NEO Lithium Corp

Preliminary Economic Assessment (PEA) 3Q Project

NI 43-101 Technical Report

Catamarca, Argentina

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List of Abbreviations

%	:	Percentage
°C	:	Temperature in Degrees Celsius
B	:	Boron
B_5O	:	Borate
Ca	:	Calcium
$CaCO_3$	:	Calcium Carbonate
Cl	:	Chloride
Cl^-	:	Chloride Ion
cm	:	Centimeter
CO_3	:	Carbonate
g/cm^3	:	Grams per Cubic Centimeter
g/L	:	Grams per Liter
GPS	:	Global Positioning System
H_3BO_3	:	Boric Acid
ha	:	Hectare
HCO_3	:	Bicarbonate
ICP	:	Inductively Coupled Plasma
K	:	Potassium
K/Li	:	Potassium to Lithium Ratio
kg	:	Kilogram
km	:	Kilometer
km^2	:	Square Kilometer
L	:	Liter
Li	:	Lithium
LIEX	:	Argentinean subsidiary of Neo Lithium Corp.
Li_2CO_3	:	Lithium Carbonate
m	:	Meter

mg	:	Milligram
M	:	Month
$Mg(OH)_2$	:	Magnesium Hydroxide
mg/L	:	Milligrams per Liter
Mg/Li	:	Magnesium to Lithium Ratio
NLC	:	Neo Lithium Company
pH	:	Measure of Acidity or Alkalinity
QA/QC	:	Quality Assurance/Quality Control
RC	:	Reverse Circulation
SO_4	:	Sulfate
SO_4/K	:	Sulfate to Potassium Ratio
SO_4/Li	:	Sulfate to Lithium Ratio
SO_4/Mg	:	Sulfate to Magnesium Ratio
$SO_4^{=}$	:	Sulfate Ion
Sy	:	Specific Yield
TDS	:	Total Dissolved Solids
USD	:	United States Dollar
UTM	:	Universal Transverse Mercator Coordinate System
WGS	:	World Geodetic System
wt%	:	Weight Percent
Y	:	Year /Years

Summary

S.1 Terms of Reference

This report was prepared by GHD for Neo Lithium Corp. (the “Company” or “NLC”) in connection with a Preliminary Economic Assessment (“PEA”) of the Tres Quebradas Lithium Project (3Q Project or Project). The primary focus of the PEA is to prepare an independent technical appraisal of the potential economic viability of the lithium contained in these properties, in conformance with the standards required by NI 43 – 101 and mineral reserve classifications adopted by the Canadian Institute of Mining, Metallurgy and Petroleum (“CIM”) Council in December 2005.

This report is based on the technical report “Mineral Resource Estimate Technical Report on the Tres Quebradas Lithium Project Catamarca Province, Argentina”, prepared by Mark King, Ph.D. P. Geo. with an effective date of May 23, 2017 in all matters referring to resource estimation. Chapters 3 through 15 of the above referred report have been herein incorporated. Chapter 16 “Brine Processing” was prepared by Claudio Suárez Ph.D. Chem., B.Sc. C. Chem, NOVIGI, independent consultant to Neo Lithium, and Marcelo Bravo, Senior Consultant to GHD. Geologist Gustavo Báez, an independent consultant to Neo Lithium, prepared Section 17.6, “Environmental Considerations”. Section 17.7 “Marketing Study” was prepared by Neo Lithium’s marketing and sales team led by Carlos Vicens (Chief Financial Officer).

In addition, GHD relied extensively on the Company and on its independent consultants, as cited on the text of the study and the references, for information on costs, prices, legislation and tax in Argentina, as well as for general project data and information.

S.2 Property Location, Description and Ownership

The 3Q Project is located in the south western zone of Catamarca Province of Argentina. The closest paved road to the Project is Ruta Nacional 60 (RN60), which connects the capital city of Catamarca Province (San Fernando del Valle de Catamarca; population 212,000) to the provinces of La Rioja and Córdoba and Argentina – Chile Paso de San Francisco border crossing. The Project is about 1,200 km west of Rosario, Santa Fe Province. The city of Rosario is located in the western border of Paraná River and is part of the river system Paraná – Paraguay, with a river port of 140 Ha that receives regular and bulk cargo.

The closest population centre to the Project is the town of Fiambalá, Argentina (population 5,000). It is located 100 km east of the Project and can be reached from the Project in a driving time of approximately three hours with current road. The company is working in road upgrades to improve the road. The capital city of Catamarca Province (San Fernando del Valle de Catamarca) is 280 km southeast of the Project.

The 3Q Project includes 35,004.72 ha of tenements in a salt flat/lake system that has been named the 3Q Salt flat Complex by NLC. The properties are oriented northwest – southeast and extend for 40 km in a valley along the bottom of the Complex basin. The Complex includes the following three large areas of open brine (brine lakes):

- A lake in the north, known as Laguna Tres Quebradas (Laguna 3Q);
- A lake in the central part of the valley, known as Laguna Verde; and
- A lake in the south, known as Laguna Negra.

The following areas of solid salt flat surfaces are also part of the Complex:

- A northern area between Laguna 3Q and Laguna Verde, known as Tres Quebradas Salt Flat (3Q Salt Flat);
- A southern area between Laguna Verde and Laguna Negra, known as Laguna Negra Salt Flat; and
- A smaller, isolated salt flat 2 km east of Laguna Verde, known as Salt Flat Escondido.

The Project is located in the Salar Tres Quebradas and in the Laguna Tres Quebradas. The Laguna Verde, Laguna Negra and Salar de la Laguna Negra are not part of the Project, and no development is planned there.

All information regarding the legal status of the 3Q Project tenements was provided by the law firm of Martin and Miguens, Argentinean legal counsel for NLC. It has not been independently verified by the Independent Qualified Person (IQP). It is the opinion of NLC's legal counsel that: (a) LIEX S.A. (a wholly-owned subsidiary of NLC) has good and marketable title to each of the Properties as of the date hereof, free and clear of any liens or other encumbrances registered on title with the Mining Authority, (b) there are no competing claims by third parties with respect to the Properties, and (c) the Surface Property Option remains valid, binding and enforceable in accordance with its terms. They advise that, up to October 26, 2017, they were not aware of any litigation or undisclosed liabilities involving LIEX.

Detailed studies of environmental liabilities have not been formally completed for the Project. However, preliminary inspection indicates that there are no historical operations or liabilities that would have an impact to the environment.

Detailed flora and fauna, limnology, microbiology, soil, air quality and landscape impact baseline studies of the 3Q Project area have been conducted, in addition to a detailed environmental impact report on the exploration stage of the Project that was completed in 2016. These studies will be critical components for detailed evaluation of environmental liabilities, which has not been formally completed for the Project. However, baseline and exploration impact reports provide early indications that potential impacts associated with production could be effectively mitigated, with appropriate pro-active management techniques.

A preliminary archeological investigation conducted for NLC by Dr. Norma Ratto (Ratto, 2016) indicates that there is low probability of archeological discoveries in this area.

The 3Q Project is not located in a protected area. It is located in a "Ramsar" site that has particular interest for conservation, particularly as the nesting sites for birds. Current environmental legislation does not prohibit the development of any project in a "Ramsar" site, provided it complies with current environmental requirements.

Tourists in four-wheel drive trucks, all-terrain vehicles, and off-road motorcycles occasionally pass through the southern end of the Project area, en route to view the Pissis Volcano. The volcano is located 21 km from the southern limit of the mineral property, to the southwest. It is accessed by dirt road.

Access to the 3Q Project is not significantly affected by weather conditions. During the winter months, the company operated normally, and the road and camp were continuously operating and the fresh water sources have remained unfrozen since the camp was opened in October 2016.

To the extent known, there are no other significant factors and risks, besides the ones noted in the technical report, which may affect access, title, or the right or ability to perform work on the property. This includes work programs recommended in section 19 of this technical report.

S.3 Geology and Mineralization

Geological mapping of the 3Q Project area was conducted by the Argentinean company Hidroar, on behalf of NLC. The area within and just outside the 3Q Project catchment is characterized by volcanic cones reaching heights of 6,000 meters above sea level (masl) or greater. Successive tectonic episodes, and reactivation of hydrogeomorphological dynamics in an extremely arid environment have formed low level drainage networks. This has resulted in the conformation of inter-mountain basin areas and positive relief in the area. The accumulation plains - or basins - and salt flats can reach a significant territorial extension in this area. The 3Q Project is located in one of these basin areas.

The brines of the 3Q Project Salt Flat Complex contain levels of dissolved salts that approach solubility limits at some locations. Brine sampling results from the brine lakes and from salt flats boreholes were used to delineate and estimate Resources, where the highest concentrations of lithium were detected. The Resource Zone includes:

- All of Laguna 3Q (Measured);
- The upper two hydrostratigraphic units in the adjacent 3Q Salt flat (Indicated); and
- The lower three hydrostratigraphic units in 3Q Salt flat (Inferred).

Laguna Negra, Laguna Verde and Salar de la Laguna Negra are not part of the resource.

Resources are defined relative to two cut-off values: 400 and 520 mg/L lithium. The 520 mg/L cut-off results in exclusion of the southern half of 3Q Project Salt flats from the Resource.

The brine lakes of the Project are the lowest points in the catchment. The largest flows into the Complex occur through the following three rivers: Salado River (discharges into the north end of Laguna 3Q), 3Q River (flows into the west side of Laguna 3Q), Valle Ancho River (flows into the west side of Laguna Negra). A program of streamflow monitoring and sampling was started in December 2016, focusing on the three primary rivers and also on some diffuse discharges.

Detailed investigation of groundwater flow in the 3Q Project Salt flat Complex has not yet been conducted, and is recommended in follow-up work to support numerical Reserve modeling. It is expected that the primary source of groundwater recharge to the salt flat and lakes is through the alluvial fans and geothermal springs. It is noted that much of the surface water flow that approaches the Complex through the three largest rivers (3Q, Salado and Valle Ancho Rivers) infiltrates into large alluvial fans before reaching the Complex. In that way, it enters the complex either as diffuse surface flow along the fan margins, or as groundwater.

The hydraulic gradient within the 3Q Project Salt flat Complex is extremely flat, as shown by elevation survey results for the three large surface brine bodies in the complex: Laguna 3Q, Laguna Verde and Laguna Negra. These data indicate a slight tendency for groundwater flow away from the centre of the Salt flat Complex, towards both the north and the south. Given the closed nature of the basin, the ultimate outlet for this flow is evaporation.

S.4 Exploration

Two field exploration campaigns have been conducted to date at the 3Q Project to evaluate the lithium development potential of the deposit. The first campaign was documented in a previous Technical Report (King, 2016a). That work involved collection of 255 surface brine samples (including 61 Quality Assurance/Quality Control (QA/QC) samples) from lakes, Salt flat, rivers, and geothermal springs throughout the property. Results were used to map the distributions of lithium, potassium, and other parameters in surface brines. The second program, documented in King, 2016b, involved:

- Additional surface brine sampling (102 samples, including 20 QA/QC samples);
- A Vertical Electrical Sounding (VES) survey, including 35 VES locations along eight transects;
- Diamond drilling – 1989 m, with construction of 13 observation wells and collection and analysis of 60 core samples for Relative Brine Release Capacity (RBRC);
- Rotary drilling – 733 m, with construction of 9 pumping wells and 4 observation wells;
- Borehole and well sampling (127 samples, including 23 QA/QC samples);
- Pumping tests on 5 pumping wells; and
- Pumping tests on 2 shallow trenches.

S.5 Mineral Resource Estimates

A Resource Estimate was developed for the 3Q Project using three-dimensional block modeling software known as Geosoft Target for ArcGIS. The software was operated by Argentinean Geologist Marisa N. Franciosi, a specialist and instructor in Geosoft Target. The modelling was supported by geological, hydrogeological and geochemical data and interpretations provided by the IQP and 3Q Project geologists. The modeling procedure and results were reviewed by the IQP and are considered valid and appropriate for developing a Measured, Indicated and Inferred Resource Estimate, as defined by the CIM and referenced by NI 43-101.

Results of the Resource Estimate are provided below, relative to cut-off grades of 400 and 520 mg/L lithium. Resources have been categorized as Measured, Indicated and Inferred based on the following qualitative assessment of the certainty associated with the quantities in each hydrostratigraphic layer:

- Measured Resources include only the resource component within the Laguna 3Q surface brine body, due to a high degree of certainty in volume and grade.
- Indicated Resources are assigned within the two upper hydrostratigraphic units (High Porosity Halite and Upper Clastics), because they were sampled and characterized with a relatively high density, and were subject to pump testing.
- Inferred Resources are associated with the lower three hydrostratigraphic units because they were penetrated by fewer boreholes and have not yet been pump tested.

Table S.1: 3Q Lithium Project Resource Estimate – Effective Date May 23, 2017.

