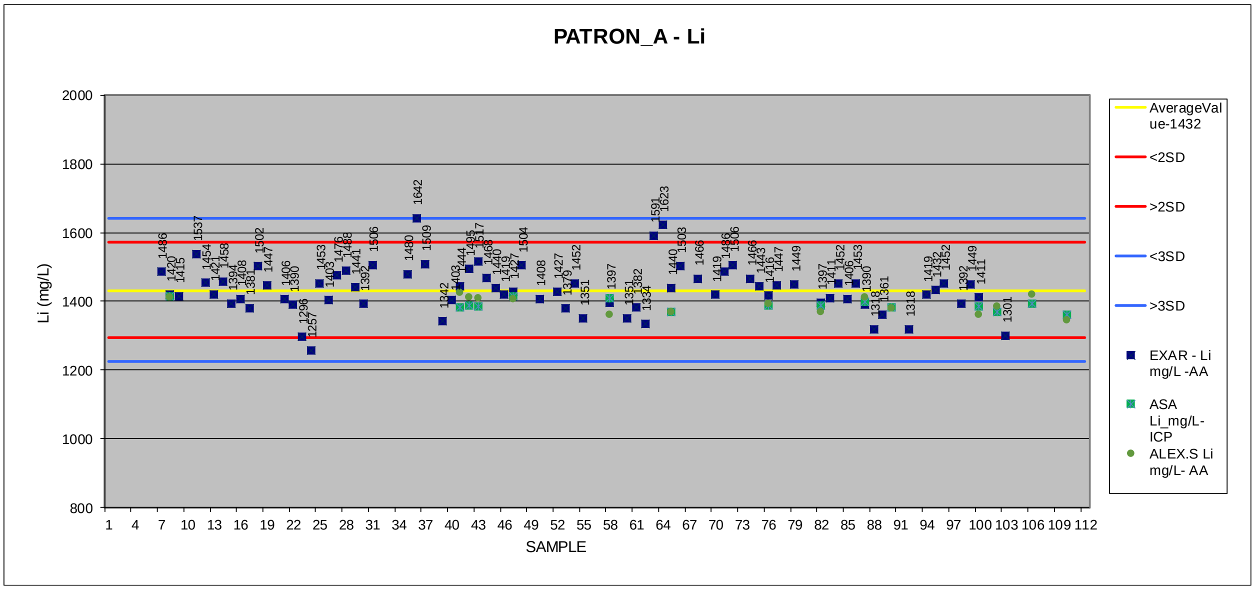


Figure 12.5 Performance of Patron B

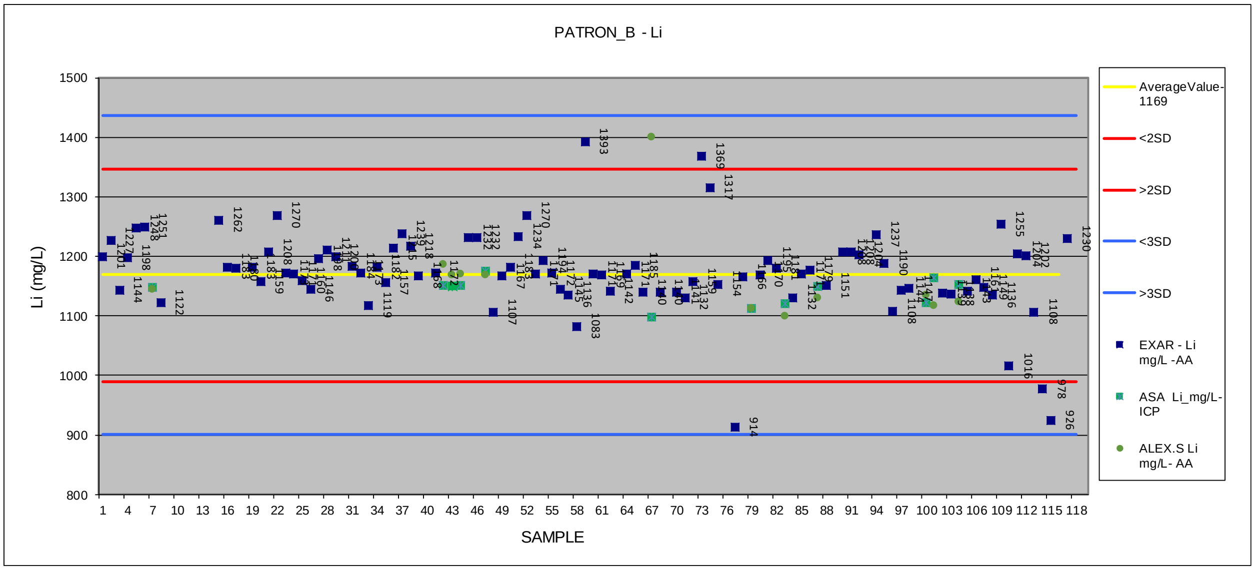


Figure 12.6 Performance of Patron C

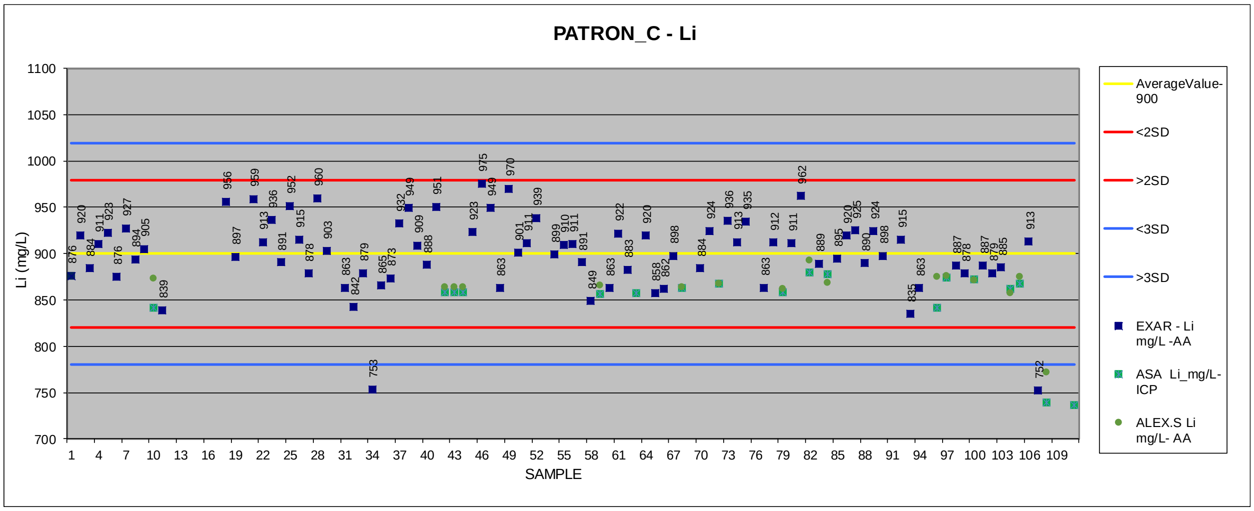


Figure 12.7 Performance of Estandar A

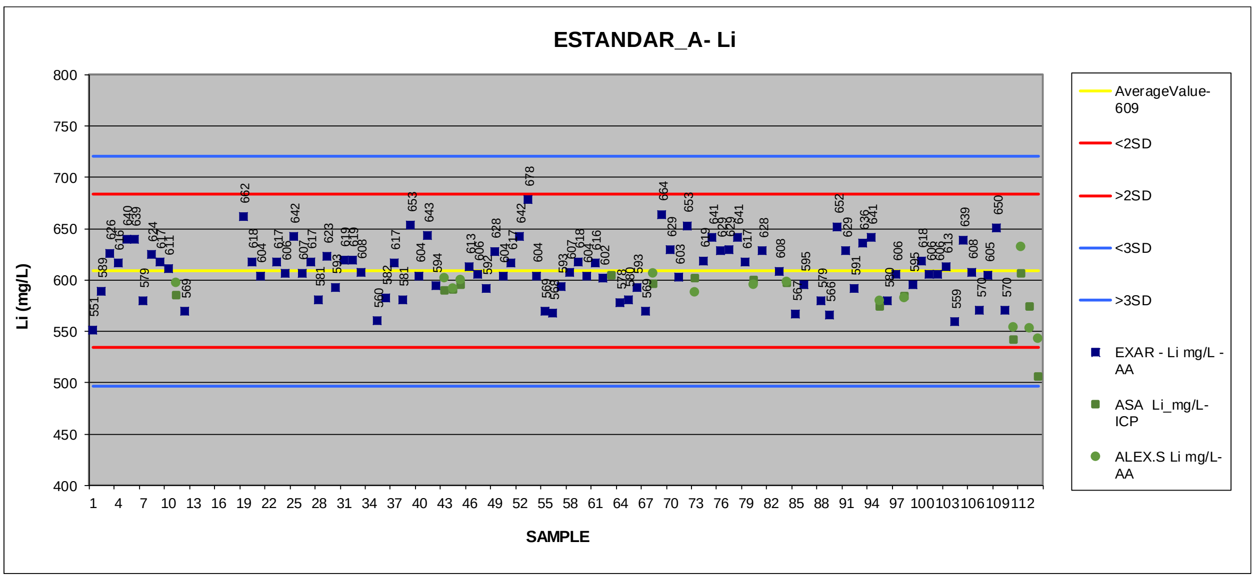


Figure 12.8   Performance of Patron AA

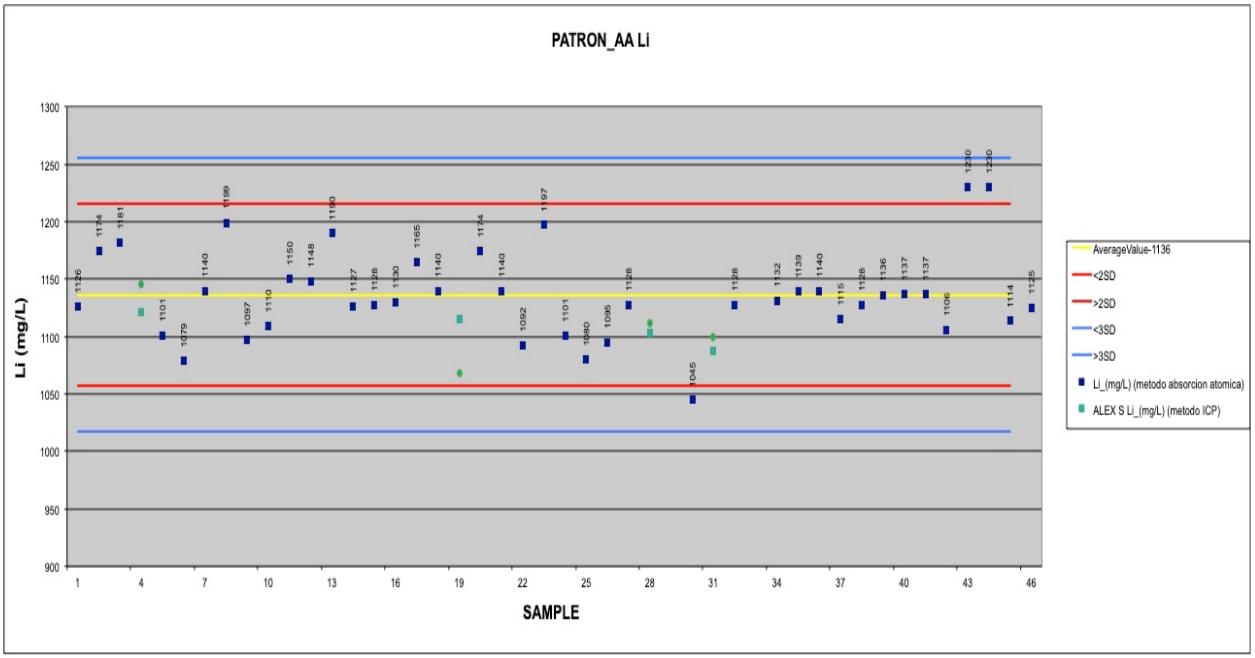


Figure 12.9   Performance of Patron BB

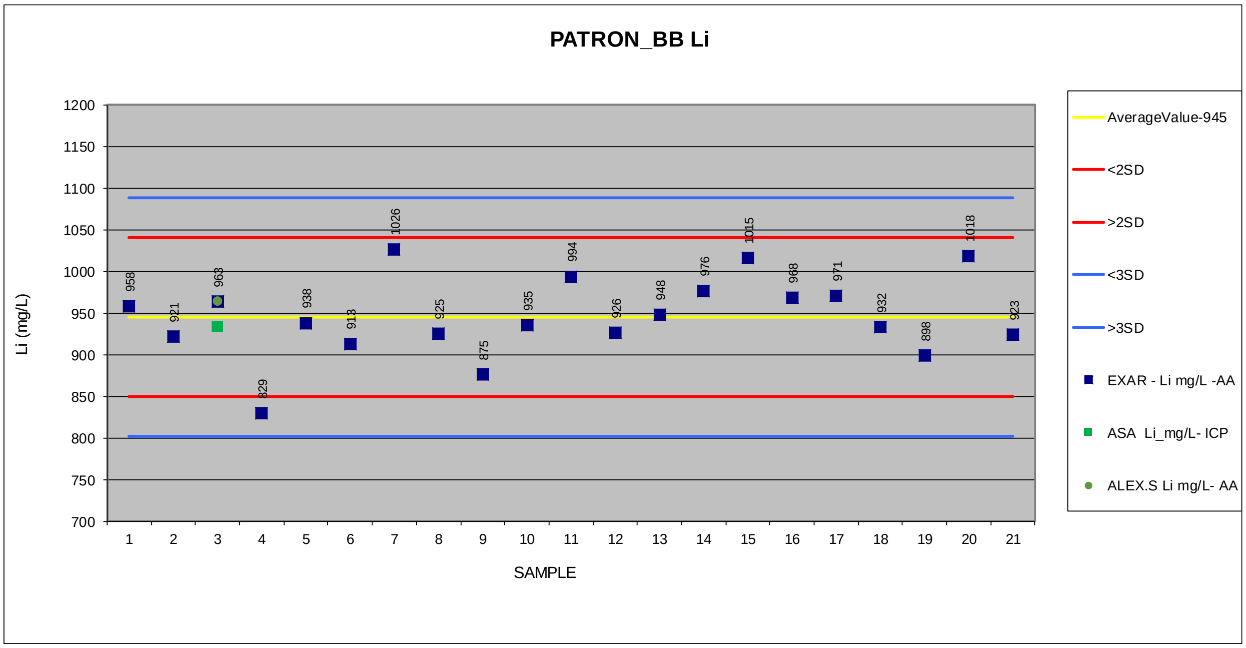


Figure 12.10 Performance of Patron CC

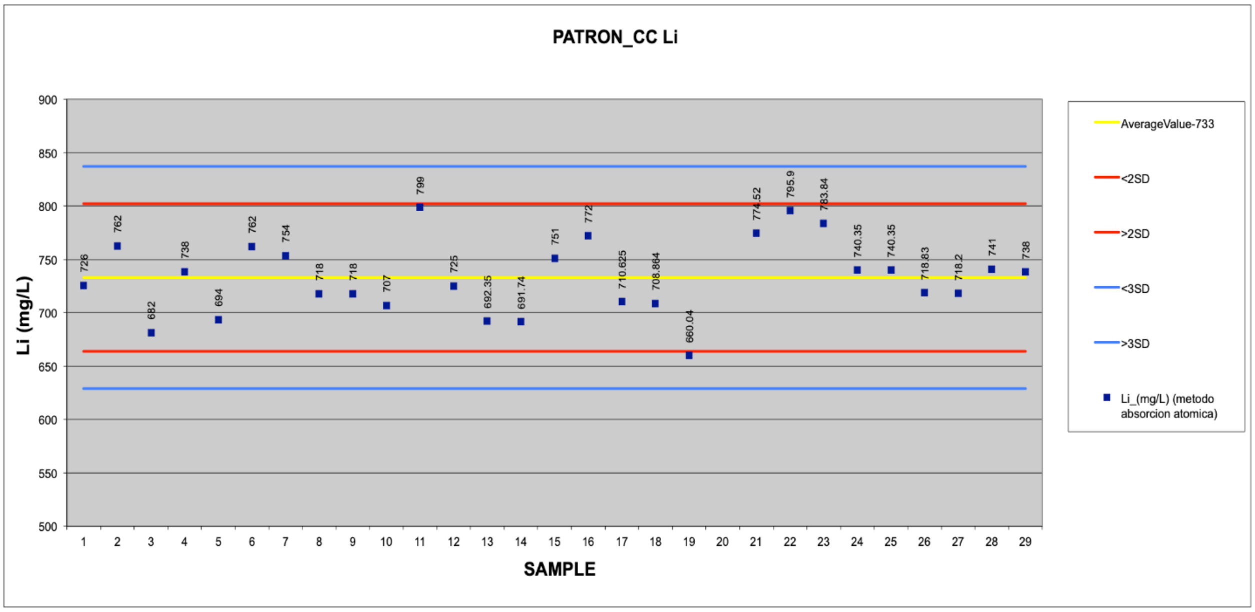
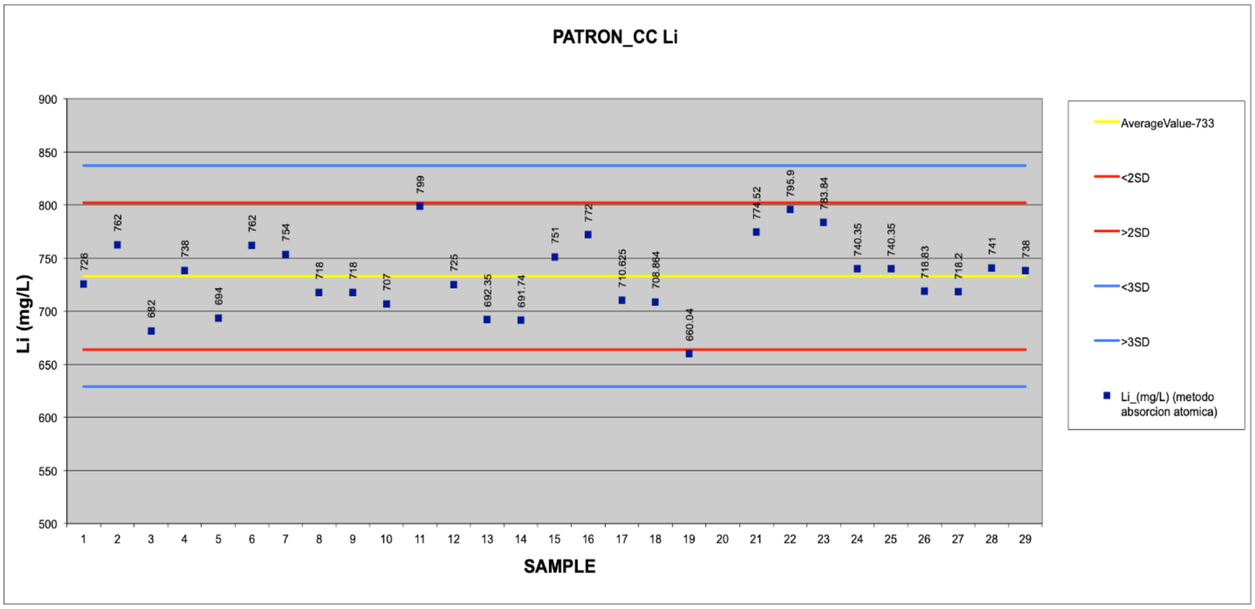


Figure 12.11 Performance of Estandar AA



Although there were no Standard Operating Procedures in place, a failure should be considered a result that is greater than +/- 3 standard deviations. None of the results for the standards were outside of this range indicating consistent results from the Exar laboratory. As seen in Figure 12.4, Figure 12.5, Figure 12.6, and Figure 12.8, the analytical results for lithium from Alex Stewart, for both AA and ICP, were slightly below the average.

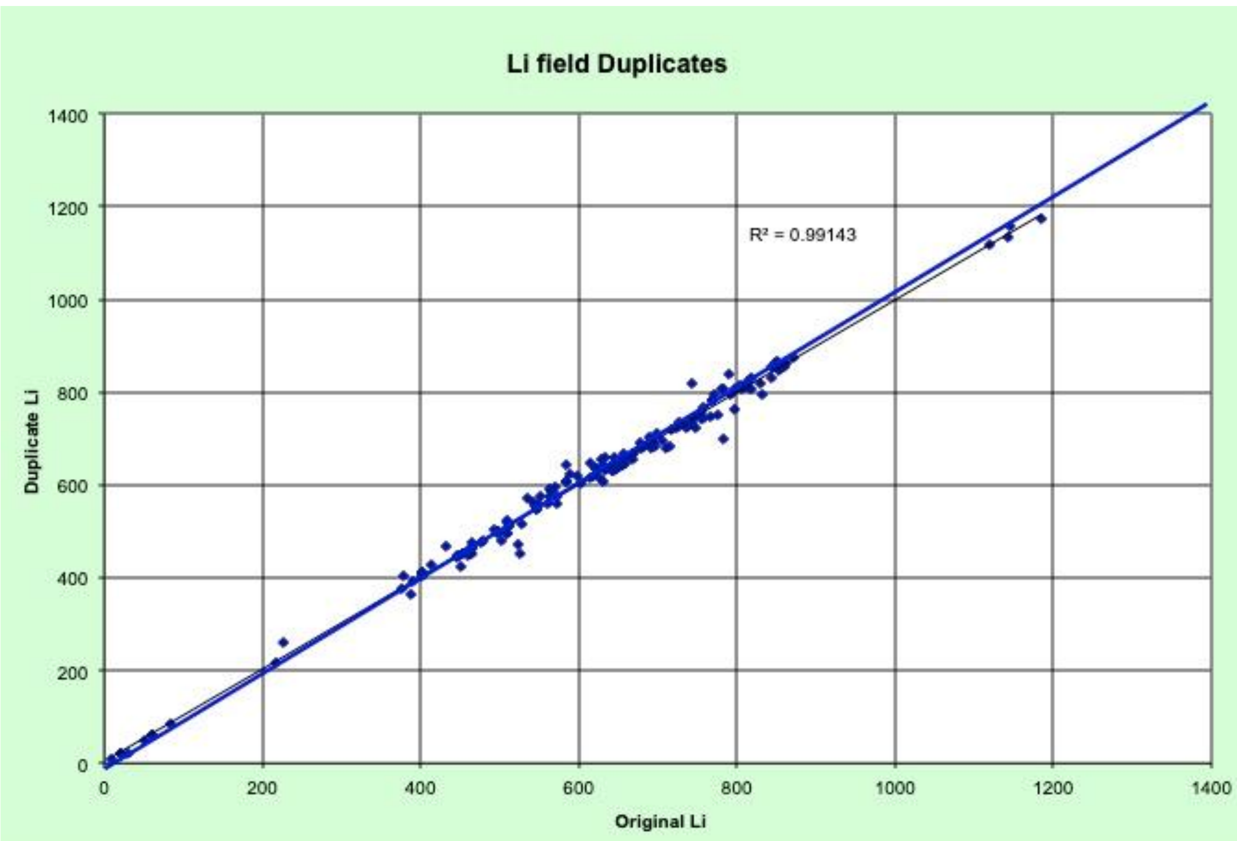
12.8 DUPLICATES

As part of their regular QA/QC program, Minera Exar routinely used duplicate samples to monitor potential mixing up of samples and data precision. Duplicate samples were collected in the field by Minera Exar personnel and preparation involved filling an additional three bottles of brine at the same depth. The original and duplicate samples were tagged with consecutive sample numbers and sent to the laboratory as separate samples. Duplicate samples were collected at a rate of approximately 1 in 20 samples.

A total of 285 duplicate samples were taken representing 6.5% of total samples.

The results of duplicate sampling are shown graphically in Figure 12.12. Data precision was strong with a correlation coefficient value of 0.99143.

Figure 12.12 Duplicate Samples – Minera Exar Laboratory



12.9 CHECK ASSAYS: EXAR VS. ALEX STEWART

Minera Exar routinely conducted check analyses at ASA to evaluate the accuracy of the Exar laboratory.

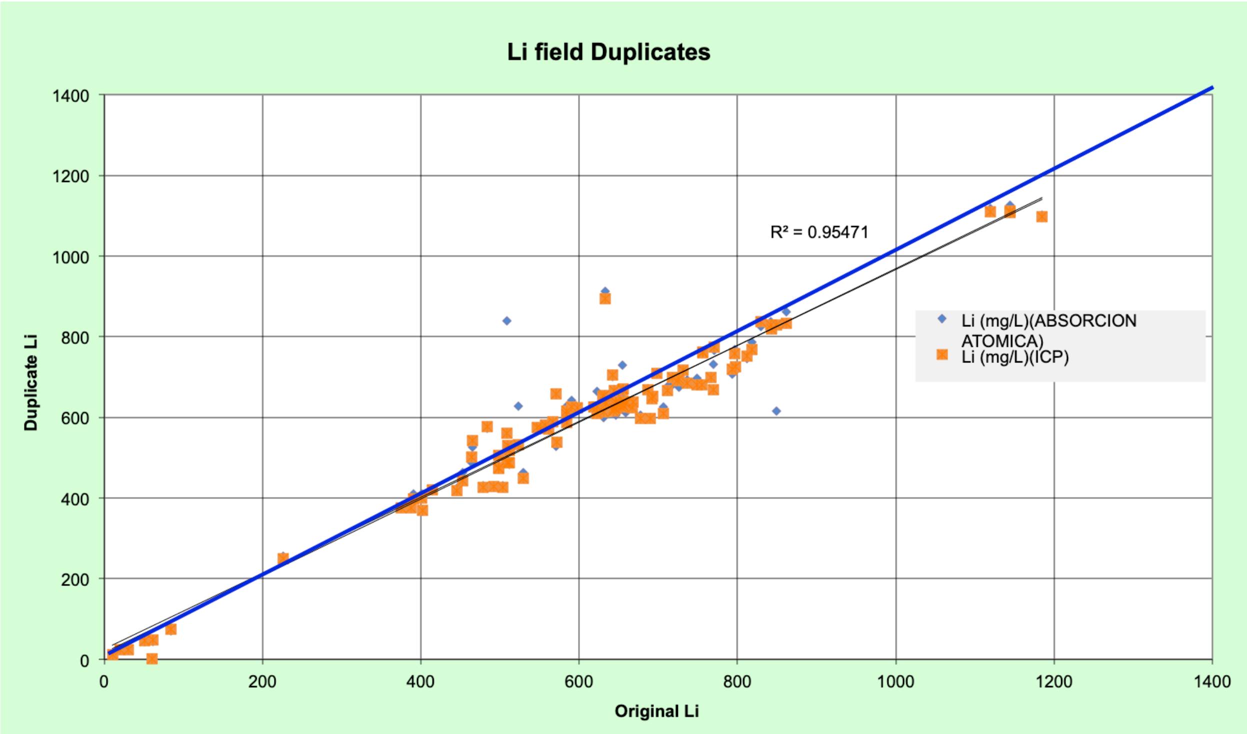
Duplicate samples were collected and sent to a second laboratory to verify the original assays and monitor any possible deviation due to sample handling and laboratory procedures. Minera Exar uses the ASA laboratory in Jujuy, Argentina, for check analyses.

A total of 105 check samples were sent to a third party laboratory for check analysis, equating to approximately 2.5% of the total samples taken during the sampling program.

Correlation coefficient is high (0.95471) for Lithium, showing strong overall agreement between the original Exar analysis and the ASA check analysis.

The results of the check sampling program are shown by way of scatter diagrams in Figure 12.13.

Figure 12.13 Check Assays – Minera Exar Laboratory Vs. ASA Laboratories



12.10 CONCLUSIONS AND RECOMMENDATIONS

Mr. David Burga has personally met, and had technical discussions with, most of the technical experts working on the Project on behalf of LAC. These individuals are competent professionals, with experience within their respective disciplines. Their interpretations demonstrate a conservative approach in assigning constraints on the estimate, which increases the technical strength of the results.

The field sampling of brines from the pumping tests is being done to industry standards. The quality control data based upon the insertion of standards, field blanks and field duplicates indicate that the analytical data is accurate, and the samples being analyzed are representative of the brine within the aquifer.

The following recommendations are made with regards to QA/QC procedures:

- Proper certified lithium standards, with values comparable to the grades found on site, be sourced;
- Standard Operating Procedures should be implemented that lay out the frequency of QA/QC sample insertion and how samples should be treated in the case of a failure of a QA/QC sample;
- A dedicated person for each turn should be responsible for monitoring incoming data from Alex Stewart and maintaining the project database.
- Analytical samples should be submitted to Alex Stewart or another internationally accredited laboratory;
- Distilled water should be used for blanks as freshwater in the area can contain trace amounts of lithium;
- If the Patrons made at the Exar lab continue to be used, they should go through round robin testing at external laboratories to obtain a more accurate value; and
- The Exar laboratory should implement ISO procedures and be subjected to external audits to maintain quality control.

13.0 MINERAL PROCESSING AND METALLURGICAL TESTING

In the 2012 Feasibility Study, LAC developed a process model for converting brine to lithium carbonate based on evaporation and metallurgical testing. The proposed process follows industry standards:

- Pumping brine from the aquifers;
- Concentrating the brine through evaporation ponds; and
- Taking the brine concentrate through a hydrometallurgical facility to produce high-grade lithium carbonate.

The 2012 process model employed proprietary, state-of-the-art physiochemical estimation methods, and process simulation techniques for electrolyte phase equilibrium. From the execution of the Shareholders Agreement between LAC and SQM in 2016 until October 2018, SQM advanced the process engineering work, employing their proprietary technology and operational experience. In 2018, SQM left the joint venture and the project and LAC and Ganfeng Lithium reviewed the process and design of the plant for 40,000 tpa output with an engineering consulting firm. The revised process work is reflected in this current Feasibility Study. The basis of the anticipated process methods has been tested and supported by laboratory evaporation and metallurgical test work.

Multiple additional tests have been conducted in different qualified laboratories and in pilot facilities located at the Project site to develop a brine processing methodology. Testing objectives included:

- Determine the evaporation path as the brine gets more concentrated and determine the type of salts which are formed during the process.

- Determine the amount of CaO required to accomplish Mg, SO_4 and B reduction in the evaporation process.

- A trade off between yield and the maximum allowable and attainable lithium concentration throughout the evaporation train.

- Complete the testing and design of the Boron solvent extraction facility with a performance guarantee supplied by the equipment vendor.

- Determine the reactant consumption and conditions for brine purification.

- Investigate ion exchange equipment, resins and operating conditions for impurity removal.

- Specify the KCl removal system in terms of design and operating conditions.

- Determine the carbonation conditions for lithium carbonate to produce high purity product.

The following outlines the testing work completed during the previous 2012 Feasibility Study and current updated progress that is the basis for this revised Technical Report.

13.1 POND TESTS – UNIVERSIDAD DE ANTOFAGASTA, CHILE

In late 2010 and early 2011, Universidad de Antofagasta (Chile) conducted evaporation testing on raw, CaO-treated and $CaCl_2$-treated brines. $CaCl_2$ was used in addition to CaO in order to determine the most cost-effective removal of sulfate ions. A temperature-regulated and air flow-regulated evaporation chamber was used (Figure 13.1). The brine is contained in the tubs in the base of the chamber, while heat lamps (shown top left) are used to simulate solar radiation. Dry, cool air is circulated through the chamber using an electric fan to simulate the environment expected at the site. Digital thermometers are shown in the pan. Samples of the brine and salt were taken to determine the change in salt precipitated from the brine during natural evaporation. These samples were analyzed for composition.

The site is located at more than 4,000 m above sea level. To simulate the effect of lower air pressure, a series of dry air, negative pressure evaporation tests were carried out in parallel with the evaporation pans. The negative pressure test apparatus is shown in Figure 13.2. These tests were done to simulate the effect of brine evaporation at elevation under natural conditions.

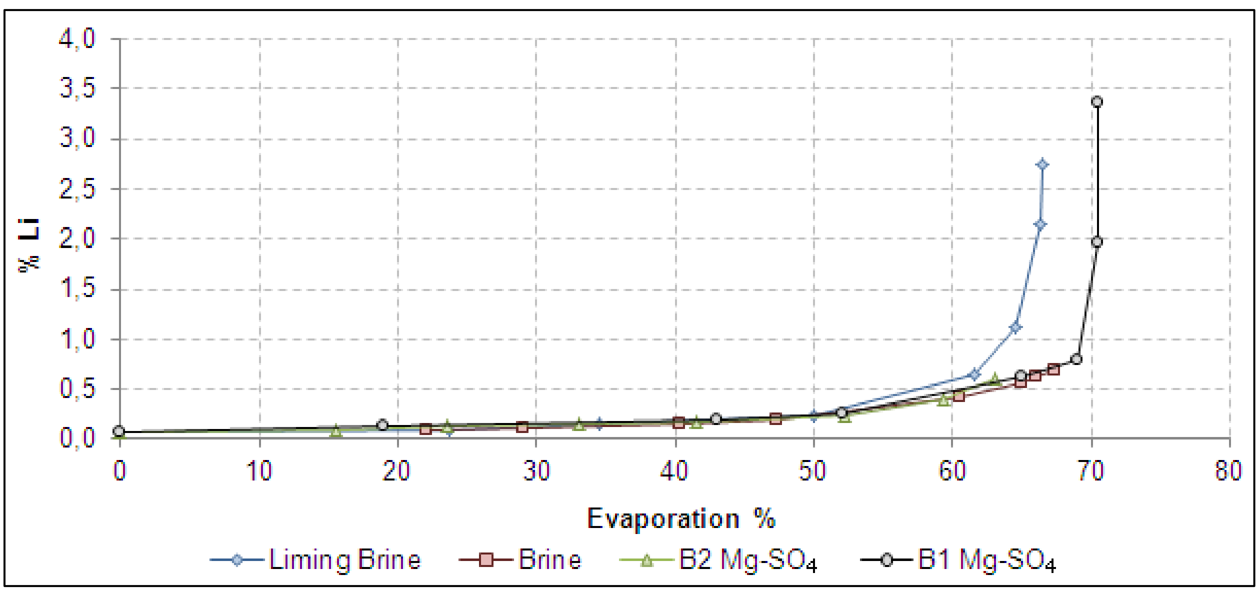
Figure 13.1 Evaporation Pans and Lamps

Test results demonstrated that it is possible and cost effective to obtain a concentrated brine through an evaporation process by treating the brine with CaO liming process alone to control Mg levels while reducing SO_4 and boron levels. The cost of $CaCl_2$ per tonne of sulfate removed was significantly higher, and the reduction of other ions by precipitating double salts was not more cost effective than removal later in the process.

Figure 13.2 Dry Air Evaporation Tests

Figure 13.3 shows the change of Li ion concentration in the brine as water is evaporated in an example test. The y-axis is the weight percent lithium, while the x-axis represents the percentage of the initial brine mass evaporated. In brines treated with either CaO and $CaCl_2$, concentrations close to 4% Li were achieved with minimal lithium loss.

Figure 13.3 Li Concentration Changes in the Brine During the Evaporation Process



Results suggested treatment with CaO alone (i.e. liming) is ideal. CaO has a lower cost than $CaCl_2$, and the increase in brine pH removes a portion of the Mg at the same time. Limed brine precipitated Sylvinite with KCl (potash) concentrations up to 20%. This suggests that fertilizer-grade potash could be produced by floatation at Cauchari (although potash production is not contemplated at this time). The precipitation of KCl and NaCl from solution purifies the brine naturally during evaporation and reduces the cost of operation and equipment in the processing plant after evaporation in the ponds.

Testing of the CaO-treated brine resulted in a 60% reduction in sulfate ions. This reduction in sulfate ion is sufficient to produce concentrated lithium brines by natural solar evaporation and $CaCl_2$ treatment is not necessary.

13.2 TESTS – MINERA EXAR, CAUCHARI SALAR

13.2.1 Salar de Cauchari Evaporation Pan and Pilot Pond Testing

To validate the bench scale tests obtained at Universidad de Antofagasta, Chile, and obtain brine evaporation rate data at the site, pilot ponds and Class A evaporation pans were installed at the site. These ponds and pans are still under operation to allow correlation of the Class A pan, brine pan and pilot pond test data and determine the scale-up factor of the full-scale ponds.

The first seven months of evaporation pan testing at the Salar de Cauchari pilot facility:

- Validated the composition of Cauchari brine exposed to the Project site seasonal environmental conditions;
- Obtained concentrated brine for additional pilot and bench scale testing; and
- Obtained precipitated salts to determine the entrainment of brine in the salt during the different salt regimes precipitated during concentration.

A total of 6 pilot ponds, pre-concetration, liming, settling, and concentration ponds, totalling 11,180 m^2 were constructed as well as the liming equipment for treating the brine. Pre-concentration, liming, settling, and concentration ponds were represented. Over 20,000 liters of 1% Li brine was generated over a 7-month period. These ponds continue to operate and provide material for pilot testing at the site and with equipment vendors. The pilot ponds can be seen in Figure 13.4

These ponds were installed with liners that consist of a geotextile underlay overlain by a polyethylene waterproofing liner to minimize the leakage from the ponds. Samples of the brine and salt are taken regularly and analyzed for composition and brine entrainment in the salt. This validates the process model used for the ponding operation and allows for the estimation of the shape factor for the full-scale ponds.

13.2.1.1 Pond Pilot Testing

- Validated the continuous operation of evaporation ponds;
- Provided data for all seasonal environmental effects (wind, temperature, rain, etc.);
- Provided concentrated brine for the purification pilot plant;
- Developed the operating philosophy of the ponds and lime system; and
- Trained the staff (engineers and operators) who will work in the commercial operation.

Salar testing results were consistent with prior laboratory and mathematical model results. The test data has been used to update the mathematical process model and ensure accurate design information. Minera Exar's project site evaporation and analytical results were independently validated by testing at ASA (Mendoza, Argentina).

The pond process performance improved when liming was performed after pre-evaporation and 10% or more excess lime was used. It was verified that the use of $CaCl_2$ was not necessary because the Ca from the CaO reduced sulfate ions sufficiently to avoid downstream $LiKSO_4$ precipitation at a lower operating cost than $CaCl_2$ addition.

Figure 13.4 Current Pilot Ponds

13.2.2 2017 Evaporation Tests

In 2017, Exar completed a 35-month evaporation test program with the intention to define the relation of brine evaporation to water evaporation. This data was obtained from the brine pan and Class A water pan data observed between June 2013 and April 2016.

Figure 13.5 presents the monthly evaporation rate of the brine during the year and Figure 13.6 presents the monthly evaporation rate of the water. Table 13.1 displays the monthly evaporation ratio of brine to water. The minimum brine evaporation rate occurs in June at 3.77 mm/day for the bottom quartile of observed test data. The minimum median evaporation rate for brine observed is 5.00 mm/day in June while November has the highest median evaporation rate of 9.8 mm/day. Comparing this to the original evaporation used to engineer the ponds of 2.54 mm/day annual average evaporation for brine in the full-scale ponds results in an increase in pond productivity per evaporative area. When applying a conservative pond shape factor of about 0.65 to the 8.2 mm/day median brine evaporation observed, the effective pond productivity for 1,200 Ha of ponds roughly doubles versus the originally estimated evaporation used in the prior DFS (Burga, et al 2017). Mass balances on the full-scale operating pond segments confirm this shape factor.

Figure 13.5   Brine Evaporation

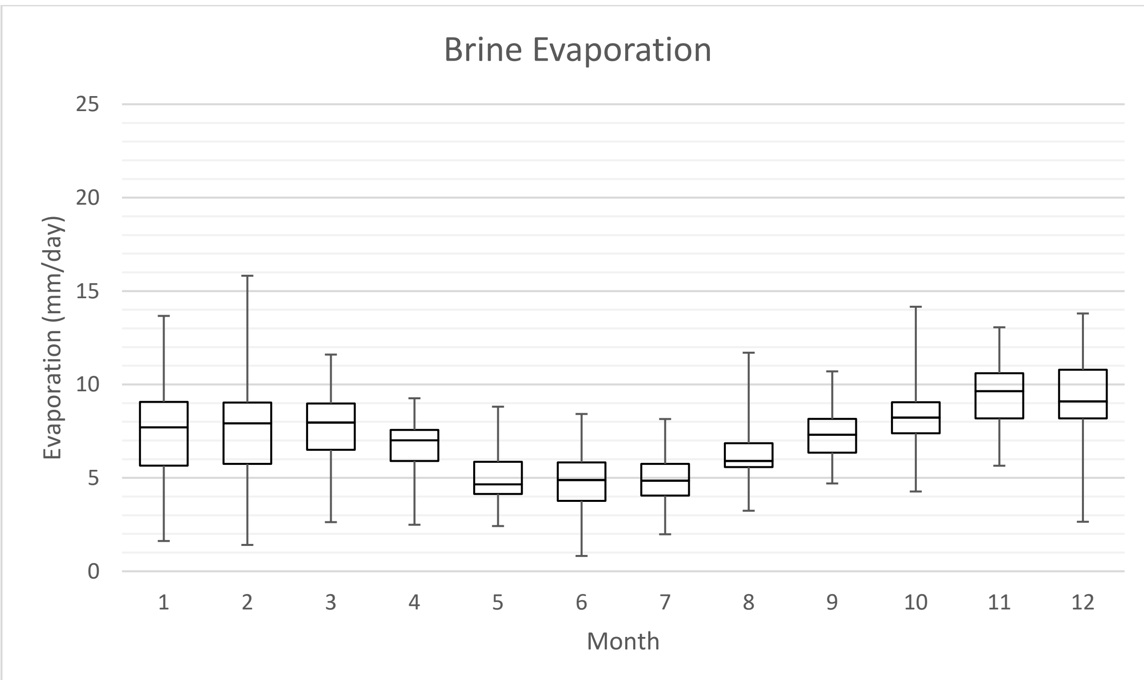


Figure 13.6 Water Evaporation

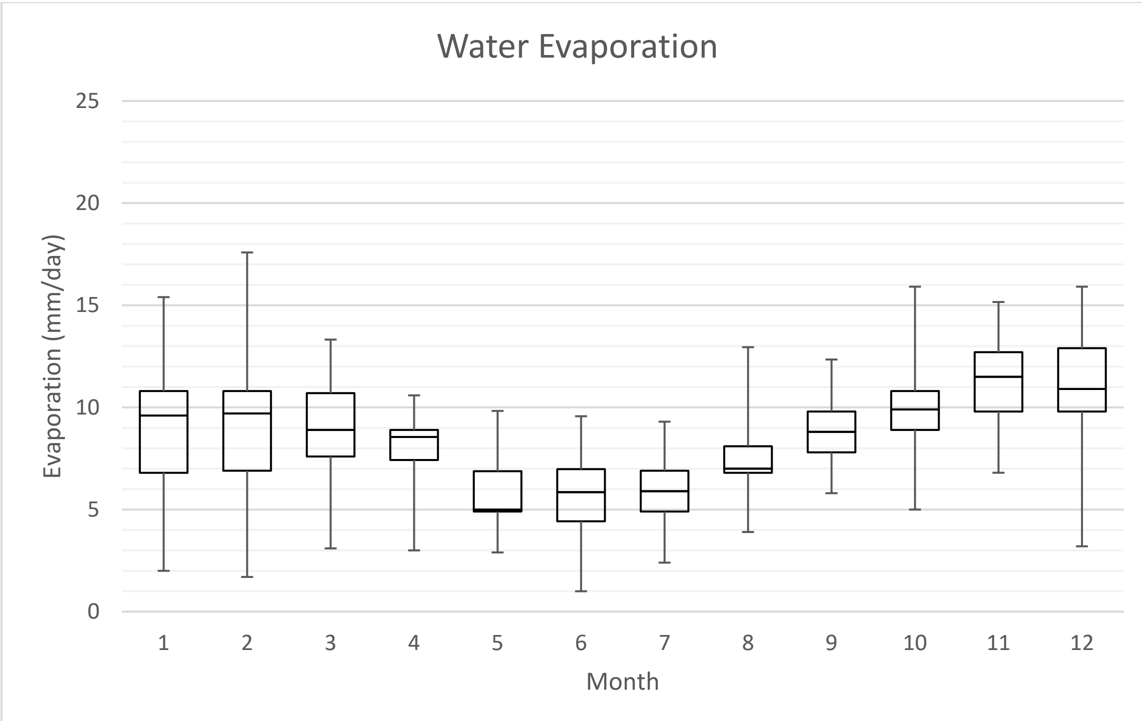


TABLE 13.1
MONTHLY EVAPORATION RATIO

Monthly Evaporation ratio												
	2017											
Month	1	2	3	4	5	6	7	8	9	10	11	12
Evaporation ratio brine/w	84%	82%	85%	84%	86%	84%	83%	84%	82%	83%	83%	83%

As a result of this test evaluation, the factor for water to brine design was changed from the assumed value of 0.7 to an average of 0.84.

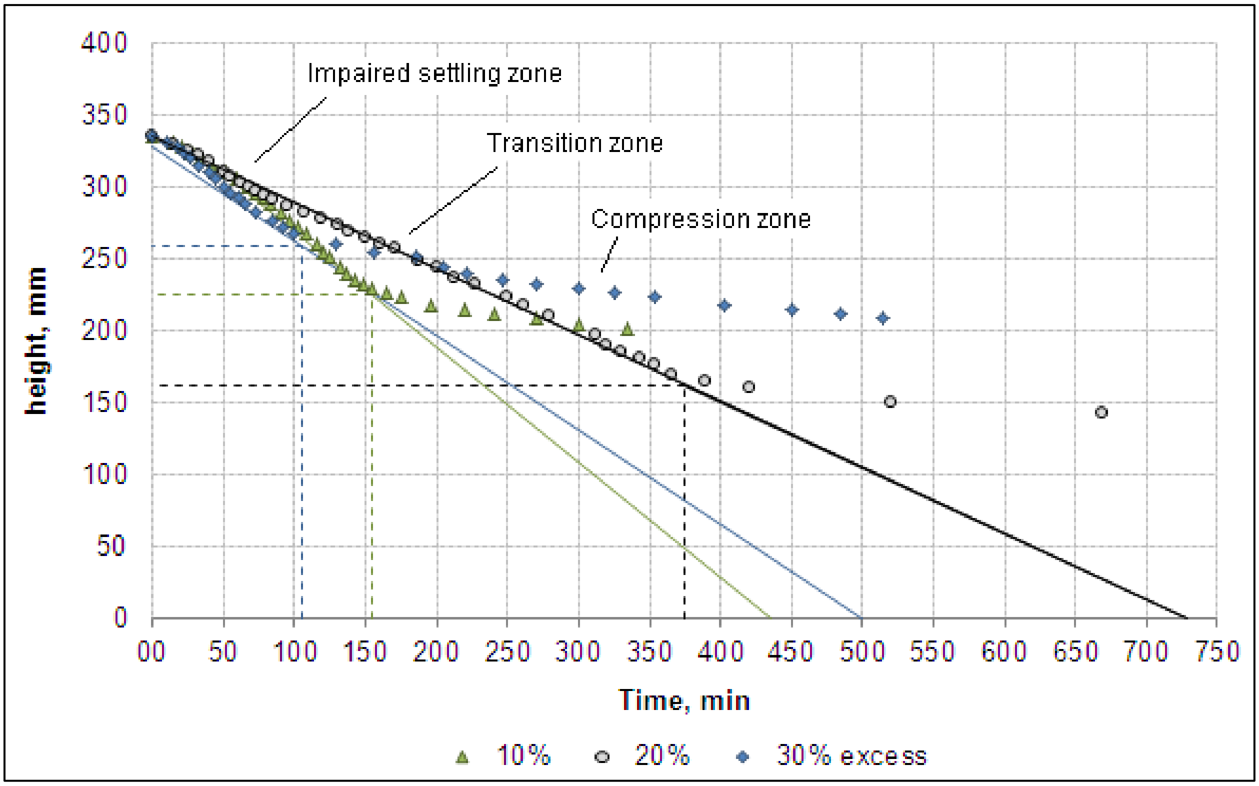
Detailed simulations were then carried out using brine chemistry observed in the test ponds and pans, and with the observed rainfall and evaporation data to determine the annual productivity of the ponds. Currently, the operations team at Minera Exar is working on detailed operating strategy to ensure a robust and safe operation based on ongoing mass balance calculations on the ponds and responses to actual weather / brine conditions.

13.2.3 Liming Tests – Minera Exar, Cauchari Salar

Lime ratio, sedimentation, and flocculent performance testing with locally-sourced CaO were performed at Minera Exar's Laboratory. Testing was completed in order to determine the required excess CaO (the liming operation) and residence time at an intermediate location in the ponds to reduce Mg, Ca, SO_4 and boron in the brine entering the Purification and Carbonation Plant.

Figure 13.7 shows the sedimentation rate data from example tests. The time is shown on the x-axis, while the y-axis shows the depth of solids during natural settling. Three tests are shown here with a 10% (green triangle), 20% (green circle) and 30% (blue diamond) excess of CaO added to the brine. The excess is estimated based on the mass of magnesium in the initial brine. The solid lines plotted on the diagram is the initial settling rate which is used to design settling equipment.

Figure 13.7 Sedimentation Rate of Limed Pulps with Different Amounts of Excess Lime



The lime ratio required to precipitate of 99.6% of Mg ions and 60% of SO_4 ions was utilized for cost estimation. Testing is presently underway at vendors to design the thickener and filters for downstream processing.

13.3 SOLVENT EXTRACTION TESTS – SGS MINERALS AND IIT, UNIVERSIDAD DE CONCEPCIÓN

Solvent extraction (SX) bench tests were performed at SGS Minerals in Lakefield, Canada, and Instituto de Investigaciones Tecnológicas (Technology Investigations Institute) of the Universidad de Concepción (ITT).

This testing determined:

- The most effective organic reagents for the extraction of boron from the brine;
- The pH effect on the extraction of boron;
- Extraction isotherms for extraction and re- extraction required in the project;
- The extraction and re-extraction kinetics in the system;
- The phase separation rate at two temperatures previously defined; and
- The required number of extraction and re-extraction stages.

Typical brine feed to SX is shown in Table 13.2.

TABLE 13.2 **COMPOSITION OF THE BRINE USED FOR TESTING SX**							
Li (g/L)	**B (mg/L)**	**Ca (mg/L)**	**K (g/L)**	**Na (g/L)**	**Mg (mg/L)**	**SO_4 (g/L)**	**pH**
10.5	5,565	266	32.3	65.4	< 0.02	26.0	11

Several organic extrant formulations were tested targeting boron removal over 97%.

Tests at both institutions showed that the extraction process should be performed at pH ≤ 4, and re-extraction of the extractant should occur at basic pH. The process uses HCl to adjust the brine pH for extraction, and a solution of NaOH for re-extraction of the boron from the organic mixture.

Figure 13.8 and Figure 13.9 show the isotherms in a McCabe-Thiele diagram. These diagrams have been used to determine the number of extraction and re-extraction steps. In Figure 13.8, the x-axis is the boron concentration in the aqueous phase, while the y-axis is the concentration of boron in the organic phase during extraction. In Figure 13.9, the x-axis is the boron concentration in the organic phase, while the y-axis is the boron concentration in the aqueous phase during re-extraction. The bold, straight line is the operating line for the proposed equipment, while the thin, stair-steps are the individual operating stages. Perfect extraction efficiency was not assumed to design the equipment to develop a realistic sizing.

Figure 13.8 Extraction Isotherm at 20ºC Using Mixed Extractants

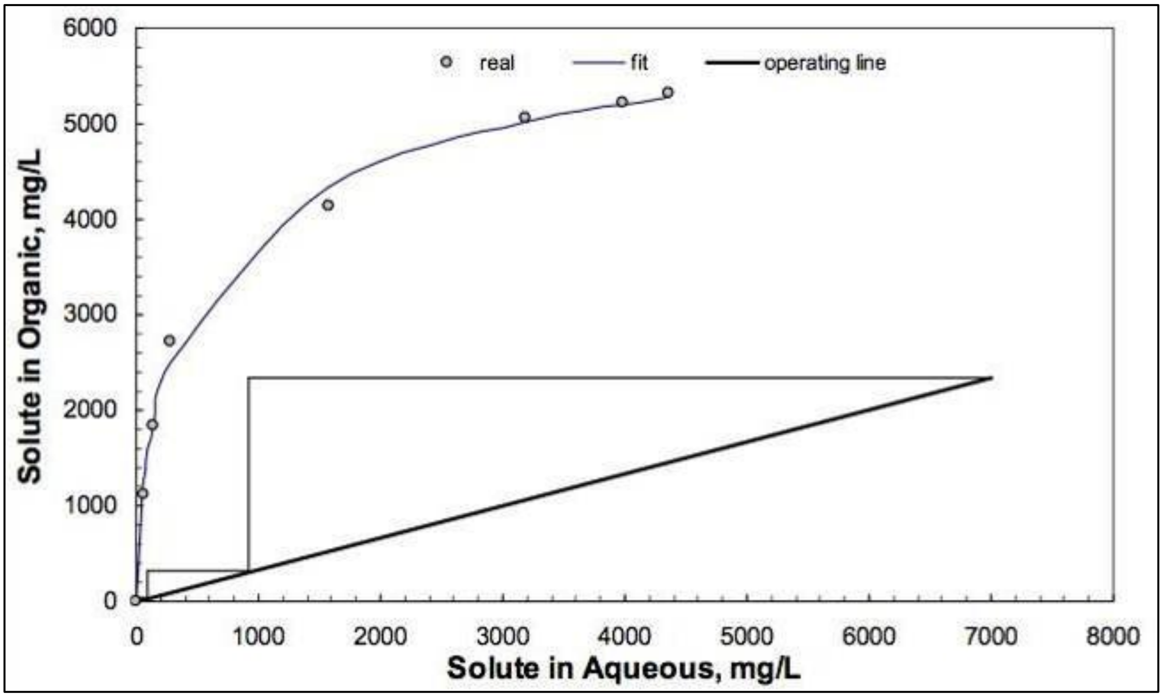
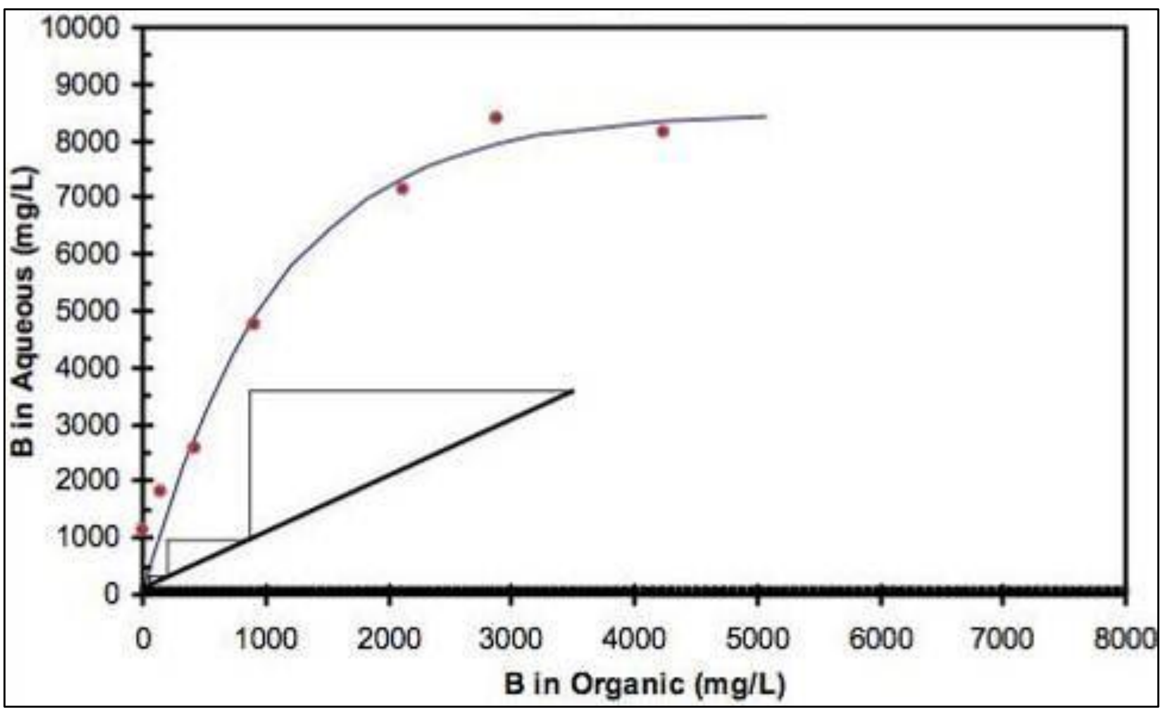


Figure 13.9 Re-extraction Isotherm at 20ºC Using Mixed Extractants



13.4 CARBONATION TESTS – SGS MINERALS (CANADA)

Carbonation tests were conducted by SGS Minerals on boron-contaminated brine.

The following tests were conducted:

- Removal of remaining Mg using NaOH solution;
- Removal of remaining Ca using a solution of Na_2CO_3; and
- Carbonation reaction of Li using Na_2CO_3 solution to precipitate Li_2CO_3.

Differing reagent dosage, residence time, and temperatures were investigated. NaOH was found to be effective to remove the remaining Mg, and careful control of the Na_2CO_3 solution was required to remove the Ca without loss of Li. The test results of these carbonation tests were used to set the temperature, residence time and dosage of reagent ranges for the pilot plant tests.

13.5 PILOT PURIFICATION TESTING – SGS MINERALS

SGS Minerals piloted removal of contaminants and lithium carbonate production. The pilot program used 10,000 liters of concentrated brine obtained from the Salar de Cauchari pilot pond system. The results were used for plant design in this study. The pilot plant flowsheet includes solvent extraction for B removal, regeneration of solvent, removal of the Ca and Mg impurities, and lithium carbonate precipitation and washing.

The main objectives of the pilot plant were to:

- Test the continuous process developed from bench testing; and

- Validate and obtain parameters and design criteria for the development of the industrial plant engineering.

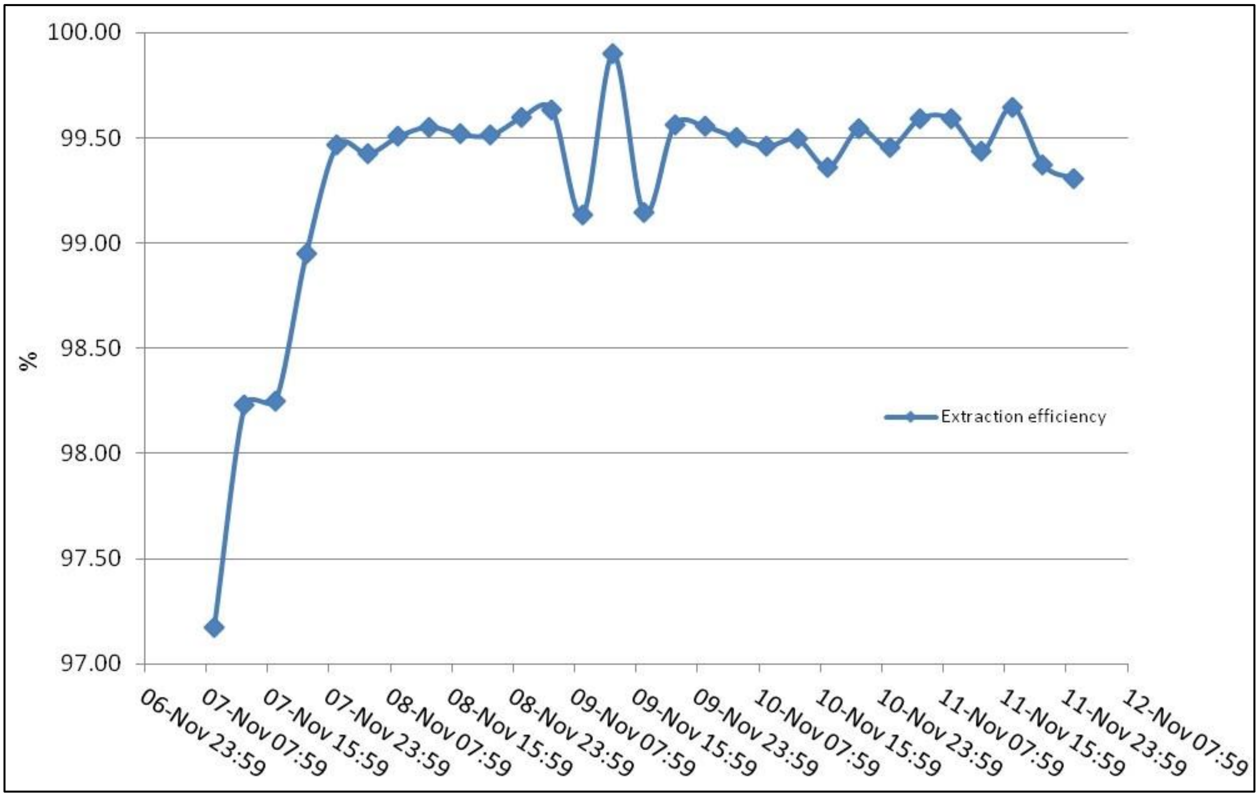
Figure 13.10 shows the equipment for the pilot plant where the first tests were performed. The solvent extraction banks are on the left of the photograph, and the other reactors and filters are shown in the center and right of the image.

Figure 13.10 Pilot Plant (SX-Purification-Carbonation-Filtration-Washing Pulp)

This plant was subsequently installed in the Salar de Cauchari for further testing and training of the operators at site. The pilot plant will provide data for brines of varying compositions from seasonal effects and final lithium concentration. The results of the pilot plant test work have been incorporated to the engineering for the final facility to ensure a robust, reliable operation capable of producing the demanded product quality at the committed rate.

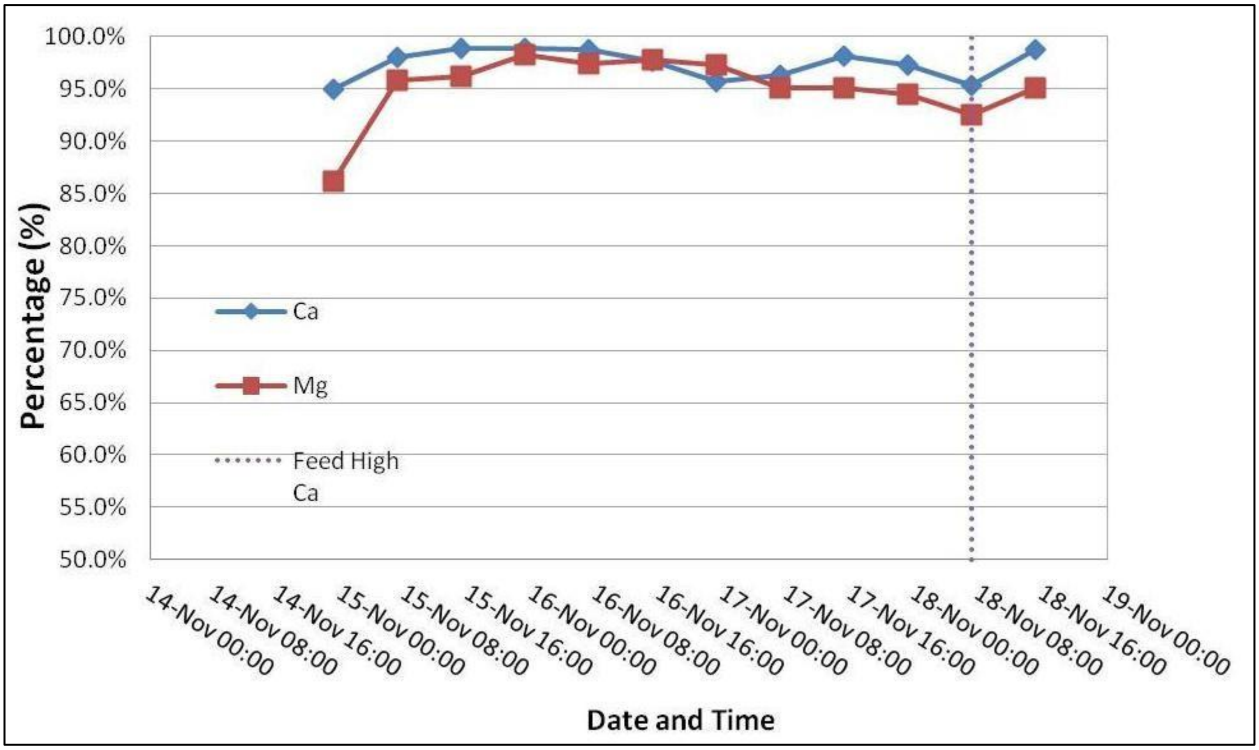
The SX pilot plant achieved an extraction efficiency of over 99.5% as shown in Figure 13.11. The x-axis in Figure 13.11 shows the date and time of the run, while the y-axis shows the percent of the boron mass in the feed that was removed during the test. The solvent extraction process was operated for 5 days during this test with no loss of boron removal efficiency.

Figure 13.11 SX Process Boron Extraction Efficiency



Mg and Ca polishing testing succeeded in obtaining over 95% removal efficiency, as shown in Figure 13.12. The x-axis is the date and time, while the y-axis shows the removal efficiency as a percentage of the mass of Ca or Mg in the feed brine. The Ca and Mg precipitation maintains the 95% removal efficiency over 4 days of operation in this test.