	Lithium Grade Cut-Off of 520 mg/L				Lithium Grade Cut-Off of 400 mg/L			
	Measured	Indicated	M&I	Inferred	Measured	Indicated	M&I	Inferred
	Brine Volume (m^3)				Brine Volume (m^3)			
	1.247E+07	1.751E+08	1.875E+08	3.532E+08	1.247E+07	3.930E+08	4.055E+08	7.418E+08
	Average Concentration (mg/L)				Average Concentration (mg/L)			
Lithium	792	710	716	713	792	560	567	567
Boron	1,254	993	1,010	1,015	1,254	779	793	792
Potassium	7,434	6,439	6,506	6,554	7,434	5,335	5,400	5,413
Magnesium	1,267	1,432	1,421	1,477	1,267	1,955	1,934	1,933
Calcium	35,182	33,038	33,181	33,644	35,182	29,759	29,926	30,067
Sulfate	599	358	374	384	599	358	365	356
	Tonnage				Tonnage			
Lithium	9,876	124,309	134,185	251,662	9,876	220,135	230,011	420,418
Lithium Carbonate	52,569	661,673	714,242	1,339,546	52,569	1,171,735	1,224,305	2,237,803
Boron	15,643	173,790	189,433	358,317	15,643	306,052	321,695	587,539
Boric Acid	89,468	993,938	1,083,406	2,049,287	89,468	1,750,371	1,839,839	3,360,251
Potassium	92,702	1,127,273	1,219,975	2,314,756	92,702	2,096,655	2,189,357	4,014,932
Potash	176,764	2,149,485	2,326,249	4,413,778	176,764	3,997,901	4,174,666	7,655,672
Magnesium	15,795	250,702	266,496	521,753	15,795	768,386	784,181	1,434,110
Calcium	438,720	5,783,626	6,222,346	11,882,330	438,720	11,694,598	12,133,317	22,302,773
Calcium Chloride	1,214,858	16,015,441	17,230,300	32,903,363	1,214,858	32,383,514	33,598,373	61,758,615
Sulfate	7,472	62,671	70,144	135,767	7,472	140,688	148,160	264,350
	Ratios				Ratios			
Mg/Li	1.60	2.02	1.99	2.07	1.60	3.49	3.41	3.41
K/Li	9.39	9.07	9.09	9.20	9.39	9.52	9.52	9.55
SO_4/Li	0.76	0.50	0.52	0.54	0.76	0.64	0.64	0.63
Ca/Li	44.42	46.53	46.37	47.22	44.42	53.12	52.75	53.05

S.6 Lithium Recovery Process for 3Q Project

The process starts with pumping brine from the production wells to the pre-concentration ponds, in order to remove NaCl as precipitated halite. Subsequently, concentrated brine with lower NaCl content is transferred to K /$CaCl_2$ ponds, whose purpose is mainly to concentrate and precipitate calcium chloride ($CaCl_2$) salts, and to a lesser extent, potassium chloride (KCl) salts. The evaporation route will be the following:

- NaCl.
- NaCl – KCl – $CaCl_2$x6H_2O.
- Gypsum– NaCl (addition of Na_2SO_4)
- H_3BO_3 – KClx$MgCl_2$x6H_2O

Once the brine has been concentrated in K /CaCl2 ponds, it is transferred to the calcium removal stage, by adding anhydrous sodium sulphate (Na_2SO_4) – or another sulphate source, free of magnesium, calcium and boron – resulting in gypsum and NaCl as precipitated salts. This reduction of Calcium (Ca) content in brine is required for increasing Lithium (Li) concentration, reducing Ca concentration, and by doing so, reducing the use of soda ash in the chemical plant.

After removing excess Ca, treated brine is transferred to the last stage of Li concentration, until reaching 6% weight of this element. Table 16.2, shows the results obtained after adding Na_2SO_4 and post-concentration stage.

Concentrated brine will be transported in trucks from the salt flat sector of 3Q to the Solvent Extraction Plant to be located in Fiambalá sector.

The Solvent Extraction Chemical Plant for the production of Lithium Carbonate includes brine purification stages for concentrated brine, before entering the carbonation stage. For this purpose, the conventional process currently used by Lithium Carbonate plants, taken as a reference, establishes the following:

- Boron removal by solvent extraction (SX).
- Treatment of boron-free brine with mother liquor and soda ash solution Calcium and subsequently treatment of the purified brine with a mix of Slaked lime and soda ash solution to eliminate Magnesium.

The purified brine is transferred to three reactors in series, where Lithium Carbonate is precipitated by the addition of sodium carbonate solution the slurry containing the precipitated Lithium Carbonate Battery Grade is separated from the mother liquor by filtration and then washed with soft water. Finally, the product is dried, compacted, classified and packed.

S.7 Capital and Operating Cost Estimate

Table S.2 shows the capital costs summary and Table S.3 shows the operating costs summary.

Table S.2: Capital Costs Summary.

Summary	Equipment $		Construction							Total Cost $
	Imported	National	Material $	Labor (All In)		Subcontract		Total Cost $	
	$	$		Total HH	Total Cost $	Total HH	Total Cost $		
Direct Cost									
Brine Extraction Wells	0	1,171,275	1,537,745	54,343	1,882,055	13,090	2,856,000	6,275,800	7,447,075
Preconcentration Ponds	0	1,543,500	36,590,729	1,625,981	74,485,781	99,774	13,288,470	124,364,981	125,908,481
KCl / $CaCl_2$ Ponds	0	572,565	10,650,026	518,364	25,853,687	40,266	5,354,102	41,857,815	42,430,380
Post concentration Ponds	0	216,878	597,063	30,208	1,290,870	3,790	490,605	2,378,538	2,595,416
Na_2SO_4 Ponds	405,300	418,320	3,302,908	238,811	6,107,518	5,440	380,605	9,791,031	10,614,651
Li_2CO_3 Plant									
Storage and Tailings Ponds	0	1,427,633	1,067,148	98,345	6,088,187	0	0	7,155,334	8,582,967
Boron Solvent Extraction Plant	0	829,500	2,030,382	50,495	1,430,243	0	0	3,460,625	4,290,125
1st Step Purification	852,600	1,243,935	1,018,117	42,326	1,312,209	0	0	2,330,326	4,426,861
2nd Step Purification	1,323,000	632,783	936,502	31,837	1,011,231	0	0	1,947,733	3,903,516
3rd Step Li_2CO_3 Precipitation	2,472,244	951,825	741,300	14,125	549,292	0	0	1,290,592	4,714,661
Li_2CO_3 Plant Facilities	0	0	1,152,415	119,052	3,038,253	99,000	10,934,000	15,124,668	15,124,668
Drying, Compacting, Micronizing and Packing Plant	1,832,250	2,026,500	592,845	40,993	1,222,209	55,000	5,467,000	7,282,054	11,140,804
Utilities	0	36,120	560,595	19,053	504,225	0	0	1,064,820	1,100,940
Vendor	47,250	997,500	367,500	16,440	639,327	38,800	3,599,570	4,606,397	5,651,147
Power Plant	7,927,500	5,964,000	0	48,361	1,172,827	8,771	1,449,900	2,622,727	16,514,227
Supporting Buildings – 3Q Salt Flat	0	0	0	0	0	15,686	1,264,040	1,264,040	1,264,040
Supporting Buildings – Li_2CO_3 Plant	0	0	0	0	0	231,495	17,982,450	17,982,450	17,982,450
Road access 3Q Salt Flat – Li_2CO_3 Plant	0	0	0	0	0	289,800	23,651,294	23,651,294	23,651,294
Site Vehicles	0	0	0	0	0	0	14,000,000	14,000,000	14,000,000
Total Direct Cost	**14,860,144**	**18,032,334**	**61,145,275**	**2,948,733**	**126,587,913**	**900,910**	**100,718,037**	**288,451,224**	**321,343,702**
Indirect Cost									
Insurance and Freight	1,188,812	721,293	785,722	0	0	0	0	785,722	2,695,826
Fee	0	0	0	0	0	0	0	0	0
Spare parts	743,007	901,617	0	0	0	0	0	0	1,644,624
Vendor	594,406	721,293	0	0	0	0	0	0	1,315,699
Engineering (Pre-Feasibility & Feasibility)	0	0	0	0	0	0	6,146,874	6,146,874	6,146,874
EPCM									
Engineering							9,640,311	9,640,311	9,640,311
Procurement	475,525	577,035	1,956,649	0	0	0	0	1,956,649	3,009,208
Management	0	0	0	0	0	0	51,911,437	51,911,437	51,911,437
Commissioning	0	0	0	0	0	0	2,249,406	2,249,406	2,249,406
Owner's Costs	0	0	0	0	0	0	9,640,311	9,640,311	9,640,311
Total Indirect Cost	3,001,749	2,921,238	2,742,370	0	0	0	79,868,339	82,610,709	88,533,696
Total	**17,861,893**	**20,953,572**	**63,887,645**	**2,948,733**	**126,587,913**	**900,910**	**180,586,376**	**371,061,933**	**409,877,399**
Contingency	**3,715,036**	**4,508,084**	**15,286,319**	**737,183**	**31,646,978**	**225,228**	**25,179,509**	**72,112,806**	**80,335,926**
TOTAL CAPITAL COST	**21,576,929**	**25,461,656**	**79,173,964**	**3,685,916**	**158,234,891**	**1,126,138**	**205,765,885**	**443,174,739**	**490,213,324**

Table S.3: Operating Costs Summary.

Description	$ / yr	$ / metric tons Li_2CO_3
Direct Costs		
Chemical Reactives and Reagents	53,934,214	1,541
Salt Removal and Transport	14,746,649	421
Energy	10,820,055	309
Manpower	4,713,192	135
Catering & Camp Services	1,659,000	47
Maintenance	1,581,389	45
Brine Transportation from Salt flat to Plant	6,167,763	176
Li_2CO_3 Transport to Zárate Port	2,705,850	77
Total Direct Costs	**96,328,112**	**2,752**
Indirect Costs		
General & Administration - LO	1,359,400	39
Total Indirect Costs	**1,359,400**	**39**
TOTAL OPERATIONAL COST	**97,676,553**	**2,791**

S.8 Economic Analysis

Tables S.4 and S.5 shows the Project evaluation. Values are expressed in thousands.

Table S.4: Project Evaluation – Discounted Cash Flow Lithium Carbonate Plant Project 35,000 TPY – year 2019 to 2029, (US$ 000)

Year	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Period	**-1**	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Revenues											
Li_2CO_3 Sales	0	0	76,083	192,955	394,555	406,035	414,190	414,190	414,190	414,190	414,190
Total Revenues	**0**	**0**	**76,083**	**192,955**	**394,555**	**406,035**	**414,190**	**414,190**	**414,190**	**414,190**	**414,190**
Expenses											
OPEX	0	0	-59,021	-85,877	-97,688	-97,688	-97,688	-97,688	-97,688	-97,688	-97,688
Transaction Tax	0	0	0	0	0	0	0	0	0	0	0
Finder's Fee Royalty (1.5% gross revenues)	0	0	-1,141	-2,894	-5,918	-6,091	-6,213	-6,213	-6,213	-6,213	-6,213
Provincial Royalties (3%)	0	0	0	0	-94	-94	-96	-96	-97	-94	-94
Water Permits	0	0	-4	-5	-5	-5	-5	-5	-5	-5	-5
Mining Licenses	0	0		-45	-45	-45	-45	-45	-45	-45	-45
Total Expenses	**0**	**0**	**-60,166**	**-88,822**	**-103,750**	**-103,922**	**-104,047**	**-104,047**	**-104,047**	**-104,044**	**-104,044**
Operating Margin	**0**	**0**	**15,917**	**104,133**	**290,805**	**302,113**	**310,143**	**310,143**	**310,143**	**310,146**	**310,146**
Profit Before Taxes											
Depreciation	0	0	-98,043	-98,043	-98,043	-98,043	-98,043	0	0	0	0
Amortization	0	0	-2,000	-2,000	-2,000	-2,000	-2,000	-2,000	-2,000	-2,000	-2,000
Remediation Allowance	0	0	-3,008	-4,441	-5,187	-5,196	-5,202	-5,202	-5,202	-5,202	-5,202
Profit Before Taxes	**0**	**0**	**-87,134**	**-351**	**185,575**	**196,874**	**204,898**	**302,941**	**302,940**	**302,943**	**302,943**
Income Taxes	**0**	**0**	**0**	**0**	**-34,332**	**-68,906**	**-71,714**	**-106,029**	**-106,029**	**-106,030**	**-106,030**
Profit After Taxes											
Depreciation, Amortization, Remediation All.	0	0	103,051	104,484	105,230	105,239	105,245	7,202	7,202	7,202	7,202
Profit After Taxes	**0**	**0**	**-87,134**	**-351**	**151,243**	**127,968**	**133,184**	**196,912**	**196,911**	**196,913**	**196,913**
Operating After Tax Cash Flow	**0**	**0**	**15,917**	**104,133**	**256,473**	**233,207**	**238,429**	**204,114**	**204,114**	**204,115**	**204,115**
Non-Operating Cash Flow											
Total Investment Li_2CO_3	-184,738	-187,321	-118,154	0							
VAT on CAPEX	-19,397	-19,669	-12,406	0	0	0	0	0	0	0	0
Refund VAT on CAPEX			19,397	19,669	12,406	0	0	0	0	0	0
Sustaining Capital 1st Phase			0	0	0	0	0	0	0	0	0
Working Capital		0	-14,755	-6,714	-2,953	0	0	0	0	0	0
VAT		0	-8,957	-13,507	-15,340	-15,340	-15,340	-15,340	-15,340	-15,340	-15,340
VAT Refund			0	8,957	13,507	15,340	15,340	15,340	15,340	15,340	15,340
Total Non-Operating Cash Flow	**-204,135**	**-206,990**	**-134,875**	**8,404**	**7,621**	**0**	**0**	**0**	**0**	**0**	**0**
Cash Flow Before Interest and Tax	**-204,135**	**-206,990**	**-118,958**	**112,537**	**298,426**	**302,113**	**310,143**	**310,143**	**310,143**	**310,146**	**310,146**
Accumulated Cash Flow (Before Interest and Tax)	-204,135	-411,125	-530,083	-417,546	-119,119	182,994	493,137	803,280	1,113,423	1,423,568	1,733,714
Income Taxes (35%)	0	0	0	0	-34,332	-68,906	-71,714	-106,029	-106,029	-106,030	-106,030
After Tax Cash Flow	**-204,135**	**-206,990**	**-118,958**	**112,537**	**264,095**	**233,207**	**238,429**	**204,114**	**204,114**	**204,115**	**204,115**
Accumulated Before Tax Profits	0	0	-87,134	-87,484	98,091	294,965	499,863	802,804	1,105,744	1,408,688	1,711,631
Accumulated Cash (Flow Net of Tax)	-204,135	-411,125	-530,083	-417,546	-153,451	79,756	318,185	522,299	726,412	930,528	1,134,643

Table S.5: Project Evaluation – Discounted Cash Flow Lithium Carbonate Plant Project 35,000 TPY – year 2030 to 2040, (US$ 000)