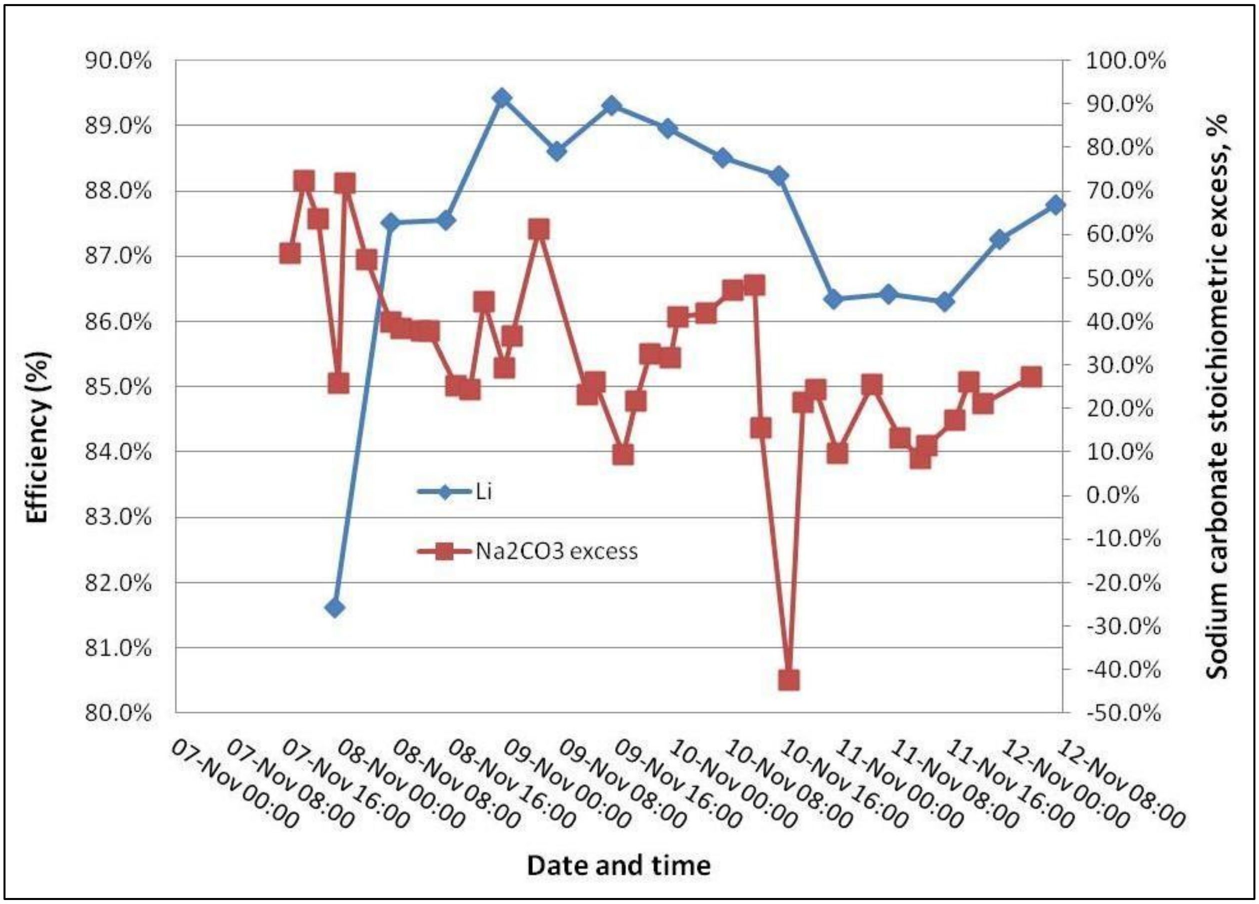
Figure 13.12 Ca and Mg Precipitation Efficiency



13.5.1 Lithium Carbonate Precipitation

Figure 13.13 demonstrates that over 86% recovery of lithium carbonate at acceptable excess-soda ash ratios was obtained. In Figure 13.13, the x-axis is the date and time of the test, while the left y-axis shows the percent of lithium mass precipitated during the tests, and the right y-axis shows the excess sodium carbonate being fed to the reactor. During this testing, excess soda ash varied from -40% to 70%. The optimum excess of soda ash is between 5 and 20% based on the lithium in the feed.

Figure 13.13 Li Precipitation Efficiency



Washing of lithium carbonate filter cake with soft water resulted in sufficient product purity for the intended markets and use.

Control of lithium carbonate crystal habit and particle size via precipitation reaction parameters was effective in minimizing impurities. The lithium carbonate was then dried and packaged. A sample of dried lithium carbonate was shipped to the United States for micronization testing.

14.0 MINERAL RESOURCE ESTIMATES

14.1 OVERVIEW

Minera Exar, operating as a subsidiary of a joint venture between LAC and GFL, commissioned Montgomery to update the lithium brine Mineral Resource Estimate for the Cauchari-Olaroz lithium brine project, Jujuy Province, Argentina. The following updated Mineral Resource Estimate has an effective date of May 7, 2019, and represents a Measured, Indicated and Inferred Mineral Resource for lithium. The Project area consists of parts of Salar de Olaroz ("SdO") basin in the north and Salar de Cauchari ("SdC") basin in the south. Figure 14.1 shows the Project area highlighting properties controlled by Minera Exar, the extents of the updated Measured, Indicated, and Inferred Mineral Resource Estimate ("Resource Evaluation Area"), the watershed boundary of the basin, and the expanded numerical model boundary domain (Section 15).

LAC has previously filed the following NI 43-101 technical reports on the Project providing prior Mineral Resource Estimates for lithium.

- King, M., 2010a. Amended Inferred Resource Estimation of Lithium and Potassium at the Cauchari and Olaroz Salars, Jujuy Province, Argentina. Report prepared for Lithium Americas Corp. Effective Date: February 15, 2010.

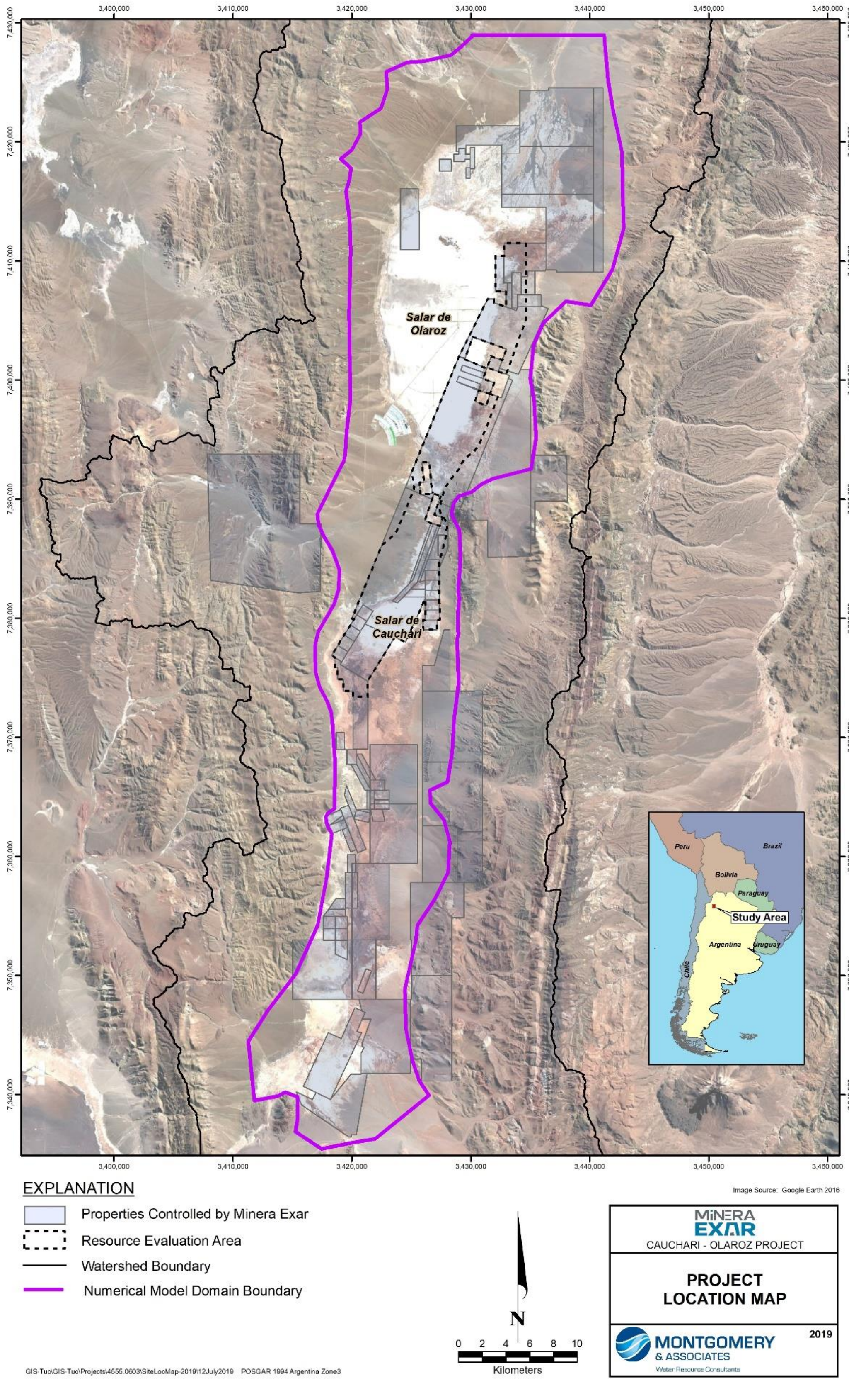
- King, M., 2010b. Measured, Indicated and Inferred Resource Estimation of Lithium and Potassium at the Cauchari and Olaroz Salars, Jujuy Province, Argentina. Report prepared for Lithium Americas Corp. Effective Date: December 6, 2010.

- King, M., Kelley, R., and Abbey, D., 2012. Feasibility Study Reserve Estimation and Lithium Carbonate and Potash Production at the Cauchari-Olaroz Salars, Jujuy Province, Argentina. Report prepared for Lithium Americas Corp. Effective Date: July 11, 2012.

- Burga, E., Burga, D., Rosko, M., King, M., Abbey, D., Sanford, T., Smee, B., and Leblanc, R., 2017. Updated Feasibility Study Reserve Estimation and Lithium Carbonate Production at the Cauchari-Olaroz Salars, Jujuy Province, Argentina. Report prepared for Lithium Americas Corp. Effective Date: March 29, 2017. Filing Date, January 15, 2018.

- Burga, D., Burga, E., Genck, W., and Weber, D., 2019. Updated Mineral Resource Estimate for Cauchari-Olaroz Project, Jujuy Province, Argentina. Report prepared for Lithium Americas Corp. Effective Date: March 1, 2019. Filing Date, March 31, 2019.

Figure 14.1 Location Map for Updated Mineral Resource Estimate



For purposes of this section, the prior Resource Estimate provided in King and others (2012) with an effective date of July 11, 2012 and subsequently included in Burga et al. (2017) are referred to as LAC (2012) and LAC (2017), respectively. The prior Mineral Resource Estimate was recently updated in Burga et. al (2019) with an effective date of February 13, 2019 and is referred to as LAC (2019); the update incorporated: 1) samples and interpretations used from the prior LAC (2012) Mineral Resource Estimate for lithium, and 2) an expanded Project database compiled from results of 2017 through 2018 exploration drilling and sampling campaigns and additional depth-specific sampling in early 2019 as part of data verification.

In developing the Mineral Reserve Estimate documented Section 15 and after statement of the recent Mineral Resource Estimate (LAC, 2019), the hydrostratigraphic (HSU) model developed in Leapfrog Geo and used for the Mineral Resource Estimate in LAC (2019) was simplified according to conceptual depositional environments or stratigraphic sequence units (Section 14.3.5). This update of the HSU model allowed for a departure from the complex 24-layer lithologic scheme used in the prior HSU model, and for deepening of the bedrock basement in the model based on recent results from both deep core drilling and sampling at Platform 1 (Section 14.2.2), and published results of neighboring property areas (Advantage Lithium, 2018 and 2019).

The results of drilling and sampling at Platform 1 conducted after statement of the recent Mineral Resource Estimate (LAC, 2019) has allowed for partial conversion of the Inferred Mineral Resource aquifer volume in the updated HSU model to Measured and Indicated Mineral Resource aquifer volumes of the deeper HSUs. This conversion of aquifer volume to more confident Mineral Resource Estimate categories surrounding Platform 1 provides the support for simulated wells in the Mineral Reserve Estimate numerical model to be completed in the deeper and more permeable Lower Sand and Basal Sand HSUs in the southeast part of the model domain. This resulted in the latest updated Mineral Resource Estimate for the Project with an effective date of May 7, 2019 (Section 14.4).

14.1.1 Statement for Brine Mineral Prospects and Related Terms

Lithium occurs as a dissolved mineral species in subsurface brine of the Project area. The brine is contained within an aquifer comprised of alluvial, lacustrine, and evaporite deposits that have accumulated in the SdC and SdO structural basin. Mineral Resource estimation for brine mineral deposits is based on knowledge of the geometry of the brine aquifer, the variation in specific yield (the yield of drainable fluid obtained under gravity flow conditions from the interconnected pore volume and also referred to as drainable porosity), and concentration or grade of dissolved mineral species such as lithium in the brine aquifer.

Following CIM standards and guidelines for technical reporting, classification standards for a Mineral Resource are applied as indicators of confidence level classifications: Measured, Indicated, and Inferred. According to these standards, “Measured” is the most confident category and Inferred is the least confident (CIM, 2012 and 2014). To estimate the Mineral Reserve, in addition to economic, process, and other potentially modifying aspects, further information is necessary for permeability (hydraulic conductivity), transmissivity, storativity, diffusivity and the overall groundwater flow regime in order to predict how the resource will change over the life of mine plan (CIM, 2012 and 2014). The evaluation framework used by Montgomery for brine Mineral Resource and Mineral Reserve estimation, based on CIM standards and best practice guidelines, is shown in Figure 14.2.

Figure 14.2 Methodology for Evaluating Brine Mineral Resources and Mineral Reserves[a]

	Exploration Results BRINE MINERAL RESOURCE	BRINE MINERAL RESERVE
Increasing Chemical, Geologic and Hydrogeologic Confidence ↓	Inferred	
	Indicated ↔	Probable
	Measured ↔	Proven
	→ • *Definition of the aquifer geometry* • *Determination of the Specific Yield (Sy) of the aquifer* • *Determination of the concentration of the elements of interest*	→ • *Determination of permeability, hydraulic conductivity, transmissivity, storativity, dispersivity and other aquifer mechanics* • *Wellfield Production Parameters; Hydrochemical Database; Flow, Transport and Density Modeling of the mining method.* • *Pre-feasibility or Feasibility level studies that include application of Modifying Factors from disciplines such as: process engineering, metallurgy, hydrodynamic modeling, production-scale well design and construction, capital and operating economics, legal, social, environmental, etc.*

a — based on CIM (2012 and 2014)

As a liquid mineral deposit, a Mineral Resource Estimate for lithium occurring as a dissolved mineral species in a brine aquifer is determined by quantifying the brine volume and associated mass able to drain by gravity effects. The Mineral Resource Estimate is computed as the product of the estimated resource area and resource thickness or aquifer volume, lithium concentration dissolved in the brine (grade), and specific yield of the resource. The brine Mineral Resource Estimate, sometimes referred to as the static or *in situ* model of the brine aquifer, can be advanced to a Mineral Reserve Estimate by projecting the producing capacity of the proposed operating facilities and site-wide lithium grade to be extracted from the aquifer volume comprising the Mineral Resource Estimate. The brine Mineral Reserve Estimate, sometimes referred to as the dynamic model of the brine aquifer, involves flow, transport and density numerical modeling for simulating an extraction wellfield using production-scale wells as the mining method of the Project.

Mineral Resource classifications used in this study conform to the 2014 CIM Definition Standards:

Mineral Resource: *a Mineral Resource is a concentration or occurrence of solid material of economic interest in or on the Earth's crust in such form, grade or quality and quantity that there are reasonable prospects for eventual economic extraction. The location, quantity, grade or quality, continuity and other geological characteristics of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge, including sampling.*

Measured Mineral Resource: *a Measured Mineral Resource is that part of a Mineral Resource for which quantity, grade or quality, densities, shape, and physical characteristics are estimated with confidence sufficient to allow the application of Modifying Factors to support detailed mine planning and final evaluation of the economic viability of the deposit. Geological evidence is derived from detailed and reliable exploration, sampling and testing and is sufficient to confirm geological and grade or quality continuity between points of observation. A Measured Mineral Resource has a higher level of confidence than that applying to either an Indicated Mineral Resource or an Inferred Mineral Resource. It may be converted to a Proven Mineral Reserve or to a Probable Mineral Reserve.*

Indicated Mineral Resource: *an Indicated Mineral Resource is that part of a Mineral Resource for which quantity, grade or quality, densities, shape and physical characteristics are estimated with sufficient confidence to allow the application of Modifying Factors in sufficient detail to support mine planning and evaluation of the economic viability of the deposit. Geological evidence is derived from adequately detailed and reliable exploration, sampling and testing and is sufficient to assume geological and grade or quality continuity between points of observation. An Indicated Mineral Resource has a lower level of confidence than that applying to a Measured Mineral Resource and may only be converted to a Probable Mineral Reserve.*

Inferred Mineral Resource: *an Inferred Mineral Resource is that part of a Mineral Resource for which quantity and grade or quality are estimated on the basis of limited geological evidence and sampling. Geological evidence is sufficient to imply but not verify geological and grade or quality continuity. An Inferred Mineral Resource has a lower level of confidence than that applying to an Indicated Mineral Resource and must not be converted to a Mineral Reserve. It is reasonably expected that the majority of Inferred Mineral Resources could be upgraded to Indicated Mineral Resources with continued exploration.*

14.2 DEFINITION OF RESOURCE-BEARING FORMATIONS

14.2.1 Geology

Based on reporting in LAC (2012 and 2017), there are two dominant structural features in the region of SdO and SdC: north-south trending high-angle normal faults and northwest-southeast trending lineaments. The high-angle north-south trending faults form narrow and deep horst-and-graben basins, which are accumulation sites for numerous salars in the region, including Olaroz and Cauchari. Basement rock in this area is composed of Lower Ordovician turbidites (shale and sandstone) that are intruded by Late Ordovician granitic rocks. Bedrock is exposed to the east, west and south of SdO and SdC, and generally along the eastern boundary of the Puna Region of Argentina. These rocks are overlain by Neogene volcanic rocks, including basaltic to rhyolitic lava flows and dacitic to rhyolitic caldera-forming ignimbrites.

The salars are in-filled with flat-lying sedimentary and evaporite deposits, including the following five informal lithological units that have been identified in drill cores:

- Red silts with minor clay and sand;
- Banded halite beds with clay, silt and minor sand;
- Fine sands with minor silt and salt beds;
- Massive halite and banded halite beds with minor sand; and
- Medium and fine sands.

Alluvial deposits intrude into these salar deposits to varying degrees, depending on location. The alluvium surfaces slope into the salar from outside the basin perimeter. Raised bedrock exposures occur outside the salar basin. The most extensive intrusion of alluvium into the basin is the Archibarca alluvial fan system, which partially separates SdO and SdC on the western boundary. In addition to this significant alluvial fan deposit, much of the perimeter zone of both salars exhibits encroachments of alluvial material associated with alluvial fan systems (Figure 14.1).

14.2.2 Drilling and Sampling

Exploration drilling and sampling programs conducted between 2009 and 2011 evaluated the lithium development potential of the Project area and supported the prior 2012 Mineral Resource Estimate (LAC 2012 and 2017). A map showing exploration wells and boreholes used to evaluate the prior Mineral Resource Estimate and the updated Mineral Resource estimate is shown on Figure 14.3.

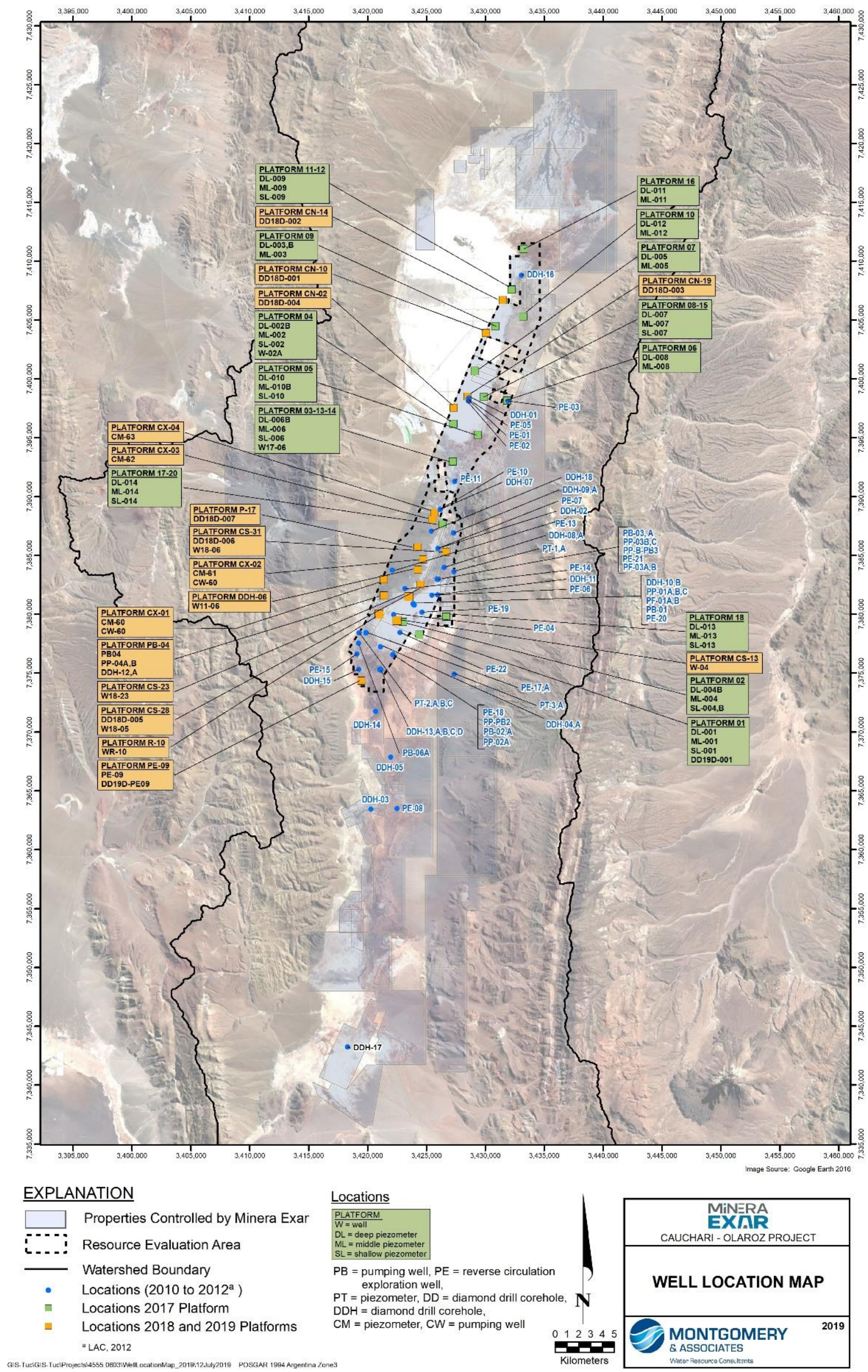
For the 2017, 2018 and 2019 exploration programs, Minera Exar provided the following additional drilling and sampling information of the Project area for analysis of the updated Mineral Resource Estimate:

- **Reverse Circulation (RC) Borehole Program:** Reverse circulation drilling was conducted to develop vertical profiles providing geological and hydrogeological information. The program included installation of 27 boreholes: 19 boreholes completed as shallow wells and eight boreholes completed as deep wells. The program included description of rotary drill cuttings samples, pumping tests, and collection of 90 depth-specific brine samples collected using bailer methods at 15 well locations.

- **Diamond Drilling (DD and DDH) Borehole Program:** This program was conducted to collect continuous cores for lithologic description, geotechnical testing (total porosity, grain size and density) and brine sampling. The program included 19 boreholes often with multiple screened-interval completions and collection of 195 depth-specific brine samples using bailer methods. In 2019, 58 additional samples were sent for RBRC testing at Daniel B. Stephens & Associates, Inc. (samples from DD19D-001 AND DD19D-PE09). Drilling and analysis of samples at Platform 1 (DD19D-001) was completed on May 7, 2019 and forms the basis of the effective date for the updated Mineral Resource Estimate.

- **Additional Depth Specific Brine Sampling Program:** Samples totaling 71 depth-specific bailer samples were collected in 2017 and 2018 at 14 RC and DDH locations drilled between 2009 and 2011. With the 2017 and 2018 depth specific samples, six additional depth-specific bailer samples were collected and incorporated into the data set in February 2019 as confirmatory samples.

Figure 14.3 Well Location Map



14.3 MINERAL RESOURCE ESTIMATE METHODOLOGY

14.3.1 Background and History

14.3.1.1 Mineral Resource Estimate (LAC, 2012)

The development of the prior Mineral Resource Estimate reported in LAC (2012; effective date of July 11, 2012) used Leapfrog Hydro modeling software; volume and mass calculations for the Resource Evaluation Area were developed using GIS software. The Resource Evaluation Area was defined as Measured or Indicated based on the continuity demonstrated by exploration drilling and sampling data. The regions of the prior 2012 Measured and Indicated Mineral Resource Estimate are shown on Figure 14.4 for slice depth of 150 m and include a section through SdC.

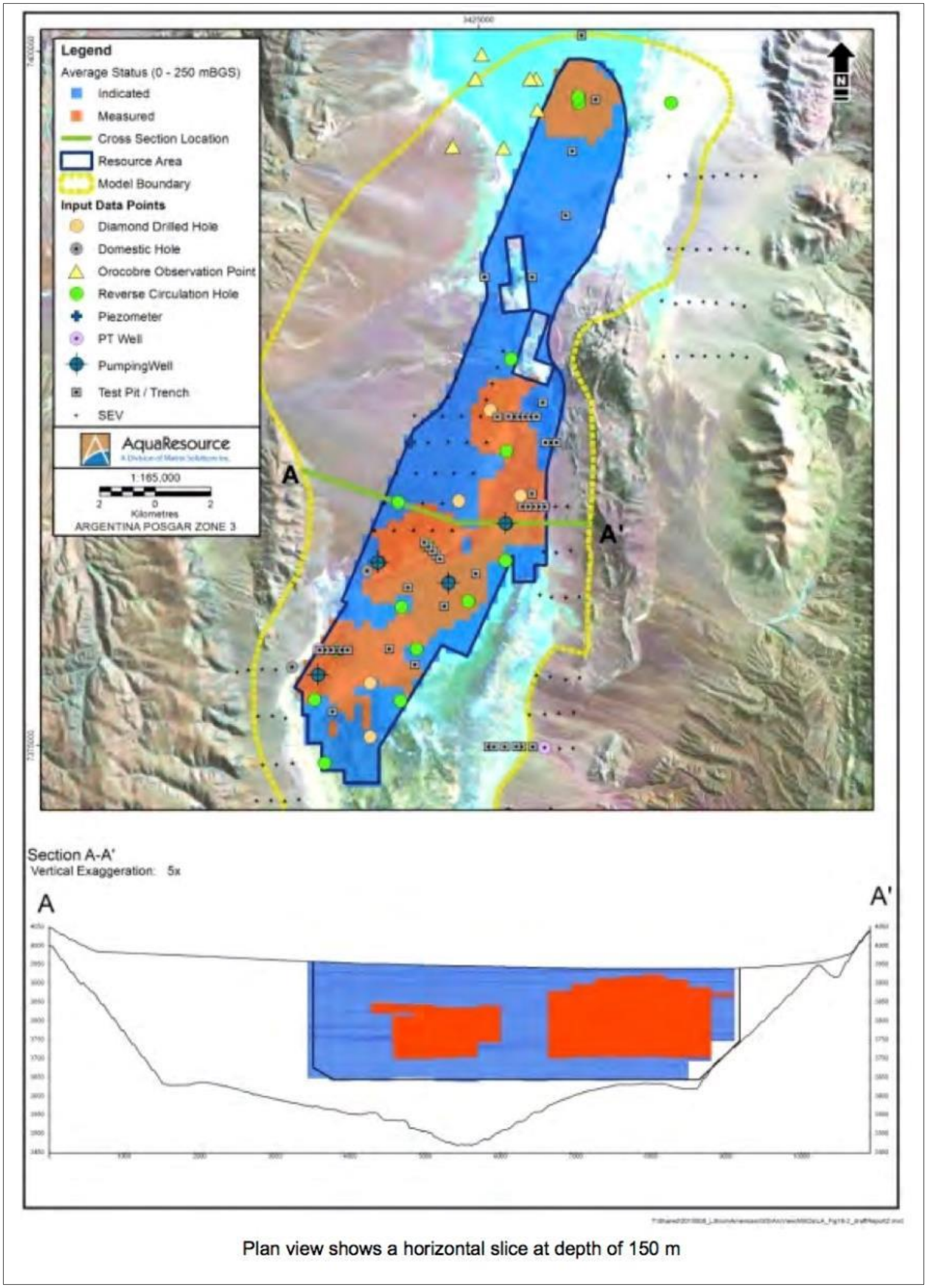
The methodology for defining the Measured and Indicated categories were as follows:

- **Indicated Mineral Resource:** The lateral extent of the Indicated Mineral Resource is defined by whichever of the following is less laterally extensive: (1) the Minera Exar claim boundary, (2) the location of the lithium iso-surface for the cut-off grade, or (3) a 1.5 km buffer around the exploration data points. The base of the zone is defined by the shallowest of the following: (1) the deepest chemistry sample in an exploration well in a 5 km search radius, or (2) the interpreted surface of the basement rock underlying the salar sediments.

- **Measured Mineral Resource:** the Measured Mineral Resource is defined if there is: (1) at least one measurement of grade within 30 m vertically and 1,250 m horizontally, and (2) adequate knowledge of grade continuity, as defined by the presence of at least four independent locations of grade measurement at any depth within a 1,500 m search radius.

The 2012 Mineral Resource Estimate was calculated relative to a lithium concentration cut-off grade of 354 mg/L. This value was identified as a process engineering constraint for the 2012 Mineral Reserve Estimate.

Figure 14.4 Plan and Section Views of the 2012 Measured and Indicated Mineral Resource Estimate



Source: *King, Kelley, Abbey (2012)*

14.3.1.2 Mineral Resource Estimate (LAC, 2019)

The development of an updated Mineral Resource Estimate reported in LAC (2019; effective date of February 13, 2019) was conducted as a collaborative effort between Montgomery and the Minera Exar project team starting in September 2018. Verification of 2017 and 2018 core logging and description methods were conducted on-site at the Project on September 8 and 9, 2018 by Montgomery QPs: Michael Rosko and Daniel Weber. The on-site field visit to the Project area was led by Minera Exar representative M. Casini and associated field hydrogeologists from Minera Exar. Results of 2017 and 2018 exploration drilling and sampling were provided to Montgomery in digital format in the software platform Strater (v.5, Golden Software) and Microsoft Excel spreadsheets. These data were subsequently compiled in a database using Microsoft Access to update the hydrostratigraphic framework.

The updated Mineral Resource Estimate incorporated: (1) samples and analytics used from the previous 2012 Mineral Resource Estimate, and (2) an expanded Project database compiled from results of 2017 and 2018 exploration drilling and sampling campaigns, and recent depth specific brine sampling in early 2019 for data verification. Sample verification and sample QA/QC was conducted by an independent QP in coordination with the Minera Exar team. To obtain the updated Mineral Resource Estimate, the previous models and expanded database were analyzed and processed by Montgomery using Leapfrog Geo 4.4 and Leapfrog EDGE geologic modeling and resource estimation software (Seequent, 2018).

A map showing the Resource Evaluation Area of resource categories is shown on Figure 14.5 for the prior Mineral Resource Estimate and for the updated Mineral Resource Estimate. For the updated Mineral Resource Estimate, the Resource Evaluation Area extended north to include: 1) Minera Exar property areas with 2017 and 2018 exploration results, and 2) areas meeting the criteria of resource categories for Mineral Resource estimation. Figure 14.6 shows a section view of the updated Mineral Resource Estimate and a map view at a slice elevation of 3,800 masl (approximate depth of 150 m within SdC). Comparing a similar representation for the 2012 Mineral Resource Estimate (Figure 14.4)**,** the updated Mineral Resource Estimate extended deeper in the brine mineral deposit as well as to the north property claim area.

Except for cut-off grade, the methodology and resource classification scheme for evaluating the updated Mineral Resource Estimate followed the prior 2012 Mineral Resource Estimate criteria for Measured and Indicated. The prior 2012 processing constraint of cut-off grade of 354 mg/L was not imposed as a strict control by Minera Exar for the update in 2019. However, for comparison purposes the cut-off grade was set at 300 mg/L concentration of lithium, largely to include results from drilling platform 06.

Comparing the 2012 Mineral Resource Estimate to the updated Mineral Resource Estimate (LAC 2012 and LAC 2019, respectively), the percent change showed a decrease of less than 1% for total average lithium concentration of Measured + Indicated (585 mg/L vs. 581 mg/L); the percent change was an increase of 53% for total LCE Measured + Indicated (11,752,000 tonnes LCE vs. 17,977,200 tonnes LCE). The large increase in overall mass can be attributed to the expansion and deepening of the Resource Evaluation Area based on exploration results obtained in 2017 and 2018. The small decline in total average concentration can be attributed to the updated Mineral Resource Estimate affected by the 2017 and 2018 range of samples collected in SdO and Archibarca areas of the Project. When spatially averaged with the lithium concentration of SdC samples, which essentially dominated the prior 2012 Mineral Resource Estimate, the updated Mineral Resource Estimate had a relatively small percentage decrease in the overall concentration of lithium.

Figure 14.5 Location Map Showing Mineral Resource Evaluation Areas – 2012 Mineral Resource Estimate and Updated Mineral Resource Estimate

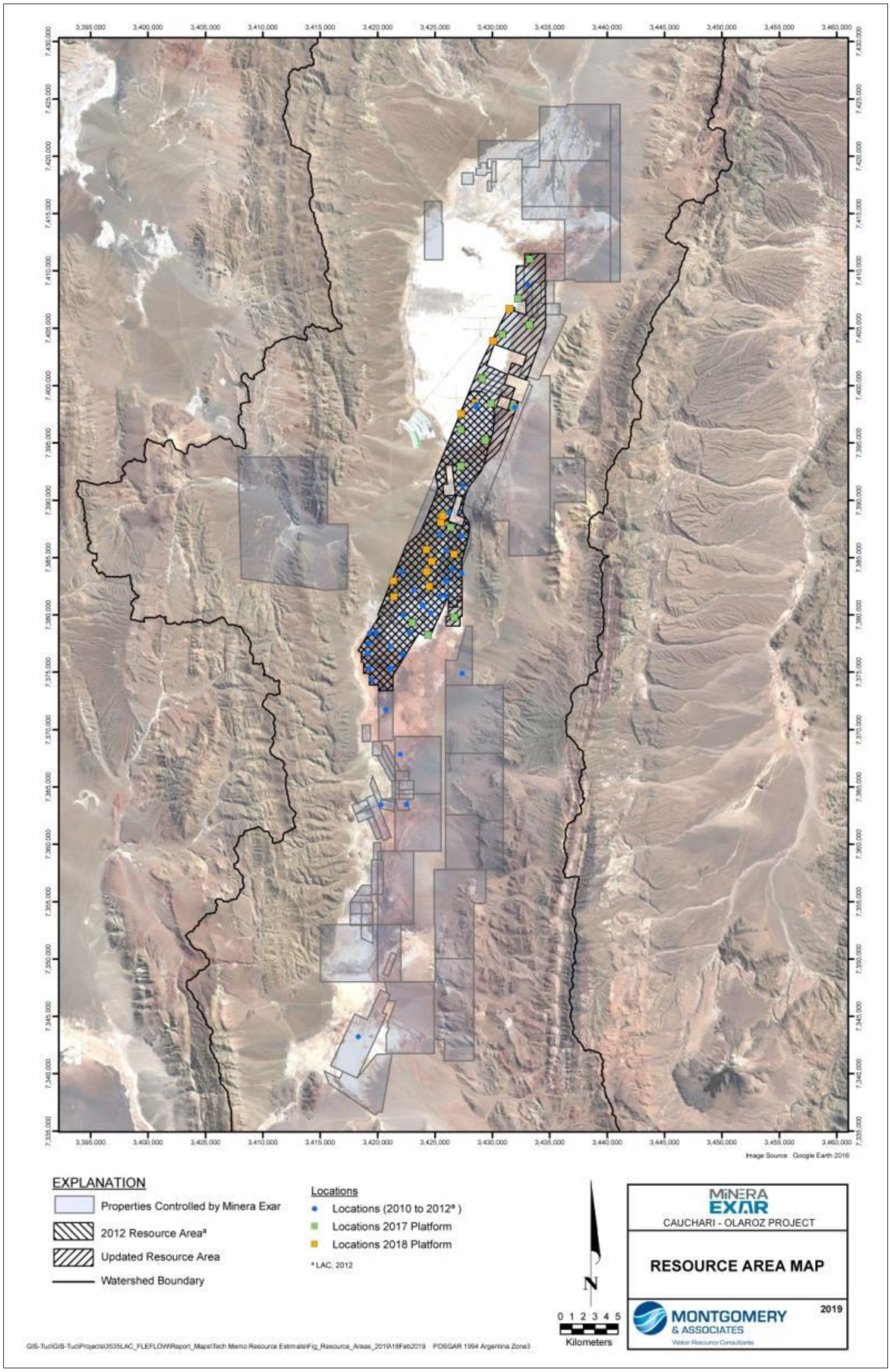
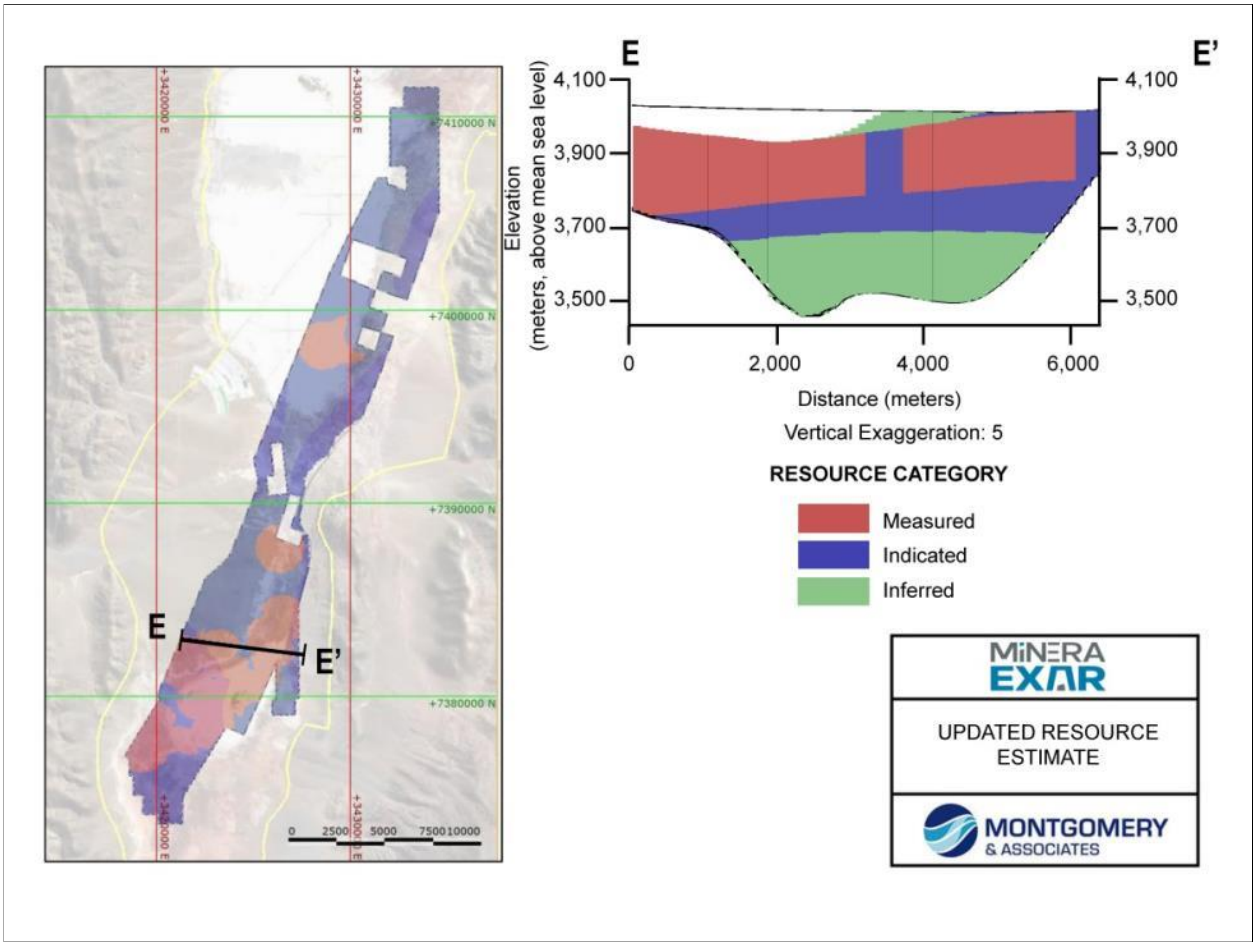


Figure 14.6 Representative Plan and Section Views of the Updated Measured, Indicated, and Inferred Mineral Resource Estimate



14.3.2 Hydrostratigraphic Framework

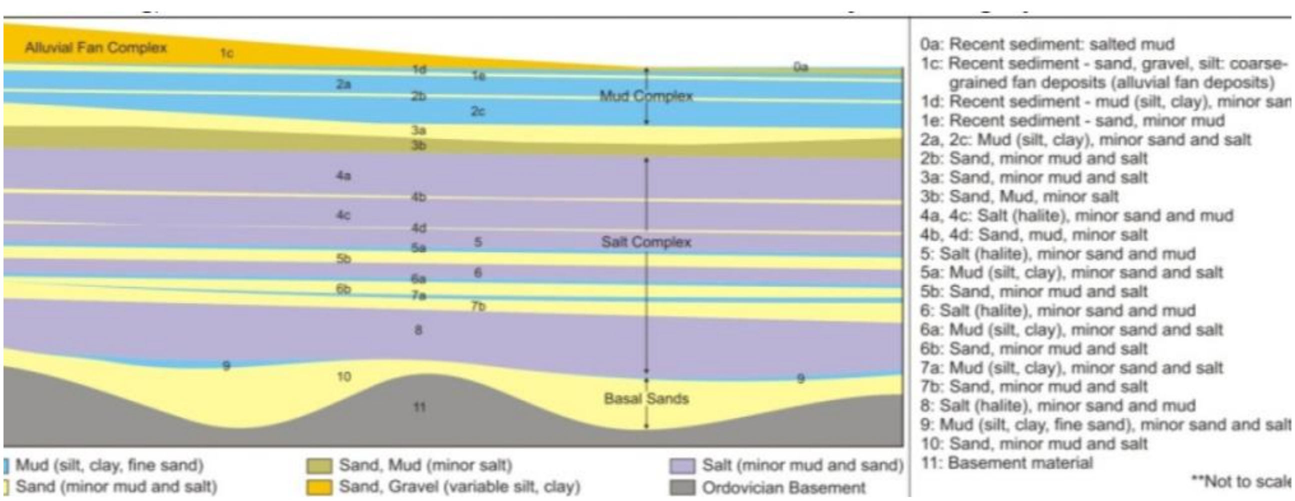
A generalized hydrostratigraphic framework of the hydrostratigraphic model developed for the 2012 Mineral Resource Estimate is presented in Figure 14.7. The framework was comprised of five primary units distributed across 24 layers representing a multi-layered, brine aquifer system. The primary units were based on the lithologic interpretation of core and rotary drill-cutting samples from boreholes, geophysical surveys, results of hydraulic testing at the site, as well as consideration of the interpreted in-filling history of the salar basin.

Interpretation of the 24 layers included the following descriptive comments (LAC 2012):

- Laterally, not all units exist at all locations, as they may pinch out laterally between sections and boreholes.
- Characterization was extended to the margins of the salar basin at a minimum thickness of 0.1 m to facilitate numerical modeling of groundwater flow regimes across natural flow boundaries.

- Hydraulic properties were assigned to zones of inferred sedimentary homogeneity in each hydrostratigraphic unit, as interpreted from pumping tests.
- The recent coarse-grained alluvial fan deposits and finer-grained mud, salted mud, and lesser sand and salt (halite) tend to be the units that occur at the surface, and in the near surface zone.
- A mud complex consisting of silt and clay with sandy lenses and discontinuous sand beds is persistent in the subsurface under recent salar sediments.
- The mud complex is separated from an underlying salt complex by a discontinuous unit of sand with minor mud and salt content.
- Alternating units of salt (halite) and sand/mud characterize the salt complex.
- A laterally discontinuous mud body is interpreted to overlie a basal sand deposit.
- The basal sand is interpreted to be persistent across most of the model.
- Geophysical data help to define a series of horst and graben structures bounded by normal faults that control the basin-filling history, and in turn control the position of the salt hardpan surfaces.
- The broad graben basin is interpreted to have an asymmetric shape; the eastern border normal fault is interpreted to have a greater component of dip-slip than the western fault. Consequently, the basin is deeper in the center and the east.

Figure 14.7 Generalized Framework for Hydrostratigraphic Model Used for the 2012 Mineral Resource Estimate



Source: *LAC (2012)*

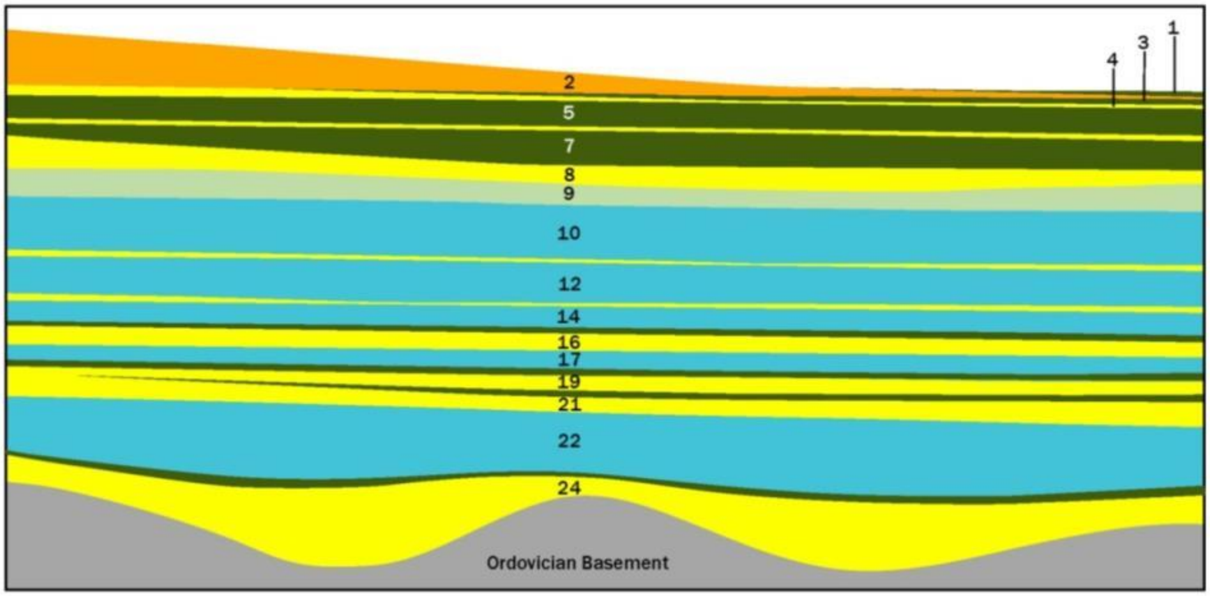
As part of data processing for the updated Mineral Resource Estimate (LAC, 2019), Montgomery used the 24-layer model represented in the 2012 FEFLOW model to integrate and update the hydrostratigraphic nomenclature according to additional lithologic data collected during the 2017 and 2018 exploration drilling and sampling campaigns. The updated Mineral Resource Estimate used six hydrostratigraphic units distributed across 24 layers representing a multi-layered, brine aquifer system. Table 14.1 shows the comparison of hydrostratigraphic interpretation and nomenclature used in the prior 2012 Mineral Resource Estimate versus the updated Mineral Resource Estimate. Figure 14.8 shows the updated hydrostratigraphic nomenclature and adjusted color scheme to correlate with colors in Minera Exar lithologic logs.

TABLE 14.1
SUMMARY OF HYDROSTRATIGRAPHIC UNITS ASSIGNED IN 2012 AND UPDATED MINERAL RESOURCE ESTIMATES

2012 Lithostratigraphic Unit[a]	2012 Stratigraphic Group[a]	2012 Resource Estimate Hydrostratigraphic Unit[a]	Updated Resource Estimate Hydrostratigraphic Unit[b]
Recent sediments	Alluvial Fan Complex	Sand	Alluvial Fan Sand and Gravel (with minor silt and clay)
Recent Sediments; Unit 1: Red silts with minor clay and sand; Unit 2: Banded halite beds with clay, silt, and minor sand	Mud Complex	Mud (Clay and Silt Mix)	Clay and Silt (with minor sand and halite)
Unit 3: Fine sands with minor silt and salt beds	Sand layer between mud and salt complex	Sand	Sand (with minor clay/silt and halite)
Unit 3: Fine sands with minor silt and salt beds	Sand/mud layer between mud and salt complex	Sand Mix	Sand and Clay/Silt (with minor halite)
Unit 4: Massive halite and banded halite beds with minor sand	Salt Complex	Halite	Halite (with minor clay/silt and sand)
Unit 5: Medium and fine sands	Basal Sands	Sand	Basal Sand (with minor silt and weathered bedrock)

(a) LAC (2012)
(b) LAC (2017)

Figure 14.8 Generalized Framework for the Hydrostratigraphic Model Used for the Updated Mineral Resource Estimate



Hydrostratigraphic Layers	
1. Clay and Silt (with minor sand and halite)	13. Sand (with minor clay/silt and halite)
2. Alluvial Fan Sand and Gravel (with minor silt and clay)	14. Halite (with minor clay/silt and sand)
3. Clay and Silt (with minor sand and halite)	15. Clay and Silt (with minor sand and halite)
4. Sand (with minor clay/silt and halite)	16. Sand (with minor clay/silt and halite)
5. Clay and Silt (with minor sand and halite)	17. Halite (with minor clay/silt and sand)
6. Sand (with minor clay/silt and halite)	18. Clay and Silt (with minor sand and halite)
7. Clay and Silt (with minor sand and halite)	19. Sand (with minor clay/silt and halite)
8. Sand (with minor clay/silt and halite)	20. Clay and Silt (with minor sand and halite)
9. Sand and Clay/Silt (with minor halite)	21. Sand (with minor clay/silt and halite)
10. Halite (with minor clay/silt and sand)	22. Halite (with minor clay/silt and sand)
11. Sand (with minor clay/silt and halite)	23. Clay and Silt (with minor sand and halite)
12. Halite (with minor clay/silt and sand)	24. Basal Sand (with minor silt and weathered bedrock)

14.3.3 Hydrostratigraphic Unit Model

The 2012 hydrostratigraphic unit (HSU) model representing the prior Resource Evaluation Area of the Project involved a complex layering scheme. In order to assess the reliance of this framework for the updated Mineral Resource Estimate method (LAC, 2019), the 2012 hydrostratigraphic model was analyzed in Leapfrog Geo using the 2012 FEFLOW layers used for modeling the 2012 Mineral Reserve Estimate. To illustrate the results, sections A-A' and B-

B’, located on Figure 14.9, are provided from the hydrostratigraphic models representing the prior and updated hydrostratigraphic model analysis, Figure 14.10 and Figure 14.11 respectively. Results show the reported 2012 hydrostratigraphic model Section A-A’ shown on Figure 14.10 compares well to the same section location of the 2012 model using the FEFLOW layers as processed in Leapfrog Geo and shown on Figure 14.11.

After similar verification methods of the 2012 hydrostratigraphic model, its 3D extents were expanded using the updated database of drilling and sampling results from the 2017 and 2018 exploration campaigns provided by Minera Exar to Montgomery. Additionally, publicly available results were used as off-property control points of the Resource Evaluation Area in SdO and SdC (Orocobre Limited, 2011 and Advantage Lithium, 2018). The 2017 and 2018 exploration campaigns included several wells in SdO to expand the model in the north and wells drilled to greater depths in both SdC and SdO to better characterize the deep salar sediments. The updated hydrostratigraphic model boundary is delineated in SdC using the prior model boundary and in SdO by either the mapped salar sediments or the Minera Exar property boundary, whichever has the greatest lateral extent. Several of the wells extended deeper than the previous 2012 basement contact resulting in the basement contact to be deepened along the eastern part of the basin. The section shown on Figure 14.12 representing the updated hydrostratigraphic model, also evaluated to Section A-A’ for comparison to the 2012 model (Figure 14.10), illustrates the deepened basement contact on the east side of the basin.

The complexity of the hydrostratigraphic layers and differences between SdC and SdO basins are shown on the SW-NE Section B-B’ in Figure 14.13, which bisects the basin and extends further NE beyond the prior 2012 model domain (Figure 14.9). Hydrostratigraphic units in SdC to the southwest are generally more varied and coarse-grained compared to SdO in the northeast which shows more halite with minor clay/silt and sand lenses. Although the 24-layer hydrostratigraphic framework was used to expand the model further NE into SdO, the section shows the complexity of translating this layering strategy outside of the original modeled area which relied on prior exploration in SdC.

Figure 14.9 Location Map of Representative Hydrostratigraphic Sections

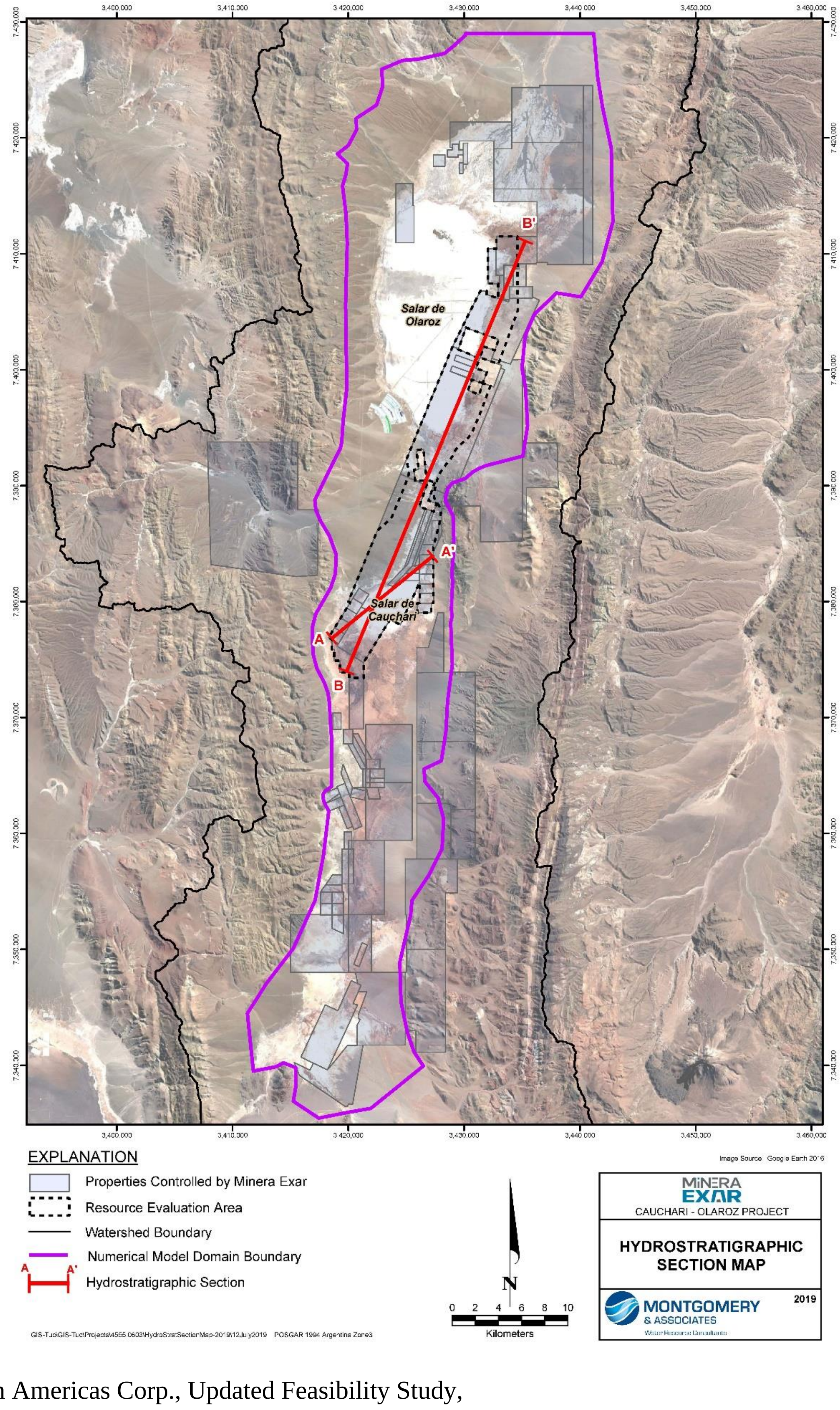
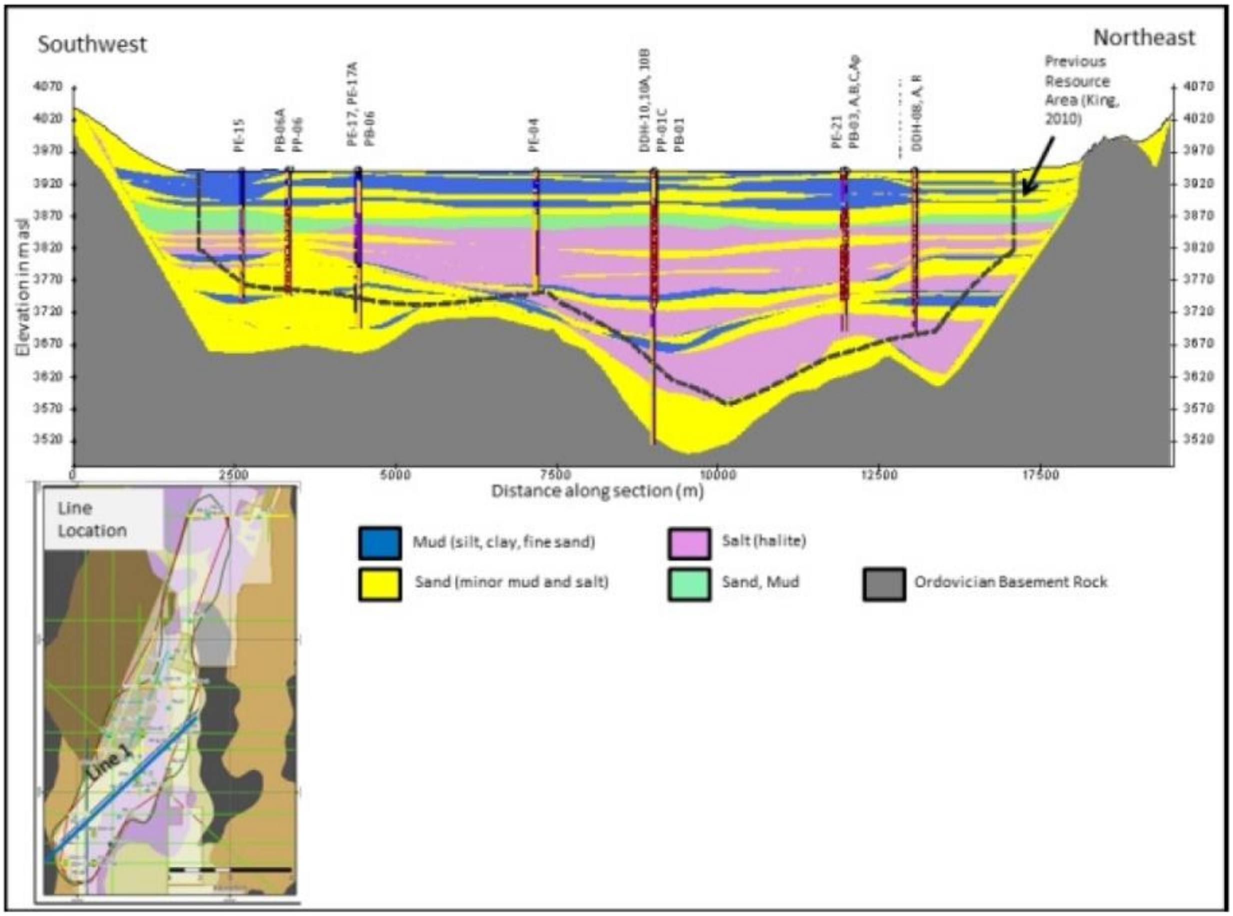


Figure 14.10 Section A-A' of the Hydrostratigraphic Model Used for the 2012 Mineral Resource Estimate



Source: *King Kelley, Abbey (2012)*

Figure 14.11 Section A-A' of the Hydrostratigraphic Model Used for the 2012 Mineral Resource Estimate Processed in Leapfrog Geo

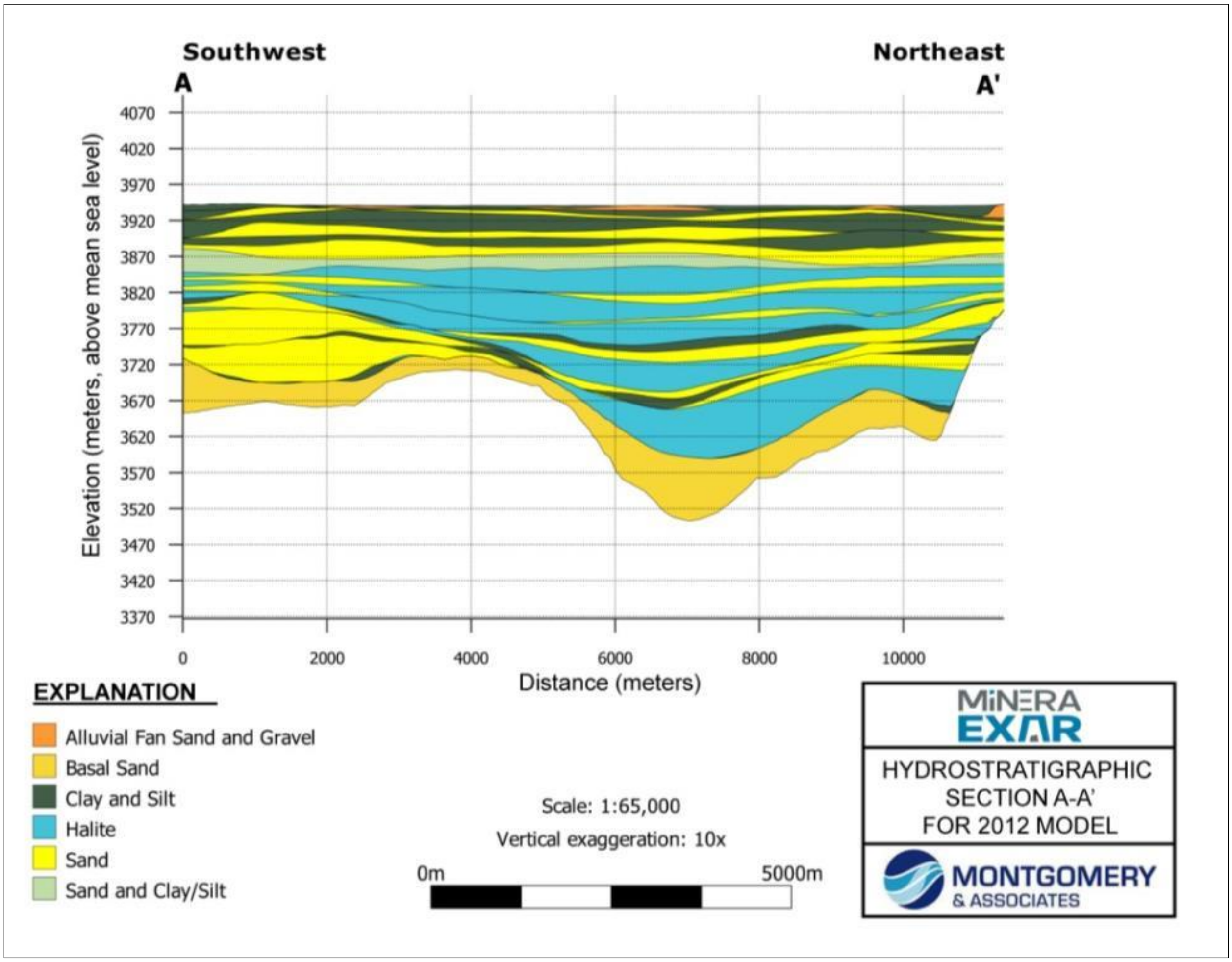


Figure 14.12 Section A-A' of the Updated Hydrostratigraphic Model Used for the Updated Mineral Resource Estimate (LAC, 2019)

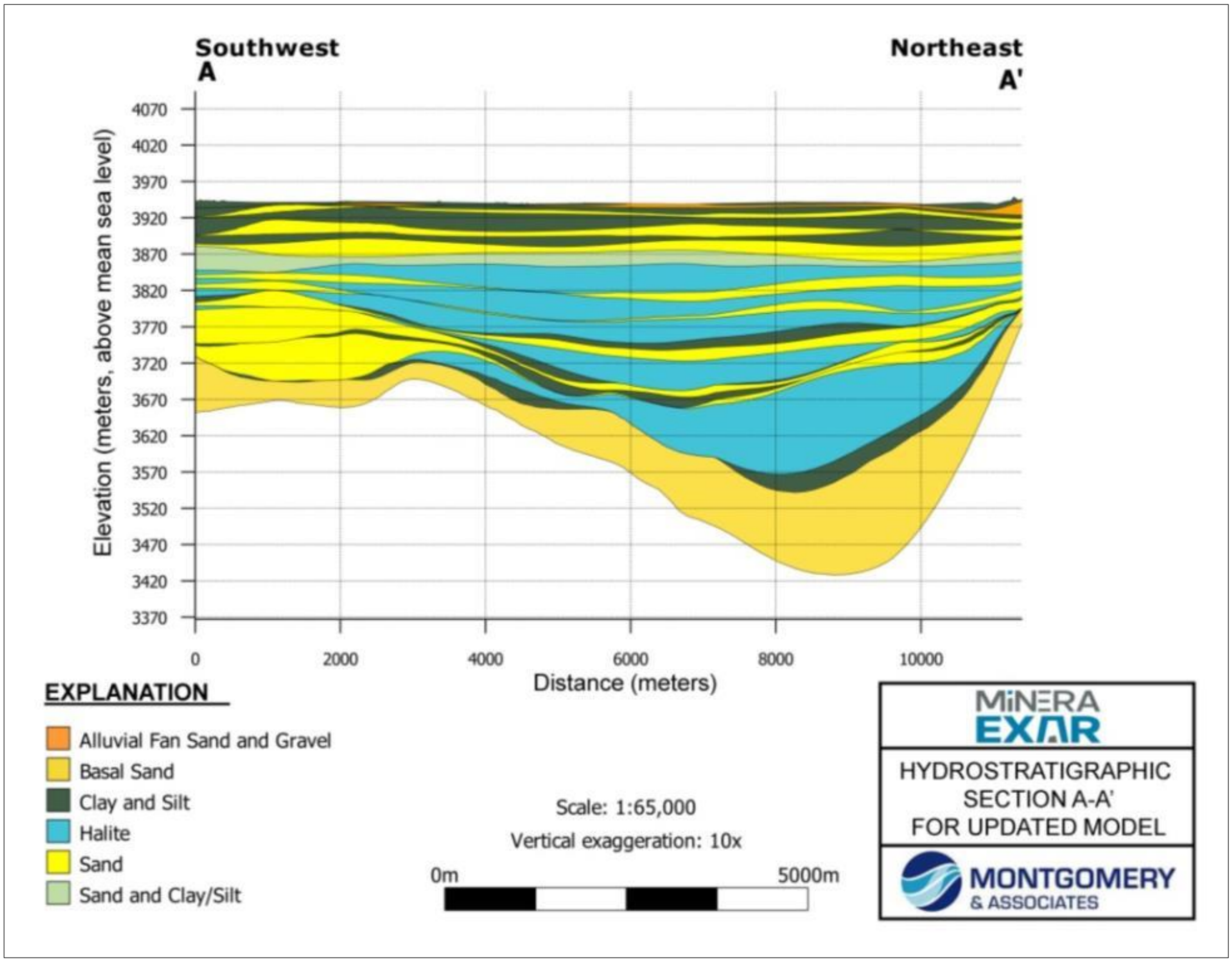
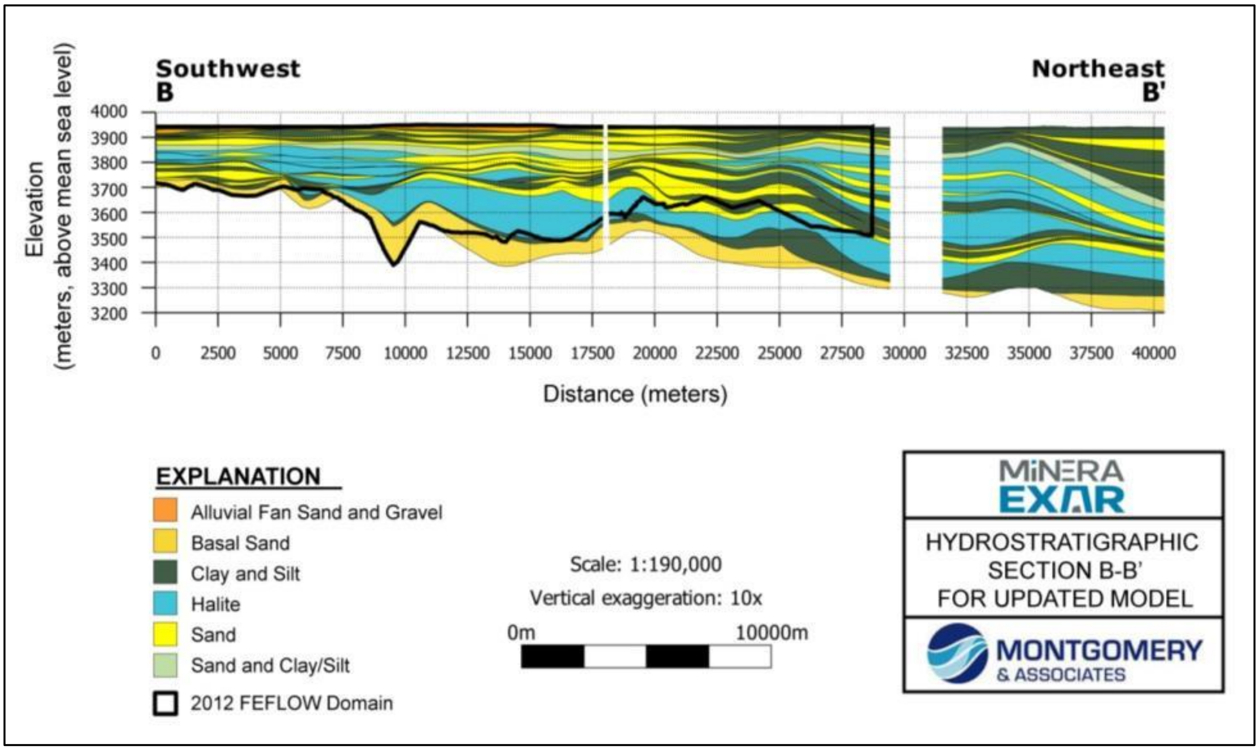


Figure 14.13 Section B-B' of the Hydrostratigraphic Model Used for the Updated Mineral Resource Estimate (LAC, 2019)



14.3.4 Specific Yield

Specific yield ("Sy") or drainable porosity is the total volume of pore space in saturated media that drains, under the influence of gravity, expressed as a percentage of sample volume. In standard terms of aquifer mechanics, Sy is defined as the volume of water released from a unit volume of unconfined aquifer per unit decline in the water table. Sy has been estimated with laboratory RBRC methods as reported in the 2012 Mineral Resource Estimate (LAC, 2012). Results were used to estimate representative Sy values for each of the six primary unit types in the hydrostratigraphic model.

In the 2012 FEFLOW model (LAC, 2012), the upper two model layers included variation in Sy to represent mapped surface geology and numerical parameter estimation results from steady-state calibration of the 2012 FEFLOW model. Deeper model layers generally had more uniform Sy based on the lithology of the primary unit. The finer-grained, primary units at depth (Halite, Clay and Silt) were modeled with a uniform Sy estimate based on the dominant lithology, while the Sy of the Sand unit varied with approximate correlation to depth and potential effects of lithostatic loading. The representative values of Sy for each layer remained unchanged from the 2012 FEFLOW model and were distributed similarly in the Leapfrog model for the updated Mineral Resource Estimate (LAC, 2019). Table 14.2 provides parameter values for Sy.

TABLE 14.2 SUMMARY OF HYDROSTRATIGRAPHIC UNITS AND ASSIGNED SPECIFIC YIELD ESTIMATES FOR THE UPDATED MINERAL RESOURCE ESTIMATE (LAC, 2019)		
Primary Unit	**Minor Units**	**Specific Yield Estimate for Primary Unit (percent)**
Alluvial Fan Sand and Gravel	Silt and Clay Lenses	24.9
Clay and Silt	Sand and Halite Lenses	5.6
Sand[a]	Clay/Silt, and Halite Lenses	24.9 / 16.0 / 12.1
Sand and Clay/Silt	Minor Halite Lenses	16.0
Halite	Clay/Silt and Sand Lenses	5.9
Basal Sand	Silt and Weathered Bedrock	13.7
(a) Sand unit modeled similarly to the LAC 2012 model where Sy generally decreases with depth: hydrostratigraphic model layers 4, 8, 11, and 16 were assigned values of specific yield of 24.9 percent; layer 13 was assigned 16.0 percent; layers 6, 19, and 21 were assigned 12.1 percent.		

14.3.5 Updated HSU Model

During the process of updating the Mineral Reserve Estimate model (Section 15), the HSU model developed in Leapfrog Geo and used for the updated Mineral Resource Estimate (LAC, 2019) described in Section 14.3.3 was modified according to conceptual depositional environments or stratigraphic sequence units. This re-evaluation of the HSU model was required to support the formulation Mineral Reserve Estimate numerical model by allowing for simplifying the complex 24-layer lithologic scheme used in the previous model, deepening of the bedrock basement in the model based on updated deep core drilling at Platform 1 (Figure 14.3), and incorporating published results of neighboring property areas (Advantage Lithium, 2018 and 2019). The re-evaluation of the HSU model, along with incorporation of Platform 1 drilling and sampling results, also allowed for an Updated Mineral Resource Estimate as presented in Section 14.4.

The resulting HSUs are essentially equivalent to and composed of the previously declared HSUs, however the HSU naming conventions and descriptions for the numerical model of the Mineral Reserve Estimate have been modified as identified in Table 14.3 into seven HSUs with representative primary and secondary lithologic units. The regrouping of units in the updated HSU model conformed to review and analysis of lithologic log descriptions grouped by the Unified Soil Classification System (USCS) according to sand, gravel, halite, silt, clay, and other descriptions noted in logs and core photographs to sum the percent distributions for the grouped HSU units. For each logged interval, the primary and secondary lithologic units were identified by percent distribution and the interval thickness was calculated in order to weight the lithology. This was then summed by HSU to provide an overall lithologic distribution to appropriately weight and adjust Specific Yield estimates based on laboratory results for RBRC and published literature estimates. The largest effect of the analysis was redistributing the previously defined single Halite HSU by splitting it into representative HSUs with either primary or secondary units of Halite and quantifying the lithologic distribution of other units mixed with the Halite.

TABLE 14.3 SUMMARY OF HYDROSTATIGRAPHIC UNITS IN THE UPDATED HSU MODEL		
Hydrostratigraphic Unit	**Primary Units**	**Minor Units**
Alluvial Fan Sand and Gravel	Sand and Gravel	Silt/Clay
Interbedded Sand and Clay/Silt	Sand and Clay/Silt	Halite
Clay/Silt with Sand	Clay/Silt with Sand	Halite
Halite with Sand	Halite with Sand	Clay/silt lenses
Interbedded Sand and Halite	Sand and Halite	Silt/Clay
Lower Sand	Sand	Silt and Halite
Basal Sand	Sand	Silt and Weathered Bedrock

Adjustments to Specific Yield estimates for the HSUs were constrained to be equivalent to the overall average Specific Yield estimate of the previous updated Mineral Resource Estimate (Burga, et al., 2019); initial lithium concentrations also remained unchanged as described in Section 14.3.6. The net effect of regrouping the HSUs was minor on the updated Measured and Indicated Mineral Resource Estimate (Burga, et al., 2019): on average, modifications to the HSU model showed an approximate 1 percent increase in the total Measured plus Indicated Mineral Resource Estimate for lithium concentrations, lithium mass, brine volume, and LCE mass compared to reported values in the Updated Mineral Resource Estimate. This net effect is largely attributed to the change in bedrock surface geometry at the boundary of the Resource Evaluation Area due to updated exploration results rather than regrouping the HSU groups.

A larger change in the Inferred Mineral Resource Estimate, by an increase of approximately 25 percent, resulted from modification of the HSU model. Again, this increase is largely attributed to the deepening of the bedrock basement incorporating results derived from exploration at Platform 1, as well as incorporating recent publically available exploration reporting by Advantage Lithium (2018 and 2019). The results of drilling and sampling at Platform 1 allowed for increasing confidence and partial conversion of the Inferred Mineral Resource aquifer volume in the updated HSU model to Indicated Mineral Resource aquifer volume of the deeper HSUs and an Updated Mineral Resource Estimate (Section 14.4). This conversion of aquifer volume to more confident Mineral Resource Estimate categories surrounding the Platform 1 location also provided the support for simulated wells in the Mineral Reserve Estimate numerical model to be completed in the deeper and more permeable Lower Sand and Basal Sand HSUs in the southeast part of the model domain (Section 15).

14.3.6 Lithium Concentrations

The lithium concentrations from the depth-specific bailer samples obtained at 2017 and 2018 boreholes were spatially analyzed and compared to the distribution of lithium in the resampled resource grid from the 2012 FEFLOW model and the 2012 Mineral Resource Estimate (LAC, 2012). Measured concentrations in the 2017 and 2018 samples often differed from values predicted by the prior 2012 resource grid. Therefore, the updated Mineral Resource Estimate required a re-interpolation of lithium concentrations to resolve the additional sampling results; incorporating the lithium concentrations in the updated Mineral Resource Estimate model followed and expanded upon methods used in the 2012 Mineral Resource Estimate model. In summary, the updated lithium concentrations database included the following:

- Concentration measurements from original samples used in LAC (2012) and recent sampling locations with bailer samples were assigned a discrete depth (if represented as a depth interval).
- Data analysis was conducted to evaluate the quality and representativeness of the data. Sample verification and the sample QA/QC was conducted by Minera Exar and independent QP and provided to Montgomery.
- Publicly available results were used for off-property northern control points in SdO of the Resource Evaluation Area in the prior 2012 Mineral Resource Estimate (Orocobre Limited, 2011); similarly for the updated Resource Evaluation Area, publically available results were used for off-property control points in SdC to the east and west of the Resource Evaluation Area (Advantage Lithium, 2018).
- Spatial correlation of lithium concentration data points was assessed with semi-variogram analysis to prepare iso-surfaces using two different methods in Leapfrog EDGE: Radial Basis Function ("RBF") and Ordinary Kriging.

In total, 1,880 lithium concentrations are represented in the 3D geologic model for the updated Mineral Resource Estimate. Locations of representative fence sections of the distribution of initial lithium concentrations are shown on Figure 14.14 for the updated Mineral Resource Estimate. For comparison purposes, the fence sections for the 2012 and the updated initial lithium concentrations are shown on Figure 14.15 and Figure 14.16, respectively.

Figure 14.14 Location Map of Representative Fence Sections for Lithium Concentrations

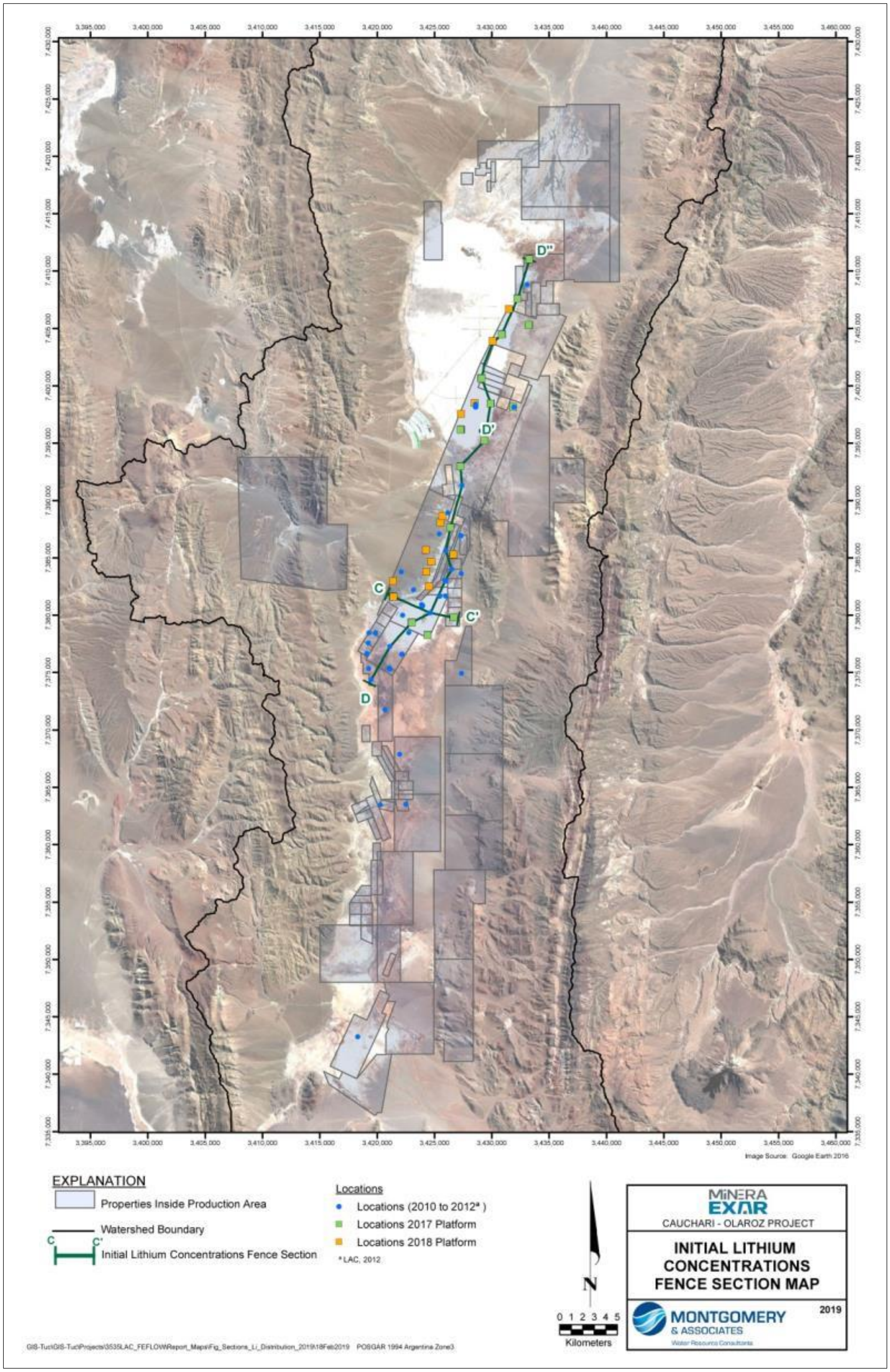


Figure 14.15 Representative Fence Sections of Initial Lithium Concentrations in the 2012 Mineral Resource Estimate Processed in Leapfrog Geo

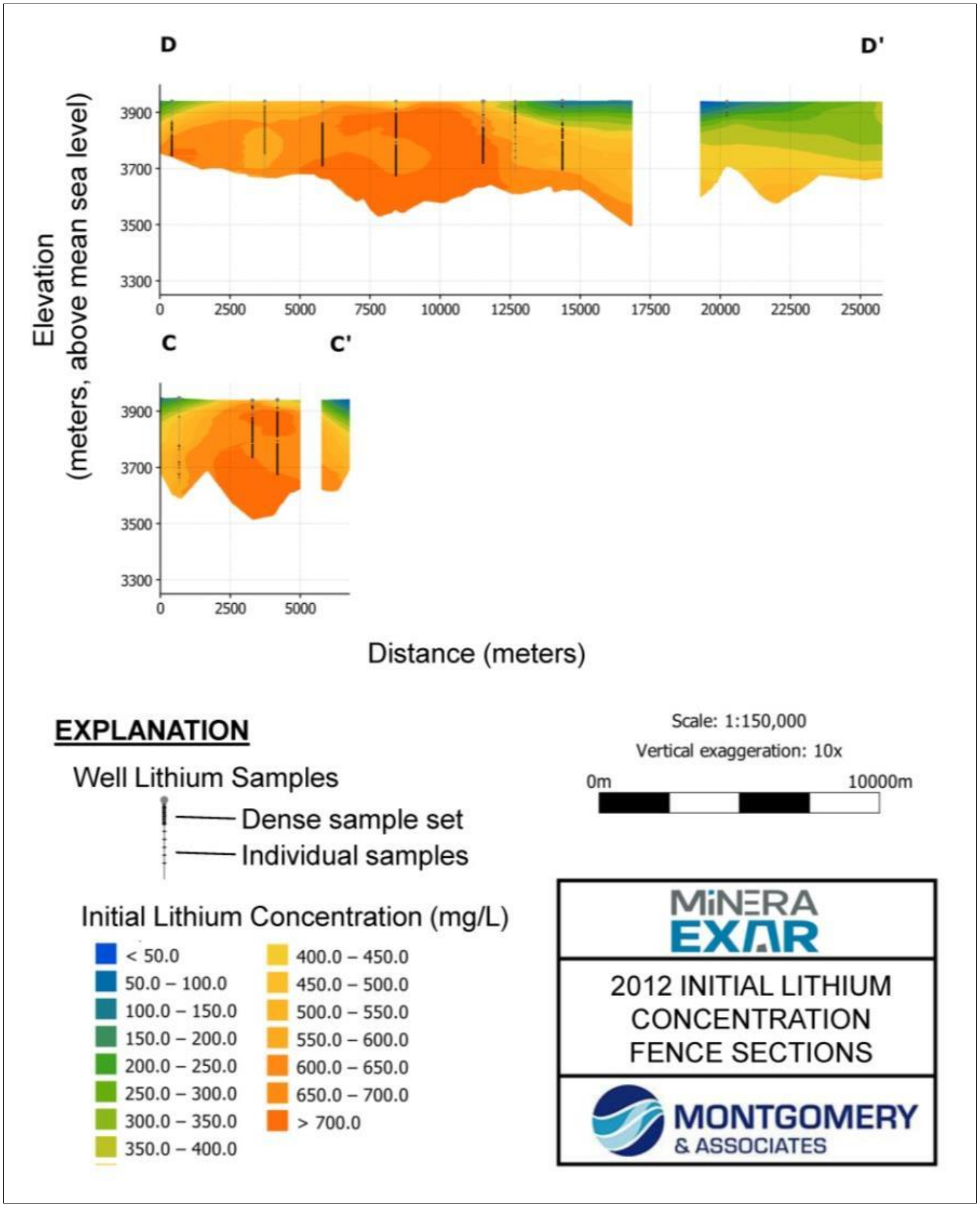
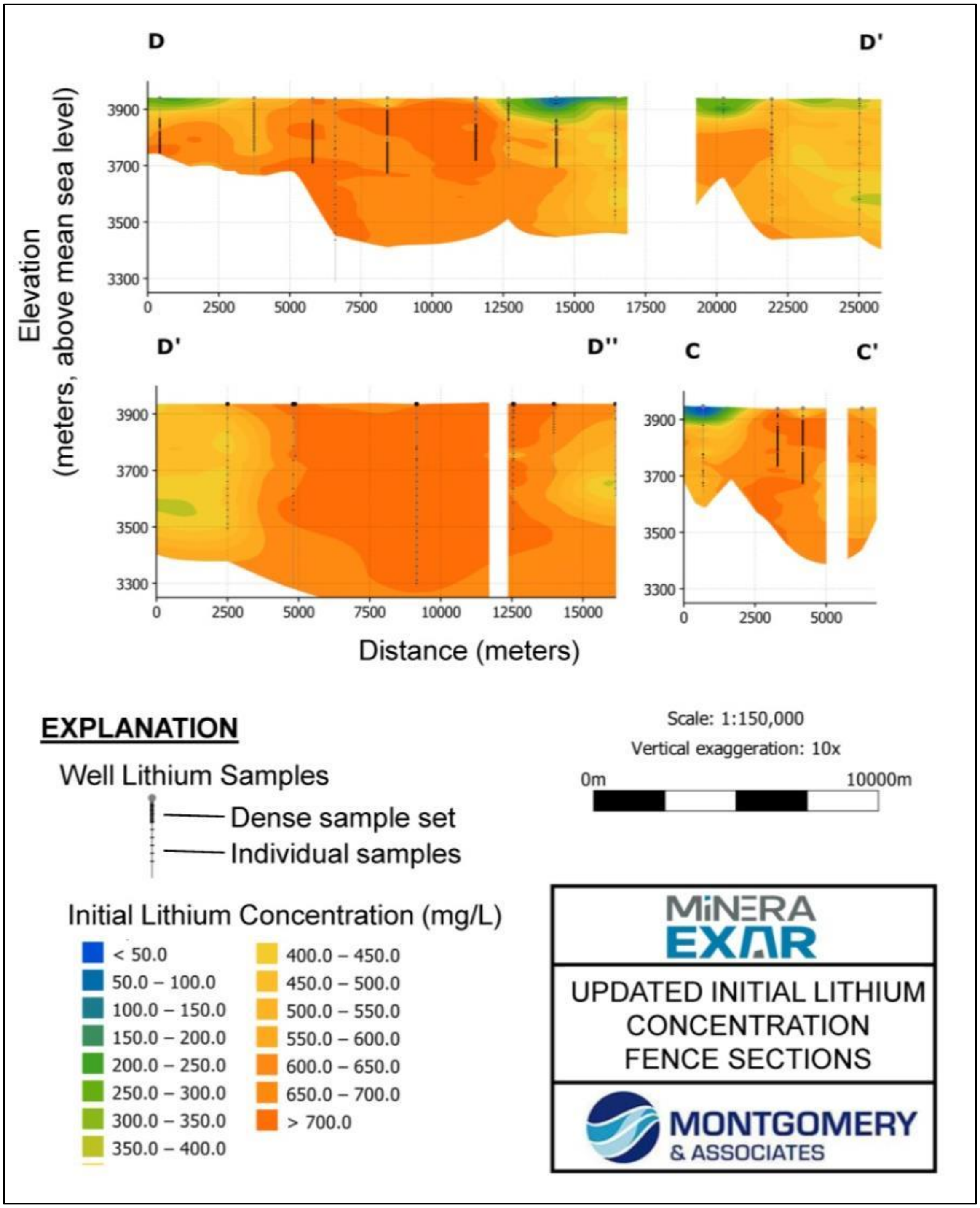


Figure 14.16 Representative Fence Sections of Initial Lithium Concentrations in the Updated Mineral Resource Estimate Processed in Leapfrog Geo

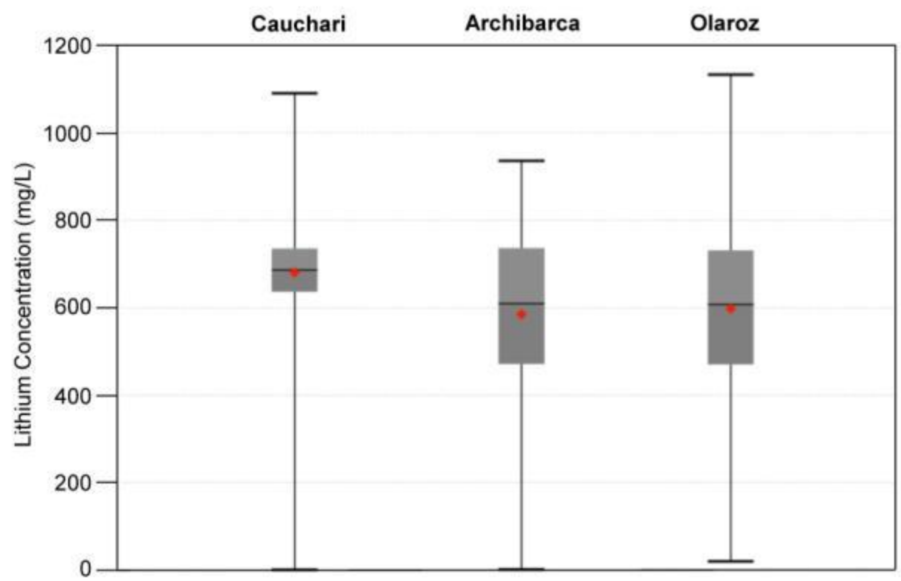


14.3.7 Exploratory Data Analysis and Domain Analysis

The Exploratory Data Analysis ("EDA") of the lithium concentrations involved the univariate statistics of the samples using histograms, box plots, and probability plots, and spatial correlations based on data posting, trend analysis, hydrostratigraphic units, and relative location in the Project area. Box plots of the lithium concentrations grouped by samples located in SdC, Archibarca, or SdO are shown in Figure 14.17. Although the variance and spatial trend of the distribution of lithium concentrations differs slightly in these three areas, the Resource Evaluation Area was modeled as one domain recognizing the following: 1) the distribution of lithium concentrations are not dependent on the hydrostratigraphic units, 2) the hydrostratigraphic units are continuous through the three areas, and 3) modeling the three areas as sub-domains, even with soft boundaries, produces disconnects in the lithium concentration contours which affect gridding required for numerical modeling of the Mineral Reserve Estimate. The perimeter of the Resource Evaluation Area was modeled as a soft boundary to incorporate outside control points.

As part of the EDA for the updated Mineral Resource Estimate, the box plots showing mean and median concentrations are informative as they show the influence of 2017 and 2018 samples collected in SdO and Archibarca relative to the SdC samples, which dominated the sample database used for the prior 2012 Mineral Resource Estimate. Additionally, the SdC sample population shows a smaller range of the upper and lower quartile, indicating less dilution effects of shallow samples collected in the SdO area and the fresh water influx of the basin margin in the Archibarca area.

Figure 14.17 Box Plots of Lithium Concentrations – SdC, Archibarca, and SdO Areas



	Cauchari	Archibarca	Olaroz
Number of Data	1165	558	157
Mean	680	584	597
Maximum	1090	936	1133
Upper quartile	735	736	731
Median	686	609	607
Lower quartile	636	471	470
Minimum	0.2	1	19
Variance	15743	44766	26753
CV	0.18	0.36	0.27

14.3.8 Mineral Resource Block Model Variography, Methods, and Validation

Variogram models were developed in three orthogonal directions based on experimental variograms. No outlier restrictions were applied, as measured sample concentrations do not show anomalously high values. Analysis of the lithium distributions did not show a dependency on hydrostratigraphic units. Therefore, the model domain was distinguished by the Resource Evaluation Area with a soft boundary accounting for samples outside of the Resource Evaluation Area. Categories were applied within the model domain to subdivide the Mineral Resource classifications (Measured, Indicated, and Inferred) and the hydrostratigraphic sequences in order to apply variations in Sy.

The Mineral Resource block model within the Resource Evaluation Area, composed of 6,896,092 blocks, was defined with a block size of x = 100 meters, y = 100 meters, and z = 1 meter. The block size was chosen to apply the specific yield to the units within the hydrostratigraphic model imposed by incorporating the parameterization in the 2012 FEFLOW model.

The spatial correlations for the lithium concentrations were reviewed in Leapfrog EDGE using experimental variograms with the parameters shown in Table 14.4. The spatial variability was modeled using three experimental directions adjusted to a 3D ellipsoidal model using one spherical structure and three experimental variogram directions. The experimental semi-variograms of lithium and theoretical model is shown in Figure 14.18.

TABLE 14.4
EXPERIMENTAL VARIOGRAM PARAMETERS

Axis	Variogram Parameters			Tolerance	
	Lag (meters)	Maximum Number of Lags	Azimuth (degrees)	Dip (degrees)	Angular (degrees)
Major	500	50	114.45	0	20
Semi-major	500	50	24.45	0	75
Minor	5	100	0	90	5

The interpolation methodology for estimating the lithium resource was Radial Basis Function (“RBF”) to produce iso-surfaces which were then evaluated to the resource block model. Figure 14.19 shows the initial lithium concentrations on plan maps for elevations of 3,900, 3,800, and 3,700 meters.

The RBF interpolation method was verified with ordinary kriging. The model was validated using a series of checks including comparison of univariate statistics, verification with ordinary kriging, evaluation of the model to the original sample points to verify values, and swath plots to detect any spatial bias. Swath Plots in the X, Y, and Z directions are shown on Figure 14.20 and provide a general perspective on the modeled concentrations compared to the samples. The model was interrogated where the swath plots showed the modeled concentrations differed from the sample concentrations. Upon examination and verification, differences were often attributed to: 1) the swath fully intersecting the Resource Evaluation Area in the specified direction, 2) variability of the number and distribution of sample data available in a given swath, and 3) the resource model incorporating soft boundary control points outside the Resource Evaluation Area.

Figure 14.18 Experimental Semi-Variograms of Lithium with Theoretical Model

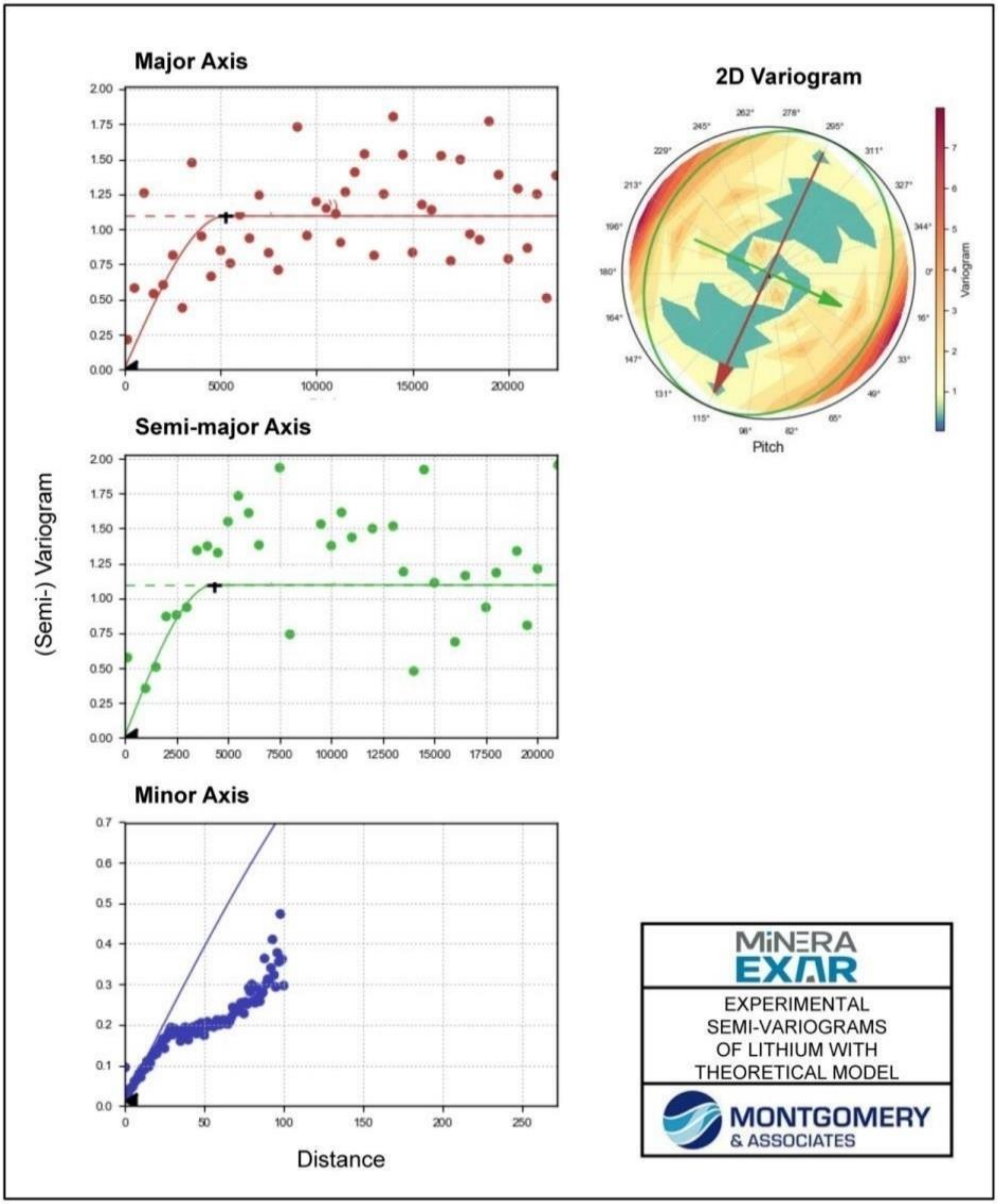


Figure 14.19 Representative Elevation Maps of Initial Lithium Concentrations for Updated Mineral Resource Estimate

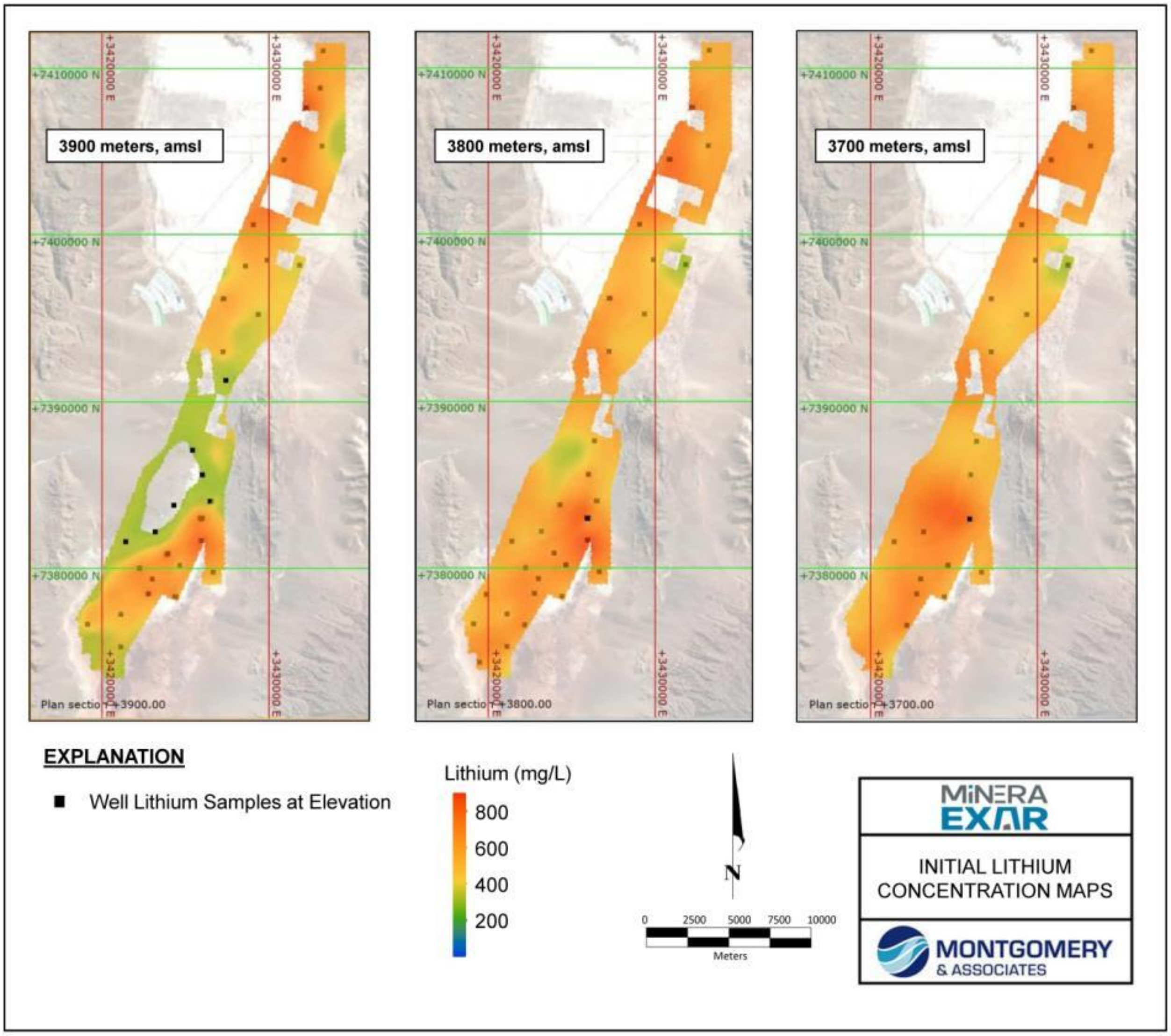
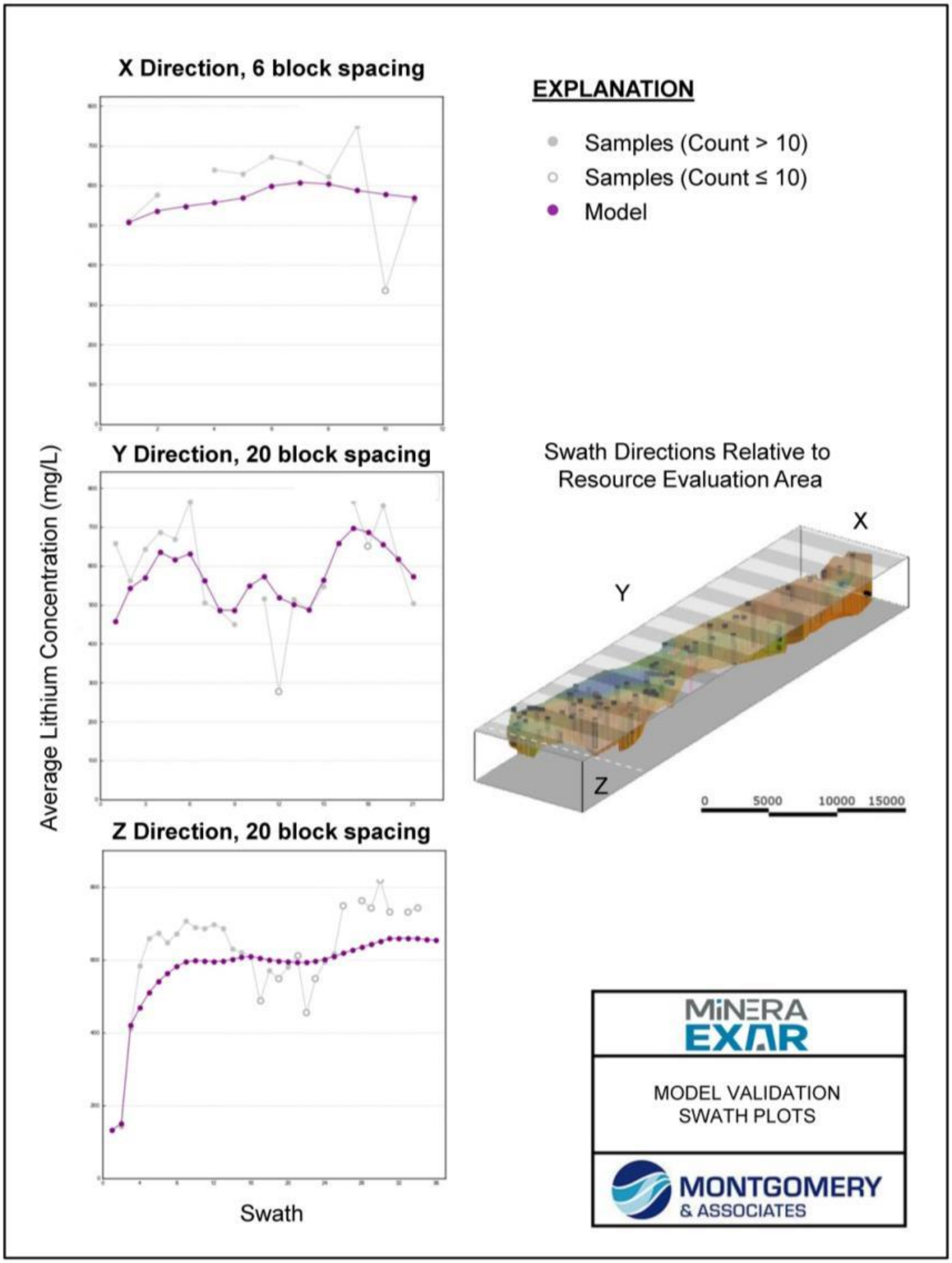


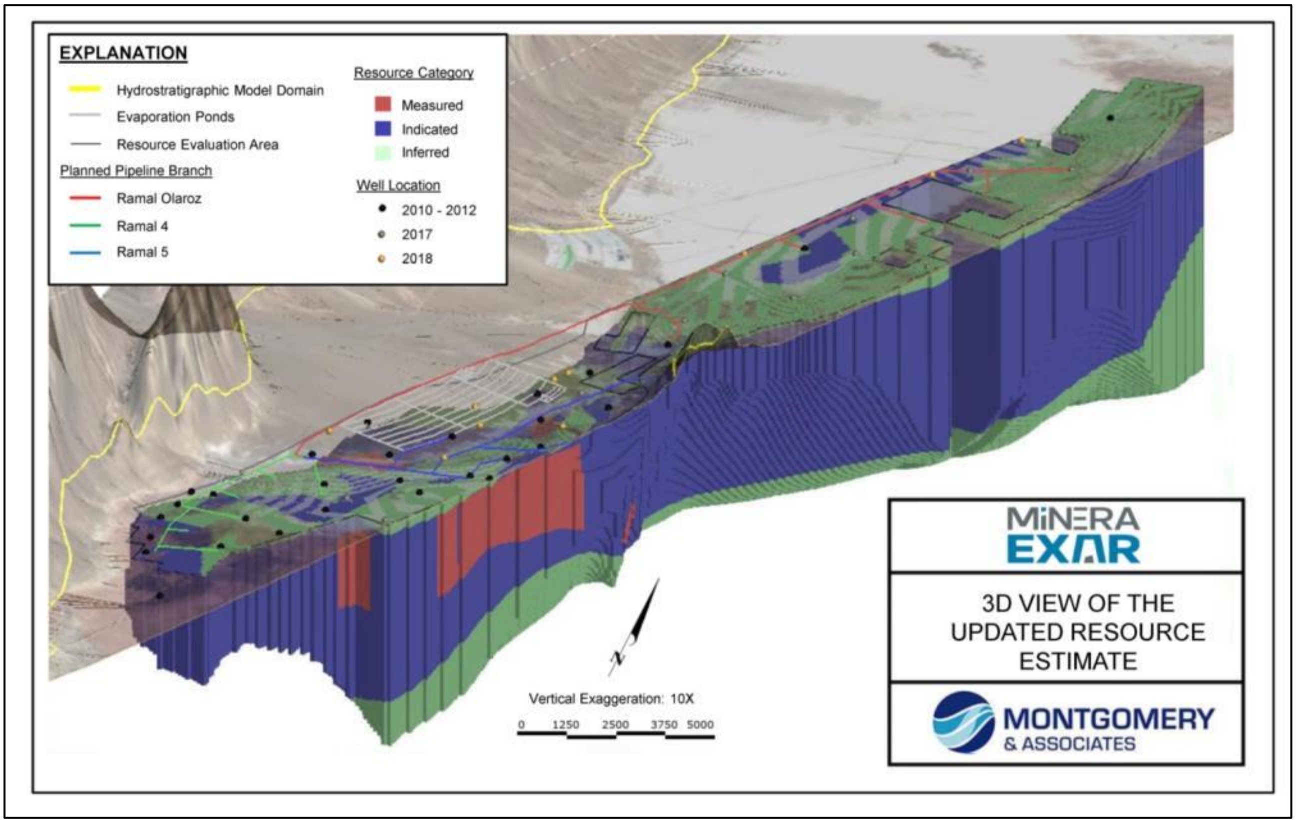
Figure 14.20 Model Validation Swath Plots in the X, Y, and Z Directions



14.4 UPDATED MINERAL RESOURCE STATEMENT

A map showing the Resource Evaluation Area of resource categories is shown on Figure 14.5 for the prior (2012) Mineral Resource Estimate and for the updated Mineral Resource Estimate (King, Kelley, Abbey, 2012 and Burga et al., 2019). For the following Updated Mineral Resource Estimate, the Resource Evaluation Area remains the same as Burga et al. (2019), extending north to include: 1) Minera Exar property areas with 2017, 2018 and 2019 exploration results, and 2) areas meeting the criteria of resource categories for Mineral Resource estimation. Figure 14.21 shows a schematic 3D view of the Resource Evaluation Area for the Mineral Resourceclassifications: Measured, Indicated, and Inferred.

Figure 14.21 3D Schematic View of the Updated Mineral Resource Estimate – Measured, Indicated, and Inferred



The methodology and resource classification scheme for evaluating the Updated Mineral Resource Estimate followed the prior 2012 Mineral Resource Estimate (King, Kelley, Abbey, 2012) and the updated Mineral Resource Estimate in Burga et al. (2019) (Section 14.3).

The Mineral Resource Estimate at the Measured, Indicated, and Inferred Mineral Resource category (CIM, 2014) for lithium is based on the total amount of lithium in brine that is theoretically drainable from the bulk aquifer volume. The volumes where lithium concentration is determined to be less than the cut-off grade of 300 mg/L are not included in the resource calculations. In some areas, there are volumes of brine included in the Mineral Resource

Estimate even where they extend beyond data points from wells. These zones (usually at depth below known data points or extending laterally from known data points) are included in the Updated Mineral Resource Estimate based on the substantial amount of geophysical information obtained that justifies extrapolating the resource to its logical boundary conditions (such as lateral property or geological boundaries, lithological characteristics, or hydrogeologic bedrock constraints). The Updated Mineral Resource Estimate does not include brine aquifer volumes at depths greater than the projected bedrock contacts.

With further exploration and characterization, deep aquifer volumes at the Inferred category may convert to a higher confidence category; other aquifer volumes within property boundaries to the north and south remain open. Prior to conducting an exploratory drilling program, geophysical surveys (seismic and CSAMT / MT) should further delineate exploration targets in these areas. This information will aid in better defining limits of the resource extending to property boundaries.

The Updated Measured, Indicated, and Inferred Mineral Resource Estimate for lithium is summarized in Table 14.5. The Updated Mineral Resource Estimate for lithium has an effective date of May 7, 2019, based Platform 1 results, the most recent drilling and sampling information included for interpreting and updating the Mineral Resource Estimate. As is accepted in standard practice for lithium brine Mineral Resource Estimates, Table 14.6 provides lithium as Li_2CO_3 or LCE, at the Inferred, Indicated, and Measured confidence level categories.

TABLE 14.5
SUMMARY OF UPDATED MINERAL RESOURCE ESTIMATE FOR LITHIUM

Classification	Aquifer Volume (m^3)	Drainable Brine Volume (m^3)	Average Lithium Concentration (mg/L)	Lithium (tonnes)
Measured Resource	1.07E+10	1.13E+09	591	667,800
Indicated Resource	4.66E+10	5.17E+09	592	3,061,900
Measured + Indicated	5.73E+10	6.30E+09	592	3,729,700
Inferred	1.33E+10	1.50E+09	592	887,300

Notes:
1. *The Updated Mineral Resource Estimate has an effective date of May 7, 2019 and includes results of drilling and sampling at Platform 1 and the updated HSU model. The Resource Evaluation Area, initial lithium concentrations, and a lithium grade cut-off of greater than or equal to 300 mg/L parameters remained the same as the Updated Mineral Resource Estimate given in LAC (2019).*
2. *The Mineral Resource Estimate is not a Mineral Reserve Estimate and does not have demonstrated economic viability. There is no certainty that all or any part of the Mineral Resources will be converted to Mineral Reserves.*
3. *Calculated brine volumes only include Measured, Indicated, and Inferred Mineral Resource volumes above cut-off grade.*
4. *The Mineral Resource Estimate has been classified in accordance with CIM Mineral Resource definitions and best practice guidelines (2012 and 2014).*
5. *Comparisons of values may not add due to rounding of numbers and the differences caused by use of averaging methods.*

Using Platform 1 results and the updated HSU model, conversion of the aquifer volumes from Inferred to Measured and Indicated, while still maintaining the 3D initial lithium concentration grid (Sections 14.3.5 and 14.3.6), results in the total Measured plus Indicated Mineral Resource Estimate for lithium concentration increasing by approximately 2% in comparison to results of the previous Mineral Resource Estimate (Burga et al., 2019). Similarly for LCE mass, this conversion of aquifer volume to more confident Mineral Resource Estimate categories surrounding the Platform 1 resulted in an increase of Measured plus Indicated of approximately 10 percent in comparison to results of the previous Mineral Resource Estimate (Burga et al., 2019).

TABLE 14.6
UPDATED MINERAL RESOURCE ESTIMATE FOR LITHIUM REPRESENTED AS LCE

Classification	LCE (tonnes)
Measured Resource	3,554,700
Indicated Resource	16,298,000
Measured + Indicated	19,852,700
Inferred	4,722,700

Notes:

1. *Lithium carbonate equivalent ("LCE") is calculated using mass of LCE = 5.322785 multiplied by the mass of Lithium reported in Table 14.5.*
2. *The Updated Mineral Resource Estimate has an effective date of May 7, 2019 and includes results of drilling and sampling at Platform 1 and the updated HSU model. The Resource Evaluation Area, initial lithium concentrations, and a lithium grade cut-off of greater than or equal to 300 mg/L parameters remained the same as the Updated Mineral Resource Estimate given in LAC (2019).*
3. *The Mineral Resource Estimate is not a Mineral Reserve Estimate and does not have demonstrated economic viability. There is no certainty that all or any part of the Mineral Resources will be converted to Mineral Reserves.*
4. *The Mineral Resource Estimate has been classified in accordance with CIM Mineral Resource definitions and best practice guidelines (2012 and 2014).*
5. *Comparisons of values may not add due to rounding of numbers and the differences caused by use of averaging methods.*

14.5 RELATIVE ACCURACY OF THE MINERAL RESOURCE ESTIMATE

The relative accuracy of the Mineral Resource Estimate for lithium is largely a function of the confidence demonstrated in sampling methods, laboratory results, analytical methods, and the overall development and understanding of the conceptual hydrogeologic system. Montgomery has confidence in the Mineral Resource Estimate based on previous data collected and interpreted by LAC (2012), as well as analysis of 2017, 2018 and 2019 exploration data and methods provided by Minera Exar, in particular with brine concentration and lithologies of the hydrostratigraphic model domain.

With respect to conceptualization and parameterization of the hydrogeologic system for the updated Mineral Resource Estimate, the factors that could affect Mineral Resource estimation include:

- Estimates of drainable porosity or Sy values. The estimates of Sy are extrapolated from the 2012 resource grid to similar lithologies in the expanded and updated resource grid. Estimates of Sy in the expanded resource grid have some uncertainty due to the lack of representative testing results of samples.

To address the uncertainties and improve the Mineral Resource Estimate, recommendations include the following:

- Drainable porosity or S_y estimates relied upon the prior 2012 model estimates because the 2017 and 2018 exploration results lacked S_y estimates. In order to address the uncertainty of S_y estimates for the different stratigraphic groups, ongoing exploration work should include analysis of S_y by use of laboratory methods such as RBRC or similar techniques for core samples, and field methods using calibrated nuclear magnetic resonance (“NMR”) borehole logging in open boreholes or in wells with PVC casing installed.

15.0 MINERAL RESERVE ESTIMATE

15.1 BACKGROUND

Mineral Reserve classifications used in this section conform to the following CIM (2012 and 2014) definitions referenced in NI 43-101 and discussed in Section 14.1.1, Statement for Brine Mineral Prospects and Related Terms:

- **Mineral Reserve:** a Mineral Reserve is the economically mineable part of a Measured and/or Indicated Mineral Resource. It includes diluting materials and allowances for losses, which may occur when the material is mined or extracted and is defined by studies at Pre-Feasibility or Feasibility level as appropriate that include application of Modifying Factors. Such studies demonstrate that, at the time of reporting, extraction could reasonably be justified. Mineral Reserves are sub-divided in order of increasing confidence into Probable Mineral Reserves and Proven Mineral Reserves. A Probable Mineral Reserve has a lower level of confidence than a Proven Mineral Reserve.

- **Modifying Factors:** modifying factors are considerations used to convert Mineral Resources to Mineral Reserves. These include, but are not restricted to, mining, processing, metallurgical, infrastructure, economic, marketing, legal, environmental, social, and governmental factors.

- **Probable Mineral Reserve:** a Probable Mineral Reserve is the economically mineable part of an Indicated, and in some circumstances, a Measured Mineral Resource. The confidence in the Modifying Factors applying to a Probable Mineral Reserve is lower than that applying to a Proven Mineral Reserve.

- **Proven Mineral Reserve:** A Proven Mineral Reserve is the economically mineable part of a Measured Mineral Resource. A Proven Mineral Reserve implies a high degree of confidence in the Modifying Factors.

The mining method to be employed for the Project involves an extraction wellfield using production-scale wells for pumping brine from the aquifer in the Resource Evaluation Area. As such, the Mineral Reserve for the Project is identified on the basis of the extraction wellfield unit and the Measured and Indicated Mineral Resources within the resource model (Section 14).

The Mineral Reserve Estimate has been conservatively modeled and stated as a Proven Mineral Reserve for Year 1 through 5 of full-scale extraction wellfield pumping and a Probable Mineral Reserve for Years 6 to 40 of full-scale extraction wellfield pumping. The division between Proven and Probable Mineral Reserves is based on: (1) sufficiently short duration of wellfield extraction to allow a higher degree of predictive confidence, yet long enough to enable significant production, and (2) a duration long enough to enable accumulation of a strong data record to allow subsequent conversion of Probable Mineral Reserves to Proven Mineral Reserves. Provided a detailed data record for monitoring wellfield operations and further updates to model calibration, the authors believe it could be possible to achieve partial conversion of

Probable to Proven Mineral Reserves during the first five years of full-scale operation and assessment of build-out of the extraction wellfield.

15.2 OVERVIEW

An Updated Mineral Reserve Estimate was developed for the Project using MODFLOW-USG, a control volume finite difference code (Panday and others, 2013), coupled with the Groundwater Vistas modeling interface (ESI, 2015). The groundwater modeling was supported by geological, hydrogeological, geochemical, and geophysical data collected through field programs at the site (LAC, 2019). Previous Mineral Reserve Estimate groundwater modeling reported in LAC (2012, 2017, and 2019) was conducted for the Project using FEFLOW finite-element groundwater modeling software (DHI, 2010). The conversion to MODFLOW-USG allowed for distinct advantages to simulate evaporative flux of the salar surface that is more numerically stable for steady-state calibration and to more accurately simulate production well conditions and mass capture using local grid refinement and robust solution methods. The MODFLOW-USG platform is a publically available groundwater flow and transport code which is now considered as the industry standard for a wide variety of groundwater-related applications; it has been verified and validated in public forums and in professional publications by the United States Geological Survey (Panday and others, 2013).

Updating the groundwater model to the MODFLOW-USG platform occurred as a sequential step after updating of the hydrostratigraphic model framework in Leapfrog Geo. With this update and expansion of model boundaries, the numerical model incorporates a larger-scale water balance (SQM, 2016) and conceptual model, while still maintaining consistency with methods used in the previous groundwater model (LAC, 2017). During the process of the numerical model update, calibration of the model used additional spatially representative pre-development hydraulic head data, and transient head data and associated aquifer parameters conforming to results of reported historical pumping tests as well as more recent pumping tests conducted by Minera Exar.

Once formulated and calibrated, the numerical model used a simulated production wellfield to project extraction from the brine aquifer and verify the feasibility of producing sufficient brine for processing a minimum target of 40,000 tpa LCE. After verifying the capability of the simulated wellfield to produce sufficient brine for the minimum 40,000 tpa LCE process target, the model was then used to predict a maximum production rate for assessment of a Total Mineral Reserve Estimate for a 40-year production and process period of LCE.

Predictive groundwater model results include projected brine production rates, drawdown in production wells, and lithium concentration during simulated wellfield pumping. A previous Mineral Reserve Estimate study by LAC (2012) concluded that rigorous consideration of variable density within the aquifer did not materially improve model results, therefore variable-density flow and transport was not simulated in these current analyses. The authors believe the procedure used for the modeling is valid and appropriate for development of a Mineral Reserve Estimate, as defined by the CIM and referenced by NI 43-101. The primary steps used to develop and apply the numerical groundwater model for the purposes of Mineral Reserve Estimation were as follows:

- The hydrostratigraphic units (HSUs) and the HSU model used for the Updated Resource Estimate (LAC, 2019) were re-evaluated to incorporate recommendations for simplification of hydrostratigraphy and incorporation of conceptual depositional environments or stratigraphic sequence units (Section 14.3.5). The re-evaluated HSU model formulated for the Mineral Reserve Estimate model is built upon the model developed for the Updated Resource Estimate and incorporates more recent information collected by Minera Exar in order to consider: 1) previous parts of deep aquifer system as an Indicated Mineral Resource aquifer volume and therefore appropriate for consideration in the Mineral Reserve Estimate model, and 2) deeper basin extents basin to include the larger numerical model domain and an expanded Mineral Inferred Resource aquifer volume. After producing the modifications to the HSU model, the updated Mineral Reserve Estimate model was designed and constructed to conform to the HSU distributions as well as interpolated lithium concentrations mapped directly from Leapfrog to the cell centroids of the numerical model.

- Appropriate lateral and vertical extents were identified for expansion of the numerical model domain. The objective was to define model boundaries that were sufficiently removed from the Resource Evaluation Area that they would not significantly constrain the production wellfield simulations, while maintaining the model domain at a practical size (Section 15.4). Additionally, lateral inflow estimates from contributing watersheds (SQM, 2016) coincided directly with the newly expanded model domain.

- Hydraulic and grade conditions were assigned along each boundary of the numerical groundwater model based on an evaluation of sub-watershed boundaries and interpreted surficial contacts alluvium and bedrock following the updated HSU model, as well as through the incorporation of a basin-wide water balance model of the entire basin (SQM, 2016; Sections 15.5 and 15.6).

- Hydraulic and transport properties were evaluated and assigned for each hydrostratigraphic unit in the numerical groundwater model (Section 15.7). A 3D lithium concentration field was mapped directly from the updated resource model in the numerical model domain. Input data included measured brine concentrations and values consistent with the Updated Mineral Resource Estimate (LAC, 2019). In zones with no available data outside of the Resource Evaluation Area, initial lithium concentrations were conservatively set to 50 mg/L.

- Preliminary modeling was previously conducted to determine the potential effect of density dependent flow on the Mineral Reserve Estimate in previous reporting (LAC, 2012). Due to their high computational demand, the exclusion of density effects from the site model would enable more model runs to be conducted for calibration and wellfield simulations. However, variable water density could only be excluded if it would not have a significant effect on the results. Based on the preliminary modeling evaluation, it was concluded that the exclusion of density-dependent flow from the numerical groundwater model would not have a significant effect on the Mineral Reserve Estimate. However, as additional monitoring data are collected in the expanded model domain and if interpretations lead to the reduction of model uncertainty, the current modeling platform will support density-dependent groundwater flow conditions using the density-driven flow (DDF) package.

- The numerical groundwater model was calibrated to current conditions and to representative long-term pumping tests (Section 15.8 and 15.9). A conceptual well design (with initial pumping rates) was input to the model, based on aquifer properties and engineering constraints for brine production efficiency. The wellfield was simulated over the life of mine estimate of 40 years, with well locations and production rates adjusted as required, in order to maximize overall wellfield extraction rate and optimize production well locations for predictive assessment of an Updated Mineral Reserve Estimate (Section 15.10).

- The long-term simulation of the wellfield by use of the Well Package of MODFLOW was used to generate the Mineral Reserve Estimate for lithium. Extracted concentrations from the wells in Groundwater Vistas represent a composite value that is weighted by the transmissivity of each model layer. The simulated wells are assumed to be 100 percent efficient and the screen tops and bottoms are represented as exact elevations.

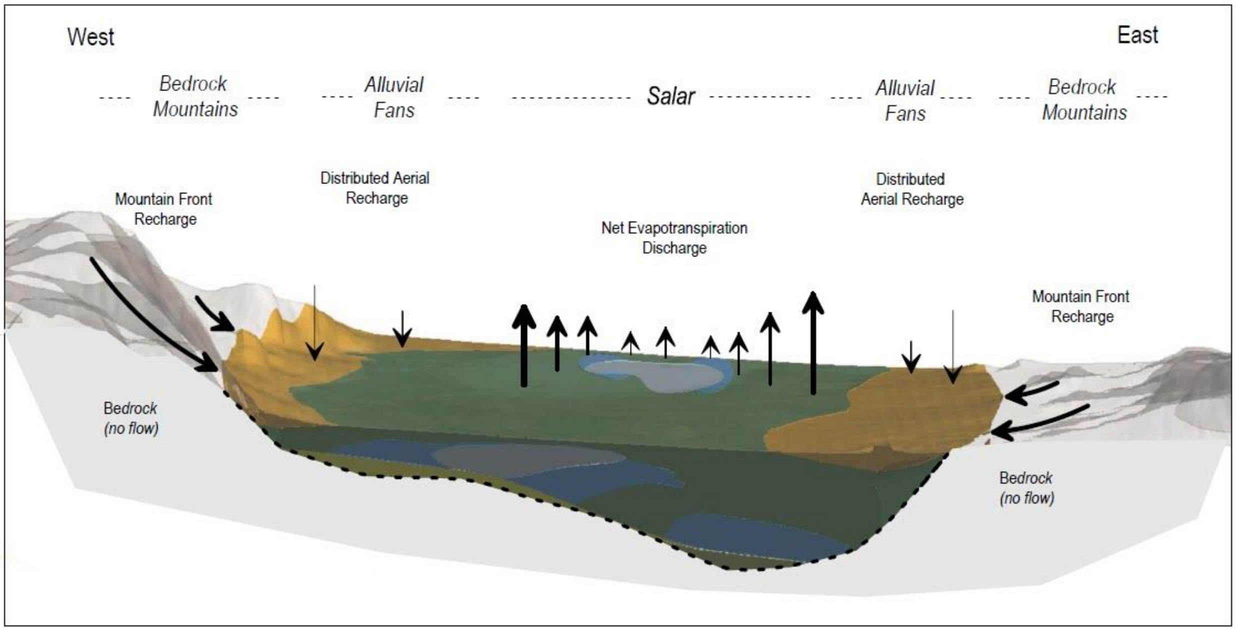
Minera Exar has advised the authors that it is unaware of any environmental, permitting, legal, title, taxation, socio-economic, marketing, or political factors, that may materially affect the Mineral Reserve Estimate contained in this Report.