Year	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	Total
Period	10	11	12	13	14	15	16	17	18	19	20	$ 1000s
Revenues												
Li_2CO_3 Sales	414,190	414,190	414,190	414,190	414,190	414,190	414,190	414,190	414,190	414,190	414,190	**7,696,668**
Total Revenues	**414,190**	**414,190**	**414,190**	**414,190**	**414,190**	**414,190**	**414,190**	**414,190**	**414,190**	**414,190**	**414,190**	**7,696,668**
Expenses												
OPEX	-97,688	-97,688	-97,688	-97,688	-97,688	-97,688	-97,688	-97,688	-97,688	-97,688	-97,688	-1,903,273
Transaction Tax	0	0	0	0	0	0	0	0	0	0	0	0
Finder's Fee Royalty (1.5% gross revenues)	-6,213	-6,213	-6,213	-6,213	-6,213	-6,213	-6,213	-6,213	-6,213	-6,213	-6,213	-115,450
Provincial Royalties (3%)	-94	-94	-94	-94	-94	-94	-94	-94	-94	-94	-94	-1,698
Water Permits	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-101
Mining Licenses	-45	-45	-45	-45	-45	-45	-45	-45	-44	-43	-45	-852
Total Expenses	**-104,044**	**-104,044**	**-104,044**	**-104,044**	**-104,044**	**-104,044**	**-104,044**	**-104,044**	**-104,043**	**-104,042**	**-104,044**	**-2,021,374**
Operating Margin	**310,146**	**310,146**	**310,146**	**310,146**	**310,146**	**310,146**	**310,146**	**310,146**	**310,147**	**310,148**	**310,146**	**5,675,294**
Profit Before Taxes												
Depreciation	-82	-82	-82	0	0	-323	-578	-578	-255	-578	-255	-493,024
Amortization	-2,000	-2,000	-2,000	-2,000	-2,000	-2,000	-2,000	-2,000	-2,000	-2,000	-2,000	-40,000
Remediation Allowance	-5,202	-5,202	-5,202	-5,202	-5,202	-5,202	-5,202	-5,202	-5,202	-5,202	-5,202	
Profit Before Taxes	**302,862**	**302,862**	**302,862**	**302,943**	**302,943**	**302,620**	**302,366**	**302,366**	**302,690**	**302,368**	**302,689**	**5,041,201**
Income Taxes	**-106,002**	**-106,002**	**-106,002**	**-106,030**	**-106,030**	**-105,917**	**-105,828**	**-105,828**	**-105,941**	**-105,829**	**-105,941**	**-1,764,420**
Profit After Taxes												
Depreciation, Amortization, Remediation All.	7,284	7,284	7,284	7,202	7,202	7,525	7,780	7,780	7,457	7,780	7,457	634,092
Total Profit After Taxes	**196,860**	**196,860**	**196,860**	**196,913**	**196,913**	**196,703**	**196,538**	**196,538**	**196,748**	**196,539**	**196,748**	**3,276,781**
Operating After Tax Cash Flow	**204,144**	**204,144**	**204,144**	**204,115**	**204,115**	**204,228**	**204,318**	**204,318**	**204,205**	**204,319**	**204,205**	**3,910,873**
Non-Operating Cash Flow												
Total Investment Li_2CO_3	0	0	0	0	0	0	0	0	0	0	0	-490,213
VAT on CAPEX	0	0	0	0	0	0	0	0	0	0	0	0
Refund VAT on CAPEX	0	0	0	0	0	0	0	0	0	0	0	0
Sustaining Capital 1st Phase	0	0	-245	0	0	0	0	-969	-764	0	0	-1,978
Working Capital	0	0	0	0	0	0	0	0	0	0	24,422	0
VAT	-15,340	-15,340	-15,340	-15,340	-15,340	-15,340	-15,340	-15,340	-15,340	-15,340	-15,340	-298,577
VAT Refund	15,340	15,340	15,340	15,340	15,340	15,340	15,340	15,340	15,340	15,340	15,340	283,237
Total Non-Operating Cash Flow	**0**	**0**	**-245**	**0**	**0**	**0**	**0**	**-969**	**-764**	**0**	**24,422**	**-507,531**
Cash Flow Before Interest and Tax	**310,146**	**310,146**	**309,901**	**310,146**	**310,146**	**310,146**	**310,146**	**309,177**	**309,382**	**310,148**	**334,567**	**5,188,686**
Accumulated Cash Flow (Before Interest and Tax)	2,043,860	2,354,005	2,663,906	2,974,052	3,284,197	3,594,343	3,904,489	4,213,665	4,523,048	4,833,195	4,548,233	0
Income Taxes (35%)	-106,002	-106,002	-106,002	-106,030	-106,030	-105,917	-105,828	-105,828	-105,941	-105,829	-105,941	-1,764,420
After Tax Cash Flow	**204,144**	**204,144**	**203,899**	**204,115**	**204,115**	**204,228**	**204,318**	**203,349**	**203,441**	**204,319**	**228,626**	**3,403,342**
Accumulated Before Tax Profits	2,014,493	2,317,355	2,620,217	2,923,160	3,226,103	3,528,724	3,831,089	4,133,455	4,436,145	4,738,513	4,436,144	43,952,564
Accumulated Cash (Flow Net of Tax)	1,338,787	1,542,931	1,746,830	1,950,946	2,155,061	2,359,290	2,563,607	2,766,956	2,970,397	3,174,716	2,995,583	27,560,587

Table S.6: Economic Indicators.

Price Case	Low	Base	High
	(US$ Million)		
CAPEX	$490	$490	$490
Values, year 20 (US$ Million)			
Revenue	$357	$414	$508
OPEX	$98	$98	$98
EBITDA	$260	$317	$410
Pre Tax (US$ Million or otherwise noted)			
NPV 6%	$1,889	$2,400	$3,307
NPV 8%	$1,471	$1,889	$2,640
NPV 10%	$1,148	$1,495	$2,125
IRR	29%	34%	41%
PAYBACK	1 Y, 9 M	1 Y, 5 M	0 Y, 10 M
After Tax (US$ Million or otherwise noted)			
NPV 6%	$1,212	$1,545	$2,136
NPV 8%	$927	$1,200	$1,691
NPV 10%	$707	$933	$1,345
IRR	24%	28%	34%
PAYBACK	1 Y, 11 M	1 Y, 8 M	1 Y, 2 M

S.9 Conclusions and Recommendations

The 3Q Project preliminary economic analysis shows very favorable economic indicators. The PEA supports the economic indicators through capital and operating cost estimates consistent with the proposed Project design. The capital expenditures of the Project (±30%) are $490 million with an operational costs are $2,791 per tonne of Lithium Carbonate.

The next step is to move forward as proposed in 3Q Project Schedule.

Lithium brine processes using evaporation are well developed and understood. The 3Q Project process uses existing technologies that have been well proven in current lithium brine operations.

The differences between existing operations and the 3Q Project are:

- Lower Mg/Li ratio.
- Mg content low enough to prevent lithium carnallite salts from precipitating, eliminating lithium loss in the carnalite salts.
- Mg will be removed in the chemical plant but the consumption of soda ash should be less then the consumption in plants with a higher Mg/Li ration.
- High calcium content and low sulphate content.
- Additional external source of sulphate to precipitate calcium contained in the brine as gypsum.
- No risk of lithium losses in precipitate is expected.
- Na_2SO_4 plant at the salt flat site to remove the calcium.
- Boron removed at the chemical plant using a solvent exchange method.

- Other elements contained in the brine such as Barium, Manganese, Strontium and so on, will be studied in detail in the next Feasibility Study stage.

Ongoing test work is currently underway in 3Q Project salt flat site to validate the process of evaporation ponds by an on-site pilot ponds.

The recommendations of the Preliminary Economic Assessment are:

- Proceed to complete a Full Feasibility Study under the premises established in this report.
- Continue the process studies to incorporate other potential by-products to the Project.
- Complete the work to move the current in-situ resource into extractable reserves.
- Proceed to build a pilot production facility to certify the product.

1. Introduction and Terms of Reference

1.1 Introduction

The 3Q Project is located in the southwestern zone of Catamarca Province of Argentina.

The 3Q Project includes 35,004.72 ha of tenements in a salt flat /lake system that has been named the 3Q Salt flat Complex by Neo Lithium Corp (NLC). The properties are oriented northwest – southeast and extend for 40 km in a valley along the bottom of the Complex basin.

Since 2016 NLC has been developing a complete plan of exploration, drilling program whose results have been published in the technical report, resource estimation and brine processing studies that include pilot pond tests. With the information obtained, a Preliminary Economic Assessment ("PEA") of the 3Q Project properties has been prepared. The primary focus of the PEA is to prepare an independent technical appraisal of the potential economic viability of the lithium contained in these properties, in conformance with the standards required by NI 43 – 101 and mineral reserve classifications adopted by the Canadian Institute of Mining, Metallurgy and Petroleum ("CIM") Council in December 2005.

1.2 Project Team and Responsibilities

This report was prepared for NLC by GHD of Santiago, Chile, and is based in the NI 43 – 101 Technical Report document "Mineral Resource Estimate Technical Report on the Tres Quebradas Lithium Project Catamarca Province, Argentina" effectively dated May 23, 2017 in all matters related to resource estimation. The chapters of the report are described below:

- Chapters 3 through 15 have been herein incorporated from NI 43 – 101 Technical Report document "Mineral Resource Estimate Technical Report on the Tres Quebradas Lithium Project Catamarca Province, Argentina" prepared by Mark King, Ph.D., P.Geo – QP with some subsequent modification.
- Chapter 16 "Brine Processing" was prepared by Claudio Suárez Ph.D. Chem., B.Sc. C. Chem who has been carried out brine processing studies, incorporating the results of NOVIGI, independent consultant to Neo Lithium. Marcelo Bravo, Senior Consultant to GHD prepared the pond design and technical specification for ponds buildings.
- Chapter 17.6 "Environmental Considerations" was prepared by the Geologist Gustavo Báez, an independent consultant to NLC.
- Chapter 17.7 "Marketing Study" was prepared by Neo Lithium's marketing and sales team lead Carlos Vicens (Chief Financial Officer).
- Chapter 17.8 "Capital Cost Estimate" was prepared by Julio Olivos, senior consultant to GHD.
- Section 17.9 and 17.10 were prepared by Door to Design, consultants to GHD.

GHD Limited Canada was retained by NLC in February 2017 to prepare the preliminary design to turn the Project into an operating extraction and processing facility of Lithium Carbonate (Li_2CO_3).

Initial studies were prepared by GHD for a 20,000 TPY of Li_2CO_3 facility, however, following the issue of report titled "Mineral Resource Estimate Technical Report on the Tres Quebradas Lithium Project Catamarca Province, Argentina", prepared by Mark King 2016b, NLC requested GHD to increase the production of Li_2CO_3 to 35,000 TPY. In addition, there is an interesting production opportunity of KCl and $CaCl_2$ that merits and requires further study. For this reason, KCl and $CaCl_2$ production facilities have not been included in this PEA report, but NLC and its consultants are to continue working on the opportunity.

Mr. Randy Pitts, B. Sc. Mining Eng., a qualified person under the terms of NI 43 – 101, and under contract to GHD conducted a site visit to the 3Q Project site March 7th and 8th, 2017. In addition to the site visit, a study of all relevant parts of the available literature and documented results concerning the Project as well as discussions with technical personnel from the company regarding all pertinent aspects of the Project was undertaken. The reader is referred to Section 20.0 “References” of this report, for further detail on the Project.

Detailed below in Table 1.1, are the respective responsibilities of the QP´s that contributed to the preparation of the report:

Table 1.1 Report Sections of Responsibilities

N°	Chapter	QP
0	Summary	Mark King, Randy Pitts
1	Introduction And Terms Of Reference	Mark King, Randy Pitts
2	Reliance On Other Experts	Mark King, Randy Pitts
3	Property Description And Location	Mark King
4	Accessibility, Climate, Local Resources, Infrastructure And Physiography	Mark King
5	History	Mark King
6	Geological And Hydrological Setting	Mark King
7	Deposit Types	Mark King
8	Mineralization	Mark King
9	Exploration	Mark King
10	Drilling	Mark King
11	Sampling Method And Approach	Mark King
12	Sample Preparation, Analysis And Security	Mark King
13	Data Verification	Mark King
14	Adjacent Properties	Mark King
15	Mineral Resource Estimate	Mark King
16	Brine Processing	Randy Pitts
17	Additional Requirements For Technical Reports On Development Properties And Production Properties	Randy Pitts
18	Interpretations And Conclusions	Mark King, Randy Pitts
19	Recommendations	Mark King, Randy Pitts
20	References	Mark King, Randy Pitts
21	Date, Signature And Certificate	Mark King, Randy Pitts
22	Appendix	Mark King

1.3 Sources of Information

This report is based on information and data provided to GHD by NLC and its independent consultants. This includes internal company technical reports, maps, published government reports, company letters and memoranda, budget quotations from contractors and service providers, and public information, as listed in the "References" Section 20.0 of this report. In addition, GHD relied on cost and design information from its Project data base and further requested budget quotations from third parties for major capital equipment items and for chemical raw materials. Several sections from reports authored by other consultants have been directly quoted in this report, and are so indicated in the appropriate sections.

1.4 Units and Currency

Unless otherwise stated all units used in this report are metric. Salt contents in the brine, including Lithium and Calcium Chloride are reported in weight percentages. All values in the report are expressed in constant USA dollars for 2017.

1.5 Use of Report

GHD of Santiago, Chile, prepared this report with data and information provided by NLC and third parties, in accordance with National Instrument 43-101 and NI 43 – 101 F1 pursuant to the agreed contractual terms of engagement. GHD represents that it exercised reasonable care in the preparation of this report and that the report complies with published industry standards for such reports and that this work is subject to the terms and conditions of engagement between GHD Limited Canada and NLC

The recommendations and opinions contained in this report assume that unknown, unforeseeable, or unavoidable events will not occur. Such events may adversely affect the cost, progress, scheduling or ultimate success of the Project. Any discussion of legal issues contained in this report merely reflects technical analysis on the part of GHD and does not constitute legal opinions or the advice of legal counsel.