15.3 CONCEPTUAL MODEL

The conceptual model of recharge and discharge relationships for a closed basin, salar setting is shown on Figure 15.1. The illustration shows the relationship between groundwater recharge from bedrock mountainous areas and distributed aerial precipitation and groundwater discharge through evapotranspiration.

Groundwater inflow occurs at the margins of the basin and moves towards the center of the salar. Inflow is relatively freshwater as it enters the salar and its salinity increases with movement towards the center due to discharge by evapotranspiration. Evapotranspiration is large in the salar perimeter areas where the water table is closest to the surface, and decreases towards the center as brine concentrations increase and salt crust thickens impeding evaporative flux. The driving force for groundwater movement in the salar is a combination of standard hydraulic gradients caused by recharge in elevated areas and discharge due to evaporation in lower areas; and convection due to density gradients.

Figure 15.1 Conceptual Model and Model Boundary Conditions



15.4 NUMERICAL MODEL CONSTRUCTION

The model domain encompasses the sedimentary and evaporite deposits comprising the Cauchari-Olaroz Project area. Extent of the model domain, which covers an area of about 1290 square kilometers, is shown on Figure 15.2.

The domain includes the Resource Evaluation Area and was designed to be large enough to minimize influence of applied boundary conditions on production well simulations. The base of the model domain was set at the top of bedrock basin in which the sediments were deposited. The model simulates equilibrium conditions for groundwater movement and lithium concentration distribution in the sedimentary basin aquifer, with fresh groundwater inflow from drainage sub-basins that surround the salars. Groundwater outflow from the basin occurs via evaporation from the moist salar surfaces. Groundwater movement is generally from the margins of the salars, where mountain front recharge enters the model domain as groundwater underflow, toward the center of the salar. Precipitation recharge, limited due to the large evaporative potential, is included in the model and was generally applied to the model surface outside evaporative zones (Figure 15.1).

15.5 NUMERICAL MODEL MESH

The 3D model domain represented on Figure 15.3 is divided into a grid of node-centered, rectangular prisms or cells. Cells with small lateral dimensions (4.69 m) were assigned in areas of interest within the salar, particularly in the vicinity of production well locations and transient calibration targets, while larger elements (531 m) were assigned near the edges of the model domain, farthest from the area of interest. Vertically, the domain was divided into 25 model layers, each of which consists of a variable number of cells (between 3,149 and 54,417 cells) depending on the presence of bedrock at depth. The entire numerical model mesh totals 805,808 nodes.

Thicknesses of model layers were designed to more refined near land surface to accommodate the evaporative surface and gradually increase in thickness with depth. Model layers directly incorporate the HSU distribution from the updated Mineal Resource model and account for transitions between HSUs, as well as zonation of aquifer parameters in particular HSUs for model calibration purposes.

Figure 15.2 Numerical Model Domain and Sub-basins Map

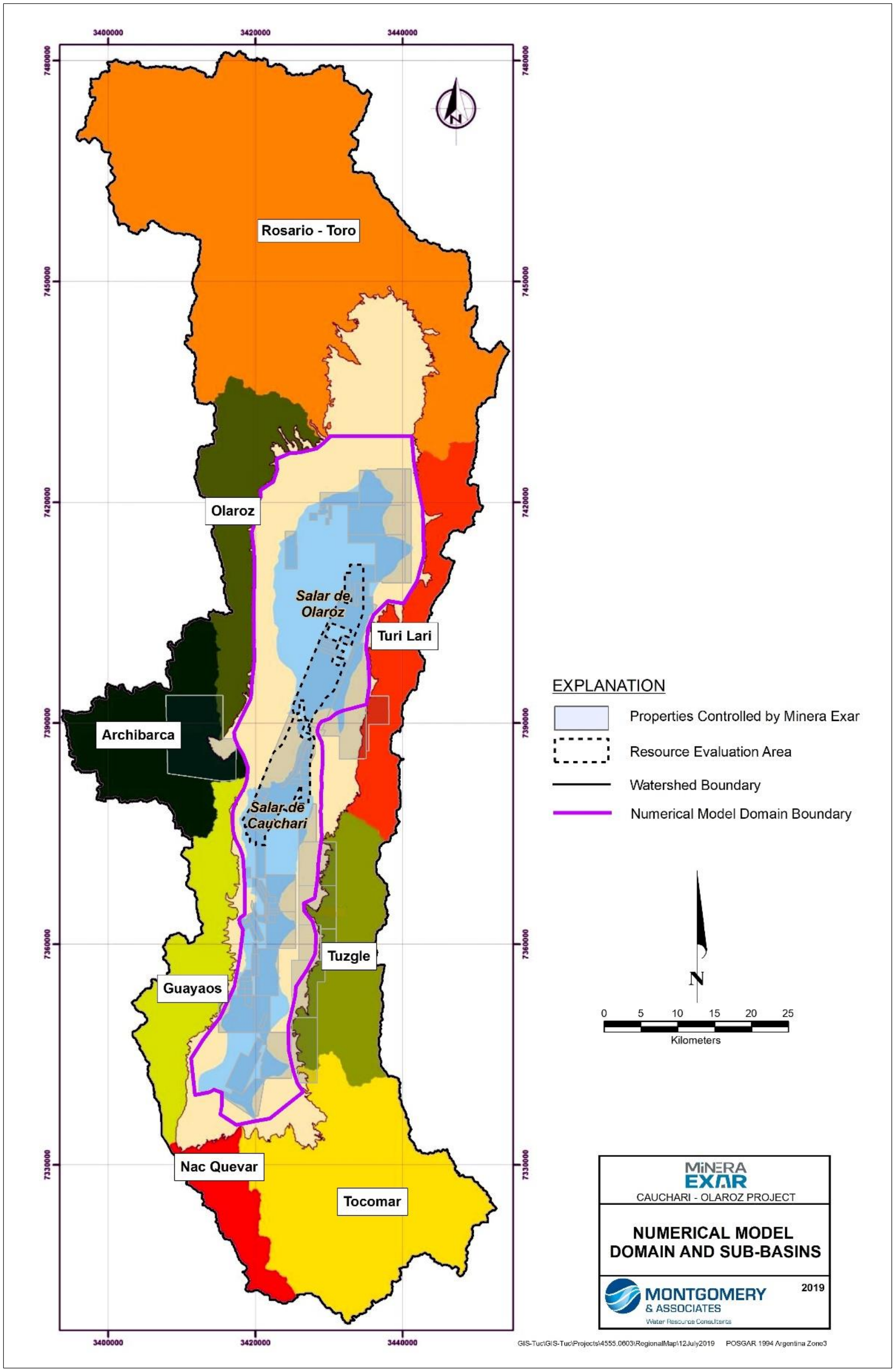
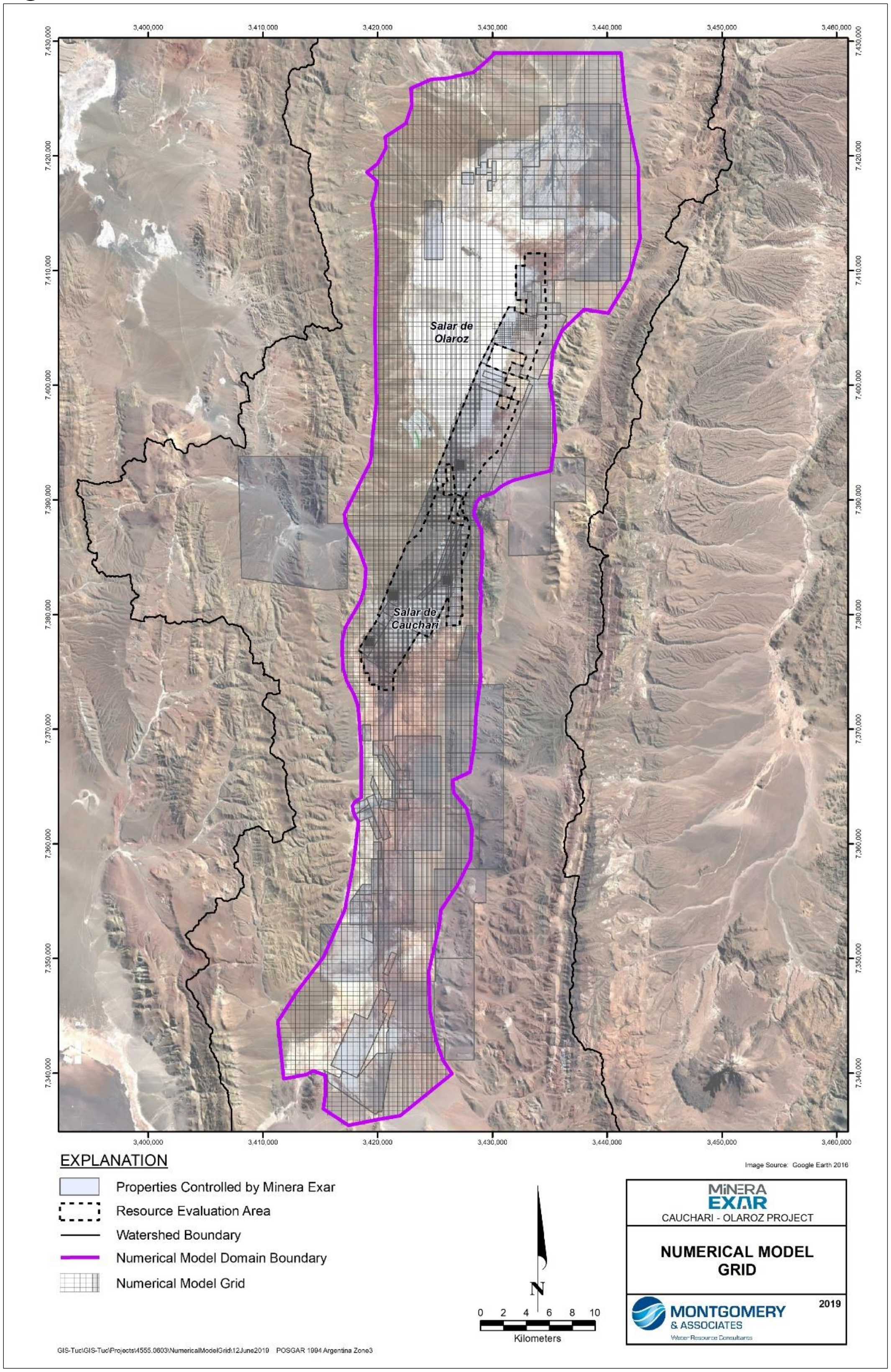


Figure 15.3 Numerical Model Grid



15.6 NUMERICAL MODEL BOUNDARY CONDITIONS

Boundary conditions that are consistent with the conceptual model were applied in the numerical model. As described in Section 15.1, the aquifer is recharged by a combination of groundwater underflow from upland, mountain front recharge and surface infiltration of precipitation. Under natural conditions, all of the influent groundwater is consumed by evaporation that occurs in the center and along the margins of the salar.

The numerical boundary conditions that were applied to simulate these groundwater flow conditions are summarized as follows:

- Top Boundary – Similar to hydrologic modeling reported by LAC (2012), recharge due to infiltration of precipitation was applied at a temporally constant rate of 10 mm/yr over the model domain that lies outside of the active zones of modeled evaporation (i.e., outside of the salar nucleus and immediate salar margins). The modeled zones of evaporation and recharge are shown on Figure 15.4. Within the active zones of modeled evaporation, in regions where depth to the water table was lower than the extinction depth, evaporation (outward flux) was applied in a linear fashion from the extinction depth to land surface using the evapotranspiration (EVT) package of MODFLOW. Potential evaporation (ETp), the rate of evaporation when the water table is coincident with the ground surface, of 2.2 mm/d, 4.3 mm/d, and 5.7 mm/d was assigned to the salar nucleus and margins respectively. Additionally, evaporative extinction depths varied as a function of interpreted water density and proximity to the salar nucleus; specifically, 0.25 m was assigned in the salar nucleus and 0.5 m to 0.7 m was specified along the salar margin. Actual evaporation was simulated as a function of depth to the water table, ranging from zero where the water table was below the extinction depth to ETp where the water table was at ground surface, and has virtually no effect on potential lithium recovery. During simulation, therefore, net recharge within the salar region of the model domain varies spatially and temporally in response to changes in depth to the water table.

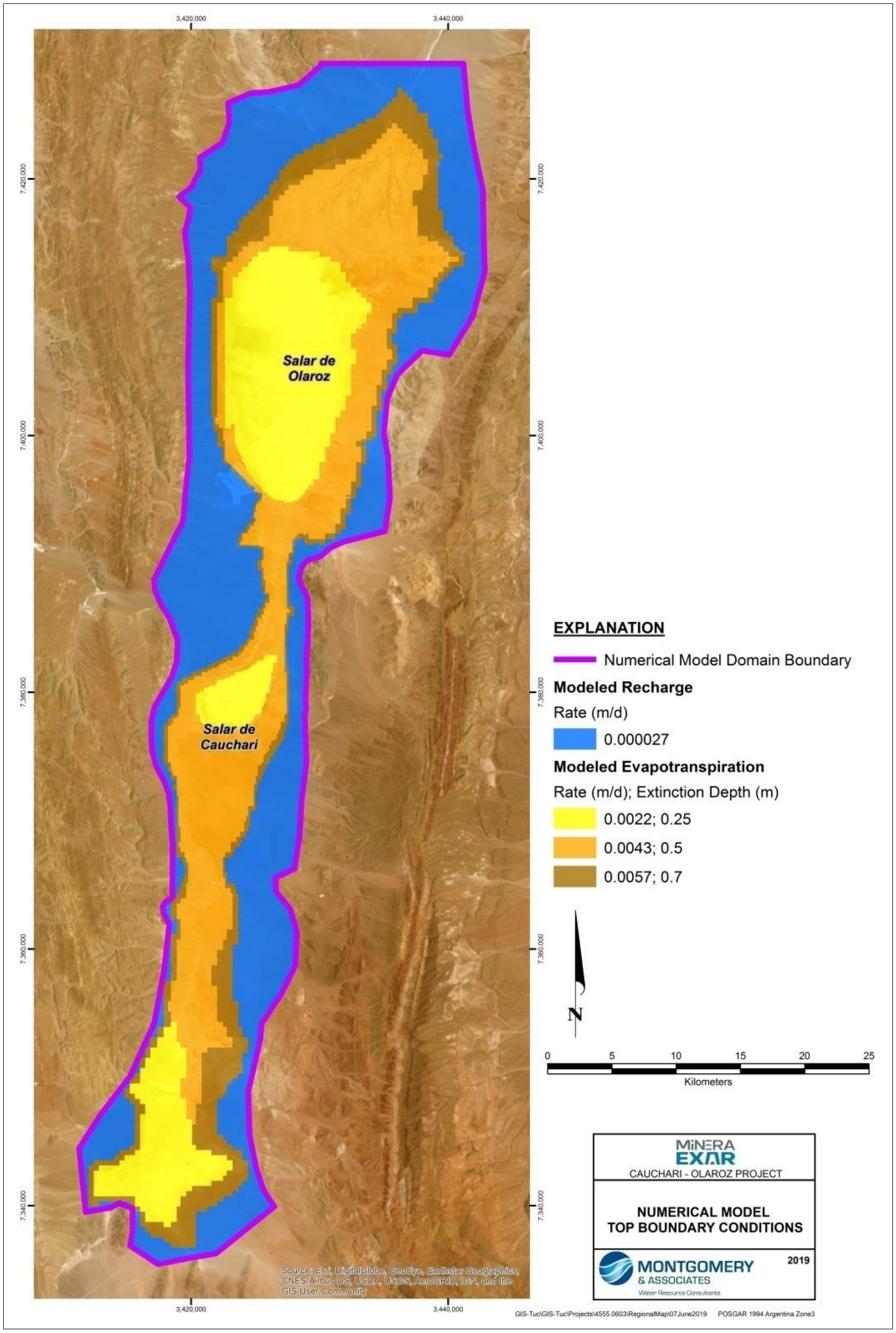
- Lateral Boundary – Except as noted below for select model cells of model layer 1, all cells in model layers along the lateral boundaries of the domain are conservatively assigned no flow boundary conditions, consistent with the bedrock lithology and its comparable low permeability. Therefore, neither fresh groundwater nor brine can enter or exit the model domain in any of these regions.

- Specific locations where boundary conditions were applied along the lateral boundaries of the model are described as mountain front recharge. The quantity of mountain front recharge in sub-basin is shown in Table 15.1 and is consistent with the previous Mineral Reserve Estimate model, following the water balance analysis reported by SQM (2016). Incoming groundwater is conservatively assumed to be fresh, with a lithium concentration of zero.

- Bottom Boundary – The entire bottom slice of the model was assigned as a no flow boundary condition.

TABLE 15.1 SUMMARY OF MOUNTAIN FRONT RECHARGE	
Sub-basin Identifier	**Recharge (L/s)**
Rosario – Toro	1,193
Turi Lari	144
Tuzgle	108
Tocomar	611
Nac Quevar	59
Guayaos	102
Archibarca	87
Olaroz	173
Total	**2,477**

Figure 15.4 Numerical Model Top Boundary Conditions



15.7 HYDRAULIC PROPERTIES

Hydraulic and transport properties used in the updated numerical model started with those determined in the prior models reported by LAC (2012 and 2017). Hydraulic properties include hydraulic conductivity in the three cardinal directions (Kx, Ky, and Kz), specific storage (Ss), and specific yield (Sy). These parameters were adjusted for specific zones to aid in subsequent recalibration of the model for the Updated Mineral Reserve Estimate. The range of assigned hydraulic properties in the model, shown in Table 15.2, conform to the range of values determined from pumping tests provided in Appendix 1, prior model calibrations, and published literature values for corresponding salar sediments and evaporites. Brief summaries of the hydraulic and transport properties are provided below.

- Hydraulic Conductivity – The hydraulic conductivity (K) distribution used in the model was determined by (i) analysis of available pumping test data in the screened HSUs and (ii) calibration of the model in steady-state and transient. Without evidence of horizontal anisotropy from testing results, Kx is considered equal to Ky; for reporting purposes horizontal hydraulic conductivity is termed radial hydraulic conductivity (Kr). Vertical anisotropy was evident from analysis of testing results, and accordingly for model calibration, was applied in the vertical direction with proportional ratios of Kz/Kr for individual HSUs where appropriate. Where anisotropy was incorporated for calibration purposes, the ratios of Kz/Kr consider results from pumping tests and estimates from literature values for similar sedimentary regimes. Sections showing representative Kr distributions as applied in the current model are provided on Figure 15.5.

- Specific Storage – The range of specific storage assigned in the model are based on results from pumping tests in addition to estimates from literature values for similar sedimentary regimes. The lower end of the range is near the compressibility of water, which indicates a rigid, low porosity material with small compressibility of the rock mass. The upper end of the range is indicative of higher porosity and larger compressibility of the rock mass.

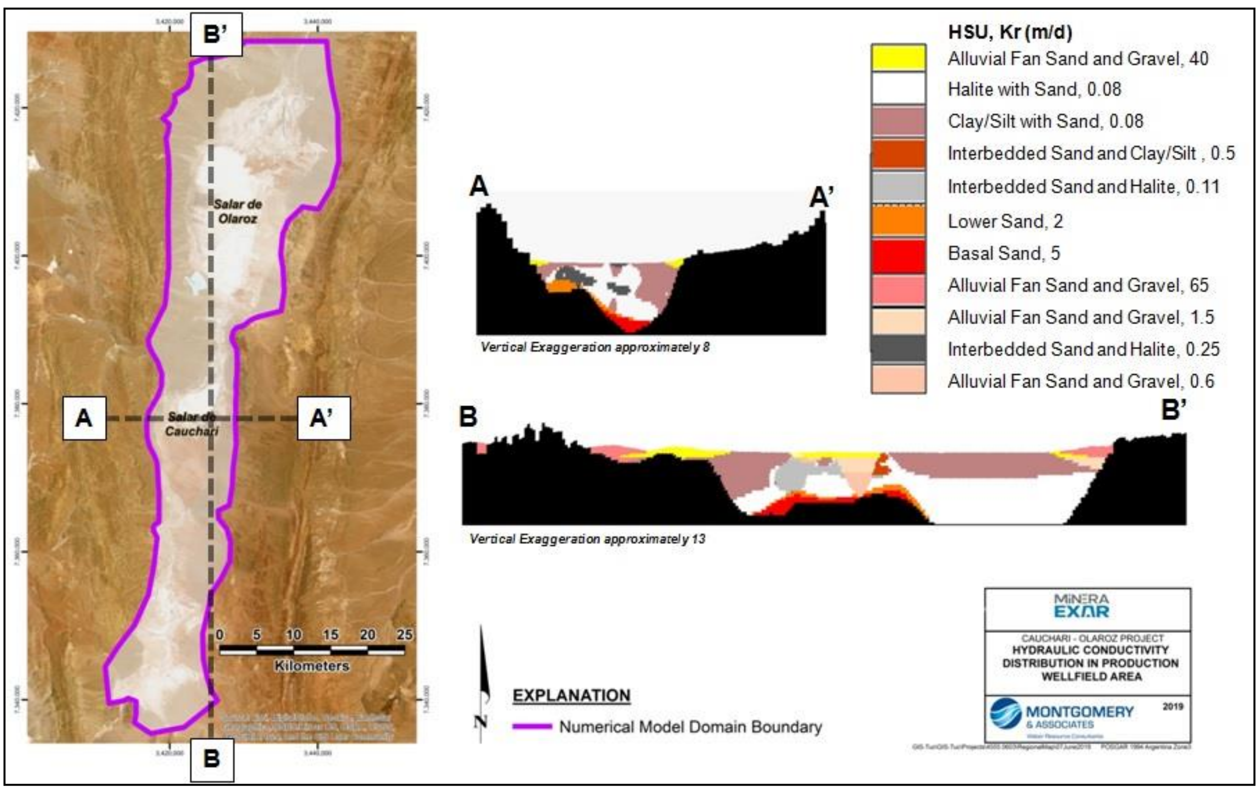
- Specific Yield and Effective Porosity – Assigned values of Specific Yield correspond to the updated HSU model, measured values determined from laboratory analyses of core samples from previous studies, and the overall average Specific Yield is consistent with the Updated Resource Estimate. Effective Porosity is assumed to be equivalent to Specific Yield and varies spatially based on the distribution of HSUs.

- Dispersion – For modeling the transport of dissolved lithium concentrations in brine, assigned values of dispersivity correspond to 5 m for longitudinal dispersivity, 0.5 m for transverse dispersivity, and 0.05 m for vertical dispersivity. Molecular diffusion was not included in the Updated Mineral Reserve model because it is considered to be negligible in large-scale regional models.

TABLE 15.2 SUMMARY OF ASSIGNED AQUIFER PARAMETER ESTIMATES					
Hydrostratigraphic Unit	**Horizontal Hydraulic Conductivity (Kr) (m/d)**		**Ratio Vertical to Horizontal Hydraulic Conductivity Estimate (Kz/Kr)**	**Specific Storage (1/m)**	**Specific Yield and Effective Porosity (%)**
	Minimum	**Maximum**			
Alluvial Fan Sand and Gravel	0.2*	65	0.33 to 1	1.0E-05 to 5.0E-04	20
Interbedded Sand and Clay/Silt	0.5	0.5	1	1.0E-07	11
Clay/Silt with Sand	0.08	0.08	1	1.0E-06	7
Halite with Sand	0.08	0.08	1	1.0E-07	8
Interbedded Sand and Halite	0.11	0.25	0.1 to 1	1.0E-07 to 5.0E-06	12
Lower Sand	2	2	1	1.0E-06	15
Basal Sand	5	5	1	1.0E-06	16

***Note:* * *Kr decreases with depth to the minimum value presented.*

Figure 15.5 Representative Hydraulic Conductivity Distribution in Production Wellfield Area



15.8 PRE-DEVELOPMENT MODEL CONDITIONS

The current or pre-development groundwater system in the basin was assumed to be in equilibrium with groundwater inflows and approximately equivalent to groundwater outflows, without pumping or temporal changes in the hydrologic stresses. Aligned with the conceptual model, simulated groundwater inflow is comprised largely of mountain front recharge inflow from margins of the basin, underflow from neighboring watersheds, and small amounts of areal recharge from precipitation infiltration. Outflow consists of evapotranspiration (primarily evaporation from the salar surface and with minimal transpiration from scant vegetation).

The pre-development model was calibrated to representative groundwater levels measured at 27 groundwater level monitoring locations in the basin representing 2018 conditions (Table 15.3). The steady-state calibration relied on these spatial values as they are generally composite water levels for wells with screened intervals completed to near land surface; additionally, the potentiometric surface represented by the water levels shows groundwater flow directions consistent with the conceptual model of the basin. Groundwater levels from wells with deeper and more isolated completions were also examined for steady-state calibration purposes and corresponding potentiometric maps show similar patterns of groundwater movement. However, these water levels from deeper parts of the brine aquifer require more complicated pressure head corrections to equivalent water level elevations, and lacking supporting water density measurements, were determined insufficient for current modeling calibration purposes.

Aquifer parameters for pre-development model calibration were varied to achieve an acceptable calibration to the representative groundwater levels. After incorporating model zonation methods of aquifer parameters and trial and error adjustment modeling techniques, the simulated groundwater levels are judged to reasonably match the measured data representing 2018 pre-development conditions. A mean error of -2.5 m was reported for the steady-state flow solution by LAC (2017) for the previous Mineral Reserve Estimate model as compared to a mean error of - 2.2 m for the revised model used in this updated modeling analysis. The maximum residual (observed minus simulated groundwater elevation) is within 7 m. Given these statistics, and provided the magnitude of the apparent error for the updated model compared to the previous model, the larger inflows incorporated from the SQM water balance (2016), as well as the exclusion of equivalent water level elevation corrections (described in Section 16.2), it was concluded that the steady-state distribution of heads could be reasonably used as initial conditions in the updated model for predictive model simulations.

TABLE 15.3 **STEADY-STATE MODEL RESIDUALS**						
Well Identifier	**Easting (m)**	**Northing (m)**	**Observed Groundwater Elevation (masl)**	**Computed Groundwater Elevation (masl)**	**Residual (m)**	**Source**
SL-001	3424377	7378282	3936.86	3938.15	-1.29	Minera Exar
SL-002	3427273	7396180	3934.51	3937.41	-2.90	Minera Exar
SL-004B	3423001	7379362	3936.92	3937.17	-0.25	Minera Exar
SL-006	3427230	7392980	3938.33	3936.81	1.52	Minera Exar
SL-007	3429894	7398465	3935.50	3936.04	-0.54	Minera Exar
SL-009	3432230	7407612	3934.26	3937.04	-2.78	Minera Exar
SL-010	3429367	7395232	3935.72	3936.18	-0.46	Minera Exar
SL-13	3426671	7379792	3939.69	3940.11	-0.42	Minera Exar
SL-014	3426361	7387640	3936.70	3940.63	-3.93	Minera Exar
PE-11	3427395	7391301	3937.14	3938.75	-1.61	Minera Exar
DDH-07	3426159	7388920	3936.23	3940.54	-4.31	Minera Exar
DDH-09	3427293	7386922	3937.21	3940.92	-3.71	Minera Exar
DDH-02	3425984	7385599	3937.95	3940.84	-2.89	Minera Exar
PT-1A	3427326	7383616	3936.96	3940.77	-3.81	Minera Exar
PF-3B	3425969	7382974	3937.58	3939.35	-1.77	Minera Exar
PF-1B	3423901	7380849	3937.28	3937.91	-0.63	Minera Exar
PT-2	3419261	7378454	3938.20	3941.14	-2.94	Minera Exar
DDH-04A	3421093	7377243	3936.80	3939.70	-2.90	Minera Exar
PE-15	3419086	7376655	3937.07	3940.34	-3.27	Minera Exar
DDH-15	3419253	7375340	3937.53	3939.83	-2.30	Minera Exar
DDH-05	3421965	7367860	3937.70	3942.22	-4.52	Minera Exar
PE-08	3422504	7363500	3937.60	3944.20	-6.60	Minera Exar
DDH-17	3418305	7343262	3960.71	3959.42	1.29*	Minera Exar
CAU02D	3424385	7376814	3938.65	3939.85	-1.20	Adv. Lithium, 2018
CAU03D	3421874	7373649	3936.90	3939.72	-2.82	Adv. Lithium, 2018
CAU06R	3423531	7370126	3937.98	3941.91	-3.93	Adv. Lithium, 2018
CAU12D	3421708	7374690	3938.83	3939.84	-1.01	Adv. Lithium, 2018

***** *Reported as flowing well; the observed value was assumed to be greater than land surface and calibrated in Groundwater Vistas using a "censoring" target, where a residual of 0 is given if the simulated value is greater than the observed.*

The simulated pre-development water budget for the updated model is provided in Table 15.4. Predicted evaporation from the salar surfaces is 228,567 m^3/d compared to 228,595 m^3/d of applied mountain front recharge and direct recharge. The resulting water balance for the pre-development model shows an acceptable error of approximately 28 m^3/d, or about 0.01 percent.

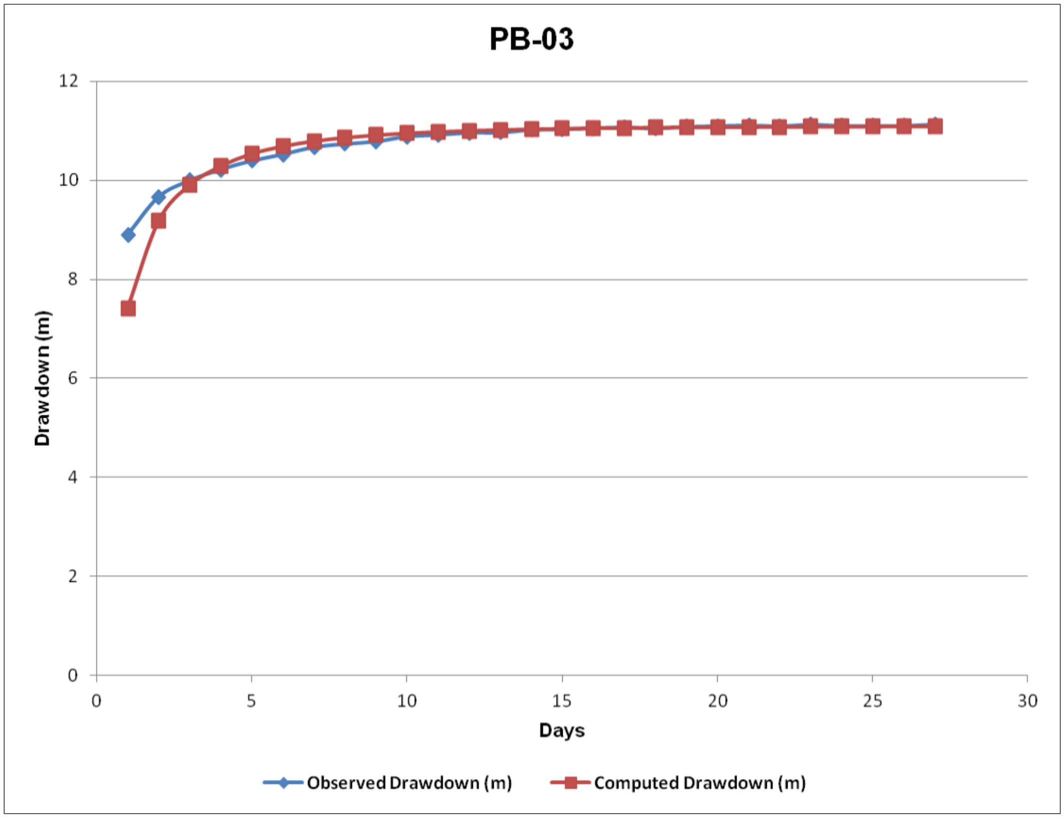
TABLE 15.4 SUMMARY OF MODEL BOUNDARY FLUXES	
Water Balance Component	**Modeled Flux (L/s)**
Mountain Front Recharge	2,477
Areal Recharge	168.8
Evaporation	2,645.5
Error	0.3
% Error	0.01%

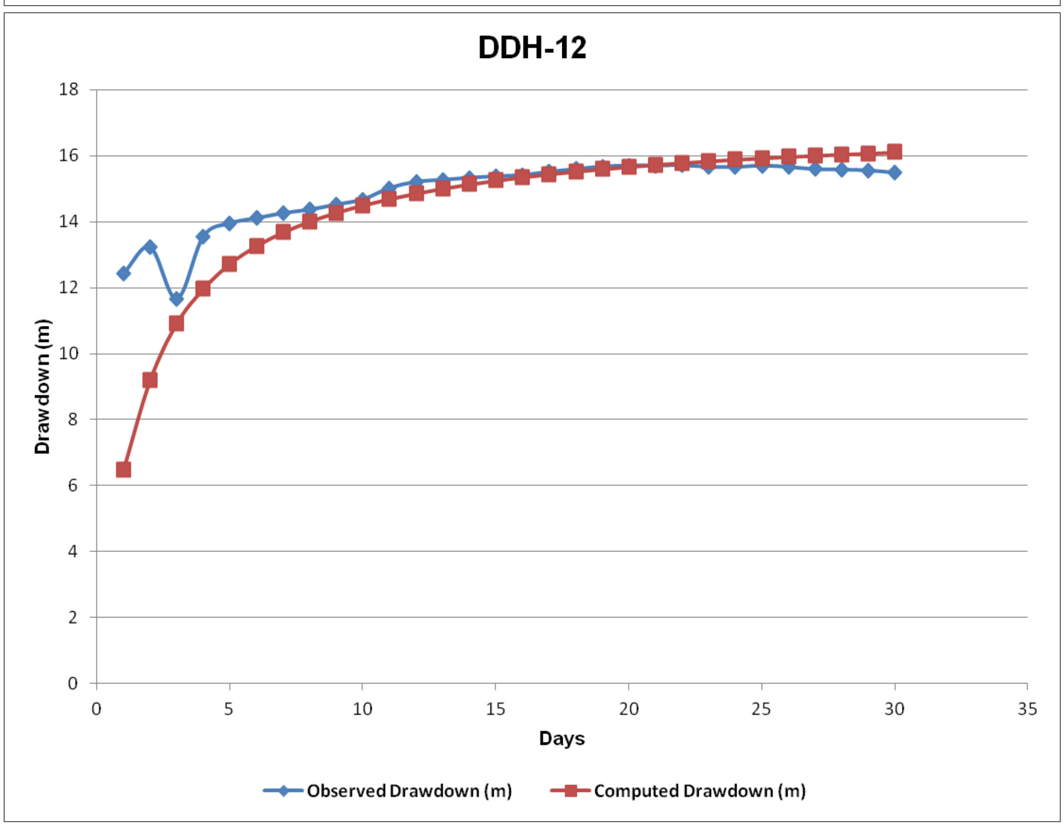
15.9 TRANSIENT MODEL CALIBRATION

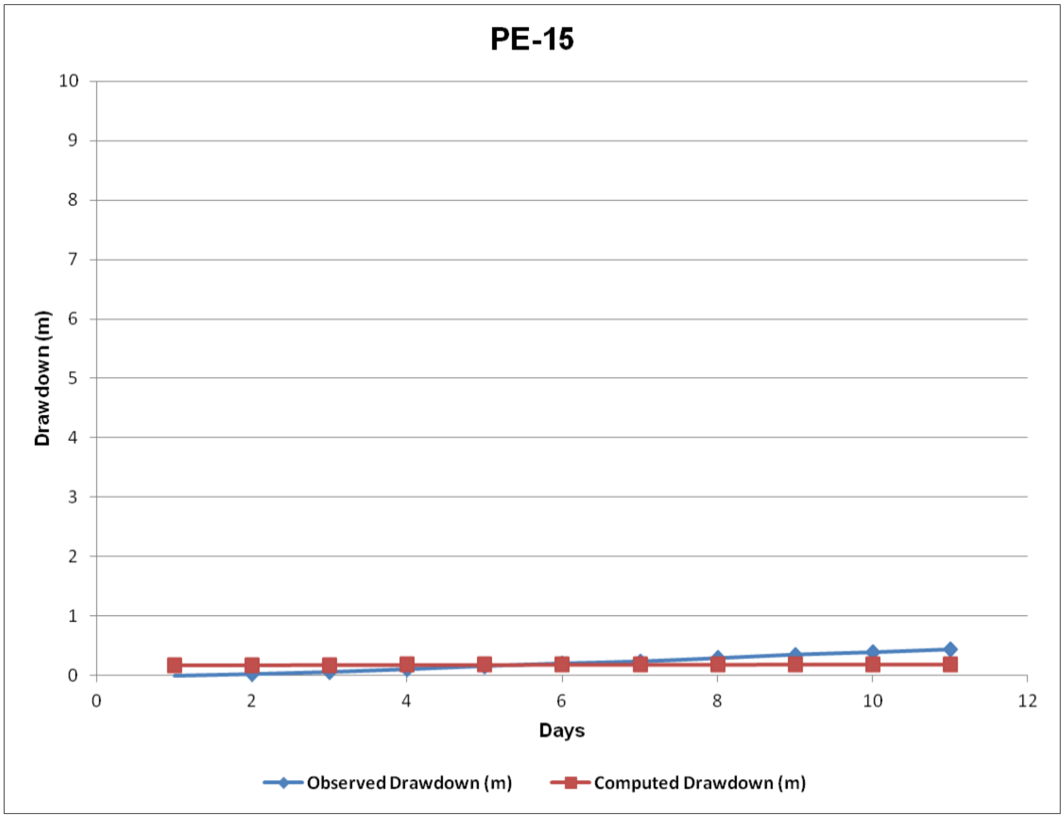
Transient model calibration in the updated numerical model for the Mineral Reserve Estimate incorporates calibration of aquifer parameters derived using analytical results from long-term pumping tests conducted in 2011 (LAC, 2012) and more recent pumping tests conducted by Minera Exar in 2018 and 2019 (Appendix 1). As a verification analysis of model calibration, the updated model was operated under transient conditions for simulation and comparison to four pumping tests: a 27-day pumping test at well PB-03A, a 30-day pumping test at well PB-04, an 11-day pumping test at well PB-06A, and a 7-day pumping test at well W17-06. Model calibration using these pumping tests focused on observation wells completed in similar HSUs as the pumped well.

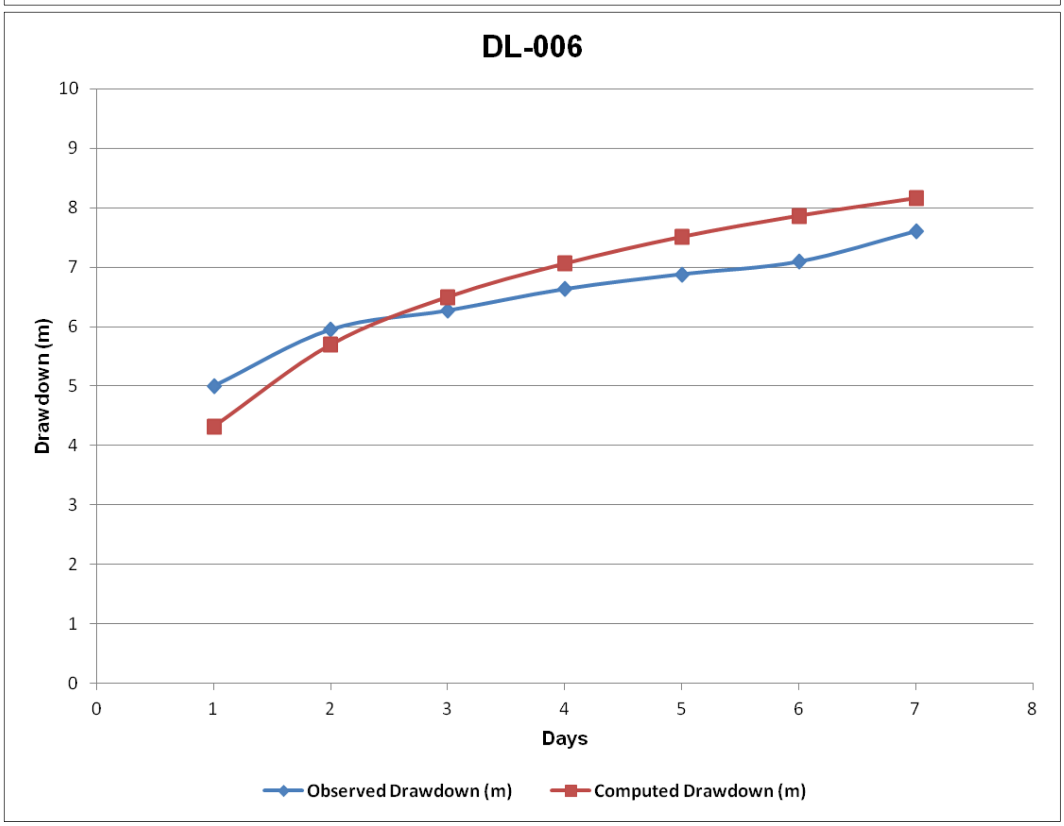
Results of the modeled and observed results for representative pumping tests are presented on Figure 15.6. Model statistics for transient calibration correspond to a scaled RMS of 5.4 percent and mean residual of 0.13 m; the values of these statistical parameters indicate a sufficient transient calibration for simulated versus measured conditions.

Figure 15.6 Measured and Simulated Drawdown Responses for Representative Pumping Tests






PE-15
Drawdown (m)
Days
Observed Drawdown (m)
Computed Drawdown (m)


DL-006
Drawdown (m)
Days
Observed Drawdown (m)
Computed Drawdown (m)

After transient model calibration using results of pumping tests, the updated model was further verified by simulating initial concentrations of lithium at six locations representing recently completed production wells for comparison to measured concentrations. The measured and simulated results are shown in Table 15.5 and are judged to be in reasonable agreement for the purposes of operating the model as a predictive tool for the Mineral Reserve Estimate.

TABLE 15.5
INITIAL MEASURED AND SIMULATED LITHIUM CONCENTRATIONS AT EXISTING PRODUCTION WELLS

Well	Pumping Rate (L/s)	Measured Lithium Concentrations (mg/L)	Simulated Lithium Concentrations (mg/L)	Percent Difference
W-04	25.3	683	679	0.6%
W11-06	22.5	750	720	4.1%
W17-06	29.6	582	560	3.9%
W18-05	22.6	766	797	-4.0%
W18-06	15.8	575	567	1.4%
W18-23	26.9	720	698	3.1%

15.10 UPDATED MINERAL RESERVE ESTIMATE MODEL RESULTS

Once completing calibration and verification procedures, the updated model was used to predict production of LCE for a 40-year wellfield operational simulation. A series of trial simulations were conducted to verify results of modeling for the prior Mineral Reserve Estimate and to select locations for production pumping wells within the expanded model domain of the Resource Evaluation Area. Pumping rates and durations were applied at each simulated production well during the simulation in order to meet the operational constraints of achieving overall wellfield production rate for a minimum of processed 40,000 tpa LCE and a minimum average lithium concentration of 590 mg/L. The layout of the simulated wellfield is shown on Figure 15.7.

The pumping schedule for the wellfield allowed for a ramping up during the initial year of production simulation period (Year 1) using 23 simulated wells, either completed or planned by Minera Exar. After Year 1, an additional 33 wells were added to the wellfield in order to meet or exceed the 40,000 tonnes LCE process target through Year 40. Annual projections are shown on Table 15.6 for wellfield production rate, lithium concentrations, and mass of lithium and LCE delivered from the wellfield and after applying processing efficiency. Appendix 2 provides per well simulated production rates, lithium concentrations, and drawdown for each well during the 40-year production period. Lithium concentrations and drawdown results represent composite values which are weighted by the amount of simulated extraction from each model layer, in accordance with the transmissivity of the screened HSUs. A map showing estimated drawdown in the upper layer of the model for the simulated wellfield area after 40 years of operation is included in Appendix 2.

Predicted brine production from the simulated wellfield, shown on Figure 15.8, ranges from 462 L/s during Year 1 of operation using Phase 1 wells, to 903 L/s during production Year 2 through 40 using the additional Phase 2 wells. Average concentration of lithium brine delivered from the simulated wellfield is included on Figure 15.8 and ranges from 615 mg/L from Year 1 to 598 mg/L through Year 40 of wellfield operations. The average concentration for the 40-year production period is 607 mg/L.

The numerical model utilizes an adaptive time stepping (ATS) scheme which varies the time step length depending on the rate of convergence; the predicted cumulative mass of lithium produced was extracted from the model results in half-year increments. The results were then multiplied by a conversion factor of 5.322785 to compute equivalent LCE. The overall efficiency of brine processing to produce LCE provided by Minera Exar is projected as 53.7 percent. To account for processing efficiency, the net amount of LCE produced was computed by multiplying the LCE extracted from the wellfield by 53.7 percent. The resulting values from each production well were then summed for each production year to determine the predicted annual LCE production. Figure 15.9 shows yearly production as LCE assuming processing efficiency of 53.7 percent. During the entire 40-year simulated production period the cumulative mass of LCE, after accounting for LCE processing efficiency, is projected to average 48,800 tonnes per year.

Figure 15.7 Simulated Production Wellfield for Updated Mineral Reserve Estimate

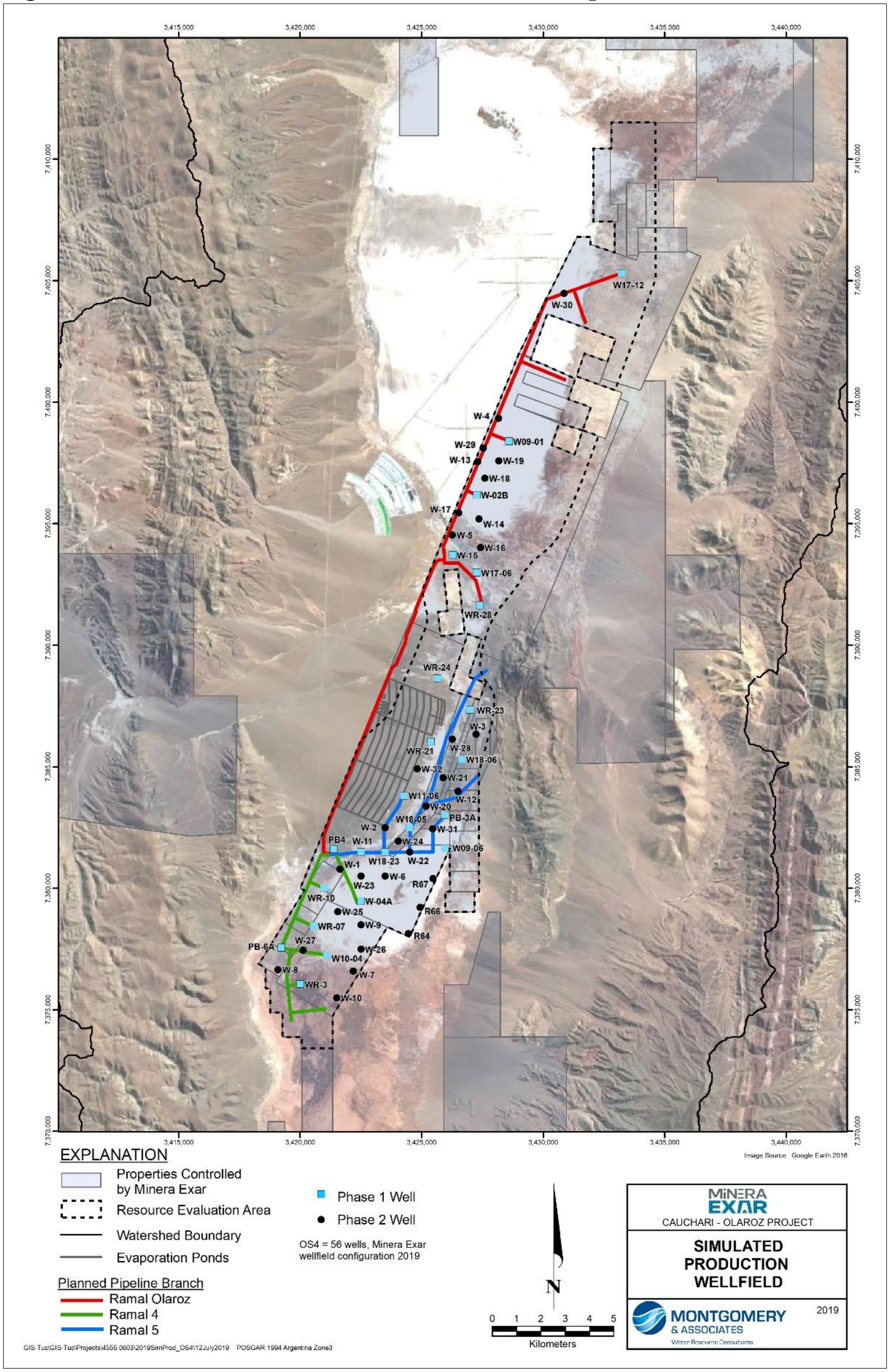


TABLE 15.6
PROJECTED ANNUAL RESULTS FROM UPDATED MINERAL RESERVE ESTIMATE MODEL

Wellfield Operation Year	Total Wellfield Delivery Rate (L/s)	Lithium		LCE	
		Average Wellfield Concentration (mg/L)	Total Wellfield Delivery Mass (tonnes)	Total Unprocessed Mass (tonnes)	Total Processed Mass (tonnes)
1	462	615	9,000	47,900	25,600
2	903	617	17,600	93,700	50,200
3	903	617	17,600	93,700	50,200
4	903	616	17,500	93,100	50,100
5	903	615	17,500	93,100	50,100
6	903	615	17,500	93,100	50,000
7	903	614	17,500	93,100	50,000
8	903	614	17,500	93,100	49,900
9	903	613	17,500	93,100	49,900
10	903	612	17,400	92,600	49,800
11	903	612	17,400	92,600	49,800
12	903	611	17,400	92,600	49,700
13	903	611	17,400	92,600	49,700
14	903	610	17,400	92,600	49,700
15	903	610	17,400	92,600	49,600
16	903	609	17,300	92,100	49,600
17	903	609	17,300	92,100	49,500
18	903	608	17,300	92,100	49,500
19	903	607	17,300	92,100	49,400
20	903	607	17,300	92,100	49,400
21	903	606	17,300	92,100	49,400
22	903	606	17,300	92,100	49,300
23	903	606	17,200	91,600	49,300
24	903	605	17,200	91,600	49,200
25	903	605	17,200	91,600	49,200
26	903	604	17,200	91,600	49,200
27	903	604	17,200	91,600	49,100
28	903	603	17,200	91,600	49,100
29	903	603	17,200	91,600	49,100
30	903	603	17,200	91,600	49,000
31	903	602	17,100	91,000	49,000
32	903	602	17,100	91,000	49,000
33	903	601	17,100	91,000	48,900
34	903	601	17,100	91,000	48,900
35	903	601	17,100	91,000	48,900
36	903	600	17,100	91,000	48,800

TABLE 15.6
PROJECTED ANNUAL RESULTS FROM UPDATED MINERAL RESERVE ESTIMATE MODEL

Wellfield Operation Year	Total Wellfield Delivery Rate (L/s)	Lithium		LCE	
		Average Wellfield Concentration (mg/L)	Total Wellfield Delivery Mass (tonnes)	Total Unprocessed Mass (tonnes)	Total Processed Mass (tonnes)
37	903	600	17,100	91,000	48,800
38	903	599	17,100	91,000	48,800
39	903	599	17,000	90,500	48,700
40	903	598	17,000	90,500	48,700
40-Year Averages	**892**	**607**	**17,100**	**90,900**	**48,800**

Abbreviations*: mg/L = milligrams per liter; tonnes = tonnes (metric), rounded to the nearest 100 tonnes.*
Notes*: 1) The mass and concentration of lithium are derived using the 2019 updated Mineral Reserve Estimate model; wellfield configuration OS4 shown on Figure 15.7;*
2) The average concentrations are weighted by the extraction rate at each well;
3) To obtain the recoverable tonnage for Lithium Carbonate Equivalent (LCE), the predicted mass of Lithium is multiplied by a factor based on the atomic weights of each element in LCE to obtain the final compound weight. The factor used is 5.322785 to obtain LCE mass from Lithium mass;
4) The LCE process calculation assumes an efficiency of 53.7 percent.
5) The first production year (year 0 of the model simulation) is presented as Wellfield Operation Year 1.

Figure 15.8 Predicted Average Pumping Rate and Lithium Concentration from Simulated Wellfield

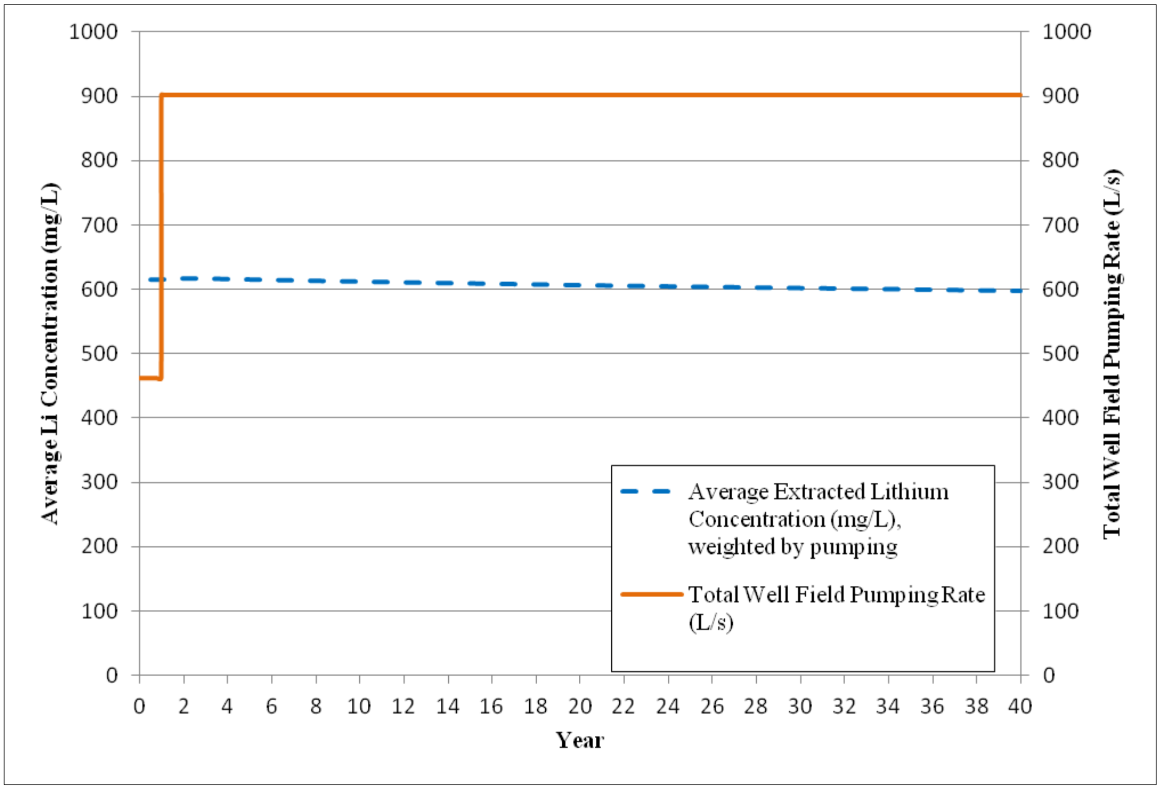
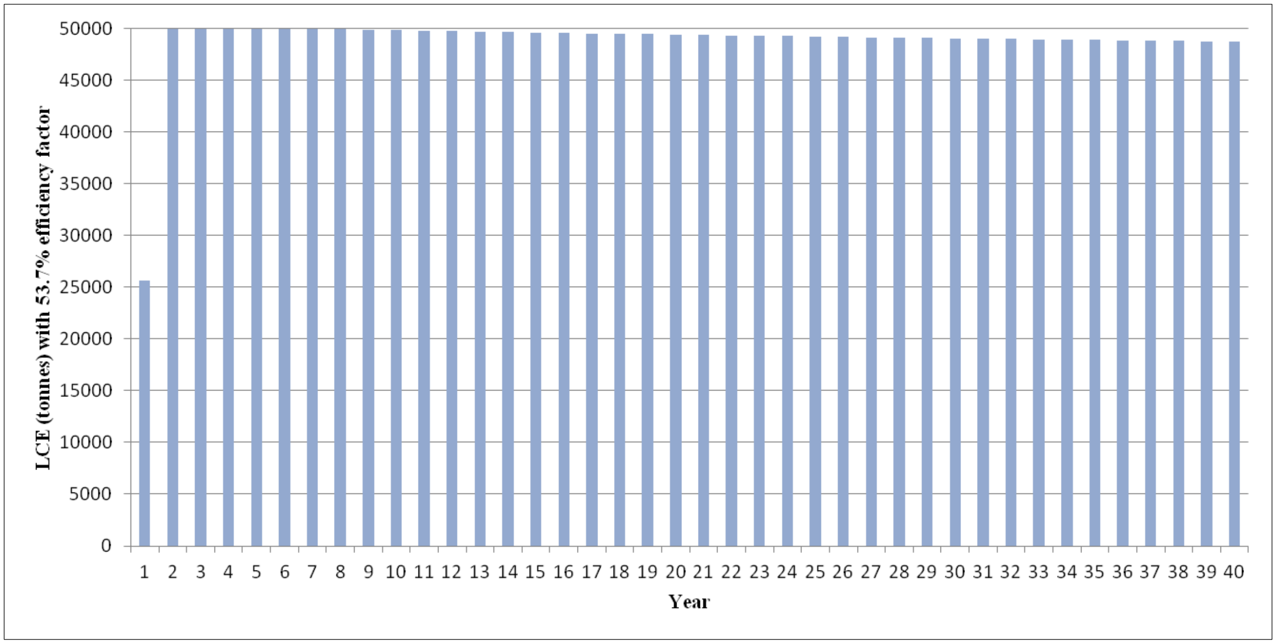


Figure 15.9 Predicted Annual LCE Production from Simulated Wellfield (Assuming 53.7% Process Efficiency)



Note: *The first production year (year 0 of the simulation) is shown as Year 1.*

15.11 STATEMENT FOR LITHIUM MINERAL RESERVE ESTIMATE

The updated numerical groundwater model was used to evaluate the potential to produce LCE for 40 years from a wellfield constructed with 56 simulated production wells within the Resource Evaluation Area of the Project (Figure 15.7). Based on predictive simulations using the groundwater model, the results are provided in Table 15.7 as a Mineral Reserve Estimate of the 40-year simulated production period and duration of a life of mine plan. The Mineral Reserve Estimate is inclusive of the reported Mineral Resource Estimate (Table 14.5 and Table 14.6) (Section 14.4).

TABLE 15.7
SUMMARY OF ESTIMATED PROBABLE AND PROVEN MINERAL RESERVES
(WITHOUT PROCESSING EFFICIENCY)

Mineral Reserve Classification	Production Period (Years)	Brine Pumped (m^3)	Average Lithium Concentration (mg/L)	Lithium Metal (tonnes)	LCE (tonnes)
Proven	0 through 5	156,875,201	616	96,650	514,450
Probable	6 t0 40	967,767,934	606	586,270	3,120,590
Total	**40**	**1,124,643,135**	**607**	**682,920**	**3,635,040**

Notes:

1) *The Mineral Reserve Estimate has an effective date of May 7, 2019.*
2) *Lithium carbonate equivalent ("LCE") is calculated using mass of LCE = 5.322785 multiplied by the mass of Lithium Metal.*
3) *The conversion to LCE is direct and does not account for estimated processing efficiency.*
4) *The values in the columns for "Lithium Metal" and "LCE" above are expressed as total contained metals.*
5) *The Production Period is inclusive of the start of the model simulation (Year 0).*
6) *The average lithium concentration is weighted by per well simulated extraction rates.*
7) *Tonnage is rounded to the nearest 10.*
8) *Comparisons of values may not be equivalent due to rounding of numbers and the differences caused by use of averaging methods.*

The Proven and Probable Mineral Reserve Estimate for the 40-year production period is summarized in Table 15.7 without factoring estimated processing efficiency. The Measured and Indicated Mineral Resources (Section 14.4) correspond to the total amount of lithium enriched brine estimated to be available within the aquifer while the Proven and Probable Mineral Reserves represent a portion of the Mineral Resource Estimate that can be extracted under the proposed pumping schedule and wellfield configuration. Therefore, the Mineral Reserve Estimate is not "in addition" to the Mineral Resource Estimate, and instead, it simply represents a portion of the total Mineral Resource that is extracted during the life of mine plan.

The authors believe the Mineral Reserve Estimate has been conservatively modeled and represents a Proven Mineral Reserve for Year 1 through 5 of full-scale extraction wellfield pumping and a Probable Mineral Reserve for Years 6 to 40 of full-scale extraction wellfield pumping. The division between Proven and Probable Mineral Reserves is based on:
1) sufficiently short duration of wellfield extraction to allow a higher degree of predictive confidence, yet long enough to enable significant production, and 2) a duration long enough to

enable accumulation of a strong data record to allow subsequent conversion of Probable Mineral Reserves to Proven Mineral Reserves.

Provided a detailed data record for monitoring wellfield operations and further updates to model calibration, the authors believe it could be possible to achieve partial conversion of Probable to Proven Mineral Reserves during the initial five years of full-scale operation and assessment of build-out of the extraction wellfield. The modeling results show that during the 40-year pumping period, brine will be diluted by less dense brine with corresponding lower concentrations of lithium (Figure 15.8). To compensate for the average decline in concentration during full-scale operations, increasing pumping rates at some wells could be achieved in the Resource Evaluation Area where excessive drawdown is minimal and lithium concentrations remain favorable.

During the evaporation and concentration process of the brine pumped from the wellfield, there will be anticipated losses of lithium. Therefore, the total amounts provided in Table 15.7 do not include anticipated loss of lithium due to process losses, and therefore cannot be used for determination of the economic reserve. Table 15.8 provides results of the Proven and Probable Mineral Reserves from the wellfield when the percent estimated processing efficiency is factored, assuming continuous average brine extraction rates and process efficiency.

TABLE 15.8
SUMMARY OF ESTIMATED PROBABLE AND PROVEN MINERAL RESERVES
(ASSUMING 53.7% PROCESSING EFFICIENCY)

Mineral Reserve Classification	Production Period (Years)	Brine Pumped (m^3)	Average Lithium Concentration (mg/L)	Lithium Metal (tonnes)	LCE (tonnes)
Proven	0 through 5	156,875,201	616	51,900	276,250
Probable	6 to 40	967,767,934	606	314,830	1,675,770
Total	**40**	**1,124,643,135**	**607**	**366,730**	**1,952,020**

Notes:
1) *The Mineral Reserve Estimate has an effective date of May 7, 2019.*
2) *Lithium carbonate equivalent ("LCE") is calculated using mass of LCE = 5.322785 multiplied by the mass of Lithium Metal.*
3) *The conversion to LCE accounts for 53.7% estimated processing efficiency.*
4) *The Production Period is inclusive of the start of the model simulation (Year 0).*
5) *The average lithium concentration is weighted by per well simulated extraction rates.*
6) *Tonnage is rounded to the nearest 10.*
7) *Comparisons of values may not be equivalent due to rounding of numbers and the differences caused by use of averaging methods.*

After accounting for processing efficiency (53.7%), the predicted results for the 40-year production period are as follows.

- Average production rate of 48,800 tpa LCE for the 40-year pumping period; the minimum of 25,600 tpa LCE occurs at the start-up of operations in Year 1; the maximum rate of 50,200 tpa LCE occurs at full-build in Years 2 and 3, after initial pumping begins for both the Phase 1 and Phase 2 wells. At the end of the pumping period in Year 40, the rate averages 48,700 tpa LCE.

- Average lithium concentration of 607 mg/L for the 40-year pumping period; the maximum concentration of 617 mg/L occurs at the start-up of full-build in Year 2 and the minimum concentration of 598 mg/L occurs near the end of the pumping period in Year 40.