Further, GHD has relied exclusively on reports, opinions and statements of various third party experts and on the Company on matters relating to legal, political, environmental, tax and pricing of commodities for which pricing is not publicly available, and while GHD believes that such information is true and accurate, GHD disclaims any and all responsibility and liability in relation thereto. In this regard, legal information concerning title to the 3Q Project is found at page 23 under the heading Type of Mineral Tenure, page 26 under the heading Royalties and page 27 under the heading Environmental Liabilities. Environmental considerations are found at page 141 under the heading Environmental Consideration. Lithium Carbonate commodity pricing and taxes information is found at page 149 under the heading Marketing Study.

Expected accuracy of the estimates contained in this report is ± 30%.

This report is considered current as of December 13, 2017.

2. Reliance on Other Experts

The preparation of this Report was supervised by the independent QP, Randy Pitts B.S. Mining. Eng., at the request of GHD. Mr. Pitts is a Mining Engineer with more than 35 years of experience in the industrial mineral mining industry.

Various technical disciplines are required to contribute in the preparation of an economical evaluation of a mining project. In the case of a lithium salt flat project the primary disciplines from which the evaluation stems are geology and hydrogeology that provide the estimation and characterization of the lithium resource, task which was accomplished in the already cited King report. The disciplines required for this Report are chemical and process engineering, mechanical engineering; cost estimating engineering economics modeling. In preparing the Report, these disciplines were led by experts in each area. Overall review and verification of materials prepared by these experts was conducted by Mr. Pitts. Main experts that participated in this study are as follows:

- Randy Pitts, B.S. Mining Engineer – Serves as principal author and is the Qualified Person, responsible for coordinating the PEA Report.
- Waldo Perez Ph.D., P. Geo. – CEO of Neo Lithium Corp; exploration geologist. Mr. Perez provided general guidance throughout the study.
- Claudio Suárez Ph.D. Chem., B.Sc. C.Chem. - Process Engineering Manager of Neo Lithium Corp and expert in the area of lithium and potassium processing.
- Marcelo Bravo, Chemical Engineer – Principal Process Engineer in ponds design.
- Nicolás Alatsis, Mechanical Engineer – Expert in process plant design.

Marcela Matus, Chemical Engineer, – Expert in non – metallic processes.

- Mark King, Ph.D., P.Geo - QP. – Expert in hydrogeology.
- NOVIGI, Engineering and sciences consulting firm.
- Julio Olivos, Mining Engineer – Expert in Capital Cost Estimation.
- Door to Design – Engineering and Project support firm.

3. Property Description and Location

3.1 Location

The 3Q Project is located in the southwestern zone of Catamarca Province of Argentina. The closest paved road to the Project is located 60 km west of the Project, the Ruta Nacional 60 (RN60), which connects the capital city of Catamarca Province (San Fernando del Valle de Catamarca; population 212,000) to the provinces of La Rioja and Córdoba and Argentina – Chile Paso de San Francisco border crossing. The Project is about 1,200 km west of Rosario, Santa Fe Province. The city of Rosario is located in the western border of Paraná River and is part of the river system Paraná – Paraguay, with a river port of 140 Ha that receives regular and bulk cargo.

The closest population centre to the Project is the town of Fiambalá, Argentina (population 5,000). It is located 100 km east of the Project and can be reached from the Project in a driving time of approximately four hours. The capital city of Catamarca Province (San Fernando del Valle de Catamarca) is 280 km southeast of the Project.

3.2 Description

The 3Q Project includes 35,004.72 ha of tenements in a salt flat /lake system that has been named the 3Q Salt flat Complex by NLC (Figure 3.1, Figure 3.2, Table 3.1, Photos 3.1, 3.2 and 3.3). The properties are oriented northwest – southeast and extend for 40 km in a valley along the bottom of the Complex basin. With reference to Figure 3.2, the Complex includes the following three large areas of open brine (brine lakes):

- A lake in the north, known as Laguna Tres Quebradas (Laguna 3Q);
- A lake in the central part of the valley, known as Laguna Verde; and
- A lake in the south, known as Laguna Negra.
- The following areas of solid salt flat surfaces are also part of the salt flat Complex:
- A northern area between Laguna 3Q and Laguna Verde, known as 3Q Salt flat;
- A southern area between Laguna Verde and Laguna Negra, known as Laguna Negra Salt Flat; and
- A smaller, isolated salt flat 2 km east of Laguna Verde, known as Salt flat Escondido.

The 3Q Project is located in the Salar Tres Quebradas and Laguna Tres Quebradas. Laguna Verde, Laguna Negra and Salar de la Laguna Negra, are not part of the Project and no development is planed there.

With the exception of Salt flat Escondido, the lakes and salt flats noted above appear to form a single salt flat system (3Q salt flat Complex) with no apparent barriers to seepage along the system. The 3Q salt flat Complex is located in a closed basin, meaning that all flow within the basin is inward to the Complex features noted above, with no apparent outflow. The surface elevations of the brine lakes have been measured with total station over a period of 3 days, to avoid weather influences on the measurements. Elevations are as follows: Laguna 3Q is 4,085.17 masl, Laguna Verde is 4,086.55 masl, and Laguna Negra is 4,085.68 masl.

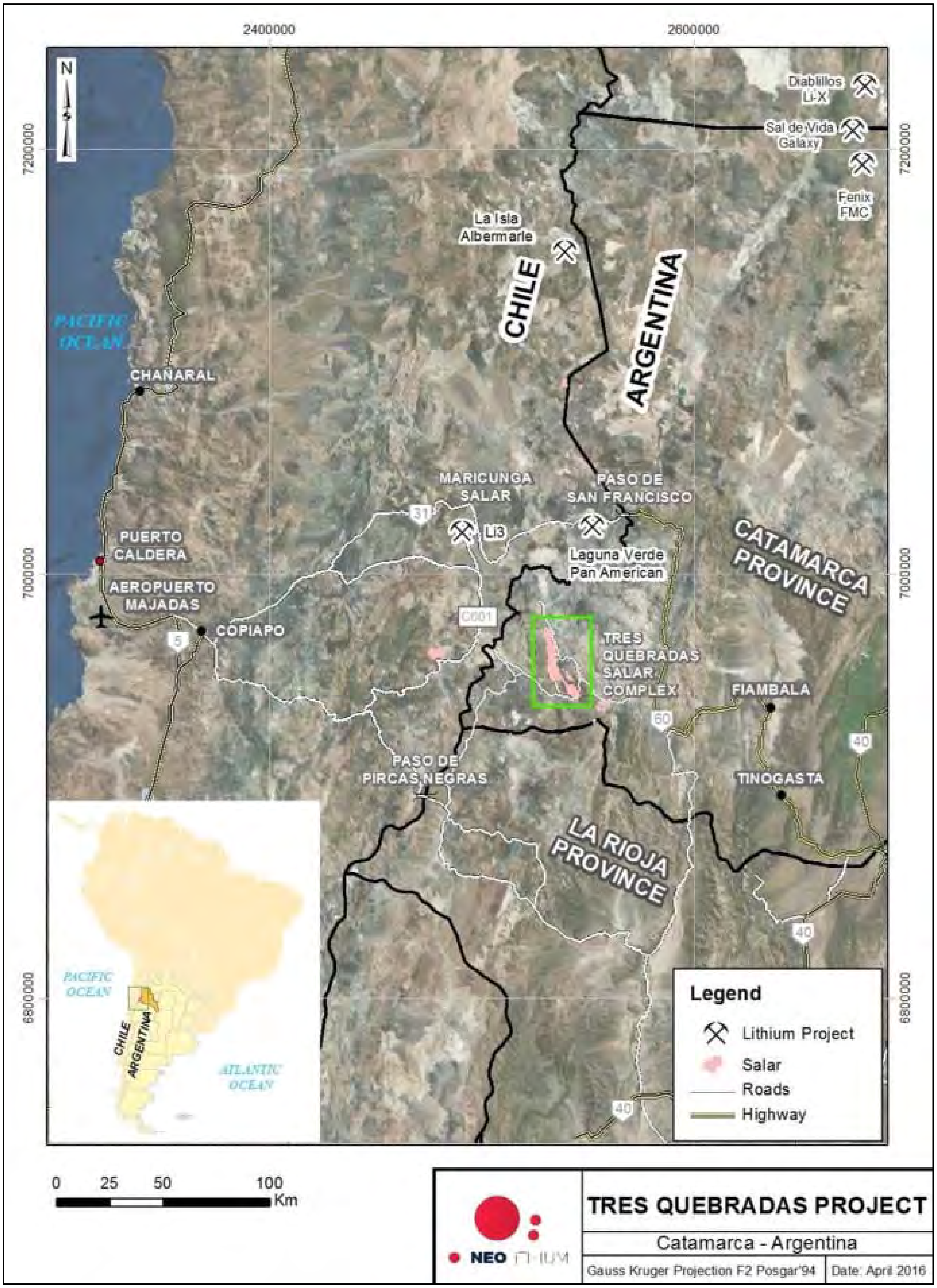


Figure 3.1: Property Location Map – 3Q Project.

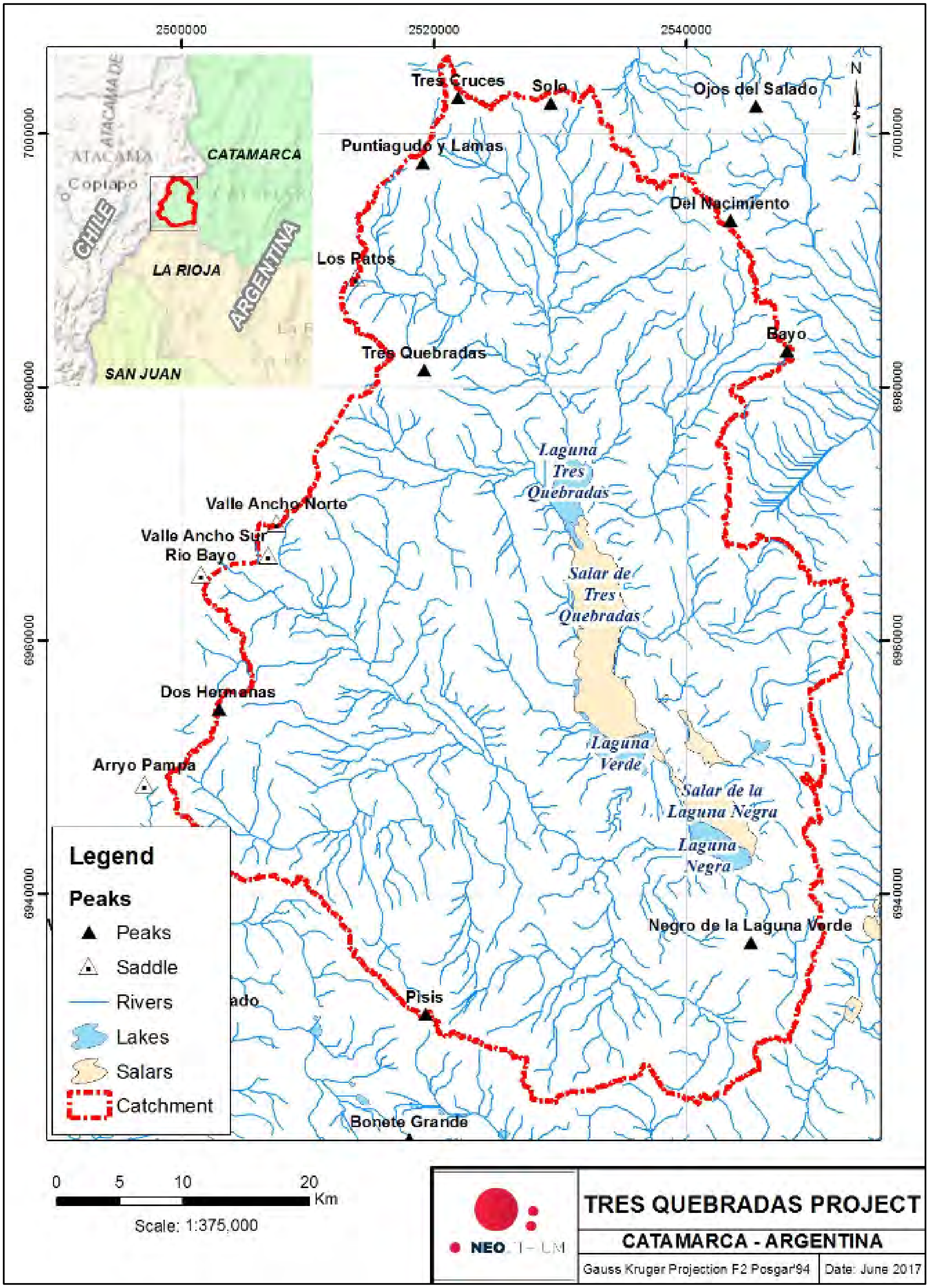


Figure 3.2: Catchment Area of the 3Q Salt Flat Complex.

Photo 3.1: Looking westward to Laguna 3Q with alluvial fan in the foreground.

Photo 3.2: A road built across the rough surface of 3Q salt flat.

Photo 3.3: View of the 3Q Camp.

3.3 Type of Mineral Tenure

All information regarding the legal status of the 3Q Project tenements was provided by the law firm of Martin and Miguens, Argentinean legal counsel for NLC. It has not been independently verified by the IQP. NLC, through a wholly owned subsidiary known as LIEX S.A., has good and marketable title to 11 Mining Claims and 1 Exploration Claim that make up the 3Q Project tenements. An outline of the individual tenements is shown in Figure 3.3. Table 3.1 lists the current 3Q property claims, the type, status, and identifying number of each and other related information. These tenements are registered with the mining authority of Catamarca, and are free and clear of any liens or other encumbrances.

There are no additional tenements included in the 3Q Project.

Argentinean law provides for the granting of two types of mining rights: an “Exploration Claim”, which is limited in duration and which allows for the exploration of a mineral property, and a “Mining Claim”, which allows for the exploitation of the minerals on the subject property. The designations of the permits in respect of the 3Q Project are eleven Mining Claims and one Exploration Claim.

Mining Claims are unlimited in duration and remain the holder’s property as long as the holder meets obligations under the Argentinean National Mining Code, as amended, including annual canon payments and minimum investment commitments.

The Properties are not located in a protected area or provincial or national park. The area in which the Properties are located is designated as a “Ramsar” site, that has particular interest for conservation, particularly for bird nesting. Argentinean environmental legislation does not prohibit the development of a mining project in a Ramsar site, provided that it complies with all environmental law requirements. LIEX has obtained all environmental approvals required, as described below under F-Environmental Permit.

Table 3.1: Status of Mineral Claims in the 3Q Project.

Claim Name	Permit ID	Title Holder	Claim Type	Area (ha)	Status
Lodomar I	23M2010	Liex S.A.	Mining Claim	1,980.87	Registration of LIEX as the owner completed
Lodomar II	24M2010	Liex S.A.	Mining Claim	1,974.54	Registration of LIEX as the owner completed
Lodomar III	25M2010	Liex S.A.	Mining Claim	1,750.62	Registration of LIEX as the owner completed
Lodomar IV	26M2010	Liex S.A.	Mining Claim	1,538.03	Registration of LIEX as the owner completed
Lodomar V	27M2010	Liex S.A.	Mining Claim	1,920.47	Registration of LIEX as the owner completed
Lodomar VI	28M2010	Liex S.A.	Mining Claim	1,091.28	Registration of LIEX as the owner completed
Lodomar VII	3L2016	Liex S.A.	Mining Claim	3,982.13	Granted Property
Lodomar VIII	2L2016	Liex S.A.	Mining Claim	6,421.22	Granted Property
Lodomar IX		Liex S.A.	Mining Claim	1,235.80	Granted Property
Lodomar X	1L2016	Liex S.A.	Mining Claim	4,784.70	Granted Property
Lodomar XI	4L2016	Liex S.A.	Mining Claim	3,411.12	Granted Property
Frontera	69L2016	Liex S.A.	Exploration Claim	4,913.94	Granted Property
Total				35,004.72	

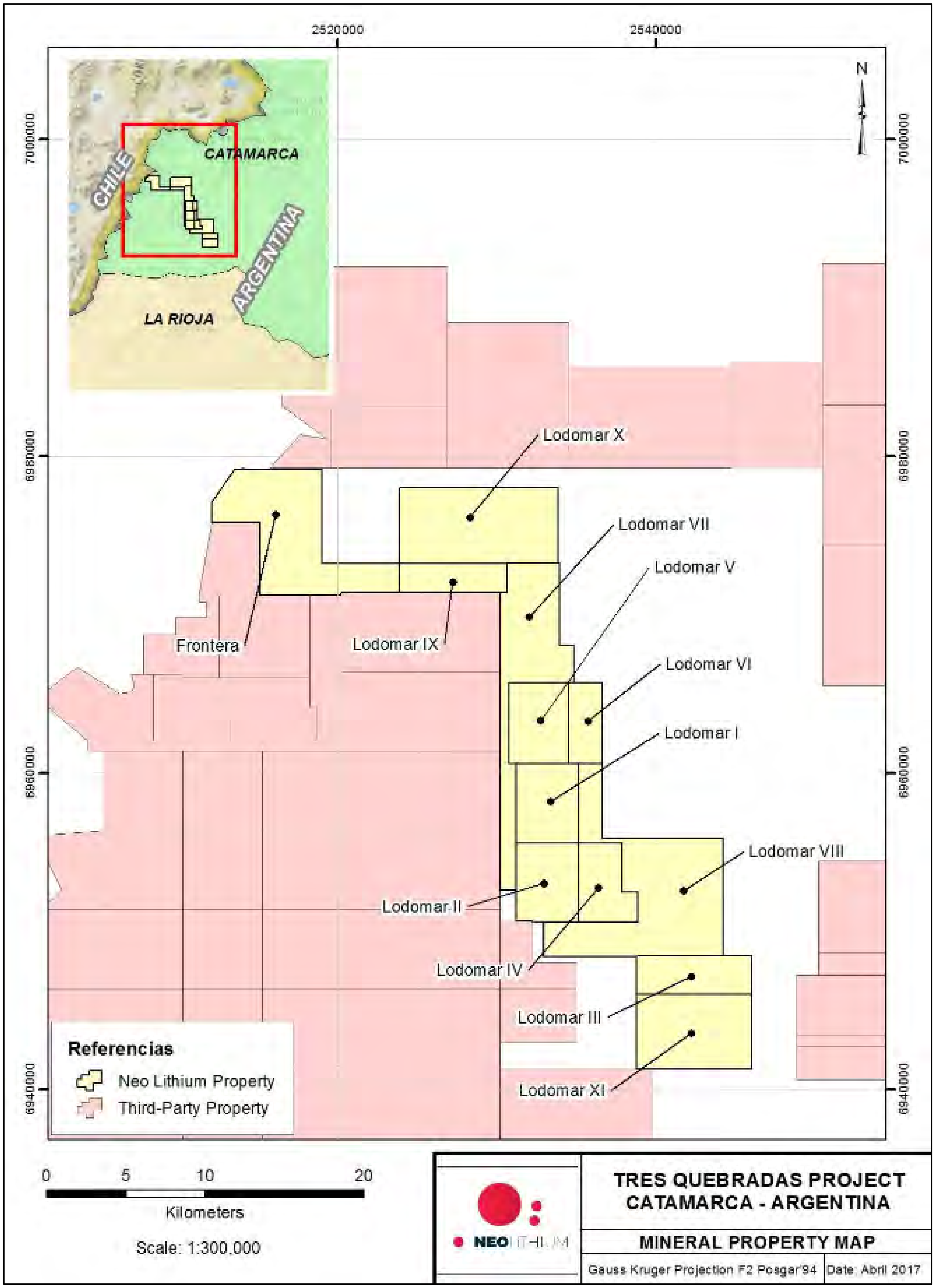


Figure 3.3: Tenements Held in the 3Q Project.

3.3.1 Mining Right Opinion

It is the opinion of NLC legal counsel that: (a) LIEX has good and marketable title to each of the Properties as of the date hereof, free and clear of any liens or other encumbrances registered on title with the Mining Authority, (b) there are no competing claims by third parties with respect to the Properties, and (c) the Surface Property Option referred to in chapter “Surface Access” remains valid, binding and enforceable in accordance with its terms. They advise that, up to November 21, 2017, they are not aware of any litigation or undisclosed liabilities involving LIEX. Due to the fact that the Properties are located in the Province of Catamarca they provide the following opinions:

Protected Areas

The Properties are not located in a protected area or provincial or national park. The area in which the Properties are located is in a “Ramsar” site, that has particular interest for conservation, particularly over the nesting sites for birds. Argentinean environmental legislation does not prohibit the development of a mining project in a Ramsar site, provided that it complies with all environmental law requirements. LIEX has obtained all environmental approvals required, as described below under F- Environmental Permit.

Surface Access

Pursuant to the Assignment of Rights Agreement, dated January 11, 2016, between Mr. Amadeo Marino (“Marino”) and Waldo Pérez, Pedro González and Gabriel Pindar (collectively referred to as “The Transferors”), whereby Marino, as the holder of title over the mining rights and as the duly authorized attorney in fact (power of attorney for property) of the third party holder of title over the surface area in which the Properties are located, undertook to grant to the Transferors (i) access easements, occupancy and water use with respect to the surface rights over the Properties; and (ii) an option to purchase up to 2500 ha of the surface rights over the Properties, for 15 $ (US dollars) per hectare (the Surface Property Option).

On December 21, 2016, LIEX requested from the Mining Authority, regarding future commercial production, the granting of legal easements for infrastructure, transit and communication, which has been approved under record # 203/16, titled “LIEX S.A. S/ SERVIDUMBRE DE INFRAESTRUCTURA EN EL DPTO. TINOGASTA” and under record # 204/16, titled “LIEX S.A. S/ SERVIDUMBRE DE TRÁNSITO Y COMUNICACIÓN EN EL DPTO. TINOGASTA”.

Water Rights

The Water and Groundwater Rights are legislated under the Waters Provincial Law # 2577. The use of common or private waters is under the control of the Provincial Body for Hydraulic Resources. LIEX has the right to use water for its activities at the Properties.

3.4 Royalties

Article 6th of Provincial Law # 4757, establishes a mining royalty of 3% over the mineral value at mine mouth (Boca Mina). According to the National Law for the reordering on the Mining sector, the law applies for coordinating and organizing the payment of royalties to the Provincial Tax Collectors, therefore LIEX S.A. is required to pay the aforementioned 3% Boca Mina royalty to the provincial government of Catamarca. The royalty is calculated on the value of mineral substances at the mine mouth (Boca Mina) after certain allowable deductions. The royalty base is calculated as the total mineral value at the time of production less deductible costs such as mineral beneficiation, transportation and related administration and overhead costs.

An Assignment of Rights Agreement, dated April 5, 2016, between the “Transferors” and LIEX S.A., establishes a royalty of 1.5%. Pursuant to this agreement, the Transferors assigned to LIEX S.A., all of their respective rights, title and interest in and to the 3Q properties (including, without limitation, Lodomar I to Lodomar VI, and all surface rights in respect thereof), and wherein it was fixed, as a portion of the consideration, a royalty of 0.5% over gross revenues from production from the 3Q properties for each Transferor, totaling an aggregate royalty of 1.5% over gross revenues from production from the 3Q properties, once the production stage starts.

3.5 Environmental Liabilities

LIEX S.A. hired GT Ingeniería S.A. to develop an Environmental Baseline Study and coordinate field campaigns for the 3Q Project. The baseline study is a fundamental tool required to prepare the Environmental Impact Report for Exploitation Stage.

Baseline studies for the current Project started in October 2016. To date, the following studies have been carried out: flora & fauna study (spring, autumn; and winter studies already completed; summer study is planned for next month); soil sampling and analysis (the soil study will be completed over the next summer season); microbial ecosystems; socio-economic study including surveys and interviews to qualified informers; archaeological studies; and paleontological studies. Additionally, hydrology studies have been carried out since activities begun in order to establish surface water inflows into the set of lakes; in situ measurement of hydrology parameters; and sampling for lab tests. Air quality will be measured and meteorological data will be periodically gathered and analyzed.

Both baseline and exploration impact reports will be critical to develop a detailed evaluation of environmental liabilities, which has not been yet formally completed for this Project. These reports will provide early indications of potential impacts associated with production that can be effectively mitigated though appropriate pro-active management techniques.

3.6 Permits

The initial environmental permit concerning the Properties was obtained by the submission of LIEX’s Affidavit of non-invasive prospecting activities required by the Catamarca Mining State Secretary (S.E.M.) resolution # 450/11. This affidavit indicated what initial activities were to be done in the areas under exploration. The affidavit was delivered to the Mining State Secretary (S.E.M.) of Catamarca Province on April 14, 2016.

On September 9, 2016, by resolution # 738/2016 the S.E.M. issued its Environmental Impact Statement, whereby the Environmental Impact Report submitted by LIEX for the “Tres Quebradas” Project was approved. This Environmental Impact Statement permits all exploration and pre-production activities at the Project up to and including the construction of pilot evaporation ponds and pilot production plant.

3.7 Aboriginal Communities

There are no aboriginal communities (or inhabitants) in the vicinity of the Project.

3.8 Site Access Risk Factors

Access to the 3Q Project is not significantly affected by weather conditions. During the winter months, the company operated normally and the road and camp were operating continuously, and the fresh water sources have remained unfrozen since the camp was opened in October 2016.

To the extent known, there are no other significant factors and risks, besides those noted in the technical report, which may affect access, title, or the right or ability to perform work on the property.

4. Accessibility, Climate, Local Resources, Infrastructure and Physiography

4.1 Accessibility

The 3Q Project is located in the southwestem zone of Catamarca Province of Argentina. The closest paved road to the Project is Ruta Nacional 60 (RN60) located 60 km west of the Project, which connects the capital city of Catamarca Province (San Fernando del Valle de Catamarca; population 212,000) to the provinces of La Rioja and Córdoba and Argentina – Chile Paso de San Francisco border crossing. The Project is about 1,200 km west of Rosario, Santa Fe Province. The city of Rosario is located in the western border of Paraná River and is part of the river system Paraná – Paraguay, with a river port of 140 Ha that receives regular and bulk cargo.

The closest population centre to the Project is the town of Fiambalá, Argentina (population 5,000). It is located 100 km (140 km) east of the Project and can be reached from the Project in a driving time of approximately three hours. The company is working in the road design and upgrading the quality of the road to shorten that time. The capital city of Catamarca Province (San Fernando del Valle de Catamarca) is 280 km southeast of the Project.

4.2 Climate

The 3Q Project is located in a high altitude, cold desert climate. NLC has been collecting meteorological data at the 3Q Project since October 2016, with an automatic “Vaisala” weather station. These data have been analyzed by Mr. Luis Gutiérrez Osorio and complied to carry out the pond engineering development. The following figures summarize the measured data from the Vaisala weather:

- Daily solar radiation measurement is shown in Figure 4.2.
- Monthly average air temperature measurement at 3Q Project are shown in Figure 4.3.
- Monthly precipitation measurement from the Vaisala weather station is shown in Figure 4.4.
- Monthly average humidity measurement is shown in Figure 4.5.
- Monthly average wind speed measurement is shown in Figure 4.6.
- Monthly average evaporation rate obtained from Vaisala weather station is shown in Figure 4.7.