15.12 RELATIVE ACCURACY IN MINERAL RESERVE ESTIMATE

The relative accuracy and confidence in the Mineral Reserve estimation is dominantly a function of the accuracy and confidence demonstrated in sampling and analytical methods, development and understanding of the conceptual hydrogeologic system, and construction and calibration of the numerical groundwater flow model. As has been demonstrated in this report and in previous technical reporting by LAC (2012, 2017, and 2019), input data and analytical results via sample duplication, the use of multiple methods to determine brine grade, and to obtain aquifer parameters from pumping tests have been verified and used as a basis for the Mineral Reserve Estimate model.

Using standard methods, a conceptual geological and hydrogeologic model consistent with the geologic, hydrogeologic, and chemistry data obtained during the field exploration phases of the project was prepared. The conceptual model was then used to prepare the numerical groundwater flow model. In addition, the calibration of the numerical model iteratively provided support for the conceptual hydrogeologic model. After review and verification of model projections, the authors have a reasonably high level of confidence in the ability of the aquifer system, assuming certain levels of uncertainties and risk described in Section 16, can yield the quantities and grade of brine calculated as the Updated Mineral Reserve Estimate.

16.0 MINING METHODS

16.1 PRODUCTION WELLFIELD

A total of 56 wells were used to simulate brine extraction for the Updated Mineral Reserve Estimate. The wells comprising the brine extraction wellfield are spatially distributed in the Resource Evaluation Area of the Project to optimize well performance and capture of brine enriched in lithium (Figure 15.7). Production was initiated in Year 1 of the pumping schedule representing 23 Phase 1 wells. In Years 2 through 40, 33 wells are added to the pumping schedule for duration of the life of mine plan (Figure 15.8). During the Phase 2 pumping period, the average nominal pumping rate per well is 16 L/s capacity, providing approximately 903 L/s of lithium enriched brine from the aquifer to the evaporation ponds.

Due to uncertainties in the spatial distribution of aquifer hydraulic properties and ultimate well hydraulic efficiencies at constructed production wells, difference may exist between pumping rates applied in the simulation versus measured pumping after construction of wells. Therefore, estimates of capital and operating costs should include a contingency allowance of additional wells to ensure that production targets can be achieved. In addition, it is likely that wells will need to be rehabilitated or replaced during the 40-year production period and cost estimates should include provisions to cover such expenditures.

16.2 BRINE PRODUCTION UNCERTAINTIES, LIMITATIONS, AND RISK ASSESSMENT

An assessment of key potential sources of uncertainties and limitations in the numerical model predictions and the Mineral Reserve Estimate is provided below. These descriptions are based on an extensive series of model runs for calibration and sensitivity analysis provided in prior LAC reporting for the previous Mineral Reserve Estimate and additional modeling analysis used for the Updated Mineral Reserve Estimate and subject of this report.

- Initial brine concentrations – These are based on relatively extensive sampling programs. The order of uncertainty in the average modeled brine concentration is expected to be ± 6% and is based on differences reported in prior resource area models of brine concentration.

- Effective Porosity (φe) and Specific Yield (Sy) – Effective porosity is difficult to measure in the field. Therefore, effective porosity was assumed to be equal to specific yield for modeling purposes. A high degree of variability is noted in the Sy estimates (as based on RBRC results). Since most of extracted brine is derived from elastic rather than pore storage, uncertainties in effective porosity affect the distance that lithium mass in the brine travels to reach a production well. As a result, uncertainties in estimates of specific yield will affect the amount of mass capture produced by the wellfield at boundaries with more dilute concentrations of lithium. To avoid these potential dilution effects and reduce uncertainty, the wellfield is currently configured for maximizing mass capture within the Project property aquifer volumes with largest amounts of lithium mass, and at sufficient distances from more dilute areas near aquifer boundaries.

- Dispersivity – The value of dispersivity, which controls the spreading of dissolved lithium as it is transported with groundwater, is also difficult to determine in field settings given the scale of the model domain. Values were set in the Updated Mineral Reserve model to be generally consistent with the previous modeling effort (King, Kelley, Abbey, 2012) and professional literature estimates for controlled testing (Gelhar et al., 1992 and Hess et al., 2002), and the amount of spreading parallel to groundwater flow (horizontal dispersivity) is reasonably assumed to be greater than the transverse and vertical components. Sensitivity runs with varied dispersivity values will aid in better evaluating its effect on the simulated results.

- Stratigraphic assumptions – Stratigraphic variability is inherent in any depositional environment. The updated HSU model is based on the available data and interpretation of depositional processes. Additional refinements using model zonation of aquifer parameters were made based on well responses to the pumping tests, to refine the continuity of aquifer and aquitard units between wells. Stratigraphic uncertainty tends to affect either the number of wells required to recover the Mineral Reserve, or the rate at which the Mineral Reserve can be recovered, rather than the total Mineral Reserve. Consequently, it can be addressed by the addition of contingency wells. Similarly, it could be addressed by acceptance of lower production rates spread over a longer period of time. As the production wellfield is constructed there will be further opportunity to update the stratigraphy and hydraulic properties to better predict drawdown and refine the number of wells required to meet pumping targets.

- Hydraulic conductivity (K) – The K distribution field is directly correlated with HSU model and, given the large range in lithologic heterogeneity of the HSUs, values of K have a broad range as well as associated uncertainty. Similar to stratigraphic uncertainty, the magnitude of the uncertainty for K estimates primarily affects the number of required pumping wells, rather than the total Mineral Reserve Estimate. If K values are smaller than represented in some areas of the model, it ultimately would require closer well spacing which can be addressed by the addition of contingency wells.

- Water Balance – The water balance is defined as the entry of water into the salar, either laterally or vertically (recharge), and water exiting the model primarily via evaporation (discharge). Given the conceptual model of the basin, recharge at mountain fronts and basin margins essentially controls influx and thereby dictates evaporative discharge flux. The amount of recharge into the model domain has the potential to affect the required number of pumping wells and steady-state residual mean, where for example, a lower recharge estimate to the salar could improve the apparent spatial bias of negative residuals (Table 15.3). Sensitivity analyses shows if actual recharge is significantly less than represented in the model, then the amount of drawdown and dilution associated with a given pumping rate will tend to be greater over long pumping periods. Consequently, more production wells would be required to spread out the effects of brine extraction and promote less drawdown and dilution at individual pumping wells. This is addressed by the addition of contingency wells.

- Water density – In most salar settings, variations in the density of groundwater are an important driver for flow, especially in the marginal mixing zone. Similar to the previous modeling efforts, a constant density of groundwater was assumed in this Updated Mineral Reserve model. Although the extensive numerical modeling analysis of LAC (2012) indicated that the consideration of variations in groundwater density did not significantly impact the simulated results of that model, the extended domain of this Updated Mineral Reserve model includes the marginal salar areas and freshwater zones of the basin. Therefore, in future modeling updates, and with additional measurements of groundwater density, consideration of variable-density flow and transport is recommended with modeling code and interface utilized (MODFLOW-USG with Groundwater Vistas). In addition, the steady-state calibration may be improved if the observed groundwater values were corrected for water density; in this case, the equivalent freshwater head would be higher than the respective observed field groundwater elevation (Table 15.3), resulting in an increased residual mean and possible improvement of the spatial bias of over predicted model values. This improvement would also be subject to more field measurements of water density in order to properly convert the observed groundwater elevations to equivalent freshwater heads.

- Brine production from adjacent properties – The Mineral Reserve Estimate assumes that production within the Project property areas will not be affected by production from adjacent third-party properties. Depending on production well locations and projected associated capture areas, this uncertainty may be large as off-property brine pumping from immediately adjacent property areas claims may have direct effect on the Mineral Reserve Estimate. Although details of proposed off-claim production are not known, a sensitivity analysis is recommended projecting the potential effects.

16.3 WELL UTILIZATION

For the Updated Mineral Reserve Estimate, it was assumed that the 56 wells are needed to meet or exceed the production goal targets and were constructed during the initial two years of operation (Phase 1 and Phase 2 wells) and tested prior to initiation of operations. Storage ponds and the recovery plant were also assumed to be fully operational at the start of the simulation. As a result, ramp up of pumping only occurred during the initial two years of operation and pumping rates needed to achieve production goals was initiated at the start of each yearly simulation period.

Variations in brine demand due to differences in brine-pond evaporation rates, either seasonal or due to long-term climatic trends, were not incorporated directly into the simulations. Incorporation of brine pumping variations can be conducted as part of model predictive scenarios for operational controls. In practice, however, pumping at selected wells could be stopped and started as necessary to meet total wellfield requirements.

17.0 RECOVERY METHODS (BRINE PROCESSING)

17.1 GENERAL

The lithium recovery process consists of the following main processing stages:

- Brine production from wells;
- Sequential solar evaporation;
- Pond-based impurity reduction by liming;
- Plant-based impurity polishing;
- Lithium carbonate precipitation;
- Mother liquor treatment and recycle;
- Lithium carbonate crystal compaction and micronization; and
- Lithium carbonate packaging.

The current process design, based on testing and simulation, has been enhanced with:

- Pond-Based sulfate and boron reduction;
- Plant-Based potassium chloride reduction; and
- Mother liquor re-concentration.

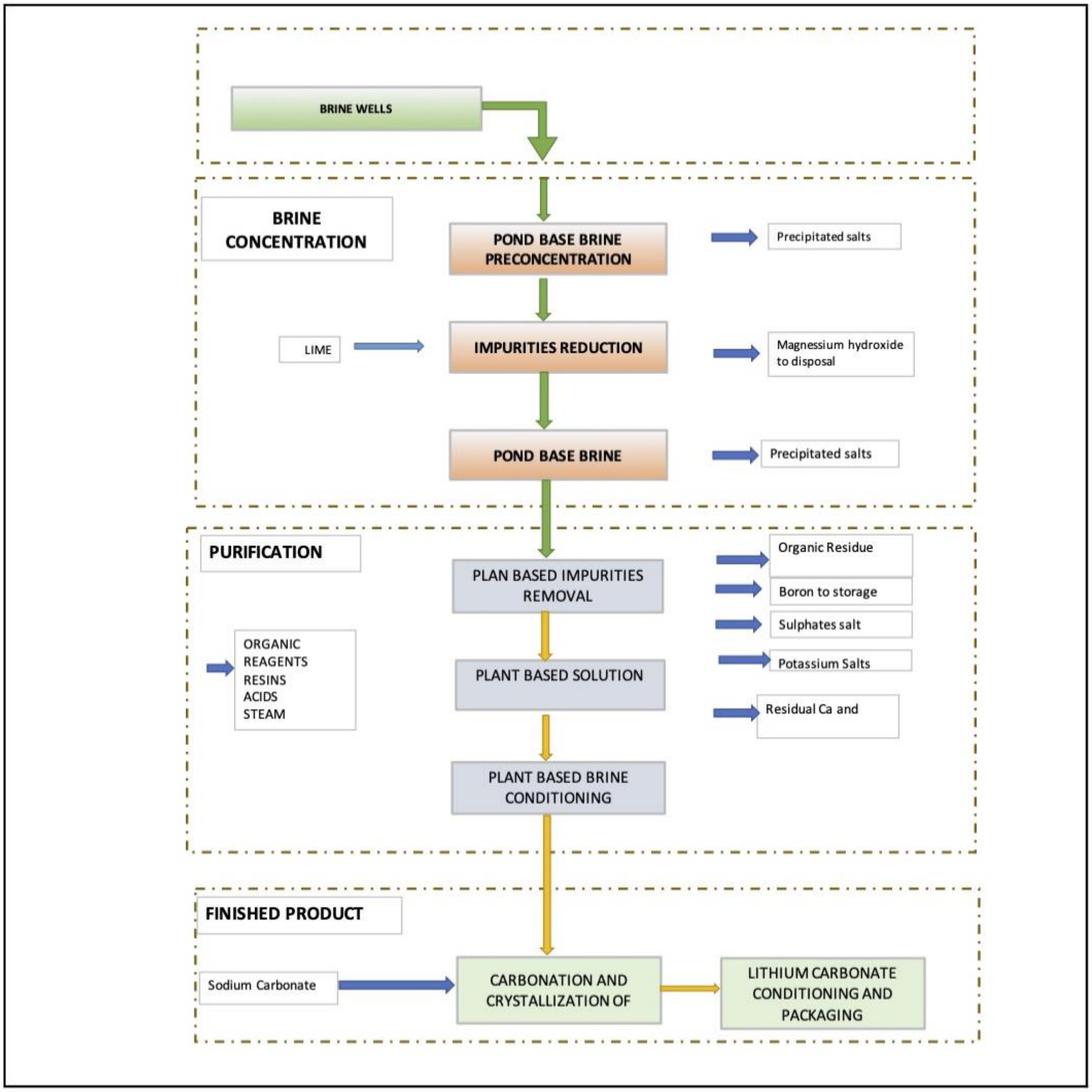
Mass and energy balance simulations were developed for estimation of operating and equipment costs. A conservative approach was used to design the ponds and plant infrastructure to ensure product purity and delivery commitments.

17.2 PROCESS DESCRIPTION

17.2.1 Process Block Diagram

Figure 17.1 shows the process diagram that outlines the general process. The brine is pumped from the salar into the pond system on the left side. As it progresses through the ponds, different salts precipitate, and chemical treatments are applied. The concentrated brine leaves the pond system on the right side then enters on the top left of the Lithium Carbonate Plant Simplified Block flow diagram.

Figure 17.1 Process Block Diagram



17.2.2 Pond Surface Area

Minera Exar has designed, configured and planned the operation of the pond system based on test work at the site and multiple laboratory tests.

A brine evaporation rate of 6.05 mm/day was used as the design criteria for the pond system, which was obtained using Class A evaporation pans and the test results discussed in section 13.2.2. In addition, 10% of the available evaporation time the pond will be available for harvesting. A seasonal model of the ponds has been used to obtain the net annual productivity including variation in rain fall, evaporation rates, and brine chemistry changes due to temperature. All these variables are estimated based on site-specific statistics.

Using the above-mentioned rate, a total pond surface area of 1,200 Ha is required to produce 40,000 tpa of lithium carbonate. The operation strategy considers daily evaporation control adjustments by adjusting surface area requirements as necessary during operations through monitoring weekly pond mass balances and long-term prediction based on historic evaporation and meterologic data.

The pond system consists of 28 evaporation ponds segregated into the following types:

- 16 pre-concentration ponds;
- 6 halite ponds;
- 2 ponds as sylvinite ponds;
- 2 ponds for control; and
- 2 lithium ponds.

The ponds configuration includes two parallel trains as presented in Figure 17.5. Associated piping allows for flexible operation and bypassing of individual ponds for maintenance activities.

17.2.3 Pond Design

The pond design consists of engineered fill material and a thick impermeable pond liner (geomembrane) with geotextile only on berms. The use of both engineered fill material and a liner reduces the potential of rocks penetrating the liner and compromising pond impermeability. The engineered fill material consists of screened sands and fines which are installed on the native material in the pond area below the liner then leveled and compacted.

Testing of this design using pond liners from several different suppliers and installation details was completed to reach the final decisions on the liner and construction approaches. A total of 10 pond cells (approx. 40m x 40m) were constructed on site and installed with the proposed design. Production and salt harvesting were then simulated, and the liners were then tested for damage/leakage using inspection and mass balances on the test ponds.

Figure 17.2 illustrates the evaporation ponds constructed upon the engineered bedding that was overlain with a geotextile and liner.

Figure 17.2 Evaporation Ponds at Cauchari Salar

The pond berms were constructed using compacted, impermeable clay-rich soils and overlain with the engineered materials described above. Testing of the berm construction material, sourced locally in the Olaroz salar, has confirmed the design specifications (Figure 17.3). Evaporation ponds are shown in Figure 17.4.

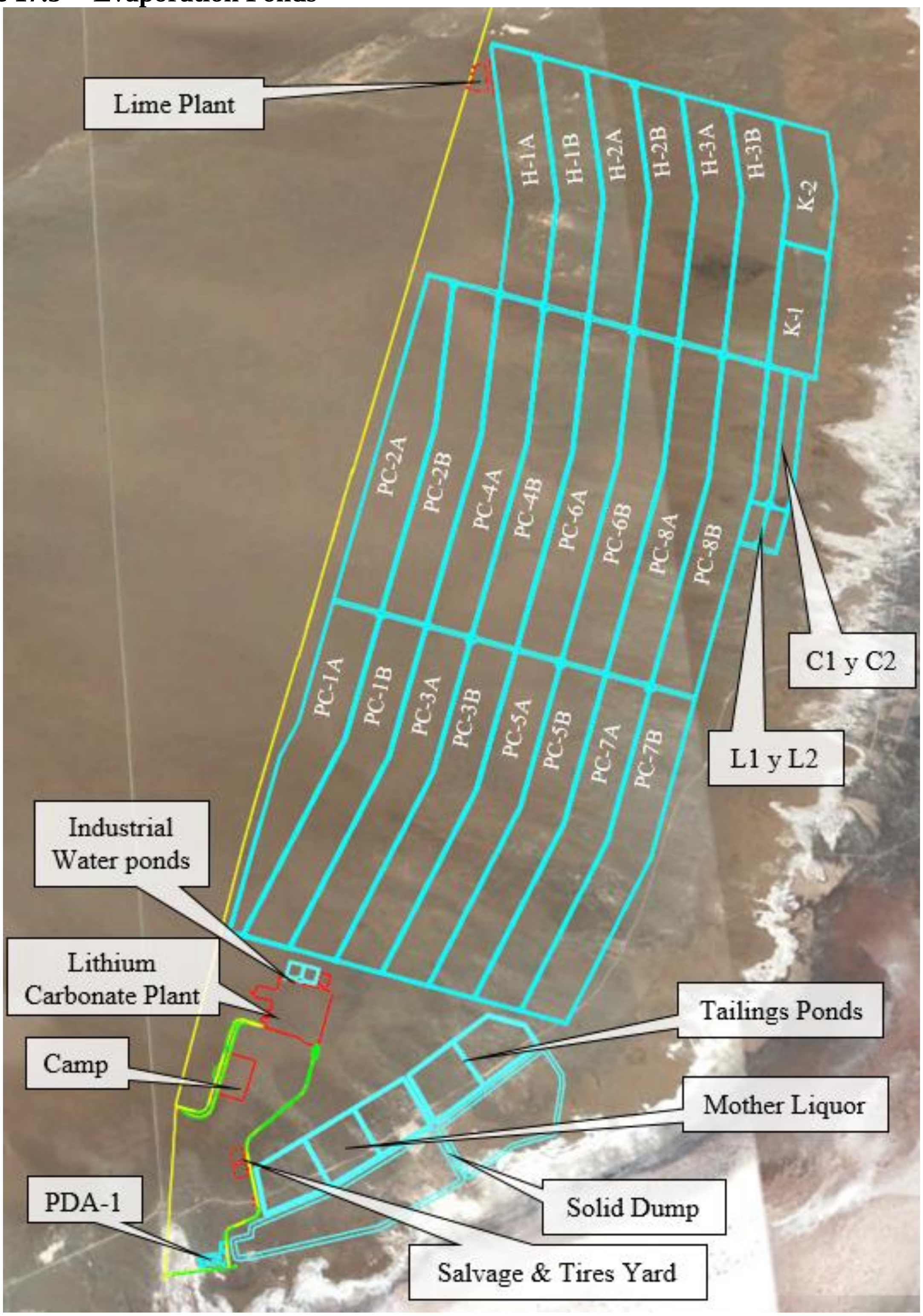
Figure 17.3 Testing of Berm Material

Figure 17.4 Evaporation Ponds

17.2.4 Pond Layout

Figure 17.5 presents the outline of the ponds and the salt disposal area.

Figure 17.5 Evaporation Ponds



17.2.5 Pond Transfer System

Each pond is equipped with a pump station and pipeline system for transferring brine between ponds (Figure 17.6). The ponds are arranged geometrically to efficiently move brine during the anticipated normal operation and maintenance of the ponds and pump systems. An analysis of the prevailing wind direction was considered in pond orientation, pump station locations, and brine inlets.

Brine progresses along the long axis of the pond. Internal, temporary walls constructed of salt ensure the brine does not bypass the pond section and has a consistent residence time.

Figure 17.6 Evaporation Ponds – Transfer Pump Station

17.2.6 Salt Harvesting

As brine concentrates, the salt precipitates in the pond thus purifiying the brine. Salt that precipitates in the bottom of ponds is porous and entraps brine. In order to recover pond volume taken up by precipitated salt and recover lithium values entrapped with the brine, salt will be harvested. Harvesting will begin after the third year of steady operation.

Harvesting operation consists in draining the free brine from the pond, scraping the salt to a minimum depth, and making drainage piles before removing salt. Draining the entrapped brine from the salt will recover roughly ½ the lithium that was entrapped in the salt. This recovery is not considered in the current process yield estimates presented in this DFS. Harvesting will include 24/7 operations to satisfy overall production plans.

17.2.7 Pond-Based Impurity Reduction-Liming

As lithium concentration increases during brine concentration, it is possible that a lithium sulfate double salt can precipitate, a form that is relatively more difficult to recover lithium from. A liming stage is necessary to avoid the precipitation of lithium compounds by removing some of the sulfate. In the liming system almost all of the Mg is precipitated with a portion of the sulphates and boron compounds.

The only reagent used in this area is quick lime (CaO) which is stored in two silos of 1,000-tonne capacity each. A milk of lime preparation system includes the lime feed and mill to prepare the reagent for the process.

Milk of lime and brine from the halite pond 1A and 1B are contacted in two separate trains of reactors. These reactors produce a slurry of sulfates, magnesium hydroxides and borates that can be easily separated from the brine and washed to recover the lithium.

The reactions that take place precipitate magnesium hydroxide, gypsum and calcium borates. The unbalanced reactions give the following products:

$$(Mg)^{+2} + Ca(OH)_{2,(s)} \rightarrow Mg(OH)_{2,(s)} + Ca^{+2}$$

$$Ca^{+2} + SO_4^{-2} \rightarrow CaSO_{4,(s)}$$

$$2Ca^{+2} + 3B_2O_4 \rightarrow Ca_2B_6O_{11} \cdot 5H_2O_{(s)}$$

The brine with precipitated solids is discharged from the reaction tank to a solid liquid separation system. The treated brine stream goes to the halite precipitation ponds for further concentration, whereas the solid are transferred to a disposal area.

17.2.8 Plant-Based Impurity Polishing

17.2.8.1 Boron

Boron removal is necessary to achieve high-quality lithium product. A solvent extraction stage will allow an effective removal of this element.

In the 2012 Feasibility Study, a boron solvent extraction stage was considered to treat the brine and produce an essentially boron-free brine for further processing.

The design of the extraction unit is based on pilot testing at the pilot plant located at the project site, and by Tenova for provision of a process guarantee.

17.2.8.2 Magnesium

Magnesium must be removed before the carbonation step. This is accomplished by adding a combination of lime and soda ash in a set of reactors. The lime reacts with the magnesium in the brine to form insoluble magnesium hydroxide. The precipitated solids will be removed by a solid-liquid separation system.

17.2.8.3 Sulfate

Residual sulfate ions will be precipitated by addition of calcium and barium chloride in a stirred reactor. The precipitated solids will be removed by a solid-liquid separation system.

17.2.8.4 Calcium

Residual calcium in the brine will be precipitated with soda ash. The precipitated solids will be removed by a solid-liquid separation system. An ion exchange system will act as a guard to remove any residual calcium, magnesium or other ions with a +2 charge.

17.2.8.5 Potassium Removal

Potassium concentrations will be reduced by evaporative crystallization and centrifugation to eliminate sylvinite crystals.

17.2.9 Lithium Carbonate Precipitation and Recovery

The centrifuges will wash the crystal with condensate to maintain a high yield of lithium, and the wash water will be sent to the evaporator feed.

17.2.10 Mother Liquor Recycle

Mother liquors will be neutralized with HCl and sent to a dedicated pond for concentration to plant head feed Li-concentration levels.

17.2.11 Lithium Carbonate Micronization

A micronization system will be employed to produce fine lithium carbonate for customers who require a small, narrowly distributed particle size.

17.3 REAGENTS

Quick lime (CaO) will be trucked to site and stored in silos. Hydrated lime ($Ca(OH)_2$) will be made on site and distributed to the various users. Two different lime qualities will be sourced. A lower grade lime will be used to supply the evaporation pond consumers while a higher quality grade CaO with less magnesium will be used within the lithium carbonate plant for magnesium removal.

Soda ash (Na_2CO_3) will be transported by ship to the port of Antofogasta, Chile and trucked to the project site in Argentina. Sodium carbonate solution will be prepared with purified water. It will be used for calcium removal and to produce lithium carbonate in the processing facility.

Barium chloride will be trucked and stored at site. A solution of barium chloride will be prepared with purified soft water and used to remove sulfate in solution.

Calcium chloride will be trucked and stored at site. A solution of calcium chloride will be prepared with purified water and used to remove sulfate in solution.

Hydrochloric acid will be trucked and stored at site as 32 wt.% solution. Hydrochloric acid as 32 wt.% solution will be used as a pH modifier. The acid will be diluted and used wash solution in ion exchange columns.

Sodium hydroxide will be trucked and stored at site. A solution of sodium hydroxide will be prepared with purified water and used as a stripping agent in the boron solvent extraction circuit and a pH modifier.

17.4 PLANT DESIGN BASIS

The following describes the criteria for the operation of the Lithium Carbonate Plant:

- Plant operating capacity is 40,000 tpa;
- The plant operates 292 days per year (80% runtime);
- Design factor of 1.2;
- Lithium carbonate plant yield is 85%;
- Lithium carbonate has a purity of at least 99.5%;
- Lithium carbonate product has a particle size (battery grade);
- Final product particle size distribution will be set based on customer demand; and
- Product is packed into 0.5 tonne maxi bags and 25 kg bags for shipping and dispatching to customers.

17.5 LITHIUM CARBONATE PLANT ENGINEERING

17.5.1 Engineering Deliverables

The scope for engineering work included in this Report involved the following areas:

- Wells location;
- Pond design;
- Lithium carbonate plant for 40,000 tpa LCE;
- Design for the Plant and all utilities;
- Supporting facilities including camp; and
- Off-site infrastructure for HV power line and natural gas pipeline.

Engineering designs were carried out by Minera Exar’s consultant in accordance with applicable standards for consulting engineering services and has achieved 80% progress as of June 30, 2020.

The main activities, plans and documents developed by each engineering discipline were used to obtain a CAPEX with a ± 15% accuracy and 7% contingency.

17.5.2 Process Discipline

This discipline provided plant design criteria, mass balances review, flow diagrams, and major equipment data sheet support, among other activities. Typical documents and drawings produced in this phase are as follows:

- Flow diagrams;
- Mass balances;
- Design criteria;
- Process trade off; and
- P&IDs.

17.5.3 Mechanical Discipline

This discipline produced major equipment technical specifications and evaluations, prepared general arrangement plans for the facilities, developed equipment listings and design criteria. Documents and activities carried out were as follows:

- General 3D models for the ponds and processing plant;
- Equipment general arrangement and plant general layout based on the model;
- General plants and elevations;
- Equipment listing;
- Mechanical design criteria;
- Mechanical equipment pre-purchasing packages;
- Mechanical equipment technical bid evaluations; and
- Support in CAPEX and OPEX estimates.

17.5.4 Structural and Civil Work Discipline

This discipline prepared the general arrangement drawings for foundations and structures used as a basis for the cost estimates. The following documents and drawings were produced during this stage:

- General structural diagrams;
- Civil-structural design criteria;
- Take-offs; and
- Support in CAPEX and OPEX estimates.

17.5.5 Piping Discipline

This discipline provided design criteria, pump data sheets for quoting, preliminary pump calculations, plant P&IDs and piping general arrangement for the cost estimates. Typical drawings and documents for this phase were:

- Piping design criteria;
- Pump data sheets;
- Natural gas pipeline technical specification;
- P&IDs;
- Piping general diagrams for take-offs; and
- Support in CAPEX and OPEX estimates.

17.5.6 Electrical Discipline

The Electrical Discipline prepared the documents and drawings required for the project electrical system. This phase involved the following activities:

- Design criteria;
- Technical specifications and trade-off for power generation;
- Electrical system architecture;
- Single line diagrams;
- Lines general arrangement;
- Equipment general arrangement – room;
- Main equipment technical specifications and evaluations (room, unit substation and MCC); and
- Support in CAPEX and OPEX estimates.

17.5.7 Instrumentation Discipline

This discipline specified the control system design, instrumentation, wiring and control cabinet designs used as a basis for the cost estimates. The following typical drawings and documents were developed:

- Design criteria;
- Control philosophy;
- Plant control system technical specification and evaluation;
- Control system block diagram; and
- Support in CAPEX and OPEX estimates.

17.5.8 Procurement

Quotations from suppliers and service providers for main equipment, materials, freight, and construction contracts were used to assemble the cost estimates. Quotations were assessed for technical and commercial soundness and only those deemed credible were included in the analysis. Argentine import rules and regulations were considered in the budgeting exercise.

Critical equipment with long delivery times or that is necessary to commence construction were identified for early procurement. The quotations used for the assessment are part of the on-going procurement effort to support the schedule presented in this study. Most of the equipment purchase orders has been placed as well as the construction contracts are being executed.

18.0 PROJECT INFRASTRUCTURE

18.1 MAIN FACILITIES LOCATION

Figure 18.1 presents the location of the main facilities that are part of the Cauchari-Olaroz Project, including:

- Well field;
- Evaporation ponds;
- Lithium carbonate plant;
- Salt and process residues disposal; and
- Camp.

18.2 BRINE EXTRACTION

18.2.1 Brine Extraction Wells

The reserve model output states the required brine production rate should be achieved with 46 brine wells. An additional 7 wells are planned for back up purposes (Table 18.1). It is estimated that an additional 1 well per year of operation will be drilled throughout the 40-year operation to maintain brine productivity.

At start-up, 40 production wells are considered for production, with average nominal capacity of 16.3 L/s, that will provide up to 652 L/s of brine to the ponds. Additionally, 13 wells will be completed during the first five years to have the operation fed by 53 wells. This flow rate assumes a yield of 53.7% on the whole lithium carbonate process.

The wells will be screened across the most productive lithium and sealed against fresh water aquifers.

TABLE 18.1
PRODUCTION WELLS ESTIMATE
(Re: Section 15)

Description	Unit	Value
Total brine from production wells	m^3/day	74,600
Total brine from wells (average)	L/s	864
Brine requirement for number of well estimate for 40,000 tpa	L/s	748
Estimated average well brine output	L/s	16.3
Number of wells planned	no.	40
Reserve wells	no.	13
Total production wells required	**no.**	**53**

18.2.2 Well Pumps

Submersible well pumps will be equipped with variable speed drives. Flow from each well will be monitored before discharging into a common pipeline. Brine from 7 wells are combined in two main pipelines that discharge into a collecting brine pool called 'PDA2'. A pumping station allows brine transfer into another collecting brine pool called 'PDA1'. Brine from the remaining wells is received in this collecting pool and the mixed brine is transferred to two main pipelines discharging directly into 'PDA1'.

The collecting brine pools ('PDA1' and 'PDA2') will enhance brine homogenization as well as act as intermediate pumping stations before transferring the full brine flow into the pre-concentration ponds. Transfer pumps from PDA2 to PDA1 have sufficient flow to meet the demands of the pond system.

18.2.3 Additional Equipment in the Well Field

In addition, the well field equipment required include:

- 10,000 L to 20,000 L capacity water trucks;
- Temporary portable diesel generators for well pump operation in early stages;
- Cable reel truck for electrical network;
- Electrical lines for proper power distribution; and
- Portable brine transfer pumps.

18.2.4 Well Field Electric Power Distribution

A 60 km 13.2 kV transmission line from the main plant substation feeds the two substations in the well field located at brine collection ponds PDA2 and PDA1. The substations downgrade the voltage for distribution to the pond pumps. Low voltage aerial distribution lines feed power to well pumps, where local transformers provide 400 V power to well pumps.

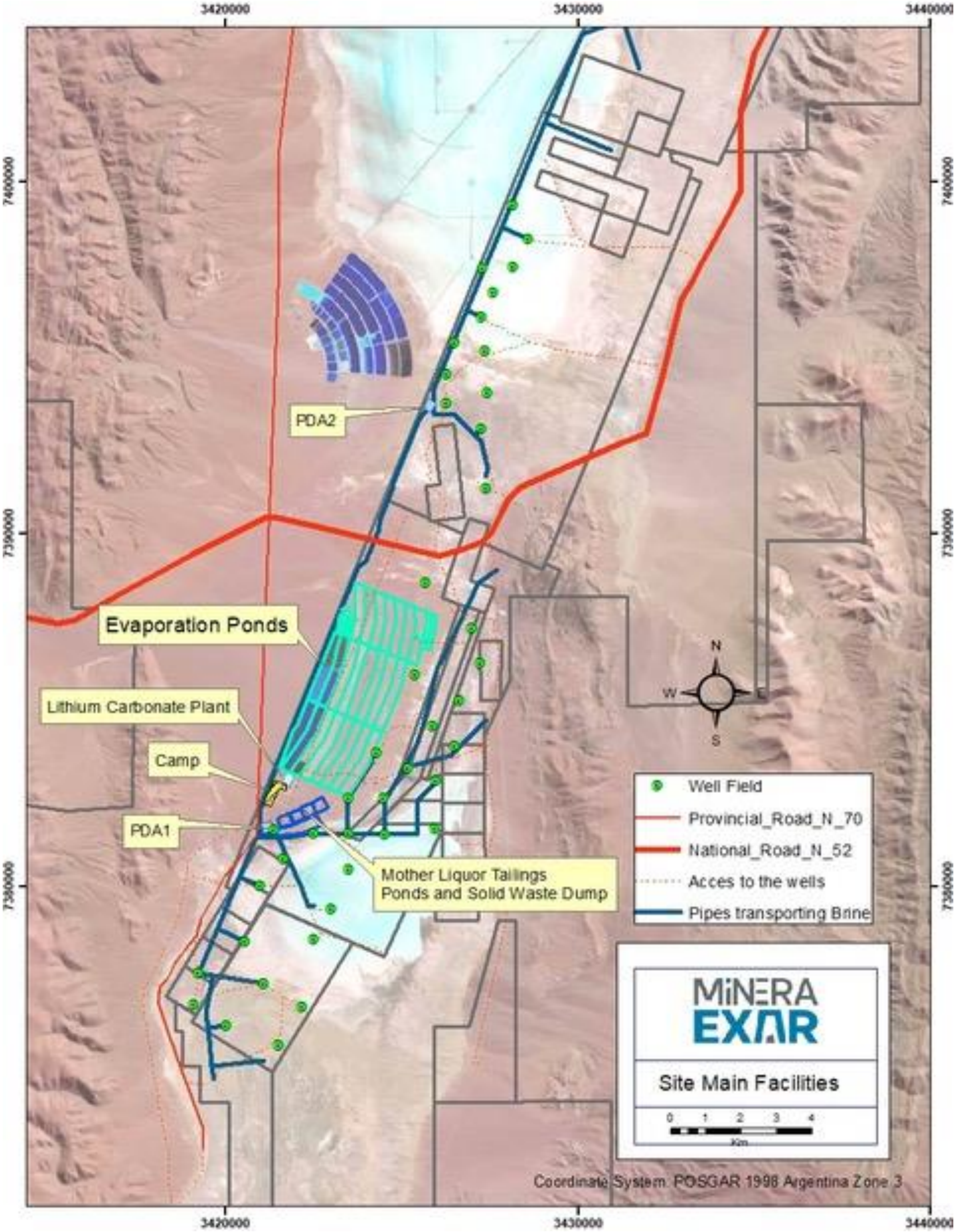
18.3 EVAPORATION PONDS

There are 28 evaporation ponds located in the south-east area of the property, and consist of:

- 16 pre-concentration ponds;
- 6 halite ponds;
- 2 sylvinite ponds;
- 2 control ponds; and
- 2 lithium ponds.

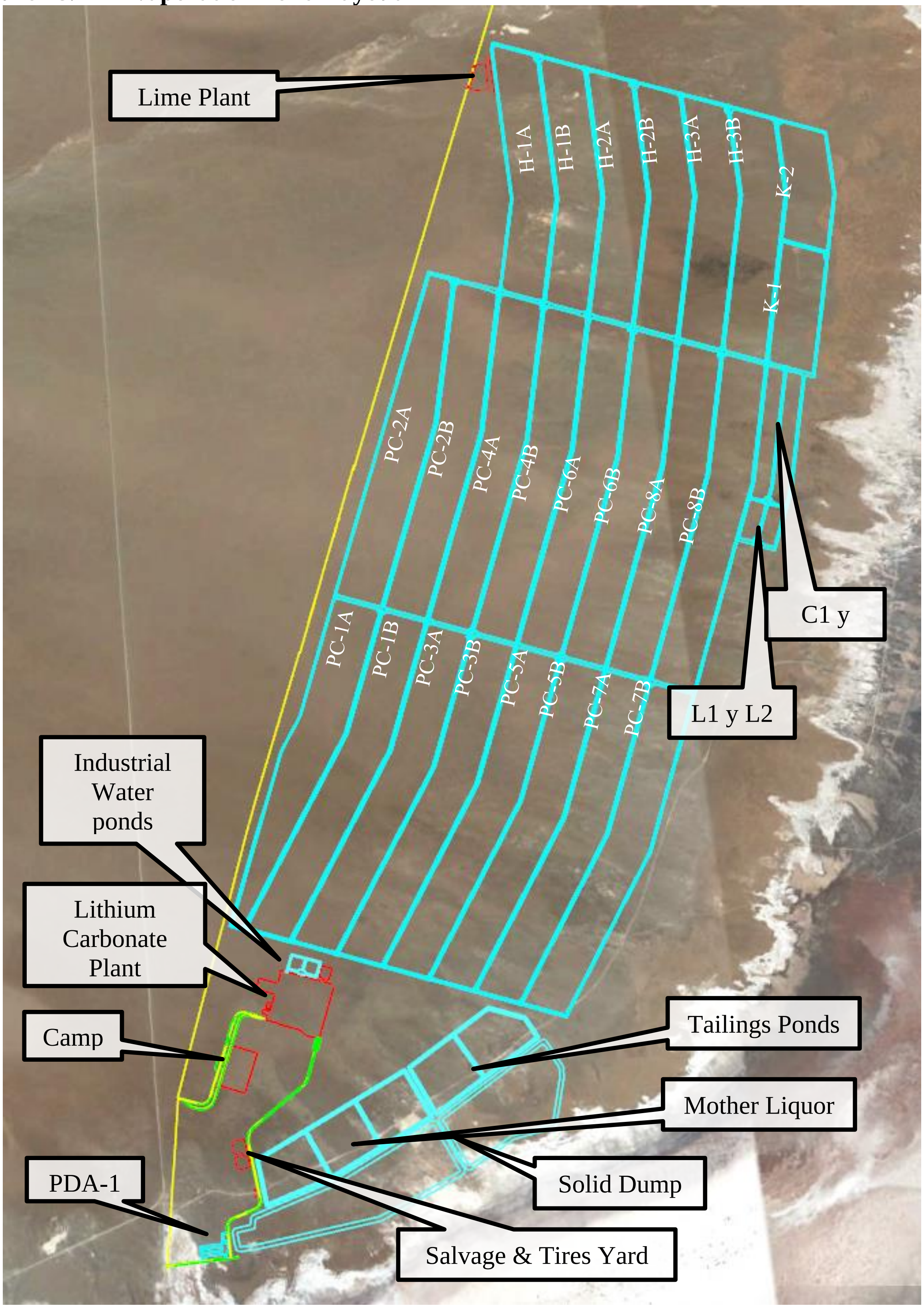
Figure 18.2 shows the location of the evaporation ponds and Figure 18.3 presents the construction development of the evaporation ponds.

Figure 18.1 Site Main Facilities



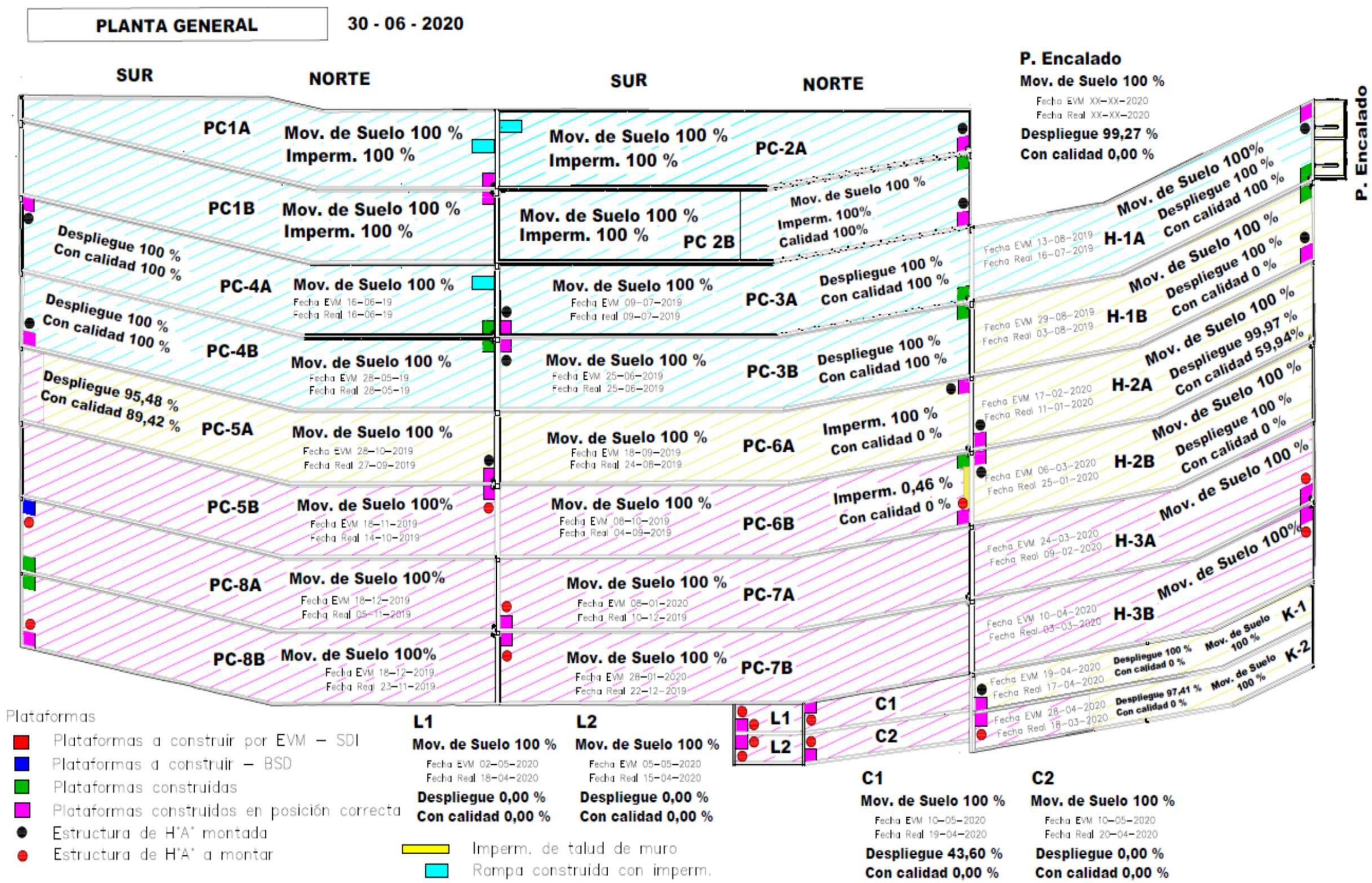
Source: *Minera Exar*

Figure 18.2 Evaporation Pond Layout



***Source:** Minera Exar*

Figure 18.3 Evaporation Pond Construction Status



18.4 SALT HARVEST EQUIPMENT

Pond design and operation require the removal of the salt deposits formed at the bottom of the ponds. Typical earthmoving machinery will be used for salt removal, such as front-end loaders and dump trucks. There will be a minimum salt depth in the pond to protect the liner from harvesting activities. Harvested salts, some of which will be rich in potassium, will be stockpiled locally and available for future recovery pending market value.

18.5 LIMING STAGE

In the liming system, a set of processes allow for the removal of magnesium and sulfate present in the lithium-rich brine obtained from the concentration ponds.

The quicklime is received from a truck that feeds storage silos by pneumatic conveying. From the silos the lime is reacted with water in an engineered system. Lime slurry is discharged from the reaction system and is screened to remove larger contaminating material. The lime slurry is stored in a tank and distributed through a recirculating loop into two liming systems. One for higher quality lime, one for less expensive lime.

The lower quality lime is used to treat the brine at the ponds. The reaction between the lime and the brine results in a precipitated solid containing almost all of the magnesium and most of the sulfate. The solids are filtered from the brine and washed to recover the lithium. The solids are then disposed of in an on-site salt pile, while the brine is sent for further concentration.

18.6 LITHIUM CARBONATE PLANT

The plant is located approximately 8000 m south of National Highway 52. Plant equipment is designed for an 80% On Stream Factor (7,006 hours per year).

18.6.1 Process Facilities

18.6.1.1 Boron Removal - Solvent Extraction

The boron concentration from the last evaporation pond is too high to make good quality lithium carbonate and most of it needs to be removed. A solvent extraction process has been engineered to reduce the boron concentration to <10 ppm. The feed needs to be conditioned prior to feeding the solvent extraction process. The organic material being used is highly selective for boric acid species, so the feed must be acidified prior to loading the organic material.

The extraction circuit is made up of a set of conventional mixing-decanters that contact an organic mixture to selectively remove the boron without dissolving in the brine. This phase loads the brine with boron compounds. The organic phase is then regenerated by removing the boron from the organic phase, while the purified brine is further purified.

The regeneration of the organic phase is done by a caustic solution in a set of mixing-decanters. The boron species are removed as sodium borate solution. The sodium borate solution is taken to a disposal pond where it evaporates. The salt from this pond is harvested and stored in the plant waste pile. The regenerated organic phase is recycled back to the extraction pipeline.

18.6.1.2 Brine Purification

The brine purification section targets the removal of Mg, Ca, B, and SO_4 to allow the evaporation system to operate at a low scaling rate and achieve the uptime target for the process plant.

18.6.1.3 Primary Teatment

The primary treatment uses slaked lime to precipitate magnesium and calcium borates. Additional reagents are added to remove sulphates. The primary treatment uses a higher quality of quick lime to purifiy the brine. These reagents precipitate the target ions as solids and is engineered to allow for efficent filtration and washing of the solids to maintain the yield of lithium. The wash water is returned back to the process while the solids are sent to the final disposal pile. The purified brine is then sent to secondary treatment.

18.6.1.4 Secondary Treatment

The secondary treatment polishes the brine from the primary treatment to finish removing sulfates and divalent ions from the brine. The brine is treated with calcium chloride and barium chloride to eliminate the sulfate. A small dose of soda ash is used to remove the divalent ions as precipitated carbonates.

The slurry produced in the chemical treatment is sent to a solid/liquid separation system. This system filters off the solids and washes the solids with water to recover the lithium. The moist cake is then discharged to a storage pile. The brine from this treatment then goes to ion exchange for final purification of the divalent ions.

18.6.1.5 Primary IX

The purified brine from secondary purification filter is subject to an ion exchange treatment to remove impurities to levels < 1 ppm.

The IX system includes a set of columns that allow for continuous operation and resin regeneration process. Conventional steps are used for elution to restore the ion exchange capacity of the resin including elution, regeneration and washing. Multiple columns are cycled through the loading, regeneration, elution, and lag processes.

18.6.1.6 Brine Concentration and Na/K reduction

After the filtration of the slurry from the brine purification plant, the brine is concentrated to increase the lithium concentration for final polishing prior to lithium carbonate production. This process removes NaCl and KCl salts from the brine to meet the target quality specifications. The resulting NaCl and KCl salts are separated from the brine with a centrifuge and washed with process condensate. The resulting wash liquid is recycled back to the feed for the evaporation/crystallization. The solid NaCl and KCl salts will be sent to final storage, and the purified brine will be sent to the lithium carbonate precipitation reaction system.

18.6.1.7 Feed Preheat

The feed is preheated via a series of condensate and steam preheaters to condition the brine prior to processing in the multiple effect evaporator. The steam heaters are used to raise the temperature.

18.6.1.8 Multiple-Effect Evaporation and Crystallization

A forced-circulation evaporator/crystallizer is utilized for the three-effect multiple effect design. The design of this system incorporates the third effect using two crystallizers. An additional cetrifuge separates the NaCl from the second effect crystallizer. The discharge from the third effect crystallizer are sent to a flash-cooled cyrstallization stage.

18.6.1.9 Flash-Cooled Crystallization

The flash-cooled crystallizer provides further removal of salts by the controlled crystallization of KCl and NaCl. The mixed salts are removed from the crystallizer by a centrifuge.

18.6.1.10 Process Condensate Collection

Additional facilities include a process condensate handling, reverse osmosis feed water, and material handling equipment for solids handling.

18.6.1.11 Mg/Ca Polishing IX

The conditioned stream from the evaporation is fed to ion exchange resin (IX) for further removal of Mg and Ca to less than 1 ppm. This is a conventional commercial circuit that allows for continuous operation and resin regeneration in a batchwise operation with continuous processing and purification of brine.

18.6.2 Lithium Carbonate Production

18.6.2.1 Carbonation

The lithium carbonate production system consists of reactive crystallizer that produces single-crystal product to obtain a high yield and consistent quality.

There are facilities to control temperature and pH and to dose the Na_2CO_3 to optimize precipitation conditions. A heat recovery system is also included in this stage. The crystallization train includes four reactors working in series.

18.6.2.2 Final Product

The resulting slurry is filtered to remove the lithium carbonate product. The filter operates as a counter current wash system using the wash water from the filtered stream. The final wash solution is used for dilution (prior to Polishing IX) and the brine from the reaction is recycled to recover the lithium. A portion of solids are recycled from the separation system to the first one reactor to promote the crystals growing and improve the amount of solids in the reactors.

The moist cake from the filter is centrifuged on a basket centrifuge and then fed to a rotary dryer. The wash water is sent to the counter current wash on the lithium carbonate filter.

The dryer is an indirect steam tube rotary dryer type. A baghouse is used to collect fine particles of lithium carbonate to control loss of final product.

The product is air-cooled while transported by a pneumatic system to storage. Then it is fed to the micronizer equipment to provide a defined particle size.

The lithium carbonate product is loaded in silos based on a packaging size system. It can be packaged into polyethylene big bags or sealed plastic bags.

18.6.3 Plant Wide Instrumentation

Well, pond, and plant control signals will be provided to a centralized control system. The control system will utilize redundant controllers. Communication with remote devices such as those associated with wells and ponds will either utilize fiber optic or wireless communications. Distributed control system information, operation, and alarms will be accessible from a centralized control room.

18.7 SUPPORTING SERVICES

18.7.1 Fresh Water

The freshwater requirements are provided by local wells within the watershed. The infrastructure for water handling includes wells, low-voltage transmission lines to power the wells, piping, two storage ponds of 15,000 m^3/each, and a storage tank at the plant. A pumping system will fill a water storage tank located in the plant. This in turn will feed the fire water system and the raw water system. Raw water will feed the reverse osmosis (RO) and water treatment plant to produce pure water for the process. A separate pump station, located at the storage pond, transfers water to the potable water plant located by the side of the camp and raw water to the process plant.

At present, water requirements for the existing pilot plant and camp facilities (406-person camp) are satisfied from a well drilled in the Archibarca Fan, located immediately to the west of the pilot plant.

At the time of this report the Company has applied to increase the fresh water use to 150 l/s which will meet the water demands of an operation of more than 40,000 tpa LCE.

18.7.2 Sanitary Services

A dedicated sanitary effluent treatment plant will receive and treat effluent from the camp. A separate dedicated sanitary effluent treatment plant will receive and treat effluent from the processing plant.

18.7.3 Diesel Fuel

The plant includes a diesel storage and dispensing station for mobile equipment and transport vehicles. Diesel fuel will be used in forklifts, stand-by generators, and as back up for the boilers.

The main fuel for equipment operation will be natural gas.

18.8 PERMANENT CAMP

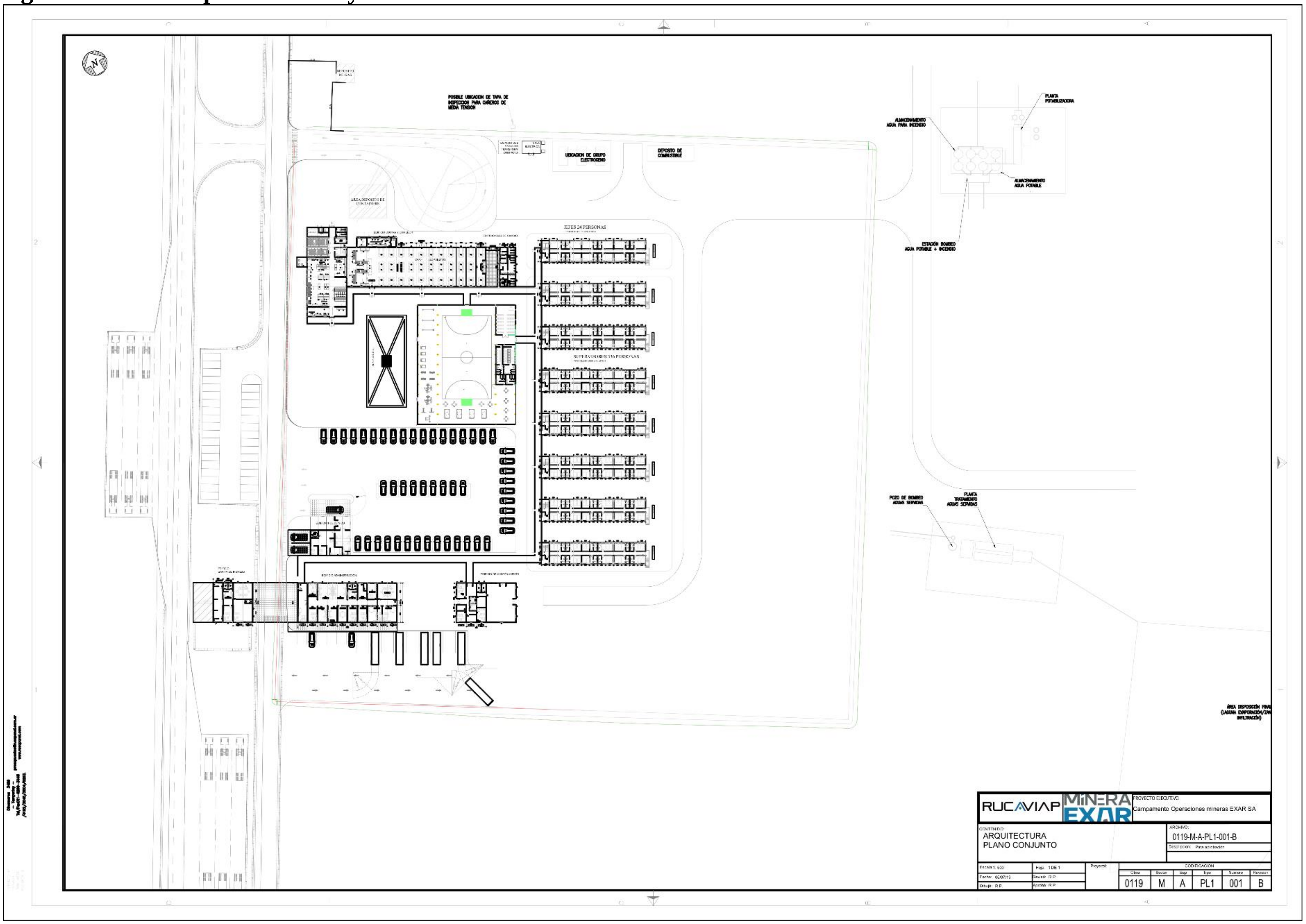
The permanent camp and construction camp will be located approximately 8,000 m south of National Highway 52. The permanent camp is a full habitational and administrative complex to support all activities in the operation with a capacity of approximately 360 people. The permanent camp includes 8,500 m^2 of buildings and 35,700 m^2 of external facilities.

The permanent camp includes administration building, habitational area, dining facilities, medical room, spare parts warehouse, lockers, gym, soccer field, and parking lots. The habitational area includes single bedrooms with private bathrooms, dormitories with private bathrooms, and large dorm rooms with shared bathrooms.

Temporary modules will be utilized during construction to accommodate a maximum construction crew capacity of approximately 1,000 people (peak during construction is higher). These modules will be gradually installed as habitational modules and will support construction crews as needed. Special modules for construction crews will be added and removed when the construction cycle is finished.

Figure 18.4 shows the camp layout and its components.

Figure 18.4 Camp General Layout



Source: *Minera Exar*

18.8.1 Other Buildings

Additional buildings include:

- Spare parts and consumables warehouse building;
- Soda ash storage building;
- Final product – lithium carbonate – storage building; and
- Solvent extraction chemicals storage building.

All buildings will be equipped with appropriate lighting, heating, ventilation, and security provisions.

18.8.2 Security

A metallic perimeter fence will be built surrounding specific areas of the lithium carbonate plant, warehouses, administrative offices and camp. Given the remote location of the facilities, it is not necessary to enclose the pond area. The pond area is to be illuminated to allow night work and improve security.

A metallic peripheral fence will be installed at each brine well facility, limiting access to equipment, instruments, and valves.

18.9 OFF-SITE INFRASTRUCTURE AND SUPPORT SYSTEMS

18.9.1 Natural Gas Pipeline

The natural gas pipeline will transport fuel to the Project from the Rosario gas compression station located 52 km south of the plant. The main pipeline belongs to Gas Atacama. In July of 2019, the U.S. Energy Information Administration wrote, "Argentina's domestic natural gas production has been rising steadily in the past three years, largely because of increasing production from the Neuquén Basin's Vaca Muerta shale and tight gas play. Production from Vaca Muerta surpassed 1.0 billion cubic feet per day in December 2018. As production has grown, Argentina has resumed exporting natural gas by pipeline to neighboring Chile and Brazil and has started exporting liquefied natural gas." (Aloulou, F., Zaretskaya, V., 2019)

This natural gas pipeline has sufficient capacity to supply its current users and the needs for the project site.

18.9.2 Electrical Power Supply

Electricity will be provided by a new 33 kV transmission line that will interconnect with an existing 345 kV transmission line located approximately 60 km south of the Project. The interconnection will consist of a sub-station with a voltage transformer (345/33 kV) and associated switchgear.

A stepdown 33/13.2 kV substation at the Project site, will consist on 2 voltage transformers (33/13,2 kV, 15-20 MVA), one (1) 33 kV electrical room and one (1) 13.2 kV electrical room with suitable switchgears and auxiliary equipment for the 13.2 kV local distribution system.

The 13.2 kV local electrical distribution system will provide power to the plant, camp, intermediate brine accumulation and homogenizing pools/lime pumps, wells, and evaporation ponds. In general, all the distribution is based on overhead lines, unless there are major restrictions then the underground distribution is adopted.

The estimated average load for the Project is around 16.4 MW or 123,461 MWh/y, assuming a plant and periphery utilization factor of 0.86. The power line has sufficient capacity for this load plus the existing users.

The whole electrical system is designed for the maximum load condition plus a safety factor of 1.2.

A stand-by diesel generating station, located close to main substation, will power selected equipment during outages.

18.9.3 Water Pipeline

A 53 km long water pipeline parallel to the gas pipeline will need to be constructed to transport 105 l/s to the lithium plant.

18.9.4 Instrumentation and Control

Control and Data Building

The Project considers the design of a single Control and Data Building, dedicated to the control and monitoring of Plant and Peripherals, located near the electrical substation, which contains the following rooms:

- 1 control room;
- 1 communication room;
- 1 server room;
- 1 HVAC room;
- 1 UPS room;
- 3 offices; and
- 1 meeting room.

Telecommunications System

Necessary infrastructure for the proper functioning and integration of the systems and services that will be used in the Project, specifically, the Control Networks, Auxiliary Services, CCTV and SCADA, including:

- 125 km of Optical Fiber 48 Core Single-Mode ADSS Cable; and
- 50 Communications and Fiber Optic Cabinets.

This infrastructure will interconnect all the Electric Rooms, Control Room, Communications Room, SSEE, Power House, Laboratory, TAS Plant, Truck Weighing, and Control Checkpoint.

Control System

The Control System will be responsible for the control and supervision of the process in the Plant and Peripheral areas of the Exar Lithium Project. The Control System is based on a conventional Control System with integral architecture.

The Control System will be made up of the following main components:

- Control Panels – Local and redundant controllers;
- Remote Inputs and Outputs Panels;
- Operation and Engineering Stations;
- Video-Wall;
- Servers and printers;
- Instrumentation:
  - Analog Signal, 4-20 mA with Hart protocol;
  - Digital Signal, with control voltage in 24Vdc;
- Process Control Network: Considered in the scope of the Telecommunications System, ETHERNET network over optical fiber, with ring topology, which will allow the Control Panels to interact; and
- Control Subnetworks: Considered in the scope of the Telecommunications System, ETHERNET network over fiber optic, which will allow to communicate the Panels of Remote Inputs and Outputs with their Controllers, and the motor controls, either smart relay or frequency drivers, with the associated Controller, both with an independent ring topology.

Other Systems

The following systems are outside the scope of Engineering, so the infrastructure to be considered should be defined by others:

- CCTV System;
- Fire Detection System;
- IP Telephony System; and
- Access Control System.

However, in the developed infrastructure (fiber optic networks), communication networks have been enabled for them to be implemented on them, without the need to make new fiber optic tracings.

19.0 MARKET STUDIES AND CONTRACTS

Lithium has unique properties that enables use in many applications. The largest applications for lithium chemicals are: rechargeable batteries, glass, lubricating greases, metallurgy, pharmaceuticals, and polymers. Lithium consumption is expected to increase significantly in the coming years driven by a rapid increase in demand for electric vehicles (EVs) and longer term energy storage for wind and solar power. Industry producers expect total lithium demand to reach between 800,000 and 1 million tonnes of LCE or higher by 2025 as a result of an increase in EVs.

This section provides a summary of the supply and demand of lithium and price forecasts. Material presented in this chapter is primarily from the United States Geological Survey (USGS) 2018 Report.

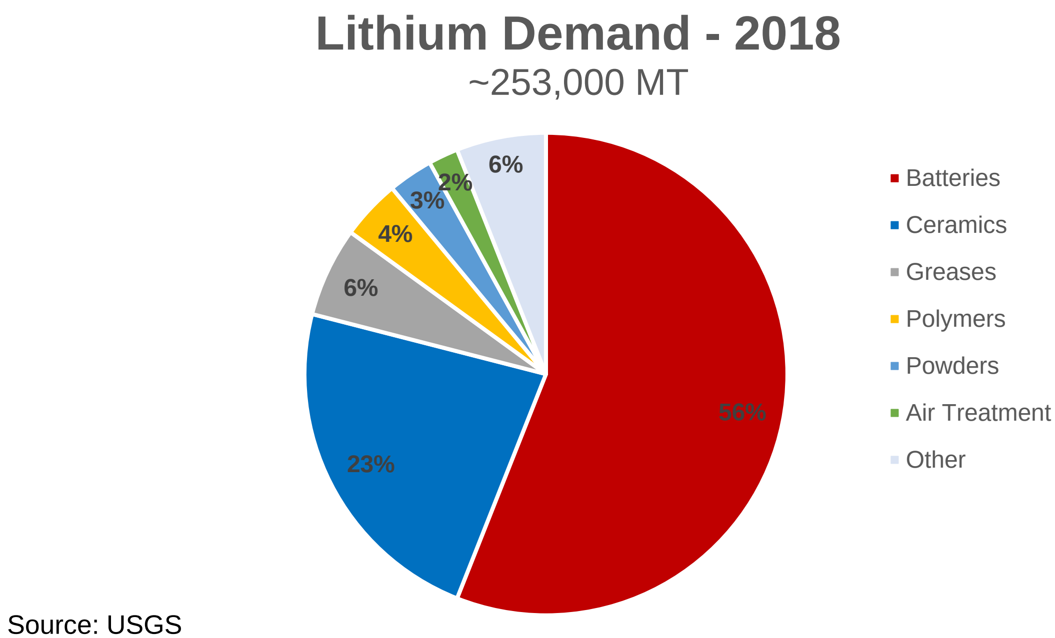
19.1 LITHIUM DEMAND

Lithium is the lightest metal in the periodic table with the symbol Li and atomic number 3. It is a soft, silver-white metal belonging to the alkali metal group. Under standard conditions, it is the least dense solid element. Like all alkali metals, lithium is highly reactive and flammable. The combination of lightness and high reactivity make it uniquely suited for use in batteries and many industrial processes.

Lithium has been listed as one of the critical elements by the U.S. Department of Energy based largely on its importance in rechargeable batteries. Lithium-ion battery is the preferred form for high-density applications like EVs and portable electronics. A full-electric EV can require over 50 kg of LCE in the battery.

In 2019, the consultancy Global Lithium estimates worldwide demand for lithium chemicals was approximately 306,000 MT of LCE with the lithium ion battery share of demand of 61% or approximately 220,000 MT LCE. Glass and ceramics are the second largest demand at 16% followed by lubricating grease at 7%. The top three applications account for more than 80% of demand (Figure 19.1).