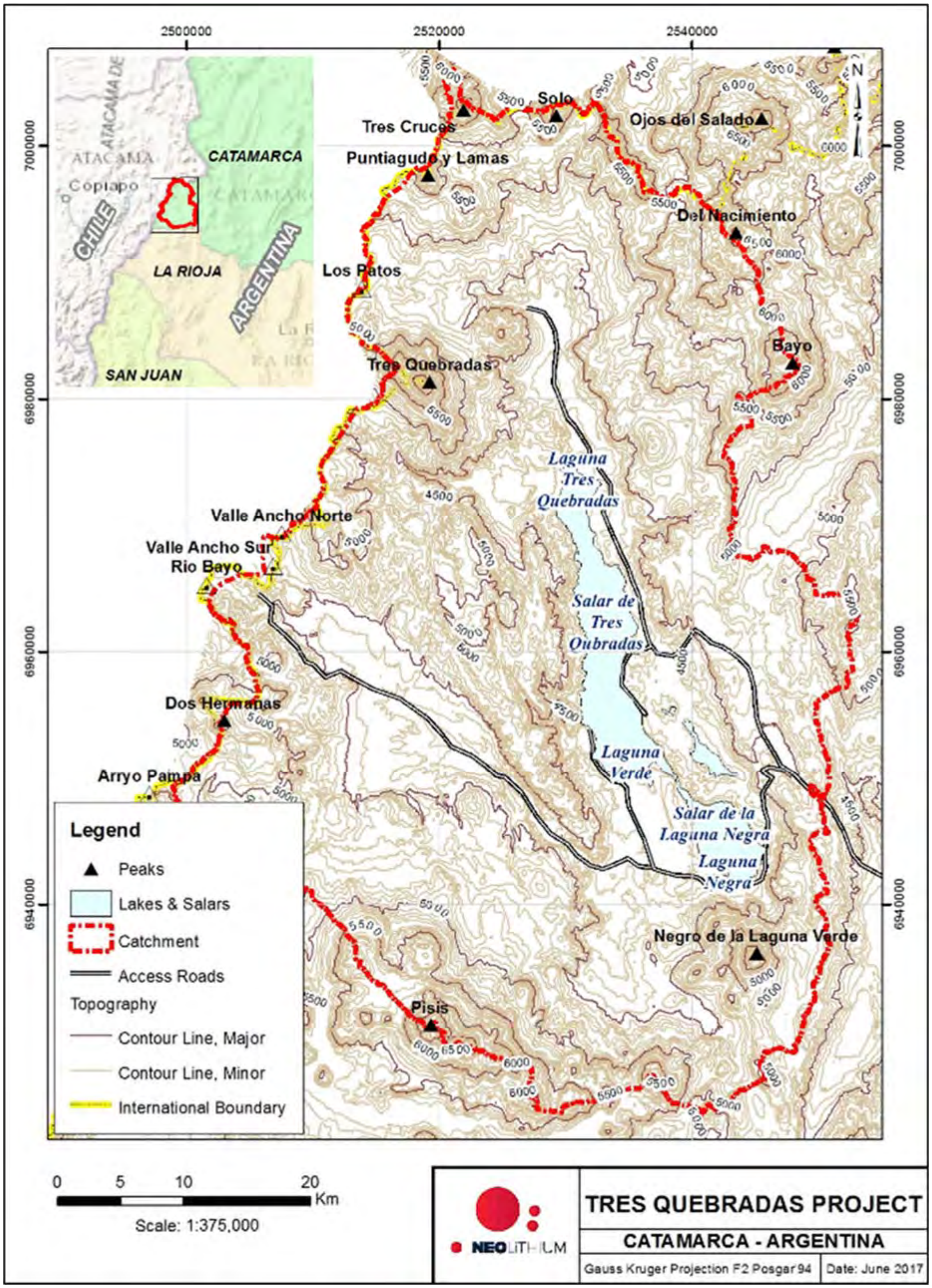


Figure 4.1: Topography of the 3Q Project Catchment.

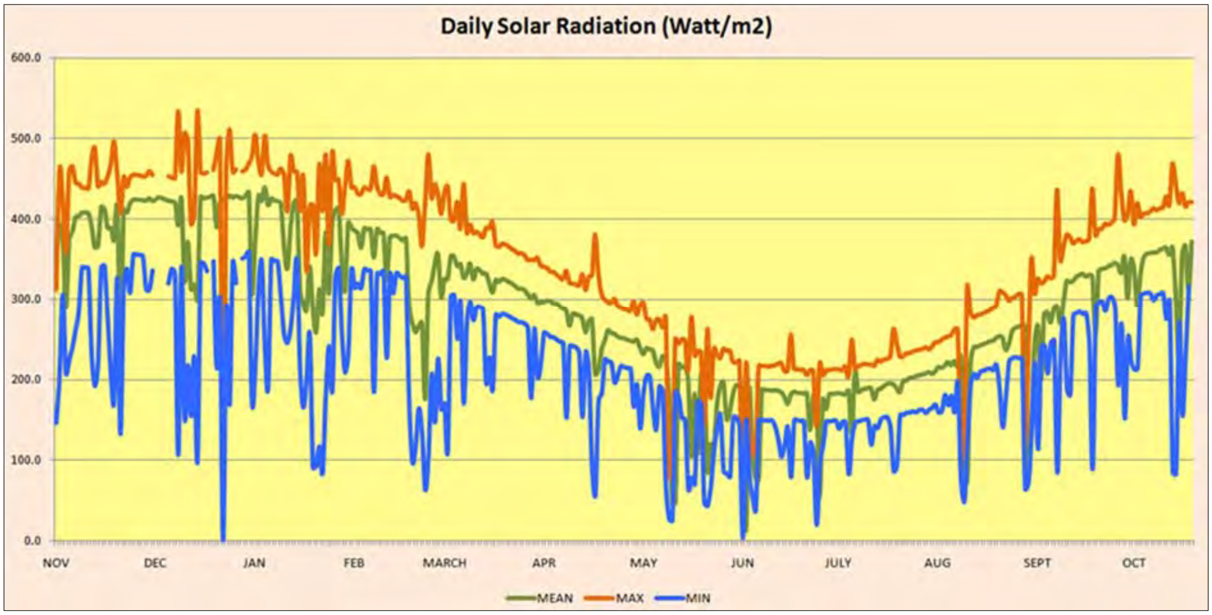


Figure 4.2: Daily solar radiation recorded at the 3Q Project by the Vaisala weather station

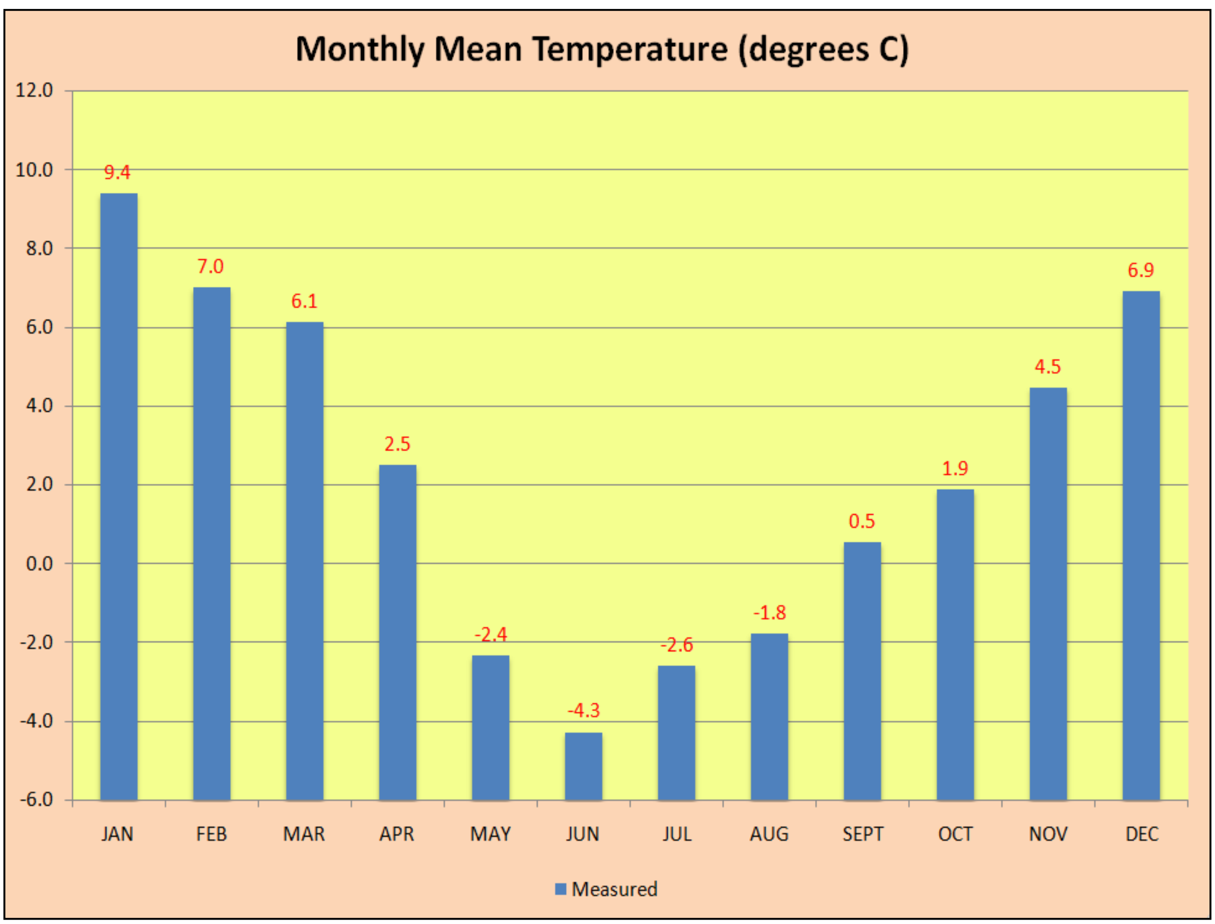


Figure 4.3: Monthly average air temperature measurementat the 3Q Project.

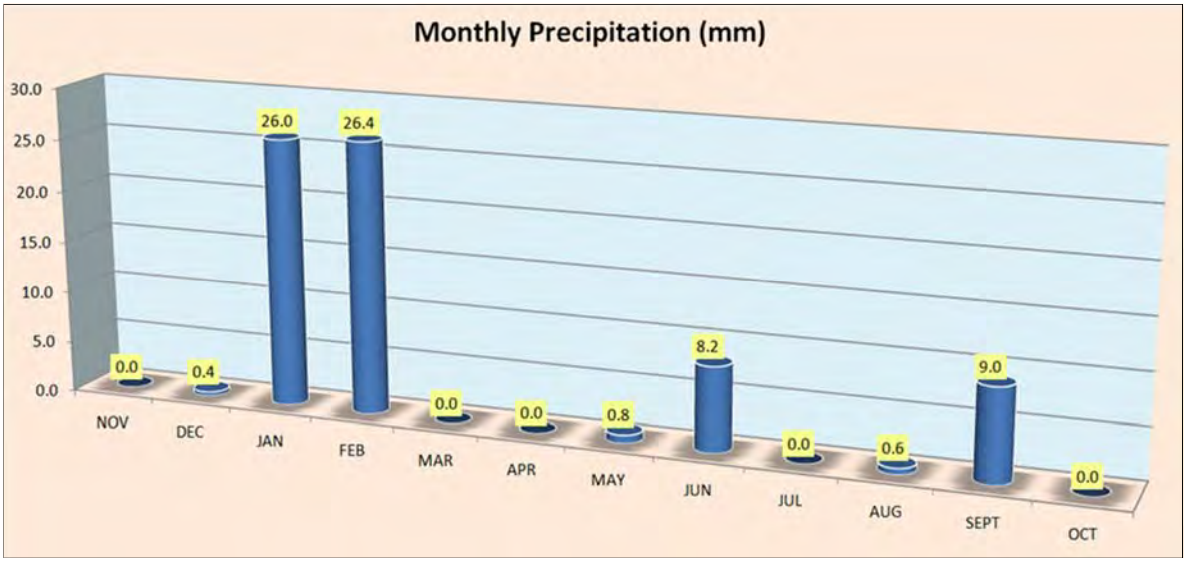


Figure 4.4: Monthly precipitation at the 3Q Project, recorded from the Vaisala weather station

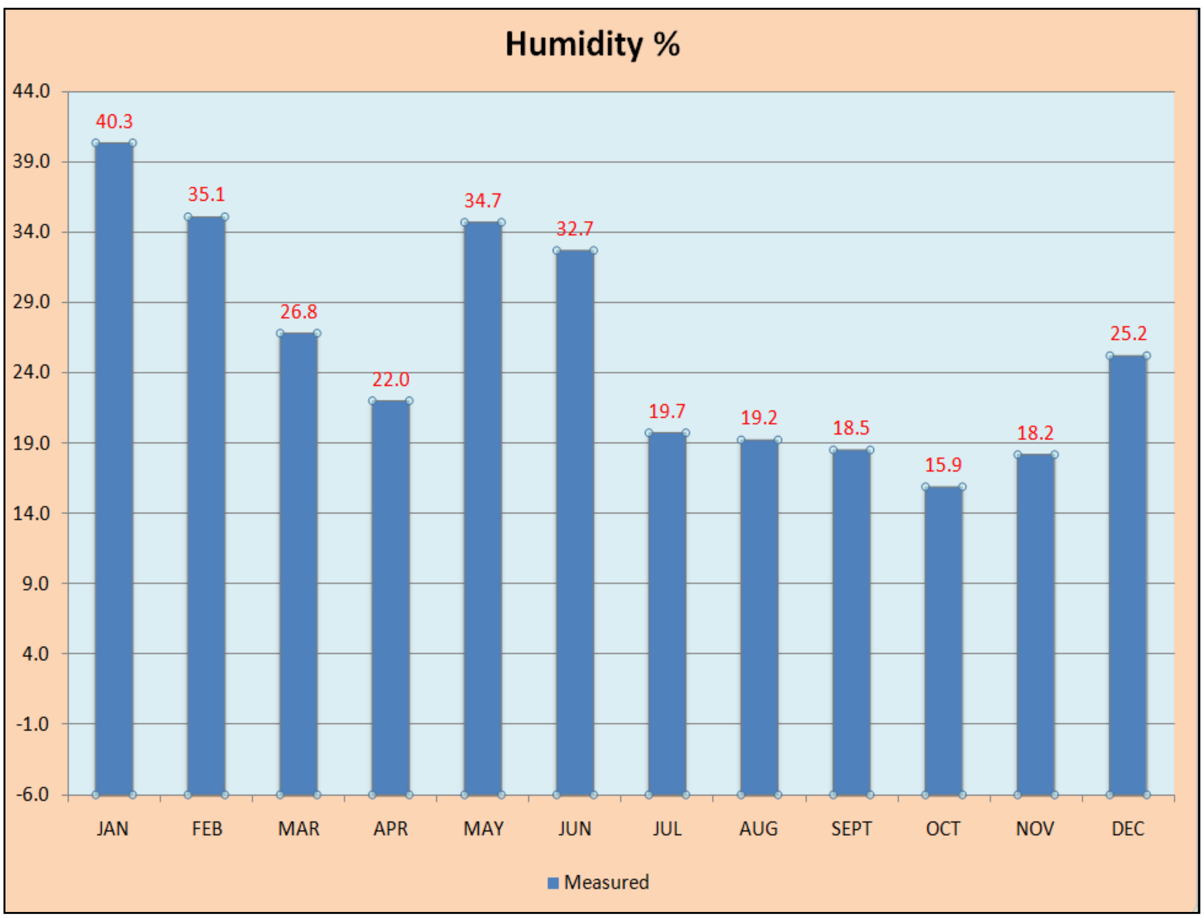


Figure 4.5: Monthly average humidity measurement at the 3Q Project.

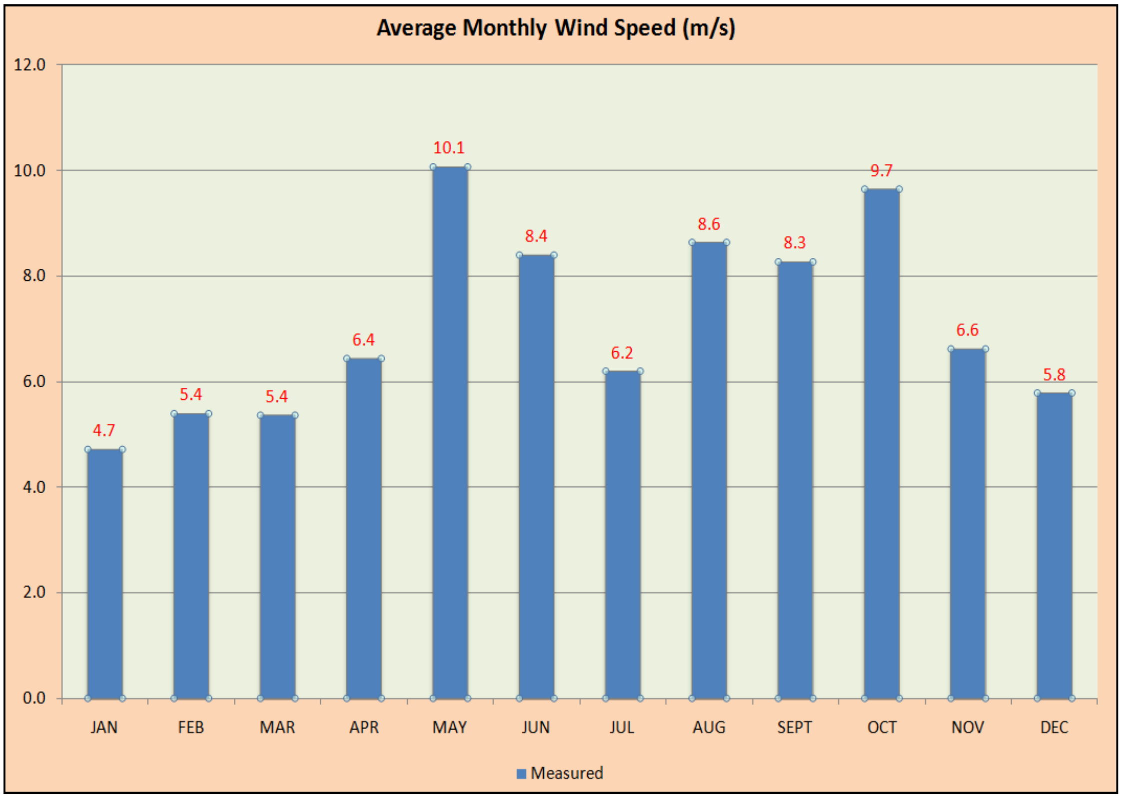


Figure 4.6: Average wind speed measurement at the 3Q Project.

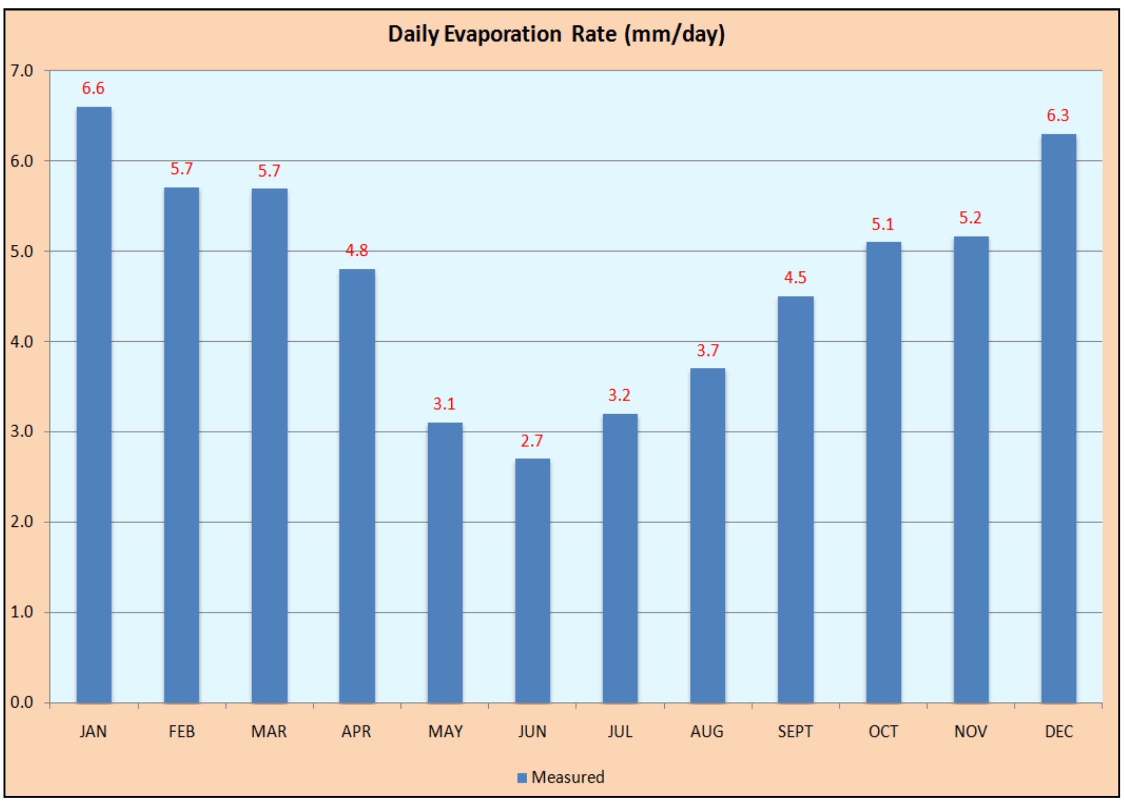


Figure 4.7: Monthly average evaporation rate obtained from Vaisala weather station at the 3Q Project.

The evaporation rate obtained (indirectly) from Vaisala weather station was 1,742 mm/yr.

On the other hand, direct measurements of on-site evaporation were carried out with Class "A" evaporimeter method using a water-brine mixture (20:80) to avoid freezing of the fluid. In this case, the average recorded evaporation was approximately 2600 mm/yr.

In general, the evaporation determined by Vaisala weather station and Class "A" evaporimeter are accepted as a reference value for the evaporation rate of a place. However to perform pond engineering calculations, both methods must be used in the correct manner, In the case of the Class "A" evaporimeter method, it is necesary to use the pan factors according to the type of climate and geographic area, together the potential evaporation obtained from the evaporimeter to calculate the ponds area. In the same way, for the case of the meteorological station the evaporation model and its equations must be correctly chosen, which allows the evaporation rate to be properly represented by means of the meteorological variables to subsequently calculate the pond area. Other considerations in this issue are the pond area effect, pond depth, water activity, altitude, albedo, latitude, etc.

4.3 Local Resources

The closest population centre to the 3Q Project is the town of Fiambalá, Argentina (population 5,000). It is located 100 km (140 km) east of the Project and can be reached from the Project in a driving time of approximately three hours. The capital city of Catamarca Province (San Fernando del Valle de Catamarca, population 210,000) is 280 km southeast of the Project.

4.4 Infrastructure

Minimal infrastructure currently exists near the Project. The national highway RN60 comes to within 50 km (60 km) of the property. A dirt road is used to access the Project. The road was built in the 90s by a mining company exploring gold in the region and was upgraded by the Company to access the Project. The road is operational all year around. A second phase upgrade is currently underway to improve this road. A hotel is located on RN60, approximately (10 km) north of where the site access dirt road intersects RN60.

Regarding other infrastructure considerations (availability of power, water, and mining personnel; potential tailings and waste disposal areas, and processing plants), some preliminary possibilities have been identified:

- Electrical power for the site camp and operational equipment would likely be provided by a combination of solar, wind and diesel generation.
- Freshwater exists in abundance in the northwest sector of the property (Frontera Claim) where monitoring flow points for rivers show approximately 1000 l/s in the 3Q River. Fresh water is also available 4 km east of the camp site in a shallow well (2 m deep). Supply in the well is enough to supply the current 70 person camp. This well does not freeze in the winter. It is also expected that freshwater sources would be found on one or more of the large alluvial fans that are adjacent to the 3Q Salt flat Complex.
- The town of Fiambalá offers a potential source for mining personnel which would stay at a camp constructed at the site. Today 90% of the company personnel come from Fiambalá.
- The storage requirements for tailings and waste materials are expected to be minimal.

Processing and infrastructure details would be further evaluated in follow-up assessment work. NLC currently controls sufficient surface rights and area to support a potential mining operation, including disposal areas, site infrastructure and plant facilities.

4.5 Physiography

Topography of the watershed containing the 3Q Project is shown in Figure 4.1. The catchment area of the 3Q Salt flat Complex is demarcated by some of the highest volcanoes on the planet, including Pissis, Tres Cruces, Nacimiento and Ojos del Salado (see Section 6). These volcanoes are surrounded by extensive lava and pyroclastic flows.

The 3Q Salt flat Complex occupies the centre of a north-south oriented ovoid catchment area approximately 80 km long and 45 km wide. The brine lakes of the Project are the lowest points in the catchment. A total station survey showed the following elevations for the lake surfaces: Laguna 3Q is 4085.1 masl, Laguna Verde is 4086.5 masl and Laguna Negra is 4085.6 masl. The maximum elevation within the Project tenements is approximately 4,650 masl. Some views of the Complex are shown in Photos 4.1 and 4.2.

Areas where the topographic contours show relatively gentle upward slopes from the lakes and salt flats are indicative of alluvial fans encroaching into the lakes and flat-lying salt flat surfaces. It is expected that the salt flat deposits extend outward under these fans to some degree. Steeper slopes are indicative of bedrock surfaces that plunge under the edges of the salt flats and lakes, giving relatively sharp boundaries to the salt flat deposits.

Photo 4.1: Drilling Platform 3, in the central area of 3Q salt flat.

Photo 4.2: A shallow pit excavated into the rough surface of 3Q salt flat.

5. History

A third party private owner previously staked six lithium and potassium mining claims located in Laguna Verde, Tinogasta, Catamarca Province, northwestern Argentina. On January 11, 2016, this owner assigned the mining rights underlying the six lithium and potassium mining claims to Messrs. Waldo Pérez, Pedro Gonzalez and Gabriel Pindar. On April 5, 2016, Messrs. Pérez, Gonzalez and Pindar assigned all their rights in these properties to LIEX S.A. in consideration of a nominal aggregate payment of 10,000 Argentinean pesos (approx. CDN$890 in the aggregate) and an aggregate 1.5% gross revenue royalty over the claims. Messrs. Pérez and Pindar are both directors of NLC. LIEX S.A. also staked four additional lithium and potassium mining claims in the same area. All information regarding the legal status of the 3Q Project tenements was provided by the law firm of Martin and Miguens, Argentinean legal counsel for NLC. It has not been independently verified by the IQP.

The catchment area of the 3Q Salt flat Complex has a very limited history of mineral exploration activity. The only known previous exploration campaign was for gold and copper. The work was conducted in the mid- to late-1990s by El Dorado Gold Corporation, in the western area of the catchment (vicinity of Valle Ancho River). The access road to the property was constructed at that time.

6. Geological and Hydrological Setting

6.1 Regional Geology

Geological mapping of the 3Q Project area was conducted by the Argentinean company Hidroar, on behalf of NLC. Subsections 6.1 and 6.2 are summarized from their report. Hidroar also conducted an independent check comparison of the Project diamond cores and logs.

The area within and just outside the 3Q Project catchment is characterized by volcanic cones reaching heights of 6,000 masl or greater (see Figure 4.1). Notable cones near the Project area include:

- Mount Pissis (6,882 masl) located to the southwest (and outside the Mining Property);
- Negro of the Laguna Verde (5,764 masl);
- Nacimiento del Jagüe (5,824 masl) to the southeast;
- Cazadero (6,433 masl) to the northeast; and
- Ojos del Salado (6,893 masl) also to the northeast.

Successive tectonic episodes and reactivation of hydrogeomorphological dynamics in an extremely arid environment have formed low level drainage networks. This has resulted in the conformation of inter- mountain basin areas and positive relief in the area. The accumulation plains - or basins - and salt flats can reach a significant territorial extension in this area. The 3Q Project is located in one of these basin areas.

6.2 Property Geology

6.2.1 Stratigraphic Unit Description

Following is a brief summary of the main lithological units found in the vicinity of the 3Q Project, indicating distribution in the mapping area. This summary is supported by a geological map of the area, provided in Figure 8.1.