Figure 19.1 Lithium Demand by Use (2018)

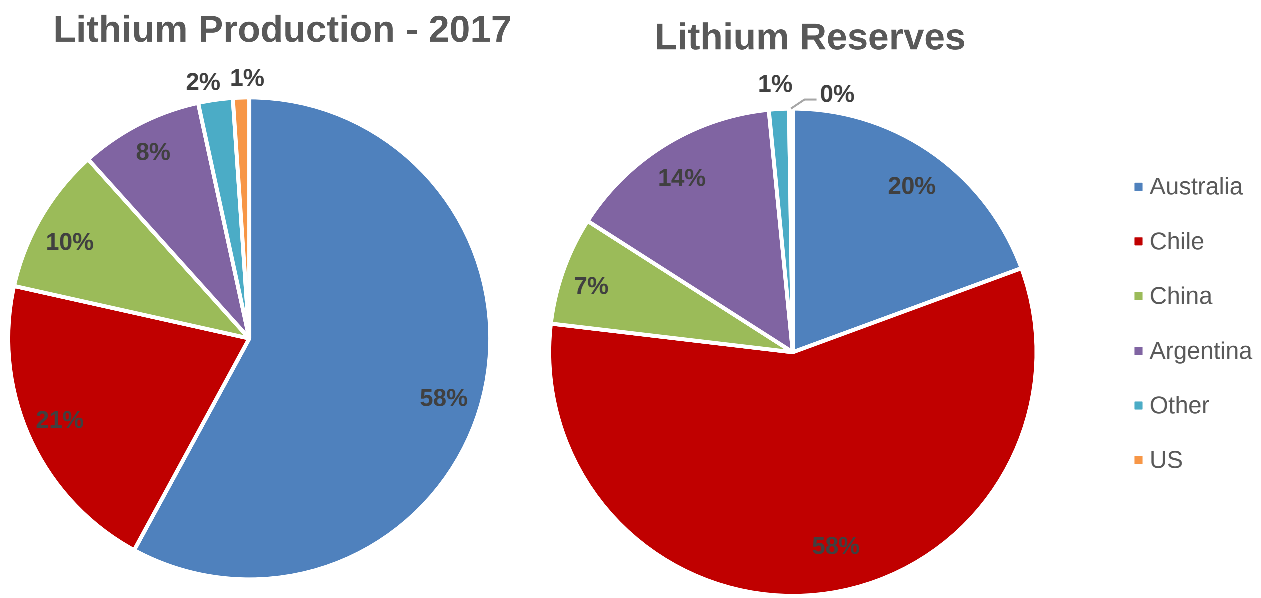


19.2 LITHIUM SUPPLY

Lithium occurs in the structure of pegmatitic minerals, the most important of which is spodumene (hard-rock) and due to its solubility as an ion, is also commonly found in brines and clays. Pure lithium does not occur freely in nature, only in compounds. Starting in the 1980s, brine based lithium chemicals provided most of the supply; however, in recent years' hardrock forms have surpassed brine as the largest feedstock for lithium chemical production.

The USGS estimates global lithium reserves of 75 MT of lithium carbonate equivalent (LCE) (USGS, 2019). Figure 19.2 shows global reserves and production by country. Chile accounts for over half of global lithium reserves, with Argentina providing 14%.

Figure 19.2 Lithium Production (2017) and Reserves (2019) by Country



Source: USGS

Five spodumene operations in Australia and two brine operations each in Argentina and Chile accounted for the majority of world lithium production. The leading spodumene operation in Australia increased its spodumene concentrate production by about 40% in 2018 and remains the world's largest lithium producer. Since 2016, one existing spodumene mine in Australia restarted and five new mines of various scale began operations. By 2019 two of the new mines had suspended production until market conditions warranted resuming operation.

In the coming five years, significant investment is expected from both established players (SQM, Albermarle, Ganfeng, Livent and Tianqi) and juniors such as Lithium Americas. Albemarle's LaNegra expansion, Livent's Hombre Muerto, Orocobre's Olaroz and SQM's Atacama expansion are a few of the largest brine expansions underway. Additional production from Talison's Greenbushes in Australia is expected.

Over 50 lithium projects can be identified in Argentina alone (USGS). Most of these projects are in the early prospecting stage, with other projects undergoing both greenfields and brownfields engineering studies (USGS, 2018). However, due to the long permitting timelines, extensive exploration requirements, high capital expenditures and complex mineralogy, it is unlikely that many of these projects will reach production. Lithium is a small industry and the number of capable, technically trained engineers with lithium experience is very limited.

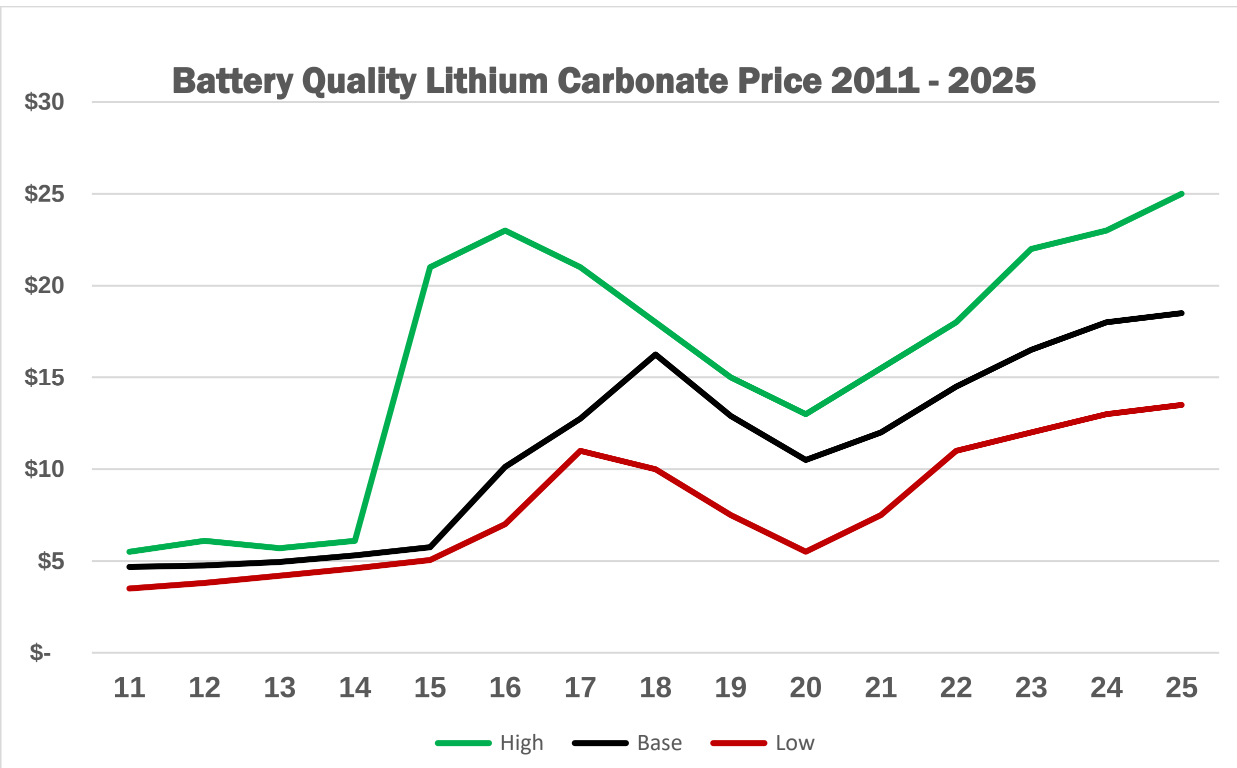
19.3 PRICE FORECAST

Total battery quality and industrial lithium chemical supply narrowly exceeded demand from 2016 to 2018. A more significant supply overhang of industrial grade supply and to a lesser extent battery quality material developed in 2019 due to addition chemical conversion capacity fed by Australian spodumene coming online in China putting downward pressure on prices. The oversupply situation is expected to be short-lived due to the increasing adoption of electric vehicles resulting from new purchase incentives and environmental legislation in the EU and China. The growth of electric mobility plus an increase in global energy storage projects, is expected to push the market towards a shortage situation by late 2021 or early 2022.

The lack of timely capacity additions by brine producers in South America coupled with the increasing rate of demand growth is expected to put pressure on the supply and demand balance and create a shortage of battery quality lithium chemicals that could last several years. Long, complex supply chains coupled with some of the capacity producing at a quality level that is unacceptable for use in the high growth battery market and requiring further processing is likely to cause a price spike similar to what occurred from late 2015 into 2018 when short term prices jumped dramatically from approximately US$6,000 per tonne to the mid US$20,000s per tonne on the spot market and into the mid-teens for longer contracts of battery quality material.

A range of projected prices to 2025 is presented in Figure 19.3.

Figure 19.3 Projected Pricing for Battery-Quality Lithium Carbonate to 2025



Source: *“Lithium Market Update,” Global Lithium LLC, October, 2020.*

A more conservative projected pricing schedule than what is presented in Figure 19.3 has been adopted for the economic analysis presented in Section 22, as displayed in Table 19.1.

TABLE 19.1 PRICING SCENARIOS ADOPTED FOR THE ECONOMIC ANALYSIS OF THE PROJECT		
Pricing Scenarios Per Tonne - Battery-Quality Lithium Carbonate		
Low	**Medium**	**High**
US$10,000	US$12,000	US$14,000

19.4 OFFTAKE CONTRACTS

Production from the Project will be divided between the partners of Minera Exar according to the their ownership (Ganfeng Lithium 51% and LAC 49%). Accordingly, LAC is entitled to 19,600 tpa of LCE based on a full production rate of 40,000 tpa. LAC has entered into lithium carbonate offtake agreements with two counterparties, Ganfeng Lithium and BCP Innovation Pte Ltd. (“Bangchak”). These offtake agreements are related to strategic investment agreements by the counterparties, which include both debt facilities for Project construction and equity investments. Assuming a 40,000 tpa production rate and LAC maintaining its 49% interest in the Project, the Ganfeng offtake agreement entitles Ganfeng to acquire 9,800 tpa of LCE (80% of 49% of the first 25,000 tpa of production) at prevailing market prices, while the Bangchak offtake agreement entitles Bangchak to acquire 6,000 tpa of LCE (20% of 49% of the first 25,000 tpa plus 46.67% of production above that rate) at prevailing market prices. The remaining 3,800 tpa is unallocated, subject to certain rights of Bangchak to top-up its offtake entiltement to 6,000 tpa from this unallocated amount in certain circumstances.

For clarity at a production rate of 40,000 tpa, Ganfeng Lithium is entitled to its 51% share of production (20,400 tpa) and 80% of LAC’s share of production up to 25,000 tpa (9,800 tpa) or, in aggregate, 75.5% of 40,000 tpa (30,200 tpa).

20.0 ENVIRONMENTAL STUDIES, PERMITTING AND SOCIAL OR COMMUNITY IMPACT

20.1 ENVIRONMENTAL AND SOCIAL STUDIES

Minera Exar hired Ausenco Vector to carry out the environmental and social studies required for the Project. The Environmental Impacts Report for the operational phase of the Project was presented to the corresponding authorities in December 2011 and approved on November 8, 2012, thus complying with existing environmental permits in the province of Jujuy, Argentina, and also with the international standards. The continued validity of this permit was ratified by a letter issued by the government of Jujuy (NOTA SMeH No 043/20179), issued on 16 March 2017. An update to the Environmental Impacts Report was submitted to the authorities in February 2017 and approved in October 2017.

A further update to the Environmental Impacts Report for the operational phase has been submitted to the Authorities and approval is expected by November 2020 (see Table 4.4).

20.1.1 Permits and Authorities

Natural resources are the responsibility of each Province under the Argentinean National Constitution. Although the Mining Code is enacted by the National Congress, permitting and jurisdictional authority is vested in the provincial authorities. Therefore, the Province of Jujuy has the authority on all significant permits regarding the Project's constructions and operations.

In particular, the Mining and Energy Resource Directorate under the Mining and Hydrocarbons Secretariat leads the proceedings and issues the Environmental Permit – the most important permit related to mining exploitation activities. The Environmental Permit (called in Spanish "*Declaración de Impacto Ambiental"* or "DIA") approval process includes its review by several provincial offices, including the Provincial Directorate of Water Resources, the Environmental Ministry, which has supervisory authority for environmental and natural resources, and the Secretariat of Tourism and Culture, which regulates operating permits in areas of potential archaeological and paleontological interest. It also includes consultation and use of land agreements with any aboriginal community in the Project area of influence. Other provincial entities are responsible for specific industrial/service permits.

The Provincial Department of Mines and Energy (Dirección de Minería y Recursos Energéticos) under the Secretariat of Mining and Hydrocarbons has approved the Environmental Impact Report for the exploration work of the Cauchari-Olaroz Project (Resolution No. 25/09 on August 26, 2009) and subsequent updates as referred in point 4.8 of this Report.

During the exploration stage, authorization was requested from the Provincial Directorate of Water Resources for the extraction of brackish water for mining/industrial use. The relevant fees have been paid through 2018 and are paid at the end of each calendar year.

A water concession permit (45 L/s) has been approved and Minera Exar has requested an amendment to the permit for 150 (L/s).

The legislation governing the Environmental Impact Report and its updates is based on the Law No. 24,585: Environmental Protection for Mining Activities ("De la Protección Ambiental para la Actividad Minera") and the procedures stipulated in Decree No. 5772-P-2010, from the Province of Jujuy Environment Law ("Ley General de Medio Ambiente de la Provincia de Jujuy").

The update to the Environmental Impacts Report for Exploitation for the Cauchari-Olaroz Project was approved by Resolution N° 010/17 (DIA) of the Directorate of Mining and Energy Resources of the Province of Jujuy. A further biannual update to the Environmental Impacts Report for Exploitation for the Cauchari-Olaroz Project was submitted in September 2019 for evaluation by the Authority. This new document includes the new environmental studies carried out and information collected during the last two years as well as taking account of the current Project layout (relocation of the process plant, camp, industrial solid waste deposits ("RISES") and industrial liquid waste pools ("RILES"), relocation of control ponds C1 and C2, and lithium pools L1 and L2. The relocation of the dumps for harvested salts was also partially authorized by the Directorate of Mining (Rs. 003/2019), since the approval for the disposal of salts on the salt crust is excluded from this approval and is currently under evaluation by UGAMP under the 2019 IIA exploitation stage permit process) and the increase of the production capacity from a previously conceived 25,000 tpa (Phase 1) to 50,000 tpa (Phase 2) to a 40,000 tpa (Phase1) project. It is expected to be approved by November 2020.

Another important agency is the Department of Environmental Management (Ministerio de Ambiente), the supervising authority for environmental and natural resources. The Cauchari-Olaroz Salar (Law No. 3820/81) is a Protected Area for Multiple Use, which allows mining activities, but has a specifically designed control system, which aims to encourage the populations of vicuñas. The Secretariat of Tourism and Culture regulates operating permits in areas of potential archaeological and paleontological interest (Provincial Law No. 4133/84, and National Law No. 25,743/03).

The biannual update of Environmental Impacts Report 2019 (Exploitation) has been filed and is in process of approval by the authorities.

20.1.2 Framework Legal Study

A compilation of international, national, and provincial norms and standards applicable to the Environmental Impacts Report was made. Special emphasis was placed on Argentine environmental standards applicable to mining projects at the national level (Argentina) and especially at the provincial level (Province of Jujuy) applicable to mining projects. All relevant state institutions involved in the implementation of the legislation and the permits that need to be managed to construct and operate the Project were taken into account.

As a base guideline for the Project, the Environmental Protection Act for Mining Activity No. 24585 and its supplementary regulations was used.

20.1.3 Environmental Liabilities

Minera Exar adhered firmly to the Equator Principles[2] ("EP") even before exploration operations began. These principles are a voluntary commitment, which arose from an initiative of the International Finance Corporation (IFC), member of the World Bank Group, to stimulate sustainable private sector investment in developing countries. Financial institutions that adopt these principles are bound to evaluate and consider environmental and social risks of the projects they finance in developing countries and, therefore, to lend only to those who show the proper administration of its social and environmental impacts such as biodiversity protection, use of renewable resources and waste management, protection of human health, and population movements.

In this context, Minera Exar established from the beginning that the Equator Principles will be the minimum standards for developing the Project, taking the following measures:

- Make the effort to understand and respect local customs, traditions, lifestyles, and needs.
- Commit to meet the country standards.
- Establish safety procedures for its own staff, consultants, and contractors.
- A FPIC (Free and Prior Informed Consent) shall be granted, thereby respecting the rights of nearby communities to access information. The two-way open communication will be kept permanently, and before each stage of the Project is initialized, nearby communities will receive the required information to participate.
- As long as relationships with communities through agreements that define roles and responsibilities are formalized, they may be used to reduce the risk of misunderstandings relative to the presence, activities, and intentions of Minera Exar in the area.

Indigenous and Tribal Peoples' Rights: As defined in the ILO (International Labour Organization[3]), will be ratified and will respect the Indigenous and Tribal Peoples' Convention, 1989 (No. 169).

Minera Exar commits to maintain a contract registration, records of all the meetings with communities and reports relating to negotiations with property owners.

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[2] EP: Credit risk management framework for determining, assessing and managing environmental and social risk in Project Finance transactions.

[3] ILO: International organization responsible for drawing up and overseeing international labour standards.

The team responsible of keeping the proper community relationships will manage this process through specific programs and the CEO of Minera Exar will be informed regularly and directly about them.

20.1.4 Environmental Baseline Studies

To describe the environmental components, the team of specialists and technicians of Ausenco Vector completed, according to the needs of each discipline, a field survey carried out between September 2010 and July 2011.

After the initial 2011 baseline three biannual renewals to the EIA for Exploitation were presented to the authorities, for which the data base was updated by further field work on some components of the baseline:

2015 (March): Air quality, water quality (surface, underground, and camp effluents), flora and fauna.

2016 (October): Air quality, water quality (surface and underground), limnology, flora, fauna and social aspects.

2017-2018: Quarterly participative monitoring rounds (air quality, including noise and surface and underground water quality).

This survey contains all the aspects that would be likely affected by the implementation of a future mining project. It includes natural environment studies and both inert (air (including noise), soil, water and geology) and biotic (flora, fauna, entomology, extremophile organisms, and limnology) components, including a section of ecosystem characterization and a socio-economic and cultural study of the analyzed surroundings.

A brief summary of the studies is presented in the sections below.

20.1.4.1 Climate

Weather data were obtained from three weather stations considered as the most representative of the Project area. Additionally, data from an automatic recording station (Vaisala meteorological station, located south of the present camp) installed by Minera Exar in late May 2010 to obtain evaporation data for the site, as well as temperature, precipitation and humidity data, was analyzed.

A new weather station (Davis) which was installed and started operating in October 2018 is located 300 m northwest of the current camp.

The climate data base was updated in June 2019 with data from the onsite weather stations through to 23 May 2019.

The Project site is affected by strong and persistent westerly winds, particularly in the warmer months (October to May). Maximum wind velocities can reach in excess of 43 m/s (155 km/h), with median wind velocities in the range of 5 to 10 m/s (18 to 36 km/h).

The monthly average temperature values show a seasonal oscillation, with the lowest averages concentrated during the period May to August, dropping to close to -2° C. The highest average values are during the period September to March, reaching approximately 12° C. The average annual temperature is 5.1 °C and the maximum and minimum annual averages are 15.6 °C and -6.6 °C, respectively. The extremes of temperatures during this period had an absolute maximum of 25.9 °C (January 11, 2011) and an absolute minimum of -17.9 °C (July 25, 2014).

Annual average rainfall is approximately 50 mm with precipitation concentrated during the period November-March with peak rainfall in January.

The average monthly relative humidity has a direct relationship with precipitation and varies between 32% and 62% in January-February to a minimum average monthly relative humidity ranging from 11% to 19% in the period September to November, based on the Project site data during the period January 2011 to October 2016.

20.1.4.2 Water Quality

Surface and groundwater water samples were analyzed for 3 surface locations (Vega de Archibarca, Vega de Olaroz Chico, and Casa de Guardasparque) and one groundwater source (the industrial water well in the Archibarca Fan). Results were compared with Water Quality Standards set by the Water Quality Reference Levels (Niveles Guía de Calidad de Agua) under the National Law N° 24585 Annex IV and by the Argentine Food Code (2010).

It was observed that for surface waters, the natural concentrations of aluminum, boron, and iron exceed the permissible limits for drinking water. The groundwater samples showed acceptable values in most of the physico-chemical parameters analyzed, boron being the only element that exceeds the Water Quality Reference Levels values throughout the area, which is inferred to be as a result of the lithologies present in the area.

Follow up field campaigns were carried out in March 2015 and October 2016. The results of these campaigns confirmed the results from previous sampling rounds.

20.1.4.3 Air Quality

A baseline air quality campaign was completed in 2012 and the different elements measured (PM_{10}, SO_2, NO_2, H_2S, O_3) were below the values established in Law 24585/95, Mining Legal Framework (Marco Jurídico Minero).

Further air quality and noise campaigns were carried out in March 2015 and October 2016, the 2016 campaign being done in conjunction with members of the communities in the Project's Area of Direct Influence. The monitoring points for these two campaigns were at the Exar camp and at the Centro de Interpretación Olaroz (CIO).

The results of the 2015-2016 campaigns indicated that PM_{10}, Pb and gases were also all below the values established in Law 24585/95 at both sites.

During the quarterly participative environmental monitoring program (2017 and 2018) CO, SO_2, NO_x, O_3, SH_2, PM_{10} and Pb, in alignment with Provincial Decree No. 5,772/10 (Table 8, Air Quality Guide Levels) of Provincial Law No. 5,063/98 General Environmental Law, were measured at six points in the area surrounding- and at the Project site. Results indicated that, for gases, CO exceeded the guidelines at all points during all the monitoring events and all other gases were below the guideline limits at all points during all monitoring events, with O_3 being close to the 8-hour guideline at all stations during all monitoring events. SH_2 was close to the 30-minute guideline limit an all monitoring events since September 2017.

During the same quarterly monitoring events, PM_{10} and Pb were measured as being well below the guideline limits at all six monitoring stations.

Noise measurements were also carried out during these participatory campaigns in 2016 and (two monitoring points) 2017-2018 (6 monitoring points), the results of which were below the guideline values (Equivalent Continuous Sound Level, L_{eq}, 70 dB(A), and Maximum Instantaneous Level, L_{max}) set by the World Health Organization (WHO) for industrial and traffic areas.

20.1.4.4 Soils

Soils in the area of the Cauchari-Olaroz Salar generally have qualities that make them unsuitable for cultivation, including weather conditions, salinity, high risk of erosion and shallow depth, and restrict use to natural pastures and wildlife and recreation. The soils in the study area have a limited development due to the severe climatic conditions prevailing in the area. They are incipient soils of the skeletal type.

In the initial Environmental Impact Assessment, a broad description of the methodology used for the edaphic characterization of the Project area, description of profiles and soil analysis was developed. Using satellite images and on-site surveys (test pits and sampling horizon), 8 soil units were defined. Based on the taxonomic classification of soils, they belong to the Entisols order, and to the Typic Torrifluvents and Typic Torripsamments subgroups.

Soil units were also classified according to their land capability classes (Soil Survey Staff, 1999)[4], all being in Class VII and Class VIII, which are marginal soils used for extensive livestock breeding, and for tourism and mining (see Table 20.1).

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[4] Soil Survey Staff. (1999). Soil taxonomy: a basic system of soil classification for making and interpreting soil surveys (2nd ed.). Washington D.C.: US Department of Agriculture Soil Conservation Service.

TABLE 20.1 **SOILS CAPABILITY CLASSES**		
Soil Class	**Area Within Study Area (Ha)**	**Soil Class Caracteristics**
Class VII	18,990	Soils subject to permanent and severe limitations when used for pasture or forestry. Located on steep, eroded, rugged, shallow, arid or flooded slopes. Its value to support some use is medium or poor and must be handled with care. In areas of heavy rainfall these soils should be used to sustain forests. In other areas, they can be used for grazing; In the latter case, rigor and care in handling must be extreme.
Class VIII	19,011	Soils not suitable for forestry or grazing. They must be used for wildlife use, for recreation or for hydrological uses. Skeletal, stony soils, bare rocks, on extreme slopes, etc.

In summary, due to its strong climatic limitations, the study is area is not suitable for the cultivation of crops. The value of the area is linked to tourism and the preservation of wildlife.

Soil quality sampling has been carried out as per Table 20.2 below.

TABLE 20.2 **SOIL QUALITY SAMPLING**			
Period	**No. of Sampling Points**	**Sampling Locations**	**Comments**
2011	2	Initial Baseline sampling	
March 2017	2	Two soils points, east and west of main Project areas	Participatory
June 2017	2	Pilot Plant, Pond area	Participatory
September 2017	4	Pilot Plant, Camp, Parking area, Borehole 1720	Participatory
December 2017	3	Pilot Plant, Camp, Accommodation modules	Participatory
March 2018	3	TAS Plant, Camp, Parking area	Participatory
June 2018	3	Pilot Plant, Camp, Diesel dispenser station	Participatory
September 2018	1	Camp	Participatory
December 2018	3	Pilot Plant, Camp, New Plant B	Participatory

The relevant legislation for soil quality is the environmental protection and conservation guidelines established in Annex V of Provincial Decree No. 5,772/10 (Table 7, Guidance Levels for Soil Quality) of Provincial Law No. 5,063/98 General Environmental Law.

All results have been found to be below the guidance levels in this legislation.

20.1.4.5 Flora

The Project area lies within the eco-regions of the Puna and High Andes. Fieldwork identified the following units of vegetation in the area of influence of the Project: dry woodland, yaretas subshrub steppe, Sporobolus and Festuca herbaceous steppe, barren areas ("peladales"), and wetlands ("vegas").

The shrub steppes vegetation unit has the highest species richness. The same trend was observed with the Shannon Index for the same vegetation units.

Further rounds of vegetation monitoring were carried out in the area of the pilot plant at the end of summer 2015 and in October 2016, this being the area where the majority of the technical field program was being carried out at the time. The values obtained for the Shannon and Weaver indices of species richness and diversity during the 2011 baseline studies reported in the 2012 EIA are similar to those obtained in the 2015 and 2016 monitoring rounds, which infers that there have not been significant changes to the plant communities.

Quarterly rounds of vegetation monitoring were carried out in 2017 and 2018 using the same methodology. The sampling sites were compared taking into account those sites in common between those surveyed in the initial baseline (2011) and those considered in the 2017 and 2018 quarterly campaigns. A new point was added in the December 2018 campaign at the new site for the Plant (New Plant B).

No major changes were noted from the 2011 baseline in the 2017-2018 monitoring rounds.

The implementation of permanent plots is recommended, especially in those sites that will be potentially impacted in the development of the Project. This will allow the analysis of the dynamics of the plant community over time, its magnitude, types of variations and changes, (if any), in relation to a base or initial situation.

20.1.4.6 Fauna

The fauna surveys identified 49 species of which 2 belong to the reptile class, 2 to the amphibian class, 40 to birds, and 5 to mammals.

All mammalian species are residents. One of the most abundant species in the cone of Archibarca is the Highland tuco tuco, a rodent that is found especially in peladales. Vicuñas were observed in all surveys. Reptiles were observed only during times of higher temperature, which coincides with their period of greatest metabolic activity. Within the bird class, the "caminera puneña" and the "agachona chica" live in the area all year round (Figures 20.1 and 20.2). The golden-wing dove and the oquencho were observed near small pools of water or on the edge of the salt flat. Species such as the "lechucita de las vizcacheras", and the local harrier showed low population densities within the Project area, but they are probable residents.

The Project area is within the Cauchari - Olaroz Flora and Fauna Reserve, created in October 1981, one of principal aims of which is the recovery of the vicuña. Because of this protection and local, national and international conservation programs, information from the 2008 National Census indicated that the population size has been restored. As a result, based on International Union for Conservation of Nature ("IUCN") criteria, vicuñas (Figure 20.3) have been considered as a Least Concern ("LC") species since 2008.

The conservation status of the bird species found in the area by national category are shown in Table 20.3, IUCN category in Table 20.4 and CITES category in Table 20.5.

Figure 20.1 Caminera Puneña (*Geositta Punensis*)

Source: *Ausenco (2017)*

Figure 20.2 Agachona Chica (*Thinocorus Rumicivorus*)

Source: *Ausenco (2017)*

Figure 20.3 Vicuñas (*Vicugna Vicugna*) on Shrub Steppe of Archibarca Cone

Source: *Ausenco (2017)*

Table 20.3 **State of National Conservation –** **Categorization of Birds of the Republic of Argentina**		
MA y DS – AA[1]	**No. of Species**	**Species (Where Applicable)**
Insufficiently Known (IC)	0	-
Not Threatened (NA)	36	-
Vulnerable (VU)	2	Puna rhea “Suri” (*Rhea pennata* var. *tarapacensis*) Flamenco austral (*Phoenicopterus chilensis*)
Threatened (AM)	2	Andean flamingo “Parina grande” (*Phoenicoparrus andinus*) James's flamingo “Parina chica” (*Phoenicoparrus jamesi*)
Endangered (EN)	0	-
Critically Endangered (EC)	0	-
Total	**40**	

***Note:* [1]** *Ministerio del Ambiente y Desarrollo Sustentable de la Nación y de Aves Argentinas.*

Table 20.4 **Conservation Categories – IUCN**		
IUCN[1]	**No. of Species**	**Species (Where Applicable)**
Data Deficient (DD)	0	-
Least Concern (LC)	36	-
Near Threatened (NT)	3	James's flamingo “Parina chica” (*Phoenicoparrus jamesi*) Chilean flamingo “Flamenco austral” (*Phoenicopterus chilensis*) Puna rhea “Suri” (*Rhea pennata* var. *tarapacensis*)
Vulnerable (VU)	1	Andean flamingo “Parina grande” (*Phoenicoparrus andinus*)
Endangered (EN)	0	-
Critically Endangered (CR)	0	-
Total	**40**	

***Note:* [1]** *International Union for Conservation of Nature*

TABLE 20.5 CITES – BIRDS, MAMMALS, REPTILES AND AMPHIBIANS			
CITES[1]	**Characterization of Appendix**	**No. of Species**	**Species (Where Applicable)**
Appendix I	In danger of extinction. The marketing of these species is prohibited and authorized. only under exceptional circumstances, such as for scientific research	1	Puna rhea, "suri" (*Rhea pennata* var. *tarapacensis*)
Appendix II	Species that are not necessarily endangered, but whose trade must be controlled in order to avoid utilization incompatible with their survival	7	Birds: Red-backed hawk or variable hawk, "aguilucho común" (*Geranoaetus polyosoma*) Mountain caracara, "matamico andino" (*Phalcoboenus megalopterus*) Burrowing owl, "lechucita vizcachera" (*Athene cunicularia*) James's flamingo "Parina chica" (*Phoenicoparrus jamesi*) Chilean flamingo "Flamenco austral" (*Phoenicopterus chilensis*) Andean flamingo "Parina grande" (*Phoenicoparrus andinus*) Mammales: Vicuña (*Vicugna vicugna*)
Total		**8**	

Note: *[1] Convention on the International Trade in Endangered Species*

20.1.4.7 Ecosystem Characterization

The Project area has a low diversity although there are some zones within it that are more diverse than others, such as shrub steppes and meadows, the Archibarca cone being the zone with the greatest biodiversity within the Project area.

Follow up fauna and flora monitoring campaigns were carried out in the area of the pilot plant in March 2015 and in October 2016 and quarterly monitoring during 2017 and 2018. Diversity results indicate that there is no significant change in the diversity parameters.

Due to the low intensity of sampling conducted at the new site where the Project will be located, it is recommended that the monitoring frequency be increased at the new sites.

20.1.4.8 Limnology

Limnological baseline sampling was completed in 2011 where the composition of the phytoplankton, zooplankton, phytobenthos and microinvertebrate communities in water bodies close to the Project have been studied. The most recent monitoring events have been the quarterly events during 2017 and 2018.

These environments have high salinity and are hydrologically stressed. The few species that have been documented are adapted to these environments. The communities of phytoplankton and phytobenthos showed some diatom species, whose presence indicates that these environments contain high concentrations of nutrients which comes from organic plant matter and the presence of cattle in the area. The zooplankton species found are adapted to shallow water bodies with high salinity. The extreme conditions are the main reason that the diversity of macroinvertebrate species in the Project area is low.

Within the macroinvertebrates, Diptera has been the most abundant Order. The absence of representatives of the Order Amphipoda after the 2017 autumn season monitoring event should be highlighted.

Within the zooplankton, the Plomidia Order has not been registered since March 2018.

It is recommended that systematic monitoring continues so that better representativeness of the environment and the changes that are occurring through the different seasons is achieved, and to assess whether they exert any influence on the communities that inhabit these bodies of water.

20.1.4.9 Landscape

Five landscape units were identified, listed as follows: Cauchari-Olaroz Salt Flats; Alluvial Plain; Isolated Mountains; Mountains West of Cauchari; and El Tanque Mountains.

In general, the fragility and visual quality of the landscape, in the area of the Project have values ranging from medium-high to medium-low, with the Cauchari-Olaroz Salt Flats landscape unit having the highest visual quality and fragility value. This indicates that protection, correction, or mitigation of environmental impacts on the landscape, which will decrease the impact of future extractive activities, will be required in order to preserve the current morphology of the landscape, chromatic variation, landscape perspectives as well as the preservation of the natural ecosystem. This has been covered within the context of the Environmental Impacts Report for Exploitation and is especially pertinent with respect to the height of the salt heaps and visibility of the ponds from the national and provincial roads.

20.1.4.10 Paleontological Study

Eight points were studied on both sides of the Cauchari-Olaroz salt flats during the paleontological survey with the aim of identifying the existence of fossils in the study area. From the geological background information and the results of the field studies it has been concluded that the area has no paleontological significance. However, any new Project activities within sedimentary lithologies will require a specific paleontological survey of the site for the purposes of assessing the impacts of the new activities.

20.1.4.11 Archaeological Study

Intensive and extensive surveys carried out in the area resulted in the identification of the presence of 52 archaeological finds, which were organized into five sectors: Northeast Sector, East Sector, Southeast Sector, West Sector and Center West Sector. Archaeological sensitivity, based on the type of project and the actions to be performed in the construction phase, is low for the Northeast, East and Southwest sectors. Based on the Project description, the West and Centre West sectors have a medium-high archaeological sensitivity. The archaeological sites that possess a high archaeological sensitivity within these two sectors are as follows: CV02, CV08, CV09, CV10 and CV26. (IIA, 2012).

20.1.4.12 Geology and Geomorphology

This subject is covered in Sections 7.3 to 7.5 of this report.

20.1.4.13 Hydrogeology

This subject is covered in Section 7.6 of this report.

20.1.4.14 Hydrology

This subject is covered in Section 7.5.4 of this report.

20.1.5 Social Characteristics

The area of direct influence for the Project includes the communities of Susques (1565 residents), Huáncar (397 residents), Pastos Chicos (150 residents), Puesto Sey (148 residents), Catua (464 residents) and Olaroz Chico (199 residents) based on 2018 data. All these communities are in the department of Susques, Province of Jujuy, with the town of Susques being the head of the Department, located approximately 60 km by road from the Project.

The population directly impacted by the Project is mostly rural and self-identifies with the Atacama ethnic group. In general, their settlement patterns and spatial dispersion is based on the camelid’s pasturage activity.

Structurally all communities share similar rural characteristics, however, Susques is unique in having urban characteristics such as denser population, national and provincial public institutions, and commercial activity. Commercial activity in Susques is the highest of the Department.

The main economic activities in Susques are employment in public administration, trade, small-scale livestock production, craft industries, and small industries related to tourism and mining. Mining-related employment includes direct employment and indirect employment such as transportation, lodging, dining, grocery shopping, vacation homes and offices. The main activities in the rest of the department are mainly related to mining and small-scale livestock (mainly camelid) production.

Project Perceptions: In the surveyed communities there is generally a positive perception of the mining industry as it has recently become an economic pillar of the region. For this reason, Minera Exar S.A. is very well considered and the Cauchari-Olaroz project is viewed as a possible source of job opportunities for the population in general.

It is estimated that the total workforce required during the construction phase of the Project will be approximately 1,000 people. The construction phase began in the first half of 2018 and is estimated to end in the second half of 2021.

A total of 270 people will be required for the operation stage (including administrative, professional, plant, laboratory and maintenance personnel) for an approximate LoM period of 40 years.

Preference is given to the surrounding areas of the Project in terms of workforce. Exar has developed a training plan for local staff, in order to meet its commitments on the hiring of local labor given that in the province of Jujuy there is not much knowledge about lithium mining. Employees will also be recruited from areas outside of Jujuy, when employment requirements cannot be met locally.

There has been an active communication, consultation, and engagement process in place since 2009. Minera Exar has designed and implemented a Community Relations Plan engendering long-term cooperation with the population within the Area of Direct Influence of the Project. The communities have signed a Convention approving all stages of the Project.

Among the direct benefits expected from the Project, respondents indicated the following: direct employment on the Project; collaboration of the company in resolving water related issues; and the provision of training. There is a general expectation that the Project will facilitate improvement in infrastructure, health and education.

Respondents also explained that approval of the Project by the members of the communities is conditional on measures taken to protect the environment and mitigate the possible social impacts, as well as the Project´s ability to generate a positive contribution to the community.

Vehicular Traffic: A traffic study of the area focused on three routes: RN No. 51, RN No. 52 and RP No. 70. Three key intersections of interest for the Project were analyzed.

Based on the Average Daily Traffic (“ADT”) results, it was observed that for both national routes the busiest hour of the day is noon; while on Provincial Highway No. 70 there was more traffic in the mornings and evenings. These differences may be related to the purpose for which the roads are used: National Routes are for international transit, while the use of the Provincial Highway is largely related to local inter-urban transit and transit to mining projects in the area.

20.1.6 Evaluation of Impacts

The identification, description and assessment of potential environmental and social impacts, both positive and negative, were performed for the construction, operation and closure stages of the Project.

Initially, actions that could cause impacts were identified, and a classification of the environment was made, providing Environmental Units to each of the factors that will be affected by the Project.

Subsequently, qualitative and quantitative impacts using the methodology proposed by Conesa Fernández-Vítora (Conesa Fernández-Vítora, 1997) [5] were performed. The evaluation was done for each stage of the Project, including construction, operation and closure.

During the construction and operation stages of the Project, there is the potential for moderate impacts to the environment, some of which can be reversed or mitigated in the short, medium and long term. The following are the key potential impacts that were identified:

- Change in air quality due to the emission of particles and combustion gases;
- Increased noise levels due to the use of equipment, machinery and vehicles, and plant process operations;
- Changes in the geomorphology and soils due to evaporation ponds and production facilities;
- Change in land use and diversification of land use;
- Impact on the brine reservoir and aquifer system in general;
- Intensive use of brackish water for mining/industrial use;
- Removal of the vegetation for the siting of Project facilities, especially the preconcentration and concentration ponds;
- Alteration of wildlife habitat due to reductions of vegetation in some sectors, emission of noise and vibration, and human settlements; and
- Impact on landscape due to harvested salt dumps.

In addition, potential impacts were identified, such as:

- Archaeological resources due to the possibility of subsurface findings; and
- Biological corridor due to the installation of infrastructure in the salt flat.

The area of direct influence (ADI) is defined as the physical space where project activities are seen to affect specific social and/or environmental components. The environmental ADI for the Environmental Impact Report for exploitation for the Project is considered to be the area comprising the housing camp, evaporation ponds, sector where harvested salts are stored, drill

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[5] Conesa Fernández-Vítora, V. (1997). Auditorías medioambientales, guía metodológica (2a. ed. re). Madrid: Mundi-Prensa. Retrieved from http://www.sunass.gob.pe/doc/cendoc/pmb/opac_css/index.php?lvl=author_see&id=174

platforms, access roads and other easements where there is a greater likelihood of interaction due to Project actions.

The social ADI was considered to be the inhabited sectors or those sectores that have communities, such as Puesto Sey, Pastos Chicos, Huáncar, Catua, Olaroz Chico and Susques. These communities are located in watersheds different from those of the Salar de Olaroz - Cauchari, except for Olaroz Chico, which is the only community located on the eastern slope of the Olaroz mountains. It is within the territory of these communities that the salt flats and mining properties are located and where the activities related to exploitation will be carried out.

The area of indirect influence (AII) is defined as the physical space where an action related to the project activity could influence the social and environmental components. For the Environmental Impact Report for exploitation for the Project, the area that is outside the limits established for the environmental ADI was considered as the environmental AII. It should be clarified that for each of the environmental factors particular areas were considered based on the possibility that effects could manifest. The extent of these areas was defined based on each action that will be implemented.

For the social aspects, the rest of the localities of the department of Susques were considered as being the social AII: Jama, El Toro, San Juan de Quillaques and Coranzuli.

Should further easements be required for the Project, the areas of influence for the Project could change.

The hiring of local labor by the Company will generate a positive impact because a portion of the population will have increased quality of life. This in turn has a positive impact on the local economy. Access to formal employment will have direct (monthly salaries) and indirect (skilled training) benefits that will have immediate and longer-term positive impacts, particularly in terms of increasing employability post completion of contracts/mine closure. Also, local employment contributes towards stopping the phenomenon of youth migration to urban centers in search of better jobs. These effects are also pertinent to the Area of Indirect Influence (personnel coming from other provinces).

The procurement of goods and services during Project implementation would involve a stimulus in each of the industries supplying these resources. These effects would occur in the total area of influence of the mining Project.

20.1.7 Management Plans

The Environmental Management Plan (EMP) sets out in detail the measures to be implemented both in the medium and long term to prevent the negative effects or impacts generated by the Project on physical, biotic and social factors.

The Community Relations Plan (CRP) sets out the measures that Minera Exar will implement in order to promote social and economic development in the area of influence of the Project within a sustainability framework.

20.1.7.1 Environmental Management Plan

The actions that Minera Exar will implement through the EMP are presented so that the activities are carried out in an environmentally responsible and sustainable manner during the activities carried out for the construction, operation and closure, as well as those associated with the post closure. The EMP aims to prevent, control and reduce the negative impacts of the Project's activities.

Preventing impacts means introducing protective, corrective or compensatory measures that consist of modifications of location, technology, size, design, materials, which are made according to the forecasts of the project or the incorporation of new elements.

The Environmental Management Plan is a dynamic document that will be updated with each biannual renewal of the IIA for Exploitation, according to the legislation, in order to include aspects that had not previously been taken into account or due to the appearance of relevant changes throughout the life of the Project.

20.1.7.2 Community Relations Plan

Minera Exar has developed a program that promotes social and economic development within a sustainability framework. Minera Exar began work on the Community Relations Program with the Susques Department in 2009. This program was created to integrate local communities into the Project by implementing sub-programs aimed at generating positive impacts on these communities.

Susques is the most important commercial center in the area. However, the Program also focused on the Catua, Olaroz Chico, Huancar, Pastos Chicos and Puesto Sey communities.

The Community Relations Program has been divided into three key sub-programs. One deals with external and internal communications to provide information and show transparency. The second is a consultation program that allows Minera Exar to acknowledge perceptions of mining activities. A third program deals with execution of contracts with the communities for economic benefits. The most important part of the program is supporting social, cultural and environmental initiatives. The criteria for choosing initiatives are: should benefit the whole community; contribute to sustainable development and be participatory, yet it must be originated inside the community.

It should also be noted that Minera Exar has signed formal contracts with neighboring communities that own the surface rights where the Project will be developed. According to these contracts, the communities grant Minera Exar traffic and other rights, while Minera Exar ensures them a regular cash flow, to be used as the members of the communities decide. The arrangements vary between communities, but they all include the following:

- Aggregate payments of approximately US$239,417 per year between 2017-2019;
- When construction begins aggregate payments of approximately US$260,000 per year and beyond during construction;
- When production begins aggregate payments of approximately US$465,000 per year and beyond during production;
- Joint environmental monitoring programs;
- Priority rights for any job for which a person from the community is qualified;
- Training on site to qualify for the job;
- A school of business training in each community to assist in setting up businesses for the provision of services during construction; and
- Individual infrastructure programs in each community.

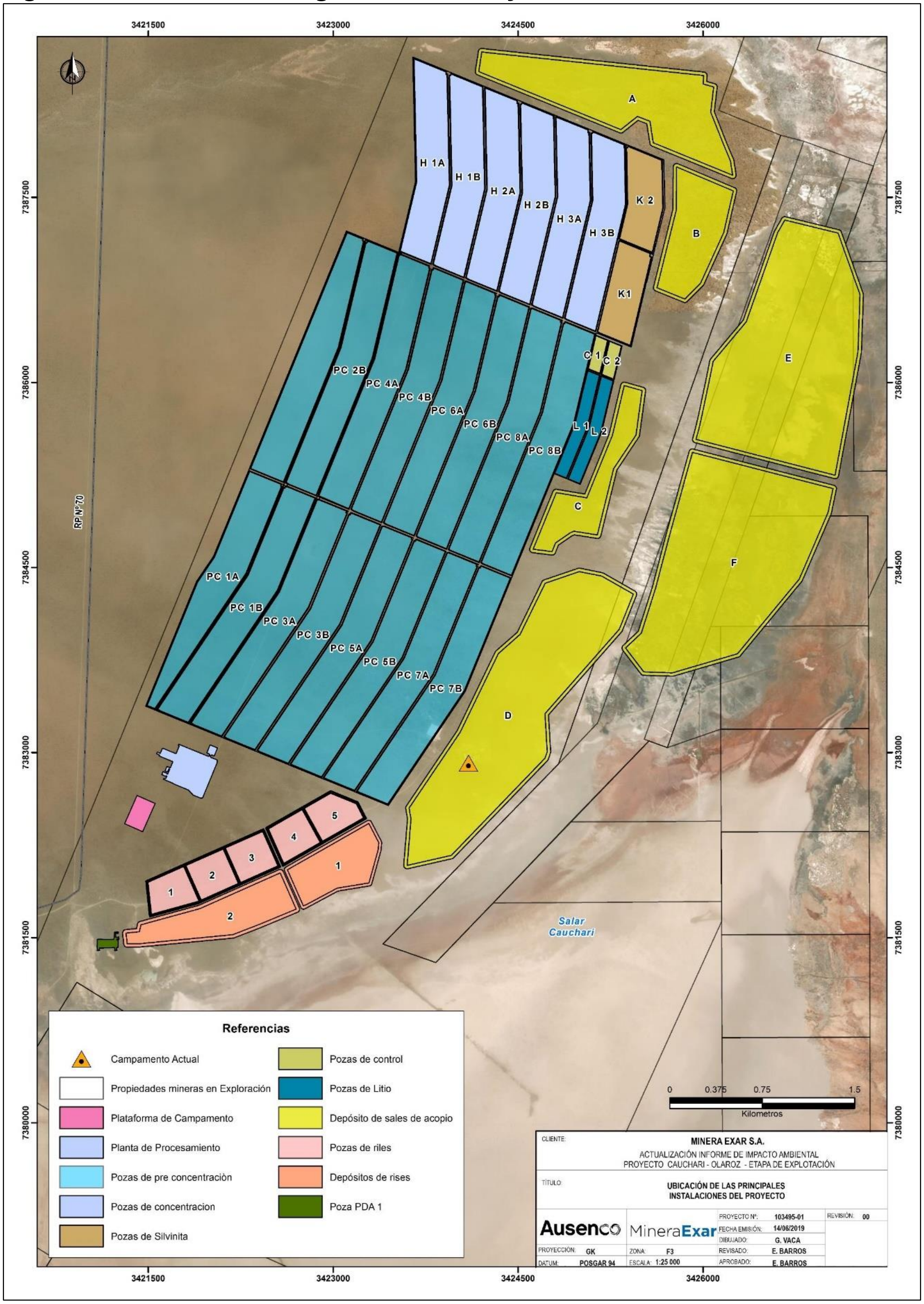
20.1.8 Waste and Tailings Disposal

20.1.8.1 Pond Solid Wastes

The evaporation process in the ponds leaves a considerable quantity of salts on the bottom of the ponds. These salts must be removed ("harvested") and transported to proximal stockpiles. The quantity of salt to be harvested is approximately 8 million tonnes/year, necessitating the use of mining-type front end loaders and trucks for this purpose. Transportation of harvested salts will be undertaken taking into account load and haul optimization needs, as well as environmental considerations. It is estimated that the six piles covering an area of approximately 740 ha will be built over a 40-year period and these piles will be built at an estimated average distance of about 2.3 km east and north of the pond sector (see Figure 20.4). The salt piles will average 10 m in height for the two that are to be built on the salt flat surface and averaging 15 m in height for the four that will be built on soil.

A further 340,000 tonnes/year of harvested salts will be generated from the plant process which will be stored in separate piles that will be equally environmentally inert.

Figure 20.4 General Arrangement of the Project Facilities



Source: *Minera Exar*

The harvested salts can be considered as an environmentally inert waste. The salts are generated from brines already present in the salt flat and do not introduce foreign compounds to it. They are composed essentially of sodium chloride (common salt), potassium chloride, sodium and calcium sulphates, magnesium hydroxide and boron. It is estimated that sodium chloride and sulphate make up over 87% of these harvested salts.

20.1.9 Tailings Liquid Disposal

20.1.9.1 Evaporation Ponds

The evaporation process in solar pools begins with a pre-concentration stage, where almost 90% of the sodium chloride (halite) crystallizes. In this pre-concentration stage, the volume of brine is reduced by between 70 and 80%, depending on its composition. 50% of the sulfate found in the brine is also extracted during pre-concentration. Pre-concentration of the brine requires 874 ha of ponds.

The next stage, called liming, is aimed at eliminating the magnesium (Mg) present in the pre-concentrated brine, by means of the controlled precipitation of magnesium hydroxide ($Mg(OH)_2$), through the addition of calcium hydroxide (lime). The liquids produced in this process are returned to the concentration ponds.

The concentration of the brine is done through a series of ponds: halite ponds, Silvinite ponds, control ponds and lithium ponds A further 312 ha are required for these ponds (see Figure 20.4).

These ponds are all part of the production process and are lined with HDPE geomembrane to contain the brine produced from the wellfield. The contents of these ponds do not represent any risk to the environment from the perspective of the chemistry of their contents.

The final liquor produced from this evaporative process is fed into the plant.

20.1.9.2 Site Selection Study Summary

Several possible sites for the evaporation ponds for the plant’s industrial liquid wastes were analyzed. A location close to the new site selected for the plant on the salt flat was chosen and which presents no risks to populated areas. A total of 50 ha is required for this purpose which includes two industrial liquid residue (“RILES”) ponds and three mother liquor ponds. The main solutions that will be sent to the RILES ponds are the lower concentration filtrate from the lithium carbonation stage and the different stages of impurity removal. These solutions will be confined in the RILES ponds from where they will be used for the preparation of reagents or recirculated into other stages of the process. The higher concentration filtrate of the carbonation stage will be stored in the mother liquor ponds, which is a purified brine of low lithium content with the objective of concentrating its lithium content by solar evaporation and its recirculation into the process.

20.1.9.3 Tailings Dam Construction

The Project generates salts and liquid wastes during the process, mainly brines, which do not represent a contamination risk. These liquid wastes are sent to the above-mentioned evaporation ponds, but the Project does not require a tailings dam.

20.1.10 Closure

The Project has a projected LoM of 40 years from the start of production. It is expected that closure and post-closure monitoring activities will continue for about 5 years from the end of the operation phase. Most of the closure activities will be carried out at the end of the mine operation phase, however, it is possible that some activities are carried out in parallel with the operation stage. Once the closure activities have been executed (with an estimated duration of 2 years), a period of 3 years of post-closure environmental monitoring will continue, before the definitive closure is achieved.

The general concept for the closure of the ponds is mainly related to the removal of roads, backfilling of the ponds., and leveling and contouring of the pond sites. The closure process for this component will involve the backfilling of the ponds with discarding salts (starting approximately from year 35, when harvesting of the precipitating salts will stop), all existing ponds on the Cone of Archibarca will be covered with local soil or borrow material (0.50 m) and be leveled and contoured. The physical stability of the pond slopes will be established.

The IIA expressly considers the closing mechanism and the post-closure monitoring of the proposed mine. The federal environmental legislation in Argentina and the provincial environmental legislation in Jujuy do not require any closure bonding or guarantees and as a result, there are no bond, closure or remediation requirements; however, the cash flow model includes an estimated closure and remediation cost of US$32.5 million in the end of the mine life for Minera Exar’s environmental and closure obligations in order to comply with the considerations in the IIA.

21.0 CAPITAL AND OPERATING COSTS

Capital and operating cost estimates are based on quotations from third-party vendors for major items, such as civil earthworks, ponds, plant buildings and equipment, transmission line, gas pipeline and wells. Firm quotations were used to develop the CAPEX and OPEX estimate, including orders already placed for contracts and purchase orders. In-house costing data from Hatch was used for minor items (i.e. doors, staircases, conduits etc.).

All values are expressed in current US dollars; the exchange rate between the Argentine peso and the US dollar as at September 30, 2020 was AR$79/US$. Argentine peso denominated costs follow the exchange rate as a result of inflation, and there is no expected impact of the exhange rate fluctuation on CAPEX and OPEX; no provision for currency escalation has been included.

21.1 CAPITAL COSTS (CAPEX) ESTIMATE

The main objectives for determining the capital costs for the Project are:

- Providing an estimate of the total project CAPEX for budget purposes;
- Identifying and evaluating the processes and facilities that provide the best balance between initial costs and operating costs;
- Providing the necessary data for the economic evaluation of the project; and
- Providing guidance for the following engineering phase.

21.1.1 Capital Expenditures - CAPEX

Capital costs for the Project in the economic model are based on the remaining construction work as of June 30, 2020, having a nominal capacity of 40,000 tonnes per year of lithium carbonate equivalent at 80 percent on stream factor. The estimates are expressed in current US dollars. No provision was included to offset future cost escalation as expenses and revenue are expressed in constant dollars.

Capital costs include direct and indirect costs for:

- Brine production wells;
- Evaporation and concentration ponds;
- Lithium carbonate plant;
- General areas, such as electric, gas and water distribution;
- Stand-by power plant, roads, offices, laboratory and camp, and other items;
- Off-site Infrastructure, including gas pipeline and high voltage power line; and
- Contingencies, salaries, construction equipment mobilization, and other expenses.

The capital investment for the 40,000 tpa Lithium Carbonate Cauchari-Olaroz Project, including equipment, materials, indirect costs and contingencies during the construction period, is estimated at US$564.7 million, of which US$304.2 milion were spent as at June 30, 2020. This excludes debt interest expense that may be capitalized during the same period. Disbursements of these expenditures are summarized in Table 21.1 and the costs for the production wells are presented on Table 21.2.

TABLE 21.1 LITHIUM CARBONATE PLANT CAPITAL COSTS SUMMARY	
Item	**Cost (US$ M)**
Direct Cost	
Salar Development	50.1
Evaporation Ponds	145.3
Lithium Carbonate Plant and Aux.	174.9
Reagents	12.4
On-Site Infrastructure	72.5
Off-site Services	13.3
Total Direct Cost	**468.5**
Indirect Cost	
Total Indirect Cost	**86.8**
Total Direct and Indirect Cost	
Total Direct and Indirect	555.3
Contingencies (1.7%)	9.4
Total Capital	**564.7**
Expended to date	**304.2**
Estimate to complete	**260.5**

TABLE 21.2 PRODUCTION WELLS CAPITAL COST ESTIMATE	
Description	**Total Project Budget (US$M)**
Well pumps and auxiliaries	45.3
Power Distribution	4.8
Total	**50.1**

Maximum brine production rate will be achieved by 40 production wells, plus an additional 13 to be implemented during operations (Table 21.3). It is estimated that the additional 13 wells will be drilled throughout the 40-year operation to maintain brine productivity. Costs for these well installations are included as part of sustaining capital in the operational expenditure estimate (Section 22).

The initial Capex for the base case scope of work at the Project is US$564.7M, of which US$304.2M is reported as expended costs to date and US$260.5M is the balance to be spent during the pre-production phase.

21.1.2 Evaporation Ponds

The capital cost estimate for the evaporation and concentration pond facilities is US$145.3M (Table 21.3).

TABLE 21.3
EVAPORATION AND CONCENTRATION PONDS CAPITAL COST ESTIMATE

Description	Total Projected Budget (US$ M)
Ponds	142.9
Power distribution	2.4
Total	**145.3**

21.1.3 Lithium Carbonate Plant

The direct cost estimate for the construction of the Lithium Carbonate plant is US$174.9M (Table 21.4) Capital equipment costs were estimated using more than 100 quotes for various equipment items and construction contracts estimates, and using in-house data for minor items. As of the effective date of this report, most of the equipment purchase orders were awarded as well as construction contracts, validating the estimate. Material take-off (e.g. material quantity estimates) from 3D models were employed as required to complete the capital cost definition.

TABLE 21.4
LITHIUM CARBONATE PLANT CAPITAL COST SUMMARY

Description	Total Projected Budget (US$ M)
Lithium Carbonate Plant	
Boron SX	38.5
Lithium Carbonate wet plant	51.5
Dry area	12.8
In-plant evaporation. circuit (KCl)	37.9
Plant wide auxiliaries	13.1
Power distribution	2.4
Utilities	15.9
Non Process Buildings	2.9
Total	**174.9**

21.1.4 Reagents Cost Estimate

Reagents cost refer to the installation for receiving, preparation and distribution of reagents for use in the process stages. Cost are shown on table 21.5

TABLE 21.5 REAGENT COST ESTIMATE	
Item	**Cost (US$ M)**
Reagents	11.2
Power supply	1.2
Total	**12.4**

21.1.5 Offsite Infrastructure Cost Estimate

Offsite infrastructure refers to gas and electrical interconnection and transmission. Costs are shown in Table 21.6.

TABLE 21.6 OFFSITE INFRASTRUCTURE COST	
Item	**Cost (US$ M)**
Natural gas supply	7.5
Power supply	5.8
Total	**13.3**

21.1.5.1 Natural Gas Supply to Plant

Natural gas will be obtained from the Rosario gas compression station of the Gas Atacama pipeline located 52 km north of the project site. Cost for this pipeline was obtained from a specific contractor bid.

Installed cost for this work is US$7.5M (Table 21.6). This pipeline is designed to supply natural gas sufficient for production up to 50,000 tpa LCE.

21.1.5.2 Power Supply to Plant

The transmission system has been designed to provide sufficient electricity for a production capacity of at least 40,000 tpa LCE. Installed cost for this work is US$5.8M (Table 21.6).

21.1.5.3 Onsite Infrastructure and General Cost Summary

Onsite infrastructure costs are summarized in Table 21.7.

TABLE 21.7
ONSITE INFRASTRUCTURE AND GENERAL CAPITAL COST SUMMARY

Description	Total Projected Budget (US$ M)
On-Site Infrastructure	
General Area (Including Roads)	55.4
Camp	12.8
Utilities	1.2
Emergency Power Generation	3.0
Total	**72.5**

21.2 INDIRECT COSTS

The indirect costs estimation used costs for this study are given in Table 21.8. The percentages listed indicates the relation between the estimated costs for the item and the direct cost.

TABLE 21.8
PROJECT INDIRECT COSTS

Description	Cost (%)	Cost (US$ M)
EP – Engineering and Procurement	5.50%	31.1
CM – Construction Management	3.41%	19.3
Commissioning	0.18%	1.0
Vendor Representative	0.13%	0.7
Third Party Services	0.44%	2.5
Temporary Facilities	0.35%	2.0
Construction Camp	1.62%	9.2
Catering and Camp Services	0.34%	1.9
Freight (by owner)	1.92%	10.9
First Fills (calculated)	0.78%	4.4
Training	0.62%	3.5
Total Indirect Costs	**15.36%**	**86.8**

21.2.1 Estimate Confidence Range

Expected confidence range for a Feasibility Study estimate is typically ±15% but as a result of the progress made by EXAR placing most of the equipment purchase orders and most of the major contracts (75.6% of US$525 M has already been committed and 53.9% already spent on the construction of ponds, wells, camps, and other purchase orders and contracts), the level of confidence for this report will be below ±10%. Contingencies are estimated at 1.7%.

21.2.2 Exclusions

The following items are not included in this estimate:

- Legal costs;
- Special incentives and allowances;
- Escalation; and
- Start-up costs beyond those specifically included.

21.2.3 Currency

All values are expressed in current US dollars; the exchange rate between the Argentine peso and the US dollar as at September 30, 2020 was AR$79/US$. Argentine peso denominated costs follow the exchange rate as a result of inflation, and there is no expected impact of the exhange rate fluctuation on CAPEX and OPEX; no provision for currency escalation has been included.

21.2.4 Sustaining Capital

A provision of US$270.5 M of the sustaining capital over the life of the Project was included in the economic model. The sustaining capital includes purchase of equipment or development of facilities which would otherwise be capitalized. The sustaining capital costs include mine equipment purchased in future years, replacement of equipment, drilling of replacement wells, capital repairs of ponds, equipment replacement for the processing plant etc.

21.3 OPERATING COSTS ESTIMATE

21.3.1 Operating Cost Summary

A ± 15% operating cost (OPEX) estimate for a 40,000 tpa lithium carbonate facility has been prepared (Table 21.9). The estimate is based on vendor quotes for main costs such as reagents, labour, maintenance, harvesting of salt, fuel (diesel and natural gas), electricity, transportation, plus catering and camp services.

Reagent consumption rates were determined by pilot plant, laboratory, and computer model simulation. Reagent cost estimates, which represent 51% of OPEX, has been obtained from reliable suppliers servicing the lithium producers in the area.

Energy consumption has been determined on an equipment-by-equipment basis and design utilization rate.

Labour levels are based on EXAR Management's expertise in operating similar types of facilities. Salary and wage estimates are the result of a informal salary survey carried out by Minera Exar in Argentina, on mining companies with similar site conditions. A labour rate cost of US$16/hr was obtained by averaging EXAR personnel salaries and area labour rates.

Maintenance estimates were developed by EXAR's management based on their experience with similar operations.

Results are as summarized in Table 21.9:

TABLE 21.9
OPERATING COSTS SUMMARY

Description	Total (US$ 000s /Year)	Li_2CO_3 (US$/Tonne)	Allocation of Total OPEX (%)
Direct Costs			
Reagents	72,535	1,813	50.7
Maintenance	16,143	404	11.3
Electric Power	6,408	160	4.5
Pond Harvesting & Tailing Management	13,334	333	9.3
Water Treatment System	356	9	0.2
Natural Gas	5,818	145	4.1
Manpower	12,809	320	8.9
Catering, Security & Third-Party Services	4,534	113	3.2
Consumables	959	24	0.7
Diesel	101	3	0.1
Bus-in/Bus-out Transportation	213	5	0.1
Product Transportation	5,072	128	3.5
Direct Costs Subtotal	**138,282**	**3,457**	**96.6**
Indirect Costs			
G&A	4,884	122	3.4
Indirect Costs Subtotal	**4,884**	**122**	**3.4**
Total Operating Costs	**143,166**	**3,579**	**100**

21.3.2 Pond and Plant Reagents Costs Definition

Reagents comprise 51% of total OPEX costs and were estimated by EXAR and the consultant using quotes obtained from their existing suppliers for similar facilities. Consumption volumes have been obtained from laboratory work and computer model simulations, performed by EXAR and its consultant.

Pond and plant reagents include the following:

- Calcium oxide;
- Lime;
- Sodium Carbonate;
- Barium Chloride;
- Hydrochloric Acid;
- Sodium Hydroxide;
- Sulphuric Acid;
- Extractants diluent; and
- Organic solvents.

As indicated in Section 17, sulphate brines such as the one present in Cauchari typically require treatment with lime to remove unwanted elements before proceeding to the lithium carbonate plant. It has been assumed that lime is bought from a local producer (150 Km from the Project) producing lime of suitable quality for the application. This producer will require expansion of their facilities to be considered a preferable supplier; however, the proximity of this lime facility could provide cost savings over other supply alternatives from San Juan province located at 1,200 km from the Project.

Na_2CO_3 is the dominant reagent cost in the lithium carbonate plant. Boron removal costs are dominated by solvent extraction organic make-up and HCl, for pH adjustment.

21.3.3 Salt Removal and Transportation

Annual cost for harvesting and disposal of the projected precipitated salts were estimated at US$13,334,000, based on qualified service provider quote.

21.3.4 Energy Cost

Overall electricity consumption is estimated to be 129.8 MWh/year. Electric power is available in the area. The project cost includes the installation of a grid-tied high voltage transmission line to supply all electric power requirements. Electricity costs have been estimated using existing grid pricing of US$0.072/kW.

Current prices of natural gas for new projects in Argentina are in the range of US$4.80/MMBTU at the plant gate including pipeline and other charges. The natural gas consumption rate is estimated to be 4,781 Nm^3/h. Natural gas yearly expenditure is US$5,818,000.

Diesel fuel is also required by the stand-by diesel generators and mobile equipment. Annual diesel cost is estimated to be US$101,000.

During construction, when the wells start pumping brine to fill the evaporation ponds, the gas pipeline and/or the electrical power facilities may not be operational. Temporary diesel power generators will be used to meet the energy requirements prior to the installation of the 33 kV line and are included in the capital cost estimate. Operating costs for these units are included in the OPEX during early years.

21.3.5 Maintenance Cost

Maintenance cost factors were estimated based on applying a 4.5% factor on the direct cost of the installation as defined by Exar's management expertise in this type of operation. Yearly expenditures for this item, including the Lithium Carbonate plant and supporting facilities, are estimated at US$16,143,000.