El Cuerno Formation (Permian)

This unit is exposed in a large area throughout the west zone between Laguna 3Q, Laguna Verde and the ravine of the Valle Ancho River, forming thick sequences of acidic and mesosilicic volcanic rocks, which come into contact by tectonic effect with evaporitic deposits and brine lakes in the east. They are part of a larger outcrop, which is partially dislocated and covered by subsequent volcanic activity. Dacitic rocks were identified from north to south, occasionally associated with rhyolites. They have porphyritic texture, are sometimes amygdaloidal and less commonly brecciated; and are formed by phenocrysts of plagioclase, alkali feldspar and quartz as main minerals, and oxidized amphibole as accessories.

Andesites an andesitic porphyry were also observed, and subordinated breccias with porphyritic texture and reddish color, including plagioclases and feldspars, comprise the outcrop mapped on the margins of the Tres Quebradas or Los Patos fan (see Photograph 6.1). The fracturing of these rocks is moderate to low. The general direction is almost meridional and the dip is about 40° to the west.

Photo 6.1: (Left) Outcrops of andesitic-dacitic rocks of the El Cuerno Formation, to the NW of the mapped area. (Right) Brecciated rock in contact with intermediate volcanics.

In the Laguna Verde area, where sequences of conglomerates, sandstones, dacites and volcanic breccias assignable to this formation were observed, hydrothermal alteration (propylitic) was apparent in large part of the outcrops, with variable intensity.

Further south, outcrops in the ravine of the Valle Ancho River also exhibit hydrothermal alteration, with contrasting colors from dark gray to whitish, and a variety of associated ochre tones. They correspond to volcanic mesosilicic and acidic rocks, with characteristics of lava flows which are associated with dikes and breccias.

In some areas the rocks are partially covered by volcanics and / or modern scouring, forming large alluvial plains above outcrops. The alluvial fan of 3Q River to the northwest stands out, as do the alluvial fans that flow into Laguna Verde (see Photo 6.2).

Photo 6.2: Outcrops of rocks from the El Cuerno Formation, in the southwest of the mapped area, in the western sector of Laguna Verde. Outcrops are partially covered by modern deposits (alluvial fans).

Los Aparejos Formation – Paleogene (Eocene – Oligocene)

This formation includes sedimentary deposits, including conglomerates with angular fragments of andesites immersed in a sandy-pelitic matrix. Physical weathering (thermoclastic) is observed and the resulting material is completely covering the outcrop (Photo 6.3).

Photo 6.3: Los Aparejos Formation. Outcrops assignable to this formation have only been identified in the northern end of the mapped area, immediately north of Laguna 3Q.

Tres Quebradas Formation (Miocene)

This formation includes andesitic porphyry rocks, interrupted in sectors by andesitic dikes (average thickness 2.5 m), with an average orientation in the field of N85°E and average slope towards the north (see Photo 6.4).

Photo 6.4: View of outcroppings of the Tres Quebradas Porphyry, in the north zone of the Project.

"Laguna Verde Strata" (Paleogene – Miocene)

These rocks are present as outcrops of predominantly sandy and silty epi-clastic sedimentary and subordinated tuffaceous material, often partially covered by modern alluvial or haulage materials. They outcrop around the eastern sector to Laguna 3Q and the homonymous salt flat, with general orientation NNW-SSE. They are in tectonic contact with evaporitic deposits to the west and with volcanics corresponding to Cerro Nacimientos Lavas to the east.

Sedimentary deposits occur, ranging from fine to coarse sand to very compact conglomeratic strata, with appreciable levels of gypsum occurring at some locations. The color of the deposits varies from greyish to purplish brown in some sectors (see Photo 6.5). This lithostratigraphic unit was identified in different outcrops, such as those mapped northeast of Laguna 3Q and to the east of the homonymous salt flat.

Photo 6.5: Interbedded sediments corresponding to "Laguna Verde Strata". To the left sandy-silty outcrop; to the right conglomerate facies.

These rocks may exhibit massive features, while in other sectors marked tabular stratification or thin-bed laminations can be seen. Other clastic facies also assignable to this formation have been identified, in the east area, characterized by alternating sandstones with medium to thick red beds (Photo 6.6). At some locations, it is possible to observe an "onyx" level of approximately 20 cm above the stratum of sands.

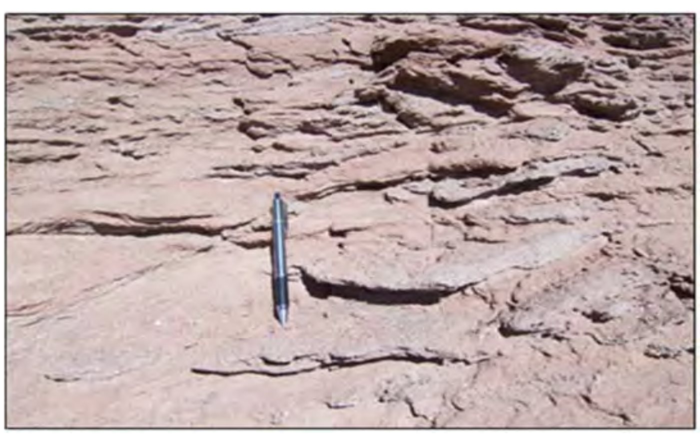


Photo 6.6: Reddish sandstones facies assignable to "Laguna Verde Strata", East of 3Q salt flat.

Volcanic Complex of Pissis (Pliocene), Basal Complex of Pissis and Los Patos (Miocene) and Andean Basalts of Campo Negro (Miocene)

These Tertiary volcanic episodes are prominent in the southern end of the mapped area, SW of Laguna Verde and Laguna Negra. They are readily apparent as lavas or volcanic mantles of basic-intermediate composition, with black to reddish colorations, often with vesicular structure and cooling fractures. Water may exfiltrate from the base of these units, so that vegetation develops at the foot of coladas (see Photo 6.7).

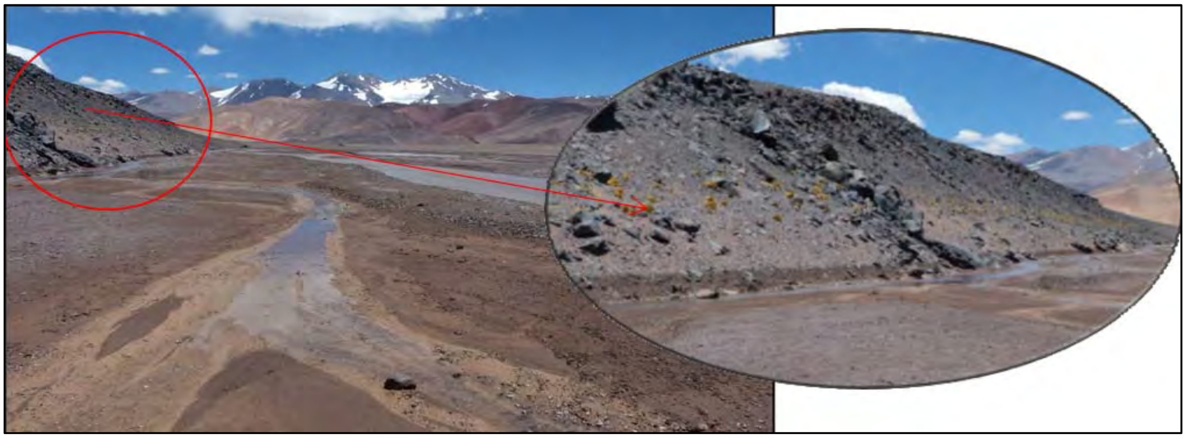


Photo 6.7: Basaltic volcanic mantles of Pissis in the south sector (Valle Ancho River valley).

Facies correspond to the "Volcanic Complex of Pissis" of Pliocene age; and volcanics of the "Basal Complex of Pissis and Los Patos" (Miocene). These last are represented in the slopes of Cerro Tres Quebradas. Both complexes correspond to basaltic andesites. Rocks of rhyolitic composition are also occasionally present.

Also identified in the southeast sector are other volcanic mantles corresponding to the "Campo Negro" Andean Basalts unit, which in some sectors can be seen as rhyolites. These facies are of Miocene age.

Cerro Nacimiento Lavas (Pliocene – Quaternary)

The volcanic facies observed in the eastern sector of the 3Q Project, in contact with clastic sequences of "Laguna Verde Strata" at the area of the 3Q Salt flat, correspond in general to this stratigraphic unit of Pliocene - Quaternary age. Outcrops identified in the field correspond to rhyolites, andesites and basalts with porphyritic texture, with tabular plagioclase phenocrysts and occasionally volcanic glass fragments in a light aphanitic matrix (Photo 6.8). These volcanic facies can be distinguished as lava mantles that generally cover the sedimentary rocks of Laguna Verde Strata.

Photo 6.8: Volcaniclastic deposits corresponding to "Cerro Nacimientos Lavas".

Evaporite deposits or Salt flats (Quaternary)

These deposits are the object of the current mining exploration, forming the salt flats in the mapped area, with mainly evaporitic halitic sequences, often with borates of the "ulexite" type and with variable contents of clastic or terrigenous materials. The surface features of these deposits have been identified from trenches, where the superficial and subsurface porous structure of these evaporites can be seen, with abundant cavities, bounded by impurities or by intercalation with sandy or clayey terrigenous materials. Frequent crystalline growth of halite in "hoppers" is observed, among other features that denote high superficial porosity. Brine has been identified in all shallow trenches excavated in 3Q Salt flat.

Through tectonic activity, these deposits are brought into contact with the Paleozoic outcrops to the west. To the east they are also delineated by faults, where they make contact with clastic sequences of "Laguna Verde Strata", effusive Cenozoic volcanites or modern alluvial-colluvial deposits, often linked to springs or valley both north and south of the mapped area. The presence of thermal waters (or their indirect evidence in temporarily inactive zones) is also highlighted in the western margin of these deposits.

Quaternary sedimentary deposits

These occur mainly as fluvial deposits associated with fans encroaching on the salt flat to varying degrees. The age of these deposits is Holocene. These detritic materials may overlie large sandy areas in some sectors around the salt flats and brine lakes of the 3Q Project. They consist mainly of unconsolidated alluvial / colluvial materials, with a range of compositions and granulometric heterogeneity, ranging from blocks of andesites and basalts to fine gravels and sands, and even finer alteration materials.

It is common to see fans coalesce in both the eastern and western sectors of the mapped area, with overlapping fill materials and channels, either active or inactive (see Photo 6.9). In certain areas, “valley” or other groundwater manifestations are developed at the foot of these fans either by direct recharge, thaw recharge or associated thermal springs. There is usually mixing of water at these locations.

Photo 6.9: Alluvial fan deposits and filling materials in inactive fluvial channels, on the northwest margin of Laguna Verde.

In terms of areal extent, the largest alluvial fans occur in the north and northwest of the area, associated with the 3Q River and Salado River. There are also large fans to the southwest, between Laguna Verde and Laguna Negra. At the downgradient ends of these systems, zones of valley and thermal springs may be present, with general diffuse drainage, wandering channels, vegetation growing in the margins, and development of saline efflorescences. Such is the case of the Salado River fan, whose waters from Nevado Tres Cruces and Cordón de los Arrieros are partially fed by hot spring systems.

6.2.2 Structures

On the western side of the mining property, a repetition of sequences can be observed in both satellite images and field mapping, making it possible to determine the presence of an inverse fault and two reverse faults further to the west. Such structures have an approximate NNW-SSE orientation. They generally involve andesitic, rhyolitic and basaltic igneous rocks of the El Cuerno Formation, in the mapped area. The sequences are shown in a succession of rhyolitic and andesitic rocks crowned by basaltic mantles. Immediately to the west one can observe the sequence but without the ultimate basaltic mantles (possibly they are eroded).

On other occasions, these structures contact the El Cuerno Formation with Tertiary or modern deposits, highlighting the lineament that contacts the 3Q Salt flat with these older rocks, where there are also points of upwelling thermal waters.

On the eastern side, the most notable structure is a direct fault whose lower edge is near the mid-point of the 3Q Salt flat. This structure mainly affects sedimentary rocks of Laguna Verde Strata. In one location, it can be observed affecting the quaternary cover (alluvial fan dissected). This structure becomes appreciable in the escarpment observed in an alluvial fan, which is the only visible evidence in the field.

This last structure was observed previously in satellite images, and inferred by the presence of the outcrops in contact with the most modern evaporite deposits, and the regional structuring described in other similar environments in the Puna region. As in the structures observed on the western side, the eastern structure also shows an approximate NNW-SSE orientation, aligning with the long axis of the salt flat.

There are other structural lineaments that have been mapped by NLC from satellite images, evidenced by the existence of oriented streams almost E-W to WSW-ENE and NW-SE. One of these is apparent on the north margin of the 3Q River valley and homonym brine lake, where there is an outcrop of the Los Aparejos Formation and the Tres Quebradas Porphyry, underlying the El Cuerno Formation to the southwest.

A significant lineament is also apparent to the northeast of 3Q Salt flat, in the ravine that is to the east of the Project area, and downstream of Cerro Campo Negro. Finally, the most noticeable NW-SE lineaments are towards the southern sector of the mapped area, coinciding with the layout of Laguna Verde and Laguna Negra, with structural control on the alignment of the Valle Ancho River.

6.3 Surface Water

The catchment and surface water network of the 3Q Salt flat Complex are shown in Figure 6.1. The brine lakes of the Project are the lowest points in the catchment. A total station survey showed the following elevations for the lake surfaces: Laguna 3Q is 4,085.1 masl, Laguna Verde is 4086.5 masl and Laguna Negra is 4,085.6 masl. The largest flows into the Complex occur through the following rivers:

- Salado River - discharges into the north end of Laguna 3Q and originates in the mountains at the northern margin of the basin, including Tres Quebradas and Tres Cruces.
- 3Q River - flows into the west side of Laguna 3Q, after discharging from a wide and diffuse discharge zone along the toe of an alluvial fan.
- Valle Ancho River - flows into the west side of Laguna Negra, after a confluence with the Pissis River.

Several hydrothermal springs were observed in the vicinity of the 3Q Salt flat Complex, all with relatively