21.3.6 Labour Cost

Minera Exar estimated the workforce requirements based on similar plant operations. The total number of employees is estimated to be 401 people (Figure 21.1). Salaries were obtained from a informal internal survey that included the main mining companies operating in Argentina with similar conditions as the Project.

Annual total costs, including base salary, contributions, bonuses, benefits and other remuneration inherent to the area and type of work performed, are approximately US$12,809,000 per year.

21.3.7 Catering and Camp Services Cost

Catering and camp services include breakfast, lunch, dinner and housekeeping. This item amounts to US$4,534,000 per year and is based on a credible supplier quotation.

21.3.8 Bus In/Bus-Out Transportation

Personnel transportation including bus and pickup truck round-trips between San Salvador de Jujuy and the project site as well as intra-site pickup trucks is expected to be sub-contracted having a reference cost of US$213,000.

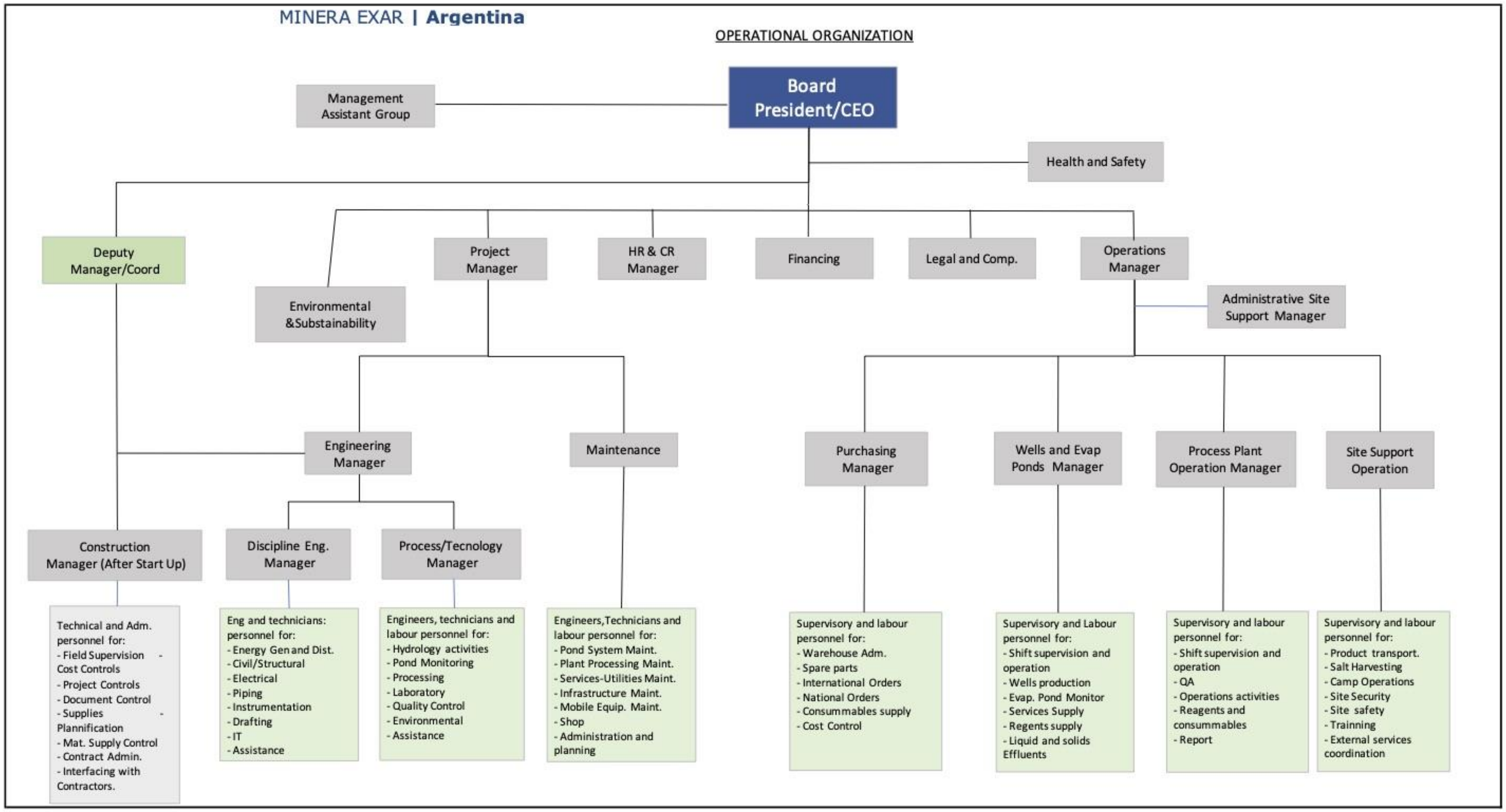
21.3.9 Transport of Product to Port

Product will be shipped through Antofagasta port in Chile. The total cost of transportation to the port in Antofagasta will be US$126.7 per tonne that represents US$5,072,000 per year.

21.3.10 General and Administrative Costs

General and Administrative Costs are estimated to be US$4,884,000.

Figure 21.1 Project Organization



22.0 ECONOMIC ANALYSIS

22.1 INTRODUCTION

The objective of this section is to present an economic analysis of the Project to determine its financial viability. The analysis was prepared by using an economic model and assesses both before- and after-tax cash flow scenarios. Capital and Operational Expenditures presented in previous sections have been used in this analysis. Prices for Lithium Carbonate are from a market study carried out by a third party and summarized in Section 19.1. The model includes all taxes, rebates, government and commercial royalties/payments and community payments.

The results include Net Present Values ("NPV") for different discount rates, Internal Rate of Return ("IRR"), Pay Back periods and sensitivity analysis of key inputs.

This economic analysis is prepared considering that construction for the project commenced in 2018 and significant funds were spent since then. All capital expenditures prior to June 30, 2020 are considered sunk and are not included in the capital expenses in the economic model. The model only includes capital expenditures that need to be spent from June 30, 2020 onwards to bring the project to production.

Investment decisions are made on a forward-looking basis. The main purpose of the economic model is to assess whether future capital expenses will bring a positive economic result. Capital expenditures spent in the past are not relevant. Future capital expenses include costs which have to be spent as of today, considering the current state of the Project, in order to complete the construction and commence commercial production. Positive economic results include future cash flows, generated from sales of the finished product, less related cost of sales and other expenses. Project-related expenses incurred in the past (sunk costs) are not relevant to making the investment decision today.

Therefore, this economic assessment ignores sunk costs in the determination of cash flows and economic indicators. However, these costs are considered as opening balances for the purpose of determining tax assets and liabilities.

22.2 EVALUATION CRITERIA

The following criteria have been used to develop the economic model:

- Project life: Engineering and construction and life of mine is estimated to be 4 and 40 years, respectively.

- Pricing was obtained from a market study (Section 19).

- Production for lithium carbonate is 40,000 tpa in the third year of operations, assuming a ramp up production rate of 19,600 tpa for the first year of operations and 36,700 tpa for the second year of operations.

- Equity basis: For project evaluation purposes, it has been assumed that 100% of capital expenditures, including pre-production expenses and working capital are financed with owners' equity.

- Brine composition may be suitable for extraction and commercial production of other salts or other chemical compounds such as Boric Acid (H_3BO_3), potassium, etc. These options were not included in this report.

- The economic evaluation was carried out on a constant money basis so there is no provision for escalation or inflation on costs or revenue.

- All values are expressed in current US dollars; the exchange rate between the Argentine peso and the US dollar as at September 30, 2020 was AR$79/US$. Argentine peso denominated costs follow the exchange rate as a result of inflation, and there is no expected impact of the exhange rate fluctuation on CAPEX and OPEX; no provision for currency escalation has been included.

- The base-case assessment was carried out on a 100%-equity basis. Apart from the base case discount rate of 8.0%, two (2) variants of 6.0% and 10.0% were used to determine the Net Present Value ("NPV") of the Project. These discount rates represent possible costs of equity capital.

22.3 TAXES AND ROYALTIES

The following taxes and royalties have been applied to the economic analysis of the Project:

22.3.1 Provincial Royalty

An effective rate of 1.6% of sales is applied; which is consistent with Orocobre Ltd.'s Argentine subsidiary (Sales de Jujuy) current royalty payments (the other company operating in the same watershed and producing the same mineral). Provinces rate is 2% of the value of the mineral at the mine head when the mineral is processed in Jujuy and 3% if it is not.

22.3.2 Export Refund

The Company's independent Tax consultant has confirmed lithium carbonate is entitled to receive a 2.5% of sales incentive refund for operating in the Puna region.

22.3.3 Tax on Debits and Credits Accounts

In Argentina, the tax on debits and credits on bank accounts considers 0.6% on debits plus another 0.6% on credits. Minera Exar is permitted to book 34% of the tax paid on credits accounts as a credit for income tax. Thus, the net effective rate on both debit and credit accounts used in the economic model is 0.996%.

22.3.4 Los Boros Agreement

The Los Boros agreement is described in Section 4.3.1. The economic analysis assumed the following payments will have to be made to Los Boros under the agreement:

- A US$12MM payment for the exercise of the option, distributed quarterly, as per the agreement, for a total of 60 quarterly installments of US$200,000 each (US$800,000 annually for 15 years); and

- Two lump sum payments of US$7,000,000 each in year 1 and year 21 of operations (royalty buyout payments).

22.3.5 Borax Argentina Royalty Payment

Pursuant to the usufruct agreement dated May 19, 2011, a fixed amount of US$200,000 per year is to be paid by Minera Exar to Borax Argentina over a total of thirty (30) years. (Paid to date: 9 installments. Remaining installments: 21). The model has assumed the same fixed amount of US$200,000 per year for the remaining 19 years of the Project, and assumes that Minera Exar will extend the agreement with Borax Argentina with the same terms and conditions. The agreement relates to claims that constitute less than approximately 5% of the Project property, and thus is not considered material to the Project's economics.

22.3.6 Aboriginal Programs

The economic model has accounted for all payments pursuant to existing agreements with local aboriginal groups.

22.3.7 Corporate Taxes

The corporate tax rate is 30%. In addition, dividends are subject to withholding tax which results in a cumulative effective tax rate of 35% (considered in this model).

22.3.8 VAT

VAT payments involve two tax rates affecting goods and services. A reduced rate of 10.5% is applied to certain supplied equipment, and certain bulk materials, and construction subcontracts that are directly part of the project implementation. A normal rate of 21% has been allocated to indirect project costs and other costs. The present regulation considers a return on the VAT payments once production starts. This is included in the model.

22.4 CAPITAL EXPENDITURES SPEND SCHEDULE

Capital costs for the Project are based on the remaining construction work as of June 30, 2020, having a nominal capacity of 40,000 tonnes per year of lithium carbonate equivalent. Table 22.1 contains consolidated expenditures from 2017. The March 2019 Technical Report (Burga, et al.,

2019) presented projected CAPEX expenditures from the 2017 Feasibility Study (Burga, et al., 2017).

The expenditure schedule for capital expenditures is presented in Table 22.1.

TABLE 22.1
CAPEX EXPENDITURE SCHEDULE

Description	2017 (US$ 000s)	2018 (US$ 000s)	2019 (US$ 000s)	2020 (US$ 000s)	2021 (US$ 000s)	Total (US$ 000s)
Brine Extraction Wells	1,199	3,135	18,148	19,404	8,257	50,144
Evaporation Ponds	-	17,974	59,434	53,994	13,890	145,292
Lithium Carbonate Plant	-	-	22,597	54,559	110,156	187,312
Infrastructure & General	6,005	19,101	39,582	81,508	26,316	172,511
Total	**7,204**	**40,210**	**139,761**	**209,464**	**158,619**	**555,259**
Expended to date (June 2020)	**7,204**	**40,210**	**139,761**	**117,060**	**-**	**304,235**
Estimate to complete	**-**	**-**	**-**	**92,405**	**158,619**	**251,023**

The summary and cash flow statement indicate that the total pre-production (initial) capital costs were evaluated at US$260.5 M (excludes sunk costs of US$304.2 M, includes contingency of US$9.4 M). The sustaining capital requirements were evaluated at $US270.5 M. Project closure costs were estimated at US$32.5 M (to be spent in three years after the closure of the operation).

22.4.1 Lithium Carbonate Production Schedule

The Lithium Carbonate production schedule is presented in Table 22.2.

TABLE 22.2
PRODUCTION AND REVENUE SCHEDULE

Year	Total Revenues (US$ 000s)	Accumulated Revenues (US$ 000s)	Li_2CO_3 (tonnes)
-2 (2020)	0	0	0
-1 (2021)	0	0	0
1 (2022)	156,933	156,933	19,617
2 (2023)	366,620	523,553	36,662
3 (2024)	480,000	1,003,553	40,000
4 (2025)	480,000	1,483,553	40,000
5 (2026)	480,000	1,963,553	40,000
6 (2027)	480,000	2,443,553	40,000
10 (2031)	480,000	4,363,553	40,000
16 (2037)	480,000	7,243,553	40,000

Table 22.2 Production and Revenue Schedule			
Year	**Total Revenues (US$ 000s)**	**Accumulated Revenues (US$ 000s)**	**Li_2CO_3 (tonnes)**
22 (2043)	480,000	10,123,553	40,000
30 (2051)	480,000	13,963,553	40,000
40 (2061)	480,000	18,763,553	40,000
Total		**18,763,553**	**1,576,279**

Note: *Li_2Co_3 price US$/tonne: $12,000.*

22.5 OPERATING COSTS SCHEDULE

The operating cost schedule is shown on Table 22.3.

TABLE 22.3 PRODUCTION COSTS													
Li_2CO_3 OPEX (US$ 000s)	**Year**												
	-2	**-1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**12**	**17**	**40**	**Total**
DIRECT COSTS													
Reagents	0	886	35,023	65,079	72,520	72,520	72,520	72,520	72,520	72,520	72,520	72,520	2,856,747
Maintenance	0	1,575	5,914	11,054	16,160	16,160	16,160	16,160	16,160	16,160	16,160	16,160	632,623
Electric Power	0	1,037	6,608	8,454	6,400	6,400	6,400	6,400	6,400	6,400	6,400	6,400	259,299
Pond Harvesting & Tailing Management	0	0	6,509	6,310	13,320	13,320	13,320	13,320	13,320	13,320	13,320	13,320	518,978
Water Treatment System	0	287	852	1,503	360	360	360	360	360	360	360	360	16,322
Natural Gas	0	0	2,847	5,322	5,800	5,800	5,800	5,800	5,800	5,800	5,800	5,800	228,569
Manpower	0	8,150	13,736	11,496	12,800	12,800	12,800	12,800	12,800	12,800	12,800	12,800	519,782
Catering, Security & Third Party Services	0	1,759	2,964	2,481	4,520	4,520	4,520	4,520	4,520	4,520	4,520	4,520	178,963
Consumables	0	720	1,449	1,941	960	960	960	960	960	960	960	960	40,591
Diesel	0	3,011	842	705	120	120	120	120	120	120	120	120	9,118
Bus-In / Bus-Out Transportation	0	0	0	0	200	200	200	200	200	200	200	200	7,600
Product Transportation	0	0	2,485	4,645	5,120	5,120	5,120	5,120	5,120	5,120	5,120	5,120	201,691
Direct Cost Subtotal	**0**	**17,425**	**79,230**	**118,989**	**138,280**	**138,280**	**138,280**	**138,280**	**138,280**	**138,280**	**138,280**	**138,280**	**5,470,284**
INDIRECT COSTS													
G & A	8,129	3,529	4,805	5,512	4,880	4,880	4,880	4,880	4,880	4,880	4,880	4,880	207,415
Indirect Cost Subtotal	**8,129**	**3,529**	**4,805**	**5,512**	**4,880**	**4,880**	**4,880**	**4,880**	**4,880**	**4,880**	**4,880**	**4,880**	**207,415**
Total Li_2CO_3 OPEX	**8,129**	**20,954**	**84,036**	**124,501**	**143,160**	**143,160**	**143,160**	**143,160**	**143,160**	**143,160**	**143,160**	**143,160**	**5,677,699**

22.6 PRODUCTION REVENUES

Production revenues have been estimated based on the three price scenarios for Lithium Carbonate (US$10,000, US$12,000 and US$14,000 per tonne), and the production schedule shown on Table 22.2. The resulting revenue projection is shown in Table 22.4.

TABLE 22.4
REVENUE - HIGH, MEDIUM AND LOW PRICE SCENARIOS (US$ 000S)

Price Scenario (US$/Tonne)	Year											
	-2	-1	1	2	3	4	5	6	7	12	17	40	Total
Li_2CO_3													
High Price Scenario: US$14,000 / Tonne	-	-	156,933	366,620	560,000	560,000	560,000	560,000	560,000	560,000	560,000	560,000	21,803,553
Medium Price Scenario: US$12,000 / Tonne	-	-	156,933	366,620	480,000	480,000	480,000	480,000	480,000	480,000	480,000	480,000	18,763,553
Low Price Scenario: US$10,000 / Tonne	-	-	156,933	366,620	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	15,723,553

22.7 CASH FLOW PROJECTION

Table 22.5 and Figures 22.1 and 22.2 summarize cash flows for the medium price scenario.

TABLE 22.5
PROJECT EVALUATION MEDIUM PRICE SCENARIO (US$ 000S)
Profit and Loss Account

Description US$ 000s	Unit	Total (US$ 000s)	-2	-1	1	2	10	20	30	40
Profit and Loss Account										
Gross Revenue										
Sales										
Li_2CO_3 Price	US$/tonne	11,850	-	-	8,000	10,000	12,000	12,000	12,000	12,000
Li_2CO_3 sales volume	Tonnes	1,576,279	-	-	19,617	36,662	40,000	40,000	40,000	40,000
Revenue	US$ 000s	18,763,553	-	-	156,933	366,620	480,000	480,000	480,000	480,000
Cost of Production										
Cost per tonne	US$/tonne	3,592	-	-	4,284	3,396	3,579	3,579	3,579	3,579
Operating Costs	US$ 000s	(5,677,699)	(8,129)	(20,954)	(84,036)	(124,501)	(143,160)	(143,160)	(143,160)	(143,160)
Taxes and royalties										
Provincial Royalties (1.6% of Revenues)	US$ 000s	(300,217)	-	-	(2,511)	(5,866)	(7,680)	(7,680)	(7,680)	(7,680)
Export Refund value (2.5% of Li_2CO_3 revenue))	US$ 000s	469,089	-	-	3,923	9,166	12,000	12,000	12,000	12,000
Tax on Debits and Credits	US$ 000s	(238,392)	(975)	(1,568)	(2,276)	(5,032)	(6,013)	(6,018)	(6,018)	(6,018)

TABLE 22.5
PROJECT EVALUATION MEDIUM PRICE SCENARIO (US$ 000S)
Profit and Loss Account

Description US$ 000s	Unit	Total (US$ 000s)	-2	-1	1	2	10	20	30	40
Aboriginal Programs	US$ 000s	(22,867)	(226)	(561)	(552)	(552)	(552)	(552)	(552)	(552)
Project closure costs	US$ 000s	(32,467)	-	-	-	-	-	-	-	(10,822)
Payment to Purchase Los Boros Option	US$ 000s	(12,000)	-	-	(400)	(800)	(800)	-	-	-
Los Boros Royalty	US$ 000s	(14,000)	-	-	(7,000)	-	-	-	-	-
Borax Roylaty	US$ 000s	(8,400)	(200)	(200)	(200)	(200)	(200)	(200)	(200)	(200)
Total taxes and royalties	US$ 000s	(159,254)	(1,401)	(2,329)	(9,016)	(3,284)	(3,245)	(2,450)	(2,450)	(13,273)
Total Expenses	US$ 000s	(5,836,953)	(9,530)	(23,283)	(93,051)	(127,785)	(146,405)	(145,610)	(145,610)	(156,433)
EBITDA	US$ 000s	12,926,600	(9,530)	(23,283)	63,882	238,835	333,595	334,390	334,390	323,567
Depreciation	US$ 000s	(839,768)	-	-	(339,313)	(113,420)	(7,687)	(7,687)	(7,687)	(7,687)
PAIBT	US$ 000s	12,086,833	(9,530)	(23,283)	(275,431)	125,415	325,907	326,702	326,702	315,880
Cumulative PAIBT	US$ 000s		(9,530)	(32,813)	(308,244)	(182,829)	2,329,560	5,592,210	8,852,276	12,086,833
Corporate Income Tax	US$ 000s	(4,230,391)	-	-	-	-	(114,068)	(114,346)	(114,346)	(110,558)
PAIT	US$ 000s	7,856,441	(9,530)	(23,283)	(275,431)	125,415	211,840	212,357	212,357	205,322

Figure 22.1 Yearly Income and Cumulative Income (Before and After Taxes) (in US$ 000s)

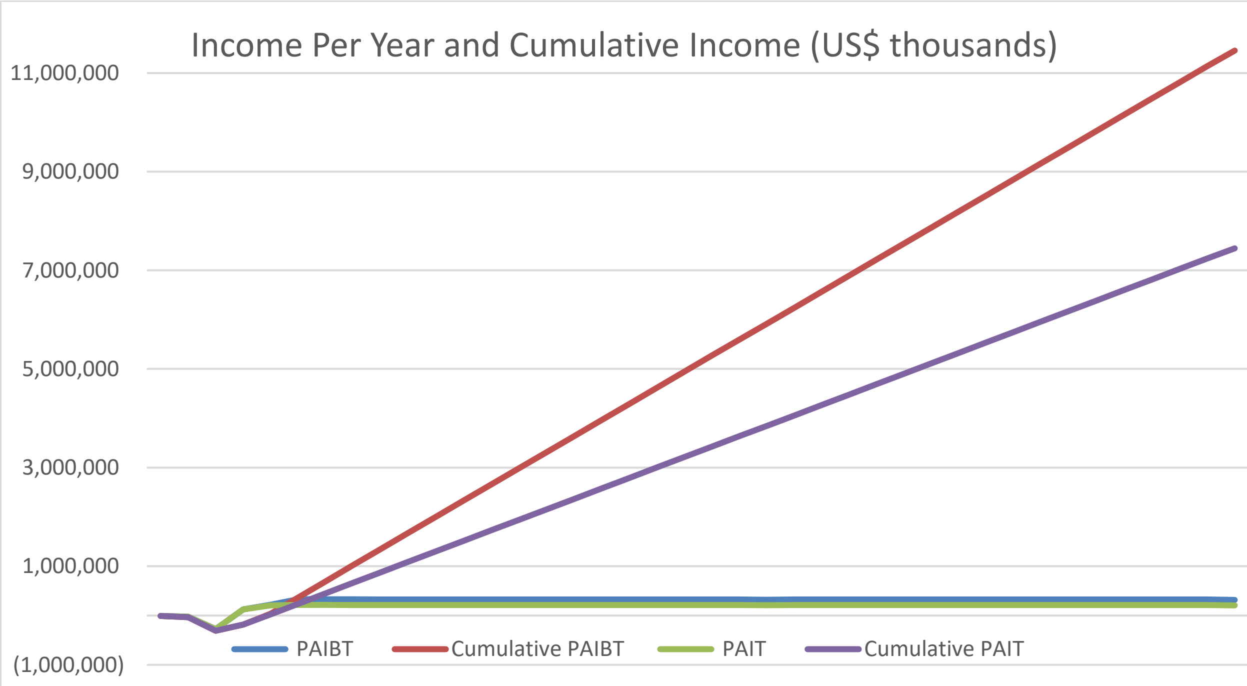
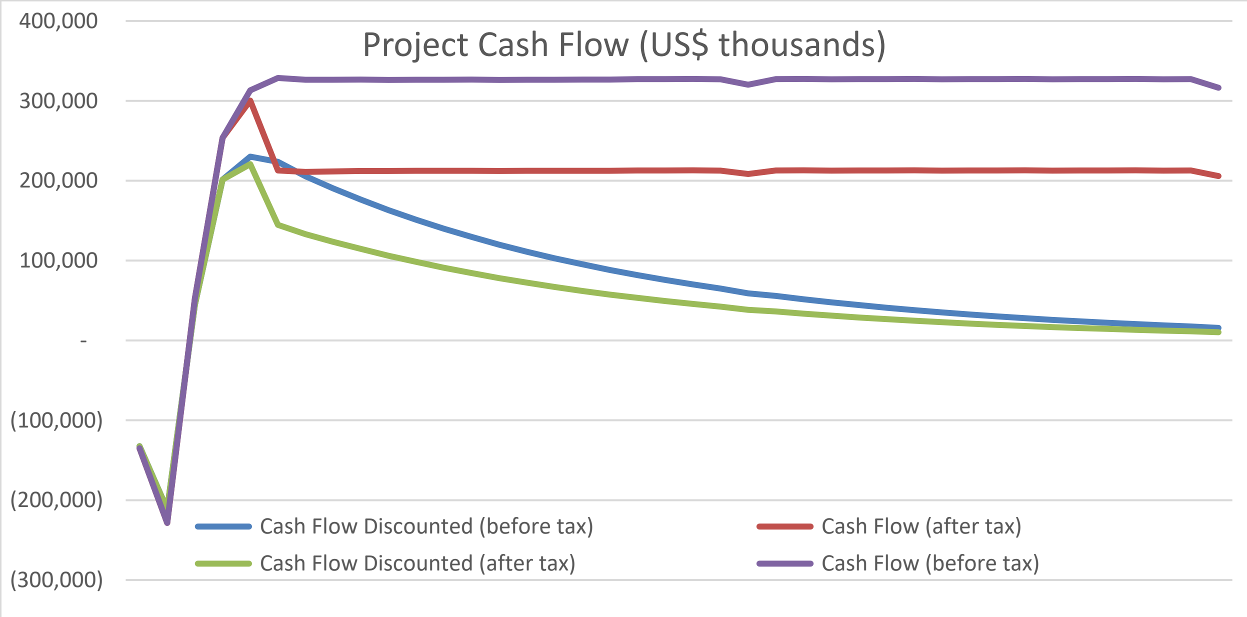


Figure 22.2 Yearly Simple Cash Flow and Discounted Cash Flow (Before and After Tax) at 8% Discount rate (in US$ 000s)



22.8 ECONOMIC EVALUATION RESULTS

Project economics resulting from three price scenarios used in the economic model are presented in Table 22.6.

TABLE 22.6
PROJECT EVALUATION RESULTS SUMMARY

Price Case	Units	High US$14,000	Medium US$12,000	Low US$10,000
Key statistics				
Project capacity	tonnes	40,000	40,000	40,000
CAPEX	US$ mln	261	261	261
OPEX	US$/tonne	3,579	3,579	3,579
Max negative cash flows	US$ mln	(228)	(228)	(228)
Lithium price LCE	US$/tonne	14,000	12,000	10,000
Average yearly values				
Revenue	US$ mln	545	469	393
OPEX	US$ mln	(141)	(141)	(141)
Other Expenses	US$ mln	(4)	(4)	(4)
EBITDA	US$ mln	380	308	235
Before taxes				
NPV (6%)	US$ mln	4,950	3,966	2,981
NPV (8%)	US$ mln	3,695	2,955	2,215
NPV (10%)	US$ mln	2,845	2,270	1,696
IRR	%	57%	52%	46%
DCF 8% Payback	Years	2 Y, 2 M	2 Y, 2 M	2 Y, 3 M
After taxes				
NPV (6%)	US$ mln	3,259	2,623	1,986
NPV (8%)	US$ mln	2,435	1,957	1,479
NPV (10%)	US$ mln	1,874	1,504	1,133
IRR	%	49%	45%	40%
DCF 8% Payback	Years	2 Y, 2 M	2 Y, 2 M	2 Y, 3 M

1. *Presented on a 100% project equity basis. As of the date of this report, LAC currently owns 49% of the project.*
2. *Measured form the end of the capital investment period.*

22.9 PAYBACK ANALYSIS

The base case scenario (US$12,000/tonne lithium carbonate) forecasts that Payback occurs in 2 years and 10 months on both a before-tax basis and on an after-tax basis.

22.10 SENSITIVITY ANALYSIS

A sensitivity analysis was conducted to illustrate the impact of changes in key variables on the project's NPV and IRR (Table 22.7 to Table 22.10 and Figures 22.3 to 22.6).

TABLE 22.7 PROJECT NPV BEFORE TAXES AT 8% DISCOUNT RATE SENSITIVITY MEDIUM SCENARIO							
Driver Variable	**Base Data**		**Project NPV (US$ M)**				
			50%	**75%**	**100%**	**125%**	**150%**
Capex	US$ M	$565	3,085	3,020	2,955	2,890	2,825
Opex	US$/tonne	$3,579	3,727	3,341	2,955	2,569	2,184
Production	Tonne/year	40,000	1,198	2,077	2,955	3,834	4,713
Price	US$/tonne	$12,000	736	1,845	2,955	4,065	5,175

Figure 22.3 Diagram for Project NPV Before Taxes at 8% Discount Rate-Sensitivity Medium Scenario

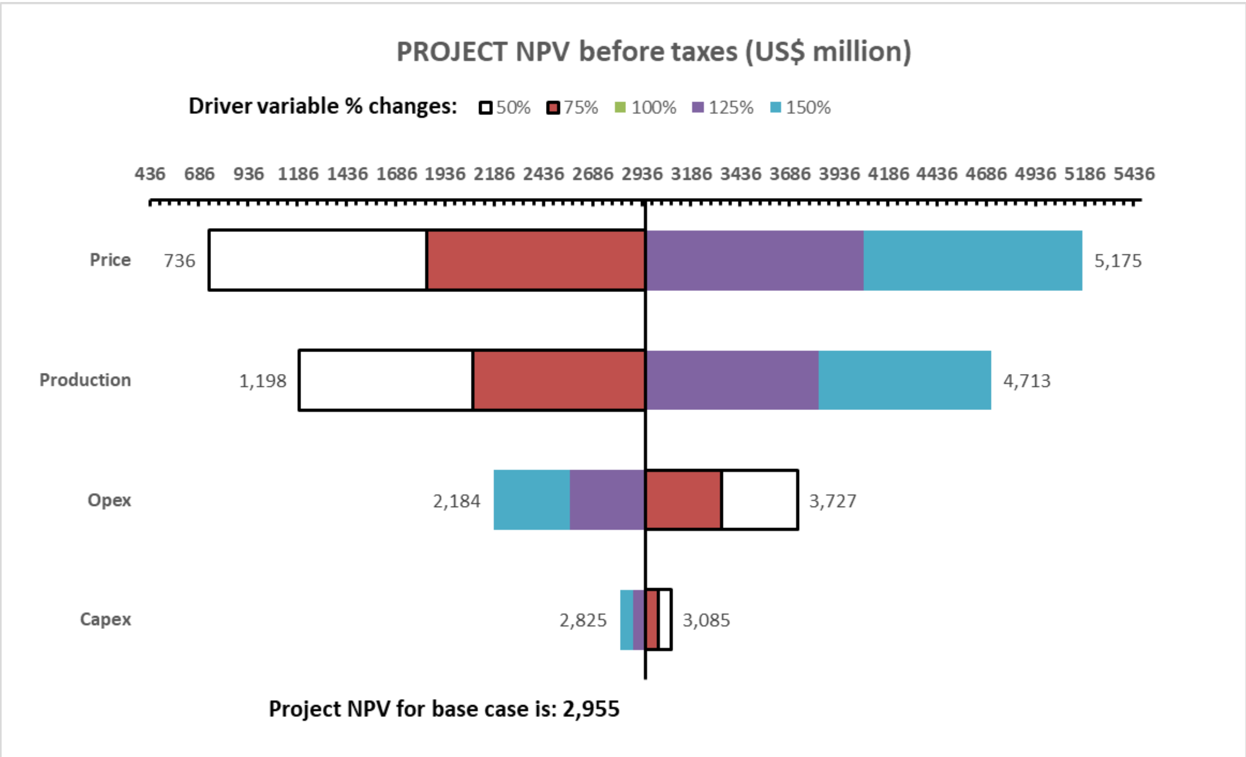


Table 22.8 **Project IRR Before Taxes at 8% Discount Rate - Sensitivity Medium Scenario**							
Driver Variable	**Base Data**		**Project IRR**				
			50%	**75%**	**100%**	**125%**	**150%**
Opex	US$/tonne	$3,579	63.25%	57.55%	51.89%	46.26%	40.64%
Capex	US$ M	$565	75.53%	61.06%	51.89%	45.44%	40.59%
Price	US$/tonne	$12,000	28.50%	42.40%	51.89%	59.40%	65.72%
Production	Tonne/year	40,000	27.71%	40.30%	51.89%	62.69%	72.85%

Figure 22.4 Diagram for Project IRR Before Taxes at 8% Discount Rate-Sensitivity Medium Scenario

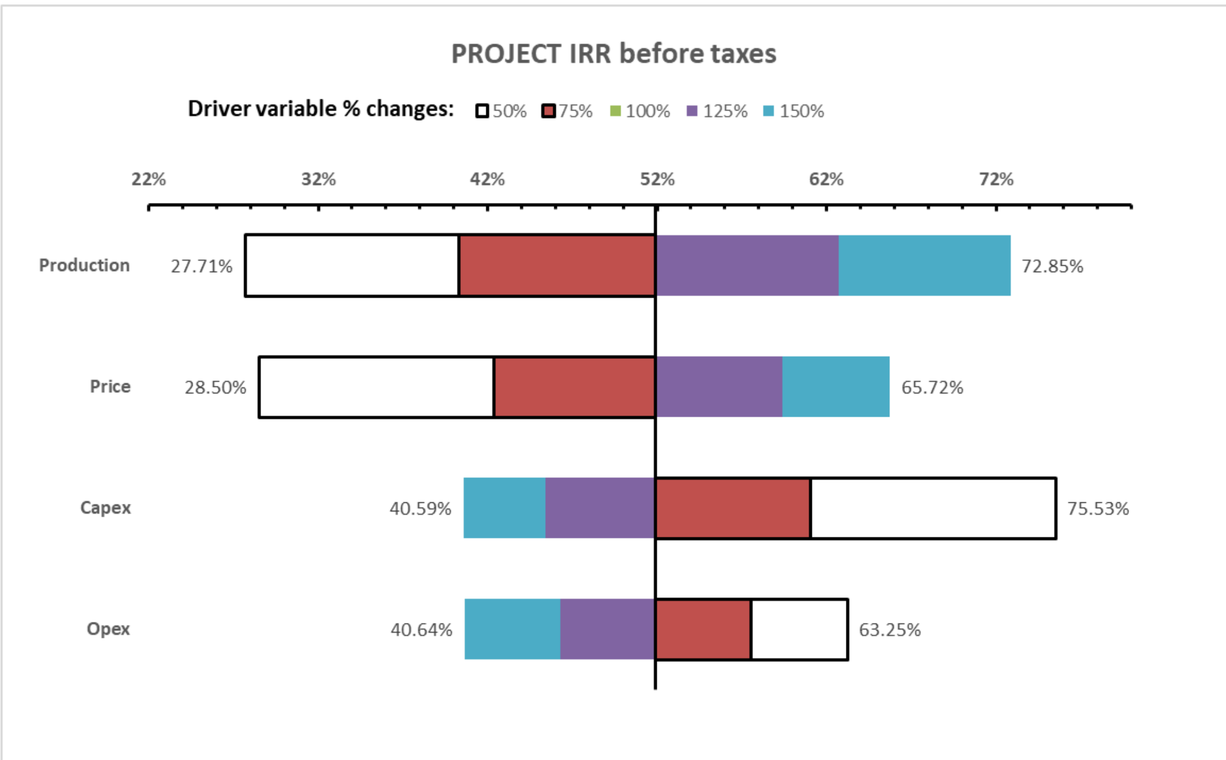


TABLE 22.9 **PROJECT NPV AFTER TAXES AT** **8% DISCOUNT RATE-SENSITIVITY MEDIUM SCENARIO**							
Driver Variable	**Base Data**		**Project NPV (US$ M)**				
			50%	**75%**	**100%**	**125%**	**150%**
Capex	US$ M	$565	2,003	1,980	1,957	1,932	1,906
Opex	US$/tonne	$3,579	2,461	2,209	1,957	1,704	1,450
Production	Tonne/year	40,000	805	1,384	1,957	2,527	3,095
Price	US$/tonne	$12,000	518	1,239	1,957	2,673	3,390

Figure 22.5 Diagram for Project NPV After Taxes at 8% Discount Rate-Sensitivity Medium Scenario

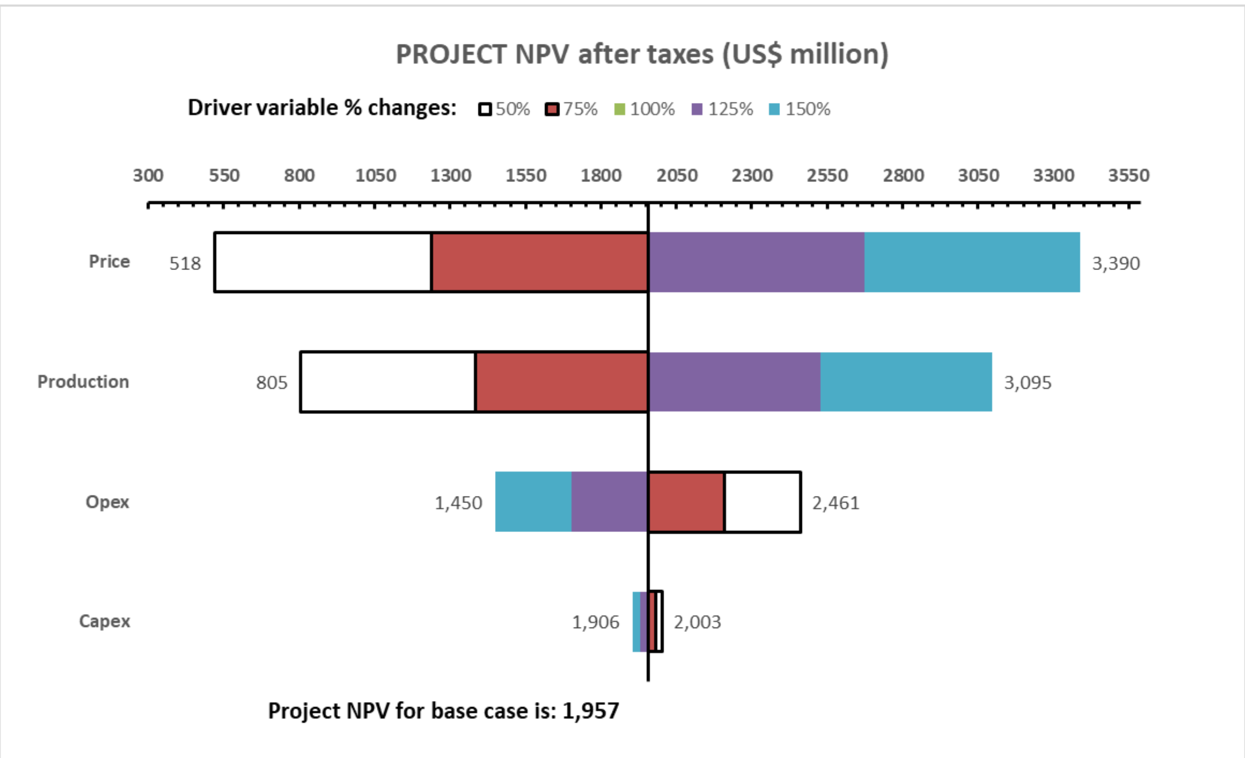
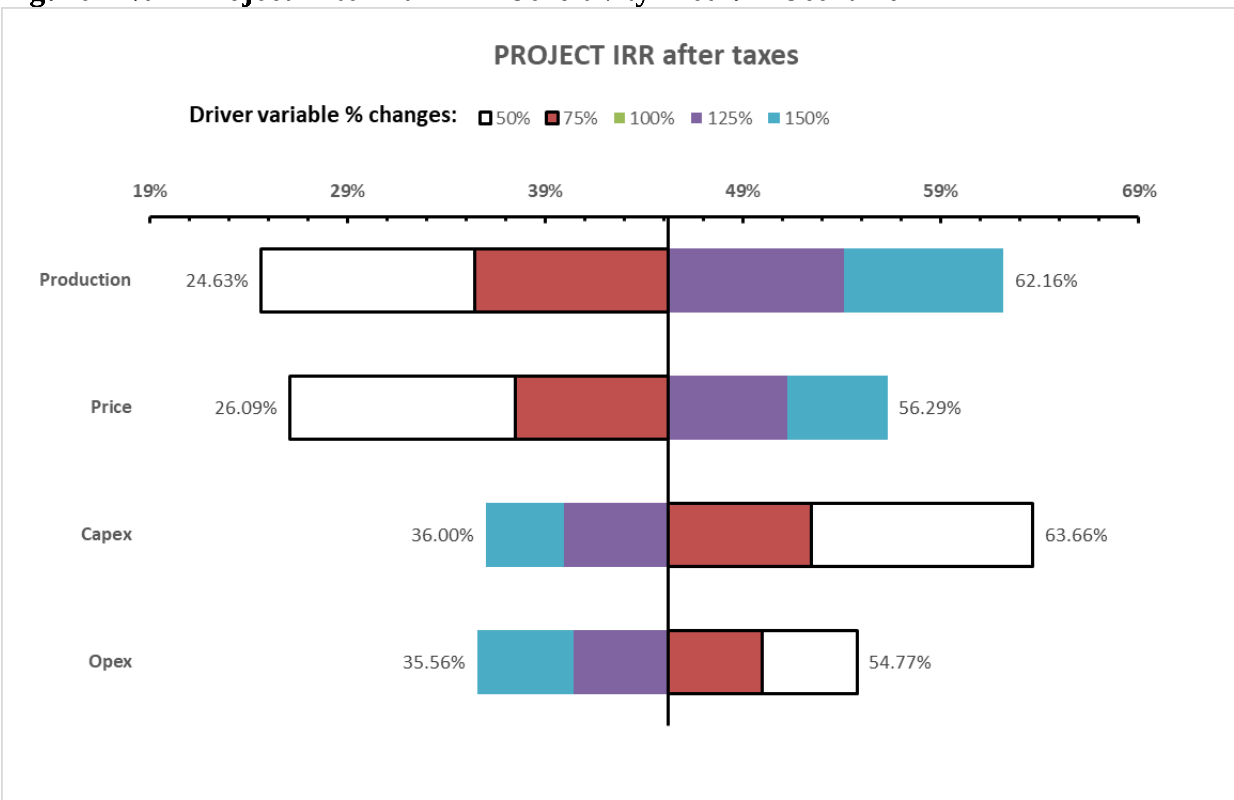


TABLE 22.10 PROJECT IRR AFTER TAXES AT 8% DISCOUNT RATE-SENSITIVITY MEDIUM SCENARIO							
Driver Variable	**Base Data**		**Project IRR**				
			50%	**75%**	**100%**	**125%**	**150%**
Opex	US$/tonne	$3,579	54.77%	49.95%	45.22%	40.39%	35.56%
Capex	US$ M	$565	63.66%	52.44%	45.22%	39.95%	36.00%
Price	US$/tonne	$12,000	26.09%	37.47%	45.22%	51.21%	56.29%
Production	Tonne/year	40,000	24.63%	35.42%	45.22%	54.09%	62.16%

Figure 22.6 Project After Tax IRR Sensitivity Medium Scenario



Project economics are most sensitive to variability in product pricing and production. Project results are less sensitive to capital expenditures and total operating costs, but some differences appear when results are measured in terms of NPV. The project is shown to be more sensitive to capital expenditures than to total operating cost when measuring IRR.

22.11 CONCLUSIONS

22.11.1 Economic Analysis

- CAPEX: Total capital investment for the 40,000 tpa lithium carbonate project, including equipment, materials, indirect costs and contingencies during the construction period is estimated to be US$565M, out of which US$304.2M was spent and excluded from the economic assessment. This total also excludes interest expenses that might be capitalized during the same period.

- Operating costs and working capital requirements in the construction phase are estimated to be US$42.7M.

- Sustaining capital expenditures total US$270.5M over the 40-year evaluation period of the project. Disbursements of these expenditures start in year 3.

- Main CAPEX components are the lithium carbonate processing plant and the pond construction.
  - The lithium carbonate processing plant represents 35% of total direct cost of project capital expenditures.

  - Pond construction represents 32% of total direct cost of project capital expenditures. Pond investment is driven by two variables, namely, evaporation rate, and pond construction unit cost. The latter has been taken from contracts awarded, and which accurately represent current costs for this work in Argentina. Minera Exar performed brine evaporation evaluation between 2012-2018 and worked with its consultant to determine the brine evaporation design criterion for pond design at 5.91 mm/d.

- OPEX: The operating cost for the Project is estimated at US$3,579 per tonne of lithium carbonate. This figure includes pond and plant chemicals, energy, labour, salt waste removal, maintenance, camp services, and transportation. The cost estimate was based on quotations from suppliers and service providers.

- Cash Flow: Cash flow will be according to production ramp up that will reach 100% in year 5 of the cash flow estimate.

- Sensitivity Analysis: Sensitivity analysis indicates that the project is economically viable even under very unfavourable market conditions.

- Other: The Project's economic evaluation presented in this report does not consider any payment on financing taken by the owner of Minera Exar.

22.11.2 Project Strengths

- Brine: The Project is based on the exploitation of subsurface brines, which as a lithium source are commercially proven to be more economic than hard rock sources of lithium.

- Mineral Reserves Size: Identified lithium Mineral Reserves (Proven + Probable) are very substantial, over 682,920 tonnes of lithium (approximately 3.6 million tonnes LCE), enough to meet the 40,000 tpa production rate over 40 years. In addition, the potential exists for resource expansion at depth and geographically to the north in Olaroz salar, and laterally outside the existing well capture zones.

- Location – Transportation: The project site is on a major international highway connecting Argentina and Chile. This route provides access to ports in Northern Chile, to bring imported capital goods and raw materials for the project, as well as for exports of product to Asia. In addition, the same route provides connection to Jujuy, Salta and Buenos Aires and allows convenient transportation of local capital goods, raw materials and personnel.

- Location – Energy Access: The project site is only 50 km away from a Natural Gas (NG) trunk pipeline; moreover, the ground over which the feeder pipeline is to be built is the edge of the salar (almost flat and featureless), reducing pipeline construction cost and complexity.

- Location – Favourable Site Conditions: Existence of an alluvial fan separating the Cauchari and Olaroz salars, and LAC's surface rights over this area reduces geotechnical risk as the plant and camp facilities will be on solid ground. Ponds will be constructed on flat ground in the salar. In general, site conditions across the entire property are favourable for this type of facility.

- Energy Costs: Access to NG supplies have improved in the country due to new natural gas fields being brought to production and by using the above mentioned pipeline. The estimated long-term costs are approximately US$4.8 per MMBTU.

- Pricing Estimate: Sensitivity analysis indicates that the project is economically viable even under unfavourable pricing conditions.

22.11.3 Project Risks

- Location – Elevation: The project site is at a high elevation, approximately 4,000m above sea level, which can result in difficult work conditions for individuals used to lower elevations. Medical oxygen tanks will need to be readily available for staff travelling to, and working at, the mine site.

- Brine composition: Relatively high contents of sulphate and magnesium in the brine make it necessary for a chemical treatment with lime to remove these components.

- Weather. Dependence. Weather variation, including higher than normal raining periods and long winter periods have occurred in recent years that those factors could impact in the performance of the evaporation cycle in the ponds.

- Process. Implementation. The Minera Exar process is specialized to the type of brine in the salar and there is no other industrial operation running the same process configuration. Mitigation factors include implementation of dedicated stages for elimination of impurities and purification of the solution.

- Process System Design. Supplier Expertise. The design and fabrication of process equipment/facilities are unique for the process and high-altitude location, considering the performance at high elevation and high wind environment. Test at different vendors and pilot plant were performed before placing some of the equipment orders.

- The COVID-19 pandemic effects were not evaluated at the time of the estimate and it has an impact on the project schedule and indirect costs. Contingency will be used to manage the potential impact of the pandemic. The project schedule included in this report reflects the best understanding of the impact based on the known information.

22.11.4 Project Schedule

The project schedule is based on activities that started in early 2017 and early construction started by mid-2017 that responded to planning of the 25,000 TPA project. The main activities included:

- Detailed engineering of on-site infrastructure including plant, wells, ponds and camp;
- Definition and acquisition of construction and installation contracts for the Pond Area;
- Equipment and materials procurement for the construction of wells, ponds and the Lithium Carbonate plant;
- Temporary camp construction; and
- Commencement of production well installation.

In 2018, the following activities occurred as part of the 25,000 tpa lithium carbonate plant:

- Continue well field construction;
- Commencement of earthworks for pre-concentration and concentration ponds, Lithium Carbonate plant and facilities;
- Commencement of pre-concentration pond construction and lining placement; and
- Pump brine to the ponds.

In 2019, the following activities were implemented:

- Continue Well field construction;
- Continue Pre-concentration ponds construction and lining placement;

- Commence operation phase by filling the first and second pre-concentration ponds strings;
- Commencement of the Lithium Carbonate plant and facilities construction;
- Continue construction of the pre-concentration ponds; and the concentration ponds;
- Construction of permanent camp;
- Contracts assigned to supply pre-engineered buildings, SX plant, lime plant, electric houses, and crystallyzer equipment awarded;
- Construction packages awarded;
- Permanent camp and plant platform contract awarded and under construction;
- Structural steel erection contract awarded and under execution;
- Concrete works for buildings awarded and under execution; and
- The first and second pre-concentration ponds strings and the concentration ponds enter into gradual operation.

In 2020, the following activities will occur:

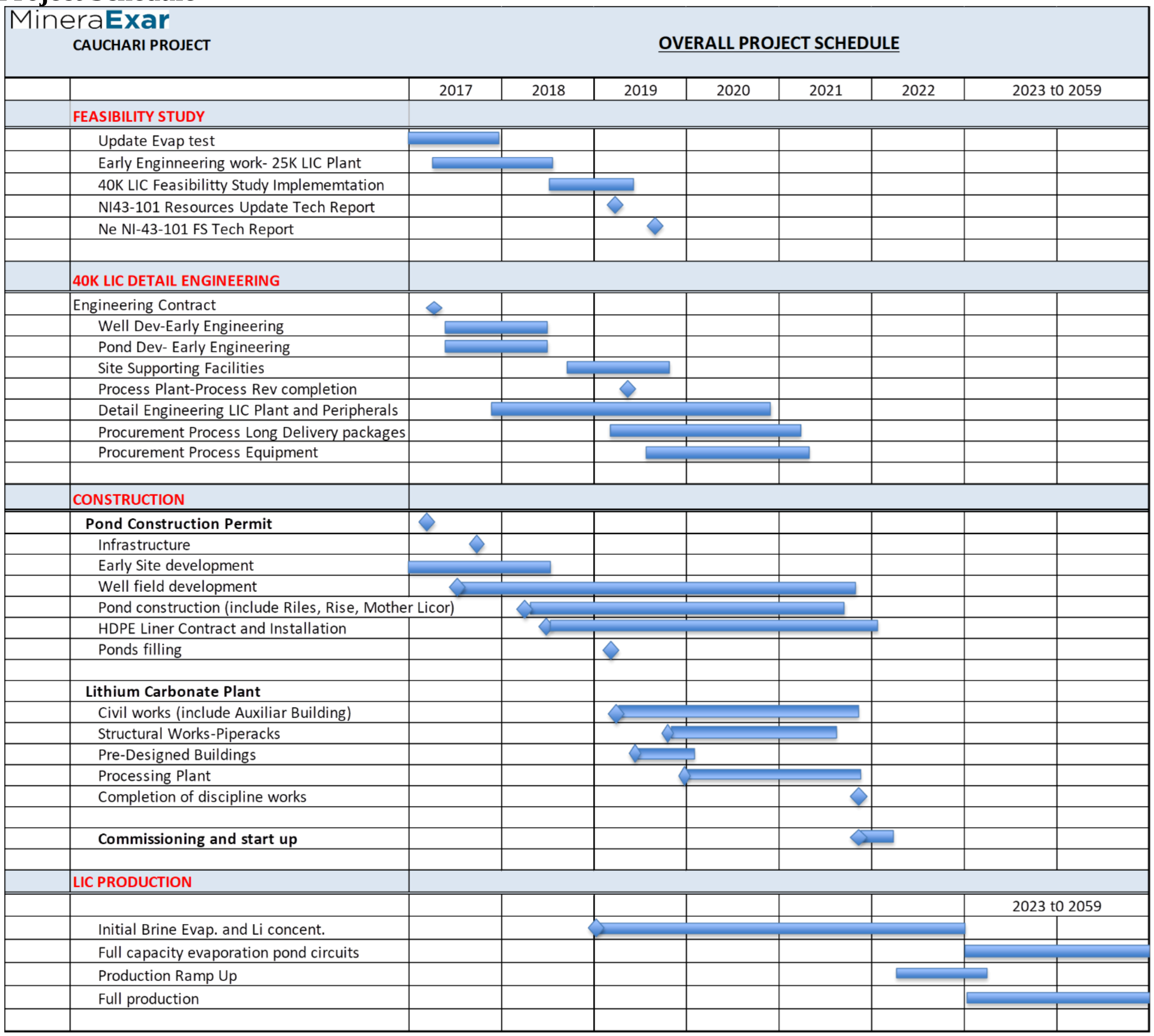
- Completion of pre-concentration ponds and Lithium Carbonate plant construction;
- Continue liner installation
- The first and second pre-concentration ponds strings and the concentration ponds enter into gradual operation;
- Construction of liming process plant;
- Complete the emergency power system and distribution power line
- Construction of Carbonate plant and facilities

In 2021 and 2022 the following activities will occur:

- Start liming process at ponds
- Complete the installation of the lithium carbonate and ancillary systems; and
- Complete lithium carbonate plant start up
- Beginning commissioning of the Lithium Carbonate plant
- Beginning of production ramp up of the Lithium Carbonate plant.

Figure 22.7 presents these activities in a Gantt chart format.

Figure 22.7 Project Schedule



23.0 ADJACENT PROPERTIES

23.1 OROCOBRE LIMITED

Orocobre Limited (“Orocobre”) is an Australian-listed company that owns and operates brine production facilities in the Olaroz and Cauchari Salars, adjacent to the Minera Exar properties. Orocobre’s Salar de Olaroz project consists of 63,000 ha of claims (Figure 23.1) and its Cauchari-Olaroz Project consists of 28,000 ha of claims.

A Technical Report on the Olaroz properties prepared by Houston and Gunn (2011) highlighted Measured and Indicated Mineral Resources for lithium of 0.27 and 0.94 million tonnes, respectively. The Measured and Indicated Mineral Resources for potassium were 2.08 and 8.02 million tonnes, respectively. Houston and Gunn note mean lithium and potassium concentrations within the nucleus of the salar of 690 mg/L and 5,730 mg/L, respectively. There have been no publicly available updates since.

In a press release dated January 31, 2012, Orocobre reported results of a pump test in the area of the proposed Olaroz extraction field. They reported the test produced average lithium grades of ± 875 mg/L, and that the test ran for more than three months at a flow rate of 14 L/s. Preliminary model results showed brine level drawdown due to pumping will be limited and the decline in grade is predicted to be slow, relative to the assumed project life.

The January 31, 2012 press release also reports results on Orocobre properties in Cauchari, adjacent to those of Minera Exar, including a drill program of six boreholes to depths between 46 to 249 m. The elevated lithium values detected on the adjacent Minera Exar property have been confirmed to extend onto the Orocobre property. Brine geochemistry is interpreted to be similar to the Orocobre Olaroz property. Based on the spacing of the boreholes, Orocobre estimated the lithium brine body to extend over an area of approximately 26 km^2.

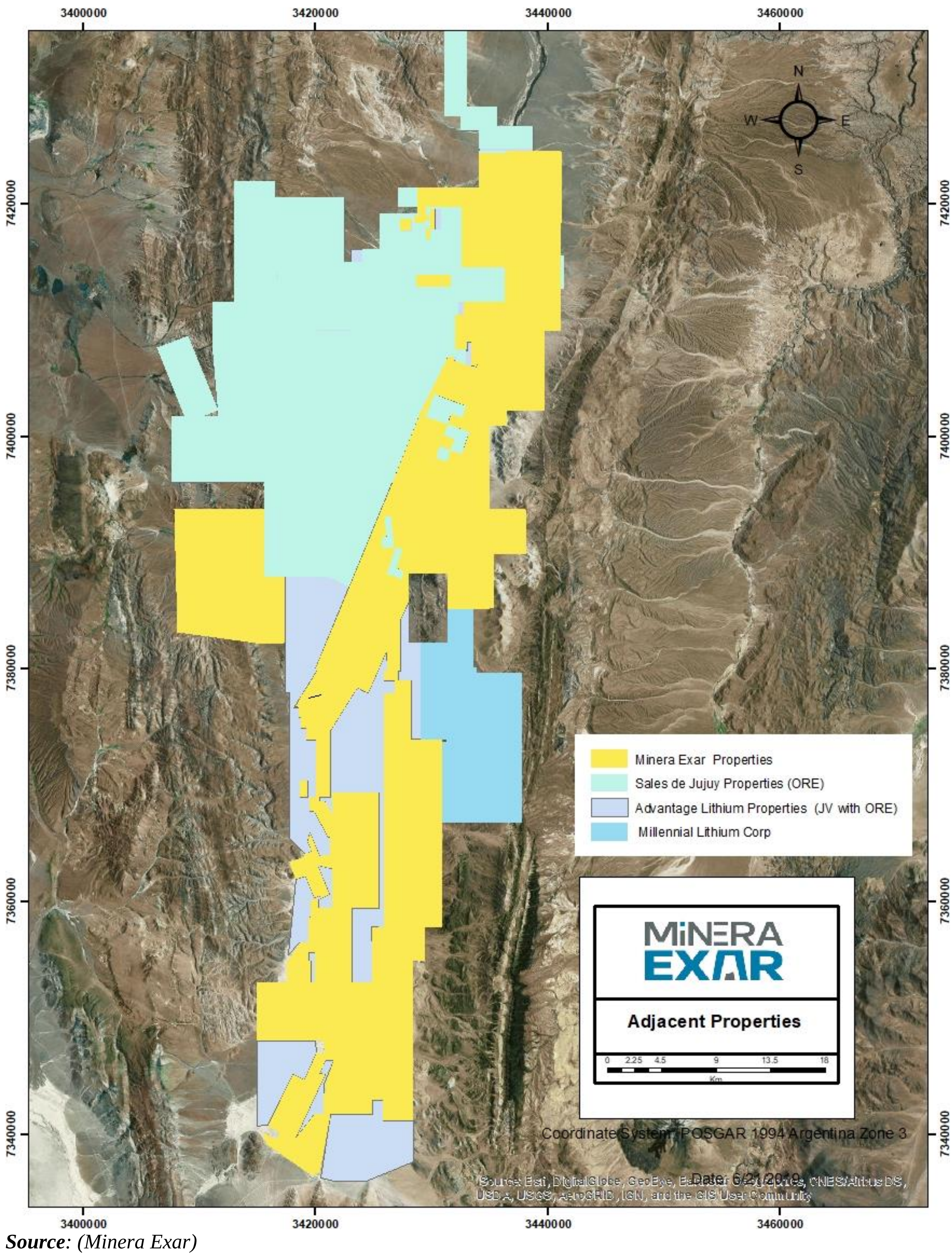
In March of 2013, Orocobre began construction of a 17,500 tpa lithium carbonate production facility that was completed in November of 2014 with production subsequently commencing on November 21, 2014.

In an October 23, 2014 press release, Orocobre announced an exploration target, approximately 100 m thick, below its present resource area at a depth between 197 m and 323 m.

On February 22, 2019, Orocobre announced a production of 6,075 tonnes of lithium carbonate in their Half Year, 2018 update.

The information in this section has not been verified by the QP and it should be noted that the information is not necessarily indicative of the mineralization on the property that is the subject of this Technical Report.

Figure 23.1 Orocobre Property Showing Boundary with the Minera Exar Property



***Source**: (Minera Exar)*

23.2 ADVANTAGE LITHIUM CORP.

In November 2016, Orocobre entered into a joint venture ("JV") agreement with Advantage Lithium on its Cauchari-Olaroz Project, as well as a number of exploration projects. The Cauchari JV project consists of 27,772 ha and is a 25/75 JV between Orocobre and and Advantage. Orocobre also owns 33.5% of Advantage Lithium's issued capital. Minera Exar's Cauchari-Olaroz Project is located between Advantage Lithium and Orocobre's producing Olaroz Lithium facility (Figure 23.1).

A Technical Report on the Cauchari-Olaroz Project prepared by Reidel and Ehren, (2018) reported Inferred Mineral Resources for lithium of 0.57 million tonnes at a mean concentration of 450 mg/L and Inferred Mineral Resources for potassium of 4.98 million tonnes at a mean concentration of 4,028 mg/L. Advantage filed a NI 43-101 Technical Report on SEDAR in March of 2019 (Reidel, 2019), which contained the updated Mineral Resource Estimate is presented in Table 23.1.

TABLE 23.1
MINERAL RESOURCE ESTIMATE FOR ADVANTAGE LITHIUM CORP.'S CUACHARI JV PROJECT

Item	Mineral Resource Classification			
	Measured (M)	Indicated (I)	M+I	Inferred
Li Mean Concentration (mg/L)	527	452	476	473
Resource (tonnes)	345,000	550,000	900,000	290,000
Li Carbonate Equivalent	1,850,000	2,950,000	4,800,000	1,500,000

The information in this section has not been verified by the QP and it should be noted that the information is not necessarily indicative of the mineralization on the property that is the subject of this Technical Report.

24.0 OTHER RELEVANT DATA AND INFORMATION

There is no other datat and information relevant to the report.

25.0 INTERPRETATION AND CONCLUSIONS

25.1 GEOLOGY AND RESOURCES

The Updated Mineral Reserve Estimate for lithium incorporates the Updated Mineral Resource Estimate for lithium using: 1) samples used from the prior, LAC (2012) Mineral Resource Estimate for lithium, and 2) an expanded Project database compiled from results of 2017 through 2018 exploration drilling, sampling, and testing campaigns, additional depth-specific sampling in early 2019 as part of data verification, and additional drilling and testing through the effective date of May 7, 2019. To obtain the Updated Reserve Mineral Estimate, the prior geologic and numerical models and the expanded database were analyzed and updated by Montgomery using Leapfrog® 3D geologic and resource modeling software developed by Seequent (2018) and MODFLOW-USG developed by Panday and others (2013) coupled with the Groundwater Vistas interface (ESI, 2015).

The Updated Mineral Reserve Estimate is based on an expanded numerical model domain incorporating the substantial amount of exploration drilling and exploration work completed through the effective date of this report. Montgomery evaluated the Updated Mineral Reserve Estimate using the following modeling criteria as specified by Minera Exar:

- A 40-year wellfield extraction period. Recovery of a minimum of 17,500 tonnes per year or more of lithium carbonate equivalent (LCE) processed during the first year of production wellfield operation and during initial wellfield ramp-on stage (Year 1), a minimum of 36,000 tonnes of LCE processed during the second year of production wellfield operation and 40,000 tonnes of LCE processed during subsequent wellfield operations (Year 3 through Year 40).

- An average lithium concentration for the 40-year extraction period from the simulated wellfield at or above the current engineering estimate for processing of 590 mg/L.

- Brine production from simulated wells derived from Measured and Indicated Mineral Resource volumes.

- In consideration of current uncertainties and limitations in the numerical model, maximize overall wellfield extraction rate and optimize production well locations for predictive assessment of an Updated Mineral Reserve Estimate.

The simulated brine production wellfield for the basis of the Updated Mineral Reserve Estimate uses a total of 56 production wells. The pumping schedule for the wellfield allowed for a ramping up during the initial year of production (Year 1) using 23 simulated wells, either completed or planned by Minera Exar (Phase 1 Wells), required to achieve or exceed the 17,500 tonnes LCE process target. After Year 1, 33 wells are added to the wellfield (Phase 2 Wells) in order to meet or exceed the 36,000 tonnes LCE during second Year 2 and 40,000 tonnes LCE process target through Year 40.

The Updated Mineral Reserve Estimate model is based on initial lithium concentrations incorporated in the HSU model used in the Updated Mineral Resource Estimate (LAC, 2019), as well as representative aquifer parameters derived from aquifer testing and calibration for steady-state and transient hydraulic conditions.

Overall, the modeled wellfield shows the ability to exceed the minimum 40,000 tpa LCE process and 590 mg/L annual lithium concentration targets. The predicted results for the 40-year production period are as follows.

- Average production rate of 48,800 tpa LCE accounting for processing efficiency (53.7%) for the 40-year pumping period; the minimum of 25,600 tpa LCE occurs at the start-up of operations in Year 1; the maximum rate of 50,200 tpa LCE occurs at full-build in Years 2 and 3. At the end of the pumping period in Year 40 the rate averages 48,800 tpa LCE.

- Average lithium concentration of 607 mg/L for the 40-year pumping period; the maximum concentration of 617 mg/L occurs at the start-up of full-build in Year 2 and the minimum concentration of 598 mg/L occurs near the end of the pumping period in Year 40.

Without factoring processing efficiency, the Mineral Reserve Estimate for lithium is summarized as Proven and Probable for a 40-year production period as follows:

- Proven Mineral Reserves (without processing efficiency).
  - The Proven Mineral Reserves for lithium are 96,650 tonnes.
  - The Proven Mineral Reserves for LCE are 514,450 tonnes.

- Probable Mineral Reserves (without processing efficiency).
  - The Probable Mineral Reserves for lithium are 586,270 tonnes.
  - The Probable Mineral Reserves for LCE are 3,120,590 tonnes.

- Total Proven and Probable Mineral Reserves (without processing efficiency).
  - The Total Mineral Reserve for lithium is 682,920 tonnes.
  - The Total Mineral Reserve for LCE is 3,635,040 tonnes.

For comparative purposes, without factoring processing efficiency, approximately 20 percent of the Updated Measured plus Indicated Mineral Resource Estimate reported in Burga et al. (2019) are converted to a total Proven and Probable Mineral Reserve Estimate as brine produced from wellfield and delivered to the brine evaporative ponds.

25.2 BRINE PRODUCTION

The location, design and assumed productivity of the brine extraction wells was determined using a hydrogeologic model supported by data collected from geologic logs, drill cores, chemistry analysis and long-term pumping test data.

25.3 PROCESS INFORMATION AND DESIGN

The proposed process is based on conventional brine extraction and processing methods including pumping brine from the salar, concentrating the brine through evaporation ponds, and taking the brine concentrate through a hydrometallurgical facility to produce high-grade lithium carbonate. Minera Exar and its consultants have successfully tested the brine chemistry of the Cauchari deposit through process simulation using estimation methods and process simulation techniques. This work has been validated by the results of evaporation and process testing at the on-site pilot plant and evaporation ponds, in addition to other testing developed with universities and suppliers.

25.4 ECONOMIC ANALYSIS

- Lithium Industry: Market studies indicate that the lithium industry has a promising future. The use of lithium ion batteries for electric vehicles and renewable energy storage applications are driving lithium demand rapidly to unprecedented levels.

- Project Capital Cost: The capital investment for the 40,000 tpa lithium carbonate Cauchari-Olaroz Project, including equipment, materials, indirect costs and contingencies during the construction period is estimated to be US$564.7 million. Costs have been estimated using consulting engineering services for facilities definition and supplier quotations for all major items. The main cost driver is pond construction, which represents 44% of total project capital expenditures.

- Operating Costs: The operating cost estimate (+/-15% accuracy) for the 40,000 tpa lithium carbonate facility is US$3,579 per tonne. This figure includes pond and plant chemicals, energy/fuel, labour, salt waste removal, maintenance, camp services and transportation.

- Sensitivity Analysis: The Project is forecast to generate cash flow even under unfavourable conditions for key variables. Project economic sensitivity analysis shows that lithium carbonate price and production have the highest impact on project results (NPV and IRR). Project results are somewhat less sensitive to capital expenditures and total operating costs.

- Viability of the Project: Project cash flow analysis for the base case and alternative cases indicates that, if assumptions that sustain the different cases materialize, the project remains economically viable.

- Project Strength: Project fundamentals, such as ease of construction, capital and operating costs, product demand and price, and economics are all strong.

25.5 PROJECT RISKS

- Based on the conceptual hydrogeologic system and results of the numerical model, the authors believe it is appropriate to categorize the Proven Mineral Reserve as what we believe is feasible to be pumped to the evaporation ponds and recovered at the end of the process during the first five years of operations as currently model for the Updated Mineral Reserve Estimate. During the initial five years of operation and wellfield build-out, the numerical model should be recalibrated based on demonstrated results and new projections should be done for re-examination of the Proven Mineral Reserve and potential for conversion of part of Probable Mineral Reserve to Proven.

- Process risk: Problems may arise during detailed design, or later in scaling up to full production capacity. Reagents consumption may be higher than predicted and/or product yields may be lower than current estimates.

- Construction delays and costs: Experience in building this type of facility is relatively limited in Argentina. This risk has been mitigated by the construction expertise input that previous partnership brought to the Project. Minera Exar has interfaced with an experienced contractor, with expertise in building similar size and type of projects in high-altitude environmental in Chile and Argentina, for reducing the risk of delay, especially for critical path items such as the pond construction. In addition, importation of foreign equipment requires careful management to ensure the necessary approvals/ documentation is in place to reduce the risk of delay. Occurrence of these delays or other factors may negatively impact project construction schedule and/or costs.

- Fluctuation in reagent costs: Soda ash supply is assumed to be imported. There is an existing soda ash manufacturer in Argentina, which currently operates at full capacity. Market pricing for other reagents may also fluctuate. However, the sensitivity analysis demonstrated that the economic performance of the project is relatively insensitive to operating cost.

- Electricity and Gas: Electricity for the Project will be supplied via the provincial electrical network and is approximately 6.2% of the total operating costs. Cost escalation risk for grid power is relatively low, and can be mitigated quickly and cost-effectively by exploiting the significant solar energy potential at site, if required. Natural gas will be used mainly for camp operations and specific process applications and represents only 4% of the total operating costs. The current natural gas price is US$4.8/MMBTU. As Argentina has became a net gas exporter to Chile and Brazil, due to successful gas production from the Vaca Muerta formation, the risk for price increased has diminished due to the large availability of this commodity. In Feb 2019, the Argentinian Government held an auction to firm gas contract between producers and distribution companies, average price fetched was US$4.6/MMBTU. Given that potential domestic natural gas resources appear ample, it is unlikely that the price will increase to above US$5/MMBTU. A rise in natural gas prices could also affect electric power costs.

- Taxes: The Company operates under Federal Argentinian Mining Law N° 24.196. This law grants Minera Exar a tax freeze, or protection against tax increases for a period of 30 years from the date when Minera Exar files the Feasibility Study with the Federal Mining Authority.

- Inflation, exchange rate, and devaluation: A change in government could affect mining policies and the Project.

- Location – Elevation: The project site is at a high elevation, approximately 4,000m above sea level, which can result in difficult work conditions for individuals used to lower elevations. Medical oxygen tanks will need to be readily available for staff travelling to, and working at, the mine site.

- Brine composition: Relatively high contents of sulphate and magnesium in the brine make it necessary for a chemical treatment with lime to remove these components.

- Weather Dependence: Weather variation, including higher than normal raining periods and long winter periods have occurred in recent years that those factors could impact in the performance of the evaporation cycle in the ponds.

- Process Implementation: The Minera Exar process is specialized to the type of brine in the salar and there is no other industrial operation running the same process configuration. Mitigation factors include implementation of dedicated stages for elimination of impurities and purification of the solution.

- Process System Design - Supplier Expertise: The design and fabrication of process equipment/facilities are unique for the process and high-altitude location, considering the performance at high elevation and high wind environment. Test at different vendors and pilot plant were performed before placing some of the equipment orders.

- The COVID-19 pandemic was not evaluated at the time of the estimate although it has impacted the project schedule and indirect costs. The contingency costs will be used to manage the potential impact of the pandemic. Project schedule included in this report reflects the best understanding of the impact based on the known information.

26.0 RECOMMENDATIONS

The Qualified Persons involved in the Report make the following recommendations:

- Based on the conceptual hydrogeologic system and results of the numerical model, the authors believe it is appropriate to categorize the Proven Mineral Reserve as what we believe is feasible to be pumped to the evaporation ponds and recovered at the end of the process during the first five years of operations as currently model for the Updated Mineral Reserve Estimate. During the initial five years of operation and wellfield build-out, the numerical model should be recalibrated based on demonstrated results and new projections should be done for re-examination of the Proven Mineral Reserve and potential for conversion of part of Probable Mineral Reserve to Proven.

- Improving the certainty of the Proven and Probable Mineral Reserve could be gained by continued calibration of the numerical model using data obtained from scheduled water level measurements along with brine density measurements at production wells and nearby monitoring wells (representing shallow, intermediate, and deep monitoring of the brine aquifer), and from additional aquifer testing to more accurately represent aquifer parameters. Changes to the hydrostratigraphic model based on additional exploration drilling and production well drilling should also be incorporated into future updates to this numerical groundwater flow and transport model.

- Drainable porosity or S_y estimates relied upon the prior 2012 model estimates because the 2017 and 2018 exploration results lacked S_y estimates. In order to address the uncertainty of S_y estimates for the different stratigraphic groups, ongoing exploration work should include analysis of S_y by use of laboratory methods such as RBRC or similar techniques for core samples, and field methods using calibrated nuclear magnetic resonance (“NMR”) borehole logging in open boreholes or in wells with PVC casing installed.

- Additional certainty in predictive simulations of wellfield extraction and capture of lithium mass could be gained by re-examination of the water balance using measured data at aquifer boundaries, model sensitivity analysis for critical aquifer parameters such as hydraulic conductivity and specific yield, and including effects of off-property production of lithium by neighboring mining operations. Along with these recommended refinements to improve certainty of model predictive capabilities, the numerical model should be used as operational tool to optimize pumping rates at production wells, maximize lithium concentrations and overall control of wellfield capture.

- Pumping Test Manual: A formal manual should be compiled and followed for execution of construction phase pumping tests.

- Monitoring Activities Manual: A formal manual should be compiled and followed for all long-term monitoring activities.

- Project Database: All existing and new ecological, hydrological, and geological site data should be compiled in a formal database.

- QA/QC: The database should be continually updated and monitored in real time. Personnel should be dedicated to the maintenance of the project database.

- QA/QC: The QA/QC program, using regular insertions of blanks, duplicates and standards should be continued. All exploration samples should be analyzed at a certified, independent laboratory.

- New Well Testing: In addition to the long-term evaluation components recommended above, each new production well should be initially pump tested for at least twenty-one days, for initial assessment of long-term performance.

- Project capacity expansion: Given the level of Mineral Resources estimated in this report to support a 40,000 tpa lithium carbonate production, we recommend that a capacity expansion project for lithium carbonate above 40,000 tpa, be carried out at a Pre-Feasibility Study (FS) level to confirm resources and compare alternate lithium adsorption technologies with conventional evaporation concentration.

- Lime supply: We recommend that efforts to support expansion of production capacity of local supplier should be pursued to ensure supply to the new facility and also perform tests to analyze the effect of different lime sources on process yields and quality.

27.0 REFERENCES

Aloulou, F. Zaretskaya, V., Growth in Argentina's Vaca Muerte Shale and Tight Gas Production Leads to LNG Exports. U.S. Energy Informaiton Administration. www.eia.gov/todayinenergy/detail.php?id=40093, July 12, 2019.

Advantage Lithium, 2018. NI 43-101 Technical Report - Preliminary Economic Assessment of the Advantage Lithium Project, Jujuy Province, Argentina: effective date August 31, 2018, prepared by Worley Parsons and Flo Solutions.

Bear, J., 1972. Dynamics of Fluids in Porous Media. Dover Publications, New York.

Beauheim R.L. and Roberts, R.M., 2002. Hydrology and Hydraulic Properties of a Bedded Evaporite Formation. Journal of Hydrology 259, no. 1-4 (March 1, 2002): 66- 88.

Beauheim, R.L., Saulnier, G.J. and Avis, G.J., 1991. Interpretation of Brine- Permeability Tests of the Salado Formation at the Waste Isolation Pilot Plant Site: First Interim Report, Report: SAND90-0083, Albuquerque, NM: Sandia National Laboratories, August 1991.

Beauheim, R.L. and Holt, R.M., 1990. Hydrogeology of the WIPP Site: Geological and Hydrological Studies of Evaporites in the Northern Delaware Basin for the Waste Isolation Pilot Plant (WIPP), New Mexico (pp. 131-79). Geological Society of America Field Trip No. 14 Guidebook. Dallas: Dallas Geological Society.

Bossi, G.E., 2011. The Cauchari Sedimentology Final Report. Minera Exar S.A., Prepared for Lithium Americas.

Burga, E., Burga, D., Genck, W., Weber, D., 2019. Updated Mineral Reserve Estimate For the Cauchari-Olaroz Project, Jujuy Province, Argentina, NI 43-101 Report, Prepared for Lithium Americas.

Burga, E., Burga, D., Rosko, M., Sanford, T., Leblanc, R., Smee, B. King, M., Abbey, D., 2017. Updated Reserve Estimation and Lithium Carbonate Production at the Cauchari-Olaroz Salars, Jujuy Province, Argentina, NI 43-101 Report, Prepared for Lithium Americas.

CIM Standing Committee on Reserve Definition, CIM Definition Standards-For Mineral Resources and Mineral Reserves. 2014.

CIM Best Practice Guidelines for Resource and Reserve Estimation for Lithium Brines, 2012. .

Conesa, V., 1997. Auditorías Medioambientales: Guía Metodológica. España.

Conhidro, 2012. Informe Plataforma Pozo Agua Industrial Pozos: PPI1 y PBI1, Salar de Cauchari, Provincia de Jujuy, Minera Exar, Septiembre, 2011.

Cooper, H.H. and Jacob, C.E., 1946. A generalized graphical method for evaluating formation constants and summarizing well field history, Am. Geophys. Union Trans., vol. 27, pp. 526-534.

Cravero, F., 2009a. Informe de Actividades realizadas en el Salar Cauchari-Olaroz, Minera Exar S.A., LAC Internal Report.

Cravero, F., 2009b. Analisis Mineralogico de los Pozos 5 y 6, Salar de Olaroz. Comparación con los Resultados de los Pozos 3 y 4, Salar de Cauchari., Minera Exar S.A. LAC Internal Report.

CRU, 2011. Potassium Chloride Ten Year Outlook 2011 Annual Report. London. DHI-WASY. 2011. User Manual FEFLOW 6.

Domenico, P. and Schwartz, F., 1990. Physical and Chemical Hydrogeology. John Wiley and Sons, New York.

Dougherty, D.E and Babu, D.K., 1984. Flow to a partially penetrating well in a double-porosity reservoir, Water Resources Research, vol. 20, no. 8, pp. 1116-1122.

Environmental Simulations Incorporated (ESI), 2015. Groundwater Vistas version 7.

Fetter, C.W., 1994. Applied Hydrogeology. Prentice Hall Inc., Upper Saddle River, New Jersey.

Fowler, J., and Pavlovic, P., 2004. Evaluation of the potential of Salar Del Rincon brine deposit as a source of lithium, Potash, boron and other mineral resources. Report for Argentina Diamonds Ltd.

Freeze, R.A., and Cherry, J.A., 1979. Groundwater. Prentice Hall Inc., Englewood Cliffs, New Jersey.

Gelhar, L., Welty, C., and K. Rehfeldt, 1992. A critical review of data on field-scale dispersion in aquifers. Water Resources Research, 28: 1955-1974.

Golden Software, 2018. Strater, Version 5.

Hantush, M.S., 1964. Hydraulics of wells, in: Advances in Hydroscience, V.T. Chow (editor), Academic Press, New York, pp. 281-442.

Hantush, M.S., 1962. Flow of ground water in sands of nonuniform thickness; 3. Flow to wells, Jour. Geophys. Res., vol. 67, no. 4, pp. 1527-1534.

Hantush, M.S., 1961a. Drawdown around a partially penetrating well, Jour. of the Hyd. Div., Proc. of the Am. Soc. of Civil Eng., vol. 87, no. HY4, pp. 83-98.

Hantush, M.S., 1961b. Aquifer tests on partially penetrating wells, Jour. of the Hyd. Div., Proc. of the Am. Soc. of Civil Eng., vol. 87, no. HY5, pp. 171-194.

Hantush, M.S., 1960. Modification of the theory of leaky aquifers, Jour. of Geophys. Res., vol. 65, no. 11, pp. 3713-3725.

Hantush, M.S. and Jacob, C.E., 1955. Non-steady radial flow in an infinite leaky aquifer, Am. Geophys. Union Trans., vol. 36, pp. 95-100.

Harbaugh, A.W., 2005. MODFLOW-2005, the U.S. Geological Survey modular ground-water model -- the Ground-Water Flow Process: U.S. Geological Survey Techniques and Methods 6-A16.

Helvaci, C., and Alonso, R.N., 2000. Borate Deposits of Turkey and Argentina; a summary and geological comparison. Turkish Journal of Earth Sciences Vol 9, pp1-27.

Hess, K., Davis, J, Kent D., and J. Coston. 2002. Multispecies reactive tracer test in an aquifer with spatially variable chemical conditions, Cape Cod, Massachusetts: dispersive transport of bromide and nickel. Water Resources Research 38: 36-1 – 36-27.

Houston J., 2006. Variability of Precipitation in the Atacama Desert: Its Causes and Hydrological Impact. International Journal of Climatology 26:2181-2189.

Houston J., 2009. A recharge model for high altitude, arid, Andean aquifers. Hydrol. Process. 23, 2383–2393, Published online 13 May 2009 in Wiley InterScience, (www.interscience.wiley.com) DOI: 10.1002/hyp.7350.

Houston, J., 2010a. Technical Report on the Cauchari Project, Jujuy, Argentina. NI 43-101 Report, prepared on behalf of Orocobre Limited.

Houston, J., 2010b. Technical Report on the Salinas Grandes – Guayotayoc Project, Jujuy-Salta Provinces, Argentina. NI 43-101 Report, prepared on behalf of Orocobre Limited.

Houston, J., and Gunn, M., 2011. Technical Report on the Salar de Olaroz Lithium- Potassium Project, Jujuy Province, Argentina.NI 43-101 Report, prepared on behalf of Orocobre Limited.

Houston, J., Ehren, P., 2010. Technical Report on the Olaroz Project, Jujuy Province, Argentina. Report for NI 43-101, prepared on behalf of Orocobre Limited.

Johnson, A.I., 1967. Specific yield — compilation of specific yields for various materials. U.S. Geological Survey Water Supply Paper 1662-D. 74 p.

Jordan, T.E., Muñoz, N., Hein, M., Lowenstein, T., Godfrey, L., and Yu, J., 2002. Active faulting and folding without topographic expression in an evaporite basin, Chile. Geological Society of America Bulletin 114: 1406-1421.

King, M., 2010a. Amended Inferred Resource Estimation of Lithium and Potassium at the Cauchari and Olaroz Salars, Jujuy Province, Argentina. Report prepared for Lithium Americas Corp.

King, M., 2010b. Measured, Indicated and Inferred Resource Estimation of Lithium and Potassium at the Cauchari and Olaroz Salars, Jujuy Province, Argentina. Report prepared for Lithium Americas Corp.

King, M., Abbey, D., Kelley, R., 2012. Feasibility Study Reserve Estimation and Lithium Carbonate and Potash Production at the Cauchari-Olaroz Salars, Jujuy Province, Argentina. Report prepared for Lithium Americas Corp.

Liu, J., Williams, J.R., Wang, X., and Yang, H., 2009. Using MODAWEC to generate daily weather data for the EPIC model. Environmental Modelling & Software 24 (5):655-644

Ma, H. (Haizhou), 2010. Professor at Qinghai Institute of Salt Lakes, Chinese Academy of Sciences, China. Personal communication with, and presentation to, Waldo Perez of Lithium Americas Inc.

Manifold Version 8.0.27, 2012. Online Manual available at: http://www.georeference.org/doc/manifold.htm.

Moench, A.F., 1985. Transient flow to a large-diameter well in an aquifer with storative semiconfining layers, Water Resources Research, vol. 21, no. 8, pp. 1121- 1131.

Orocobre Limited, 2011. NI 43-101 Technical Report on the Salar de Olaroz Lithium-Potash Project: dated May 13, 2011, prepared by J. Houston and M. Gunn.

OSC, APGO and TSX. Mineral Project Disclosure Standards – Understanding NI 43- 101. Presentation at PDAC Conference, Toronto, Ontario, February 29, 2008.

Panday S, Langevin ChD, Niswonger RG, Ibaraki M, Hughes JD, 2013. MODFLOW–USG version 1: an unstructured grid version of MODFLOW for simulating groundwater flow and tightly coupled processes using a control volume finite-difference formulation. Ch 45, Section A, Groundwater Book 6, Modeling Techniques. USGS, Reston, VA, USA.

Papadopulos, I.S. and H.H. Cooper, 1967. Drawdown in a well of large diameter, Water Resources Research, vol. 3, no. 1, pp. 241-244.

Proyecto Fenix – Salar de Hombre Muerto website, http://www1.hcdn.gov.ar/dependencias/cmineria/fenix.htm.

Remy, N., Boucher, A., and Wu, J., 2011. Applied Geostatistics with SGeMs: A User's Guide. Cambridge University Press, New York.

Robson, S.G. and Banta, E.R., 1990. Determination of specific storage by measurement of aquifer compression near a pumping well. Ground Water. V. 28m no. 6, pp. 868-874

Roskill, 2009. The Economics of Lithium. 11th Edition.

Salazar, G.A., 2019. Reporte, Análasis estadístico de datos meteorólogicos medidos y de tendencia de evaporación en Salar Cauchari-Olaroz (Prov. de Jujuy-Argentina) INENCO-CONICET.

Schroeter, H. and Watt, W., 1980. Practical Simulation of Sediment Transport in Urban Runoff. Canadian Journal of Civil Engineering. Vol. 16, No. 5, pp. 704-711.

Seequent, 2018. Leapfrog Software, Geo 4.4 and EDGE.

signumBOX, 2011. Lithium Carbonate Market Study Final Report. Santiago, Chile.

Smee, B., 2011. Quality Control Data Review, Salares Lithium Project, Argentina. Report for Minera Exar.

Stormont, J. C., Hines, J. H., Pease, R. E., O'Dowd, D. N., Kelsey, and J. A., 2010. Method to Measure the Relative Brine Release Capacity of Geologic Material. ASTM Geotechnical Testing Journal Symposium in Print: Innovations in Characterizing the Mechanical and Hydrological Properties of Unsaturated Soils.

SQM, 2016. Cálculo de la recarga de caudal en la cuenca de los salares Cauchari y Olaroz, utilizando el modelo hidrológico HEC HMS.

Suárez-Authievre, C., and Villarroel-Alcocer, F., 2012. Cutoff analysis of Lithium Carbonate process from brines the Salar de Cauchari. Report for Lithium Americas.

TetraTech, 2000. Data Input Guide for SWIFT for Windows. The Sandia Waste- Isolation Flow and Transport Model RELEASE 2.60.

Theis, C.V., 1935. The relation between the lowering of the piezometric surface and the rate and duration of discharge of a well using groundwater storage, Am. Geophys. Union Trans., vol. 16, pp. 519-524.

USACE (United States Army Corps of Engineers), 2006. Hydrologic Modelling System HEC-HMS. User's Manual. Version 3.1.0. http://www.hec.usace.army.miL/software/hec-hms/documentation.html.

US SEC (United States Securities and Exchange Commission), 2009. Form 20-F for Sociedad Quimica y Minera de Chile S.A. (Chemical and Mining Company of Chile Inc.).

Van der Leeden, F., Troise, F., and Todd, D., 1990. The Water Encyclopedia, Second Edition. Lewis Publishers, Chelsen, Michigan.

ViewLog Systems, 2004. Viewlog Borehole Data Management System, October 2004, http://www.viewlog.com.

Watermark Numerical Computing. 2010. PEST: Model-Independent Parameter Estimation User Manual, 5th Edition. www.pesthomepage.org

Background References

ARA WorleyParsons, 2011. Preliminary Assessment and Economic Evaluation of the Cauchari-Olaroz Lithium Project, Jujuy Province, Argentina.

Esteban C. L., 2005. Estudio geologic y evapofacies del salar Cauchari, departamento Susques, Jujuy. Universidad Nacional de Salta, Tesis Professional.

Jerez, D., 2010. Informe sobre los tributos con incidencia en el Proyecto Cauchari. August 2010.

Koorevaar P., Menelik G., and Dirksen C., 1983. Elements of Soil Physics, Elsevier.

Kunaz, I., 2009. Cauchari and Incahuasi Argentine Salars Assessment and Development. Internal report by TRU group for Lithium Americas Corp.

Kunaz, I., 2009. Evaluation of the Exploration Potential at the Salares de Cauchari and Olaroz, Province of Jujuy, Argentina. Internal report by TRU group for Lithium Americas Corp.

Latin American Minerals, 2009. Informe de impacto ambiental, etapa de exploracion proyecto Olaroz – Cauchari.

Lic. Echenique Mónica, Lic. Agostino Gilda, Lic Zemplin Telma, 2009. Plan de relaciones comunitarias.

Nicolli H. B., 1981. Geoquimica de aguas y salmueras de cuencas evaporaticas de la Puna. Anal. Acad. Nac. Cs. Ex. Fís. Nat. Buenos Aires, Tomo 33.

Platts, January, 2016, Argentina eyes raising natural gas prices to boost output, retrieved from http://www.platts.com/latest-news/natural-gas/buenosaires/argentina-eyes-raising-natural-gas-prices-to-21829120 on March 31, 2017.

Schalamuk, I., Fernandez R. y Etcheverry R., 1983. Los yacimientos de minerals no metalíferos y rocas de aplicacion de la region NOA. Ministeria de Economía, Subsecretaría de Minería, Buenos Aires.

Autor desconocido, 2000. Estudio geologic-económico, mina La Yaveña, departamento de Susques de Jujuy.

Testing

CICITEM, Estudios Experimentales Salmuera Salar de Cauchari, Parte 1 y 2, Dr. P. Vargas, Mayo 2011.

Minera EXAR, Pruebas De Encalado Con Cal Viva, Documento interno, Noviembre 2011.

Minera EXAR, Pruebas De Sedimentacion Con Cal Viva, Documento interno, Noviembre 2011.

IIT-UdeC, Pruebas De Laboratorio De Extraccion Por Solvente De Boro Desde Salmuera Del Salar De Cauchari, I. Wilkomirski, Octubre 2011.

SGS Canada Inc. The Production Of Lithium Carbonate From A Representative Sample From Salar Cauchari, Project 13101-001 – Final Report, septiembre 2011.

SGS Canada Inc, Pilot Plant investigation into The Production of Lithium Carbonate from a Representative Sample from Salar Cauchari, Mayo 2012.

SRC, Saskatchewan Research Council Mining and Minerals Division, Cauchari- Olaroz Project Potash Recovery from Salt Lake Winter Precipitates, Diciembre 2011.

Background References

NOVIGI, SLPPFO PHYSICAL PROPERTY ESTIMATION PACKAGE, versión 1.1.0, estudio realizado para Lithium Americas Corp., Junio 2011.

NOVIGI, SLURRY LIBRARY, librería de modelos matemáticos base de unidades de proceso desarrollado para Lithium Americas Corp., Junio 2011.

Bibliography

Conesa Fernández-Vítora, V. (1997). Auditorías medioambientales, guía metodológica (2a. ed. re). Madrid: Mundi-Prensa. Retrieved from http://www.sunass.gob.pe/doc/cendoc/pmb/opac_css/index.php?lvl=author_see&id=174.

Soil Survey Staff. (1999). Soil taxonomy: a basic system of soil classification for making and interpreting soil surveys (2nd ed.). Washington D.C.: US Department of Agriculture Soil Conservation Service.

28.0 CERTIFICATES

CERTIFICATE OF QUALIFIED PERSON
DAVID BURGA, P.GEO.

I, David Burga, P. Geo., residing at 3884 Freeman Terrace, Mississauga, Ontario, do hereby certify that:

1. I am an independent geological consultant contracted by Lithium Americas Corp..

2. This certificate applies to the technical report titled "Updated Feasibility Study and Mineral Reserve Estimation to Support 40,000 tpa Lithium Carbonate Production at the Cauchari-Olaroz Salars, Jujuy Province, Argentina", (the "Technical Report") with an effective of September 30th, 2020.

3. I am a graduate of the University of Toronto with a Bachelor of Science degree in Geological Sciences (1997). I have worked as a geologist for a total of 22 years since obtaining my B.Sc. degree. I am a geological consultant currently licensed by the Association of Professional Geoscientists of Ontario (License No 1836). I have read the definition of "qualified person" set out in National Instrument 43-101 ("NI 43-101") and certify that, by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101. My relevant experience for the purpose of the Technical Report is:

Exploration Geologist, Cameco Gold	1997-1998
Field Geophysicist, Quantec Geoscience	1998-1999
Geological Consultant, Andeburg Consulting Ltd.	1999-2003
Geologist, Aeon Egmond Ltd.	2003-2005
Project Manager, Jacques Whitford	2005-2008
Exploration Manager – Chile, Red Metal Resources	2008-2009
Consulting Geologist	2009-Present

4. I have visited the Property that is the subject of this Technical Report on January 24, 2017, February 19-21, 2019 and June 10-12, 2019.

5. I am responsible for Sections 2-12, 23, 24, 27, and co-author for Sections 24 to 26 of the Technical Report along with those sections of the Summary pertaining thereto.

6. I am independent of the Issuer applying the test in Section 1.5 of NI 43-101.

7. I have had prior involvement with the Property that is the subject of this Technical Report. That involvement was as an author on the technical report titled "Updated Mineral Resource Estimate for the Cauchari-Olaroz Project, Jujuy Province, Argentina" (the "Technical Report") with an effective of March 1st, 2019, and the technical report titled "Updated Feasibility Study and Reserve Estimation and Lithium Carbonate Production at the Cauchari-

Olaroz Salars, Jujuy Province, Argentina", (the "Technical Report") with an effective of March 29th, 2017.I have read NI 43-101 and Form 43-101F1 and this Technical Report has been prepared in compliance therewith.

8. I have read NI 43-101 and Form 43-101F1 and the Technical Report has been prepared in compliance therewith.

9. As of the date of this certificate, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Effective Date: September 30th, 2020
Signing Date: October 19th, 2020

{SIGNED AND SEALED}
[David Burga]

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David Burga, P.Geo.

CERTIFICATE OF QUALIFIED PERSON
ERNEST BURGA, P. ENG.

I, Ernest Burga, P. Eng., residing at 3385 Aubrey Rd., Mississauga, Ontario, L5L 5E3, do hereby certify that:

1. I am an Associate Mechanical Engineer and President of Andeburg Consulting Services Inc.

2. This certificate applies to the technical report titled "Updated Feasibility Study and Mineral Reserve Estimation to Support 40,000 tpa Lithium Carbonate Production at the Cauchari-Olaroz Salars, Jujuy Province, Argentina", (the "Technical Report") with an effective of September 30th, 2020.

3. I am a graduate of the National University of Engineering located in Lima, Peru where I earned my Bachelor's degree in mechanical engineering (B.Eng. 1965). I have practiced my profession continuously since graduation and in Canada since 1975. My work with major consulting firms in Canada has exposed me to hydrometallurgical processing with specialized depth to understand chemistry as required for metal extraction and lithium brines processing. In the last 25 years, I have completed hydrometallurgical projects interfacing directly with metallurgists for application of conventional and novel hydrometallurgical processes including hydrometallurgical processing of copper refinery slimes for a precious metal refinery, the selective removal of Bismuth and antimony from copper refinery electrolyte using IBC Advanced Technologies' Molecular Recognition Technology based on a Nobel prize recognized development. During the last ten years, I have participated in the Lithium industry in brine processing interfacing with specialized metallurgists and process modeller for interpreting test works results, brine processing mass balances and undertaken full responsibility for process implementation and engineering work for PEAs and Definite feasibility studies for brine processing projects. Main clients include Lithium 1, Galaxy Resources, Simbol Minerals, Pure Energy and Lithium Americas Corp. I am licensed by the Professional Engineers of Ontario (License No. 6067011).

   I have read the definition of "qualified person" set out in National Instrument 43-101 ("NI 43-101") and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience in the Lithium Carbonate extraction processing, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101. My summarized career experience is as follows:

Maintenance Engineer – Backus and Johnston Brewery of Peru	1966-1975
Design Mechanical Engineer – Cambrian Engineering Group	1975-1978
Design Mechanical Engineer – Reid Crowther Bendy	1979-1981
Lead Mechanical Engineer – Cambrian Engineering Group	1981-1987
Project Engineer –Hydro Metallurgical Division- HG. Engineering	1988-2003
Lead Mechanical Engineer – AMEC Americas	2003-2005
Sr. Mechanical Engineer – SNC Lavalin Ltd.	2005-2009
President – Andeburg Consulting Services Inc.-	2004 to present

Specialized in Lithium Extraction
Contracted Mechanical Engineer – P&E Mining Consultants Inc. 2009 to present

4. I have visited Property that is the subject of this Technical Report on January 24, 2017 and June 10-12, 2019.

5. I am responsible for authoring Sections 18, 19, 21, 22 and 25.2-25.5 of this Technical Report along with those sections of the Summary pertaining thereto.

6. I am independent of the issuer applying the test in Section 1.5 of NI 43-101. I am independent of the Vendor and the Property.

7. I have had prior involvement with the Property that is the subject of this Technical Report. That involvement was as an author on the technical report titled "Updated Mineral Resource Estimate for the Cauchari-Olaroz Project, Jujuy Province, Argentina" (the "Technical Report") with an effective of March 1st, 2019, and the technical report titled "Updated Feasibility Study and Reserve Estimation and Lithium Carbonate Production at the Cauchari-Olaroz Salars, Jujuy Province, Argentina", (the "Technical Report") with an effective of March 29th, 2017.

8. I have read NI 43-101 and Form 43-101F1 and the Technical Report has been prepared in compliance therewith.

9. As of the date of this certificate, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Effective Date: September 30th, 2020
Signing Date: October 19th, 2020

{SIGNED AND SEALED}
[Ernest Burga]

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Ernest Burga, P. Eng.

CERTIFICATE OF QUALIFIED PERSON
DANIEL WEBER, P.G., RM-SME

As the co-author of the report titled "Updated Feasibility Study and Mineral Reserve Estimation to Support 40,000 tpa Lithium Carbonate Production at the Cauchari-Olaroz Salars, Jujuy Province, Argentina", (the "Technical Report") with an effective of June 30th, 2020 (the Technical Report) I, Daniel Weber, P.G., RM-SME, do hereby certify that:

1. I was a senior hydrogeologist and operations manager with Errol L. Montgomery & Associates, Inc. (Montgomery & Associates), 400 South Colorado Blvd., Suite 340, Denver, CO 80246 USA.

2. I graduated with a Bachelor of Science degrees in Geological Sciences and Environmental Sciences from Bradley University, Peoria, Illinois in 1980. I graduated with a Master of Science in Hydrology from the University of Arizona, Tucson, Arizona in 1986.

3. I have professional registrations in good standing with the following organizations: Registered Professional Geologist in the State of Arizona (26044); Registered Professional Geologist in the State of California (5830); Registered Member of the Society for Mining, Metallurgy, and Exploration (SME) registered member (4064243).

   I have practiced hydrogeology for 33 years, during which I have worked extensively in salar basins in Arizona, Nevada, California, Chile and Argentina. My experience as a hydrogeologist includes groundwater resource development and management, drilling and testing of production, injection, and monitoring wells, technical oversight for feasibility investigations, design and application of groundwater models, and interpretation of aquifer test data. My relevant experience for the purpose of the Technical Report is: Qualified Person for the Centenario-Ratones Project, Salta Province, Argentina for Eramine Sudamerica, a subsidiary of Eramet; Qualified Person for the Clayton Valley Lithium Project, Esmeralda County, Nevada for Pure Energy Minerals; and evaluation of brine resources and reserves in salar settings of the altiplano of Argentina and Chile, and the arid regions of the southwestern U.S. as part of independent technical due diligence investigations.

   I have read the definition of "qualified person" set out in National Instrument 43-101 ("NI 43-101") and certify that and by reason of my education, experience and affiliation with professional associations I fulfill the requirements to be a "Qualified Person" for the purposes of NI 43-101.

4. I participated in field visits to the Project site on September 8 and 9, 2018.

5. I have had prior involvement with the Property that is the subject of this Technical Report. That involvement was as an author on the technical report titled "Updated Mineral Resource Estimate for the Cauchari-Olaroz Project, Jujuy Province, Argentina" with an effective of March 1st, 2019.

6. As of the date of this certificate, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

7. I am independent of the issuer applying all of the tests in section 1.5 of National Instrument 43-101.

8. I have read National Instrument 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.

9. As qualified person for this project, I have been responsible for review of the conceptual model and drilling and testing results, updating and re-calibrating the previous numerical groundwater flow model, and for calculating estimated Mineral Resource and Reserve values for lithium and potassium provided in this Technical Report. I am responsible for authoring Sections 14 to 16 of the Technical Report along with those sections of the Summary pertaining thereto.

Effective Date: September 30th, 2020
Signing Date: October 19th, 2020

{SIGNED AND SEALED}
[Daniel Weber]

____
Signature of Daniel Weber, P.G., RM-SME

CERTIFICATE OF QUALIFIED PERSON
MAREK DWORZANOWSKI

I, Marek Dworzanowski, CEng, Pr.Eng, BSc(Hons), FIMMM, FSAIMM residing at Lieu dit Langlade,Trejouls, France, do hereby certify that:

1. I am an independent process consultant contracted by Lithium Americas Corporation ("Lithium Americas").

2. This certificate applies to the technical report titled "Updated Feasibility Study and Mineral Reserve Estimation to Support 40,000 tpa Lithium Carbonate Production at the Cauchari-Olaroz Salars, Jujuy Province, Argentina," (the "Technical Report") with an effective date of September 30, 2020.

3. I graduated from the University of Leeds, UK, with a BSc (Honours) in Mineral Processing in July 1980. In March 2016, I was appointed as a Visiting Adjunct Professor in Metallurgical Engineering, University of Witwatersrand, South Africa.

4. I became a Fellow of the Southern African Institute of Mining and Metallurgy (SAIMM) in 2006 and my membership number is 19594. I became a Fellow of the Institute of Materials, Minerals and Mining (IMMM) in 2020 and my membership number is 485805. I became a Professional Engineer with the Engineering Council of South Africa (ECSA) in 1987 and my registration number is 870480. I became a Chartered Engineer with the Engineering Council of the United Kingdom in 2020 and my registration number is 485805.

5. I have read the definition of "qualified person" (QP) set out in NI 43-101 and by reason of my education, affiliation with a professional association and past relevant work experience, I fulfill the requirements to be a QP for the Technical Report.

6. I have over 40 years of experience in the mining industry during which time I gained a considerable amount of diverse experience in various senior roles within the areas of mineral processing and hydrometallurgy, production, project execution, project studies, technical consulting and research and development. My relevant experience in lithium brine projects for the purpose of the Technical Report includes operational reviews of producing lithium plants, process consulting support and acting as QP for a number of lithium brine projects including: Minera Salar Blanco Maricunga Project PEA and DFS (Chile), Millennial Lithium Pastos Grandes Project PEA and DFS (Argentina), Advantage Lithium Cauchari Project PEA and PFS (Argentina) and Centaur Resources PEA (Argentina).

7. I am independent of Lithium Americas applying the test in Section 1.5 of National Instrument 43-101 ("NI 43-101").

8. I have not visited the property that is the subject of the Technical Report.

9. I am responsible for Section 13 and Section 17 of the Technical Report along with those sections of the Summary pertaining thereto.

10. I have read NI 43-101 and Form 43-101F1 and those portions of the Technical Report that I am responsible for have been prepared in compliance therewith.

11. As of the date of this certificate, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Effective Date: September 30th, 2020
Signing Date: October 19th, 2020

{SIGNED AND SEALED}
[Marek Dworzanowski]

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Marek Dworzanowski, CEng Pr.Eng

CERTIFICATE OF QUALIFIED PERSON
ANTHONY SANFORD

I, Anthony Sanford, BSc. (Hons.), MBA (Mineral Resources Management), Pr.Sci.Nat, residing at Calle Esquilache 371, Piso 6, San Isidro, Lima Perú do hereby certify that:

1. I am an independent geological consultant contracted by Lithium Americas Corporation.

2. This certificate applies to the technical report titled "Updated Feasibility Study and Mineral Reserve Estimation to Support 40,000 tpa Lithium Carbonate Production at the Cauchari-Olaroz Salars, Jujuy Province, Argentina," (the "Technical Report") with an effective date of September 30, 2020.

3. I graduated with a MBA (Mineral Resources Management) from the University of Dundee, Scotland, Centre for Energy, Petroleum and Mineral Law and Policy, in 1998; with a B.Sc (Hons), Geology from the University of Natal, Durban, South Africa in 1985 and B.Sc. (Geology & Applied Geology) in 1984. I have worked in my profession for a total of 35 years since completing my honours degree in 1984 in the fields of geology, and environmental and social science related to the exploration, construction, operation, and closure phases of mine development. My experience includes working in environmental and social issues related to both open pit and underground mining including heap leach and mine waste/tailings disposal, and on the development of regulatory permits including ESIAs and mine closure plans, the last 20 years of which have been in South America. I have read the definition of "Qualified Person" set out in National Instrument 43 101 ("NI 43-101") and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "Qualified Person" for the purposes of NI 43-101. My relevant experience for the purpose of the Technical Report is:

Senior Regional Consultant, South America, Ausenco	2016-present
Environmental Services and Water Resources Manager. Perú, Ausenco	2015 - 2016
Environmental Services Manager, Perú, Ausenco	2008 - 2015
Senior Geologist, Perú, Ausenco	2004 - 2008
Geologist, Senior Geologist, Anglovaal, South Africa, Zambia	1985 - 1996

4. I have visited the Property that is the subject of this Technical Report during the period 14-15 February, 2017 and 23-24 July, 2019.

5. I am responsible for authoring Section 20 and Sections 4.7 through 4.10 and co-authoring Sections 25 and 26 of the Technical Report along with those sections of the Summary pertaining thereto.

6. I am independent of the Issuer applying the test in Section 1.5 of NI 43-101.

7. I have had prior involvement with the Property that is the subject of this Technical Report. That involvement was as an author on the technical report titled “Updated Feasibility Study and Reserve Estimation and Lithium Carbonate Production at the Cauchari-Olaroz Salars, Jujuy Province, Argentina”, (the “Technical Report”) with an effective date of March 29, 2017.

8. I have read NI 43-101 and Form 43-101F1 and this Technical Report has been prepared in compliance therewith.

9. As of the date of this certificate, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Effective Date: September 30th, 2020
Signing Date: October 19th, 2020

{SIGNED AND SEALED}
[Anthony Sanford]

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Anthony Sanford, Pr.Sci.Nat.

APPENDIX 1. SUMMARY TABLES OF PUMPING TEST RESULTS FOR EXPLORATION AND PRODUCTION WELLS

TABLE 1
LOCATION AND CONSTRUCTION INFORMATION FOR EXPLORATION WELLS AND PUMPING TESTS

Well Identifier	Coordinatesa		Land Surface Elevation (m amsl)	Year Constructed	Total Depth of Well (m)	Depth Interval of Well Screen (m, bls)		HSU(s) Penetrated by Screened Interval of Well
	East (m)	North (m)				Top	Bottom	
PB-01	3423907.28	7380861.37	3939.95	2010	204	66	186	Halite with Sand
PB-03A	3425965.69	7383015.18	3940.3	2011	201	58	197	Interbedded Sand and Halite
PB-04	3421378.53	7381604.24	3946.67	2011	305	59	297	Clay/Silt with Sand Interbedded Sand and Halite
PB-06A	3419220.00	7377555.48	3942.00	2011	194	57	191	Interbedded Sand and Halite Lower Sand
PB-I	3422532.00	7385915.00	3962.30	2011	51	18	44	Alluvial Fan (Archibarca)
W17-06	3427261	7392988	3936.49	2018	455	94	437	Alluvial Fan (East)
W18-05	3424500	7382499	3943.12	2018	270	63	265	Alluvial Fan (East) Interbedded Sand and Halite
W18-06	3426650	7385299	3945.91	2018	460	63	440	Interbedded Sand and Halite Halite with Sand
W04-A	3422492	7379474	3937.97	2019	478	73	472	Halite with Sand Interbedded Sand and Halite Halite with Sand Lower Sand Basal Sand
W11-06	3424279	7383792	3945.95	2019	434	114	422	Alluvial Fan (Archibarca) Halite with Sand Interbedded Sand and Halite Lower Sand Basal Sand

TABLE 1
LOCATION AND CONSTRUCTION INFORMATION FOR EXPLORATION WELLS AND PUMPING TESTS

Well Identifier	Coordinatesa		Land Surface Elevation (m amsl)	Year Constructed	Total Depth of Well (m)	Depth Interval of Well Screen (m, bls)		HSU(s) Penetrated by Screened Interval of Well
	East (m)	North (m)				Top	Bottom	
W18-23	3423500	7381500	3941.25	2019	484	70	476	Clay/Silt with Sand Interbedded Sand with Halite Halite with Sand Lower Sand Basal Sand
CW-62	3425680	7388632	NA	2019	90	47	86	Alluvial Fan (East) Clay/Silt with Sand

a) coordinates of wells constructed after 2011 based on DEM; wells constructed in 2010 and 2011 are based on reported differential GPS survey (Posgar 94)
NA = not available

TABLE 2
HYDRAULIC RESULTS OF PUMPING TESTS AT EXPLORATION WELLS

Pumped Well Identifier	Month-Year of Test	Pumping Period (days)	Pre-pumping Water Level (m, bls)	Average Pumping Rate (L/s)	Drawdown (m)	Specific Capacity (L/s/m)	Data Source
PB-01	Mar-2011	8	4.80	4	41.27	0.097	LAC 2012
PB-03A	Aug-2011	27	6.36	12	31.78	0.38	LAC 2012
PB-03A	Oct-2016	12	7.79	13	64.57	0.20	SQM 2016
PB-04	May-2011	31	13.50	20	50.40	0.40	LAC 2012
PB-04	Sep-2016	15	10.94	25	55.28	0.45	SQM 2016
PB-06A	Oct-2011	11	5.21	22	40.34	0.55	LAC 2012
PB-06A	Oct-2016	10	4.19	21	35.15	0.60	SQM 2016
PB-I	Sep-2011	4	18.99	23	3.84	6.0	LAC 2012
W17-06	Oct-2018	7	7.46	50	21.22	2.4	EXAR 2018
W18-05	Oct-2018	11	NA	31	42.47	0.73	Andina 2018
W18-06	Jan-2019	9	5.50	17	40.74	0.42	EXAR 2019
W04-A	May-2019	3	11.65	25	30.00	0.83	EXAR 2019
W11-06	Jan-2019	5	13.84	30	32.82	0.91	EXAR 2019
W18-23	May-2019	4	13.43	25	25.35	0.99	EXAR 2019
CW-62	Apr-2019	4	4.62	16.5	48.71	0.34	EXAR 2019

NA = not available

TABLE 3
SUMMARY OF COMPUTED AQUIFER PARAMETERS FOR EXPLORATION WELLS

Pumped Well Identifier	Observation Well Identifier	Distance from Pumped Well (m)	Average T (m^2/d)	Estimated Aquifer Thickness[a] (m)	Average K_r (m/d)	Ratio K_z/K_r	Average S	Ss (m^{-1})	Average S_y	Representative HSU(s)
PB-01[b]	PP-1B PP-1C	71.3 29.8	10	132	0.08	0.002	3.0E-05	2.2E-07	---	Halite with Sand
PB-03A	PB-03	24.0	60	131	0.46	---	2.6E-05	2.0E-07	---	Interbedded Sand and Halite
PB-04	DDH-12A	23.8	65	238	0.27	---	1.0E-04	4.2E-07	---	Clay/Silt with Sand Interbedded Sand and Halite
PB-06A	PE-15 PE-17	909 1118	125	121	1.0	---	3.0E-03	2.4E-05	---	Interbedded Sand and Halite Lower Sand
PB-I	PP-I	15	1,730	26	67	---	4.0E-02	1.0E-04	---	Alluvial Fan (Archibarca)
W17-06[c]	ML-006 DL-006	40.9 25.2	650	373	1.7	0.3	2.5E-03	7.0E-06	0.18[d]	Alluvial Fan (East)
W18-05	PE-14 DDH-11	1340 1690	90	202	0.45	---	4.0e-04	2.0E-06	---	Alluvial Fan (East) Interbedded Sand and Halite
W18-06	---	---	70	258	0.3	---	---	---	---	Interbedded Sand and Halite Halite with Sand
W04-A	---	---	170	399	0.43	---	---	---	---	Halite with Sand Interbedded Sand and Halite Halite with Sand Lower Sand Basal Sand
W11-06	---	---	200	308	0.65	---	---	---	---	Alluvial Fan (Archibarca) Halite with Sand Interbedded Sand and Halite Lower Sand Basal Sand

TABLE 3
SUMMARY OF COMPUTED AQUIFER PARAMETERS FOR EXPLORATION WELLS

Pumped Well Identifier	Observation Well Identifier	Distance from Pumped Well (m)	Average T (m^2/d)	Estimated Aquifer Thickness[a] (m)	Average K_r (m/d)	Ratio K_z/K_r	Average S	Ss (m^{-1})	Average S_y	Representative HSU(s)
W18-23	---	---	170	406	0.42	---	---	---	---	Clay/Silt with Sand Interbedded Sand with Halite Halite with Sand Lower Sand Basal Sand
CW-62	CM-62	8	220	65	3.5	0.1	3.5E-03	5.4E-05	0.2[d]	Alluvial Fan (East) Clay/Silt with Sand

a) thickness from top of tested unit to bottom of perforated interval of pumped well
b) 28-hour response prior to boundary effect
c) 3-day response prior to boundary effect
d) estimated; longer duration of pumping is required to confirm estimate

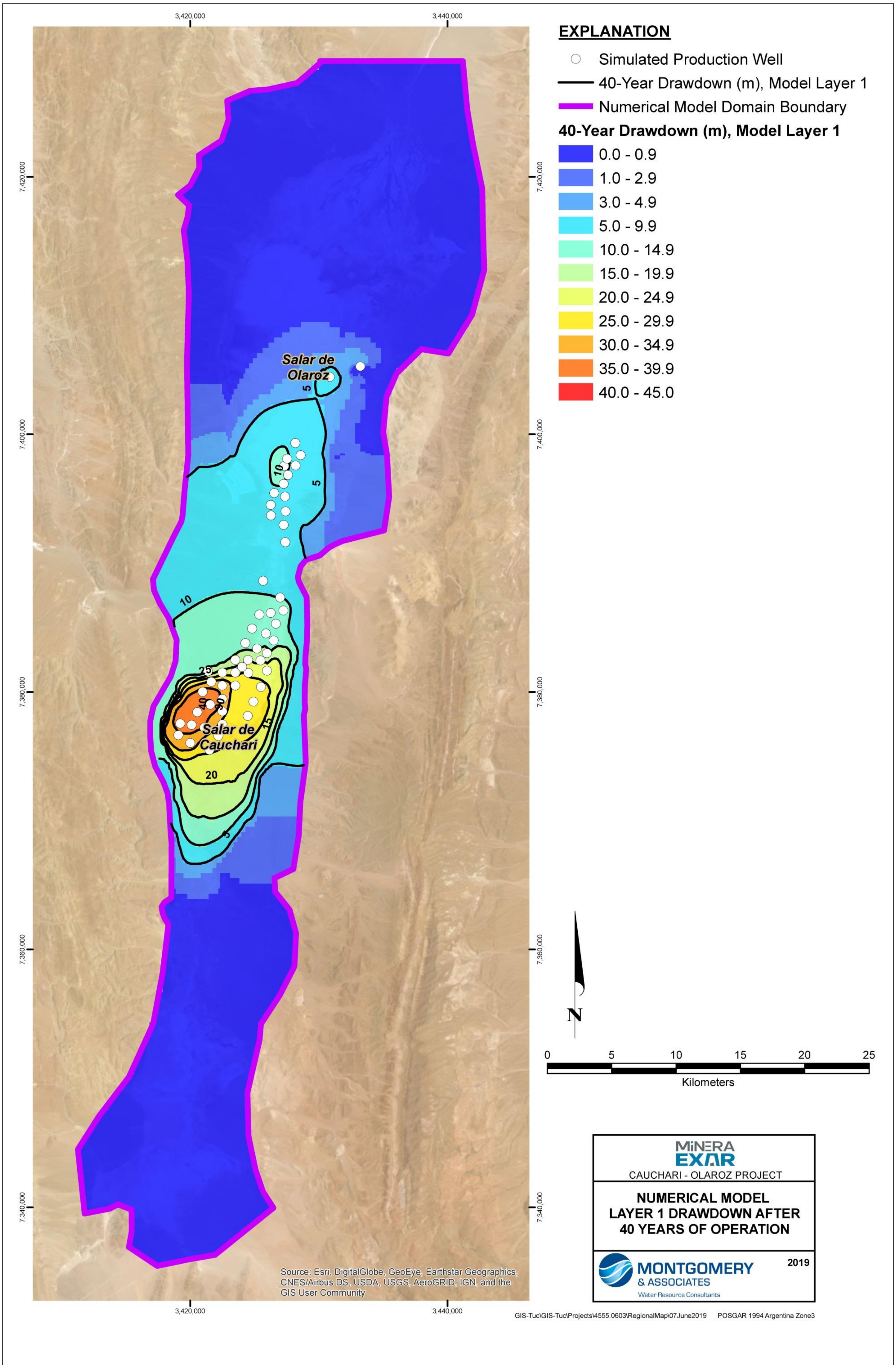
APPENDIX 2. SUMMARY OF UPDATED MINERAL RESERVE ESTIMATE MODEL PROJECTIONS

TABLE 4
UPDATED MINERAL RESERVE ESTIMATE

Well Information - OS4 (56 Wells)										Predicted Composite Drawdown (m)					Predicted Composite Lithium Concentration (mg/L)				
Simulated Production Well	Easting (m)	Northing (m)	Top of Model (masl)	Well Screen Top (masl)	Well Screen Bottom (masl)	Start (year)	End (year)	Pumping (L/s) Year 1	Pumping (L/s) Years 2 through 40	Year 1	Year 10	Year 20	Year 30	Year 40	Year 1	Year 10	Year 20	Year 30	Year 40
PB-3A	3425965	7383015	3939.83	3881.49	3749.95	1	40	9.5	9.5	92.30	99.14	103.56	107.41	110.72	813.95	801.33	797.26	791.61	785.15
PB4	3421378	7381604	3946.79	3902.67	3589.13	1	40	12.41	12.41	70.92	77.74	82.12	85.65	88.93	546.64	520.77	467.29	428.87	401.36
PB-6A	3419220	7377554	3941.44	3884.64	3749.28	1	40	14.97	14.97	9.40	24.82	32.24	37.54	42.85	503.85	499.85	489.26	480.97	476.83
W18-05	3424500	7382499	3943.12	3880.18	3678.18	1	40	22.61	22.61	33.32	42.05	46.68	50.54	53.85	797.30	750.32	723.85	709.05	701.94
W17-06	3427261	7392988	3936.49	3842.42	3499.42	1	40	29.58	29.58	5.35	6.07	7.39	9.26	11.31	559.90	559.57	559.19	558.51	557.84
W11-06	3424279	7383792	3945.95	3832.10	3524.10	1	40	22.5	22.5	7.38	12.39	15.95	19.02	21.94	720.04	678.38	629.89	584.57	545.64
W18-06	3426650	7385299	3945.91	3881.12	3504.12	1	40	15.81	15.81	25.56	31.74	34.91	37.78	40.54	566.78	555.28	540.23	525.07	510.50
W-02B	3427266	7396185	3937.76	3600.00	3435.00	1	40	20	17	2.59	7.32	8.86	10.40	12.03	527.09	530.72	532.38	534.32	536.84
W-04A	3422492	7379474	3937.97	3865.18	3466.18	1	40	25.3	25.3	7.83	24.28	30.92	35.38	39.18	679.11	680.91	679.86	674.44	666.50
WR-21	3425377	7386026	3945.40	3570.00	3423.80	1	40	25	17	3.61	8.30	11.33	14.09	16.74	574.17	573.41	578.36	582.96	586.57
WR-10	3420980	7380008	3943.39	3862.10	3596.10	1	40	20	15	9.86	24.55	31.72	36.59	41.05	567.89	568.62	560.73	553.11	546.94
WR-07	3420554	7378442	3941.95	3890.83	3682.23	1	40	21	21	8.09	24.83	32.38	37.63	42.72	552.62	558.64	551.48	543.47	536.84
WR-23	3426988	7387343	3941.00	3872.69	3482.69	1	40	15	10	19.62	16.97	19.52	22.06	24.58	492.26	495.39	497.56	499.26	500.43
WR-3	3420007	7376056	3940.29	3750.00	3683.09	1	40	21	21	7.72	21.22	28.50	33.47	38.14	602.60	615.09	619.23	618.49	618.01
W17-12	3433225	7405308	3938.41	3857.41	3489.04	1	40	17	17	14.43	15.59	15.91	16.07	16.18	661.45	655.44	650.46	643.99	636.71
W18-23	3423500	7381500	3941.25	3871.50	3467.47	1	40	26.9	26.9	5.28	18.22	23.39	27.24	30.60	697.68	685.51	677.29	675.55	681.13
WR-24	3425666	7388636	3944.99	3796.70	3462.72	1	40	20	10	3.56	4.57	7.00	9.43	11.84	555.58	558.42	561.74	561.39	560.15
W09-01	3428590	7398393	3935.62	3510.00	3368.58	1	40	21	21	3.16	8.01	9.57	10.91	12.31	583.03	578.09	575.97	574.30	572.56
W10-04	3421093	7377243	3940.06	3720.00	3666.45	1	40	21	21	8.77	23.51	30.79	35.76	40.30	654.73	635.52	620.24	605.18	598.65
WR-28	3427380	7391643	3938.59	3838.53	3488.53	1	40	23	23	3.13	3.84	5.29	7.20	9.21	615.35	614.99	613.55	611.53	609.25
W09-06	3425959	7381651	3939.34	3510.00	3422.20	1	40	28	28	4.84	17.36	22.39	26.14	29.44	632.84	632.18	631.63	629.99	627.63
W-1	3421632	7380788	3942.39	3810.00	3442.00	2	40	0	15	2.76	24.79	30.61	34.80	38.56	585.34	576.68	570.20	563.03	550.47
W-10	3421500	7375500	3940.37	3660.00	3340.00	2	40	0	13	0.57	11.16	17.73	22.35	26.21	569.95	578.25	587.07	579.32	510.26
W-11	3422500	7381500	3943.43	3810.00	3443.00	1	40	13	13	17.92	28.00	33.11	37.00	40.49	631.46	581.83	539.81	510.21	487.12
W-12	3426499	7383999	3938.61	3540.00	3438.00	2	40	0	15	2.57	17.44	21.43	24.71	27.74	586.20	590.95	592.41	591.88	589.14
W-13	3427303	7397557	3937.78	3600.00	3438.00	2	40	0	10	1.18	6.96	8.54	9.99	11.52	572.39	574.46	576.31	579.01	582.18
W-14	3427363	7395197	3937.57	3570.00	3337.00	2	40	0	8	1.16	6.44	7.94	9.55	11.27	544.28	540.59	540.89	540.93	540.42
W-15	3426283	7393711	3938.69	3570.00	3338.00	1	40	17	17	4.87	7.16	8.63	10.48	12.45	583.22	586.62	589.54	592.20	595.02

TABLE 4
UPDATED MINERAL RESERVE ESTIMATE

Well Information - OS4 (56 Wells)										Predicted Composite Drawdown (m)					Predicted Composite Lithium Concentration (mg/L)				
Simulated Production Well	**Easting (m)**	**Northing (m)**	**Top of Model (masl)**	**Well Screen Top (masl)**	**Well Screen Bottom (masl)**	**Start (year)**	**End (year)**	**Pumping (L/s) Year 1**	**Pumping (L/s) Years 2 through 40**	**Year 1**	**Year 10**	**Year 20**	**Year 30**	**Year 40**	**Year 1**	**Year 10**	**Year 20**	**Year 30**	**Year 40**
W-16	3427420	7394024	3937.06	3510.00	3337.00	2	40	0	15	1.01	6.18	7.63	9.36	11.22	584.34	577.18	574.40	570.88	566.93
W-17	3426523	7395459	3938.81	3600.00	3338.00	2	40	0	15	1.03	6.92	8.44	10.08	11.83	555.57	559.07	564.09	566.84	567.57
W-18	3427606	7396872	3937.08	3600.00	3337.00	2	40	0	8	1.33	6.89	8.45	9.92	11.48	537.57	538.97	539.28	539.67	540.68
W-19	3428178	7397594	3936.35	3570.00	3336.00	2	40	0	8	1.36	6.98	8.54	9.95	11.42	554.08	549.92	546.25	543.19	540.67
W-2	3423500	7382500	3945.92	3600.00	3445.00	2	40	0	15	2.51	14.07	18.54	22.05	25.21	666.81	663.73	669.63	684.43	698.12
W-20	3425179	7383375	3943.33	3600.00	3443.00	2	40	0	17	2.63	14.26	18.51	21.91	25.00	645.84	644.77	646.94	656.74	671.81
W-21	3425885	7384559	3941.04	3570.00	3441.00	2	40	0	15	2.50	13.12	16.78	19.87	22.77	613.70	609.42	604.10	601.21	601.88
W-22	3424513	7381491	3939.63	3540.00	3439.00	2	40	0	17	2.91	16.97	22.14	25.96	29.31	676.43	671.02	669.61	669.77	667.32
W-23	3422500	7380500	3940.97	3810.00	3341.00	2	40	0	17	2.72	25.36	31.55	35.83	39.50	674.35	677.50	678.00	675.81	672.52
W-24	3424030	7381949	3942.35	3570.00	3342.00	2	40	0	17	3.03	16.34	21.23	24.94	28.22	676.36	673.45	669.70	683.52	710.52
W-25	3421551	7379038	3940.34	3840.00	3340.00	2	40	0	17	2.60	30.89	38.36	43.29	47.69	709.73	675.94	673.92	672.82	673.28
W-26	3422500	7377500	3939.09	3570.00	3338.00	2	40	0	17	0.85	16.72	23.48	28.08	31.94	657.74	646.80	637.12	629.49	624.23
W-27	3420119	7377453	3940.77	3840.00	3340.00	2	40	0	13	2.93	20.25	27.69	32.90	37.96	567.41	556.72	551.62	548.11	548.34
W-28	3426257	7386139	3941.78	3510.00	3342.00	2	40	0	18	2.61	17.30	20.30	23.06	25.71	547.51	552.93	551.98	550.51	549.40
W-29	3427532	7398121	3937.63	3600.00	3337.00	2	40	0	10	1.22	7.21	8.80	10.21	11.69	577.01	579.82	582.67	585.29	587.80
W-3	3427237	7386343	3942.28	3841.00	3441.00	2	40	0	18	2.05	39.99	42.70	45.35	47.96	524.92	515.92	505.16	495.43	486.63
W-30	3430861	7404476	3936.33	3835.00	3335.00	2	40	0	12	0.07	13.88	15.04	15.75	16.26	762.90	762.99	761.91	760.78	759.61
W-31	3425454	7382449	3940.98	3570.00	3341.00	2	40	0	17	3.05	16.14	20.86	24.47	27.70	643.38	644.40	645.71	647.98	650.77
W-32	3424814	7384921	3946.45	3600.00	3346.00	2	40	0	13	1.90	9.48	12.85	15.78	18.56	611.46	617.61	624.17	630.32	633.89
W-4	3428167	7399343	3936.52	3836.00	3336.00	2	40	0	10	1.10	6.79	8.41	9.74	11.10	621.16	623.48	625.27	625.35	621.69
W-5	3426260	7394546	3939.03	3600.00	3339.00	2	40	0	15	0.98	6.91	8.40	10.15	12.03	571.42	575.03	579.64	581.23	585.09
W-6	3423500	7380500	3937.92	3600.00	3338.00	2	40	0	15	2.59	18.21	23.99	28.08	31.60	718.36	712.66	704.74	697.86	691.54
W-7	3422182	7376598	3940.15	3600.00	3340.00	2	40	0	13	0.77	13.54	20.25	24.87	28.75	552.82	543.16	538.97	537.26	536.81
W-8	3419086	7376655	3940.72	3810.00	3340.00	2	40	0	13	1.99	18.04	25.37	30.52	35.56	544.58	540.81	533.96	535.14	529.97
W-9	3422500	7378500	3938.00	3570.00	3338.00	2	40	0	15	1.63	21.44	28.22	32.77	36.61	627.63	627.80	619.24	607.73	596.86
R64	3424476	7378150	3938.74	3390.00	3354.60	2	40	0	17	1.03	15.67	22.00	26.35	29.99	580.62	628.56	623.14	613.49	583.96
R66	3424918	7379262	3938.99	3450.00	3374.90	2	40	0	17	1.63	16.45	22.43	26.59	30.13	635.03	631.03	627.57	624.56	621.61
R67	3425499	7380396	3939.50	3480.00	3398.30	2	40	0	17	2.40	16.83	22.35	26.30	29.72	583.53	632.46	630.18	627.58	625.17


EXPLANATION
Simulated Production Well
40-Year Drawdown (m), Model Layer 1
Numerical Model Domain Boundary
40-Year Drawdown (m), Model Layer 1
0.0 - 0.9
1.0 - 2.9
3.0 - 4.9
5.0 - 9.9
10.0 - 14.9
15.0 - 19.9
20.0 - 24.9
25.0 - 29.9
30.0 - 34.9
35.0 - 39.9
40.0 - 45.0
Salar de Olaroz
Salar de Cauchari
N
0 5 10 15 20 25
Kilometers
MINERA EXAR
CAUCHARI - OLAROZ PROJECT
NUMERICAL MODEL LAYER 1 DRAWDOWN AFTER 40 YEARS OF OPERATION
MONTGOMERY & ASSOCIATES
Water Resource Consultants
2019
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
GIS-Tuc\GIS-Tuc\Projects\4555.0603\RegionalMap\07June2019 POSGAR 1994 Argentina Zone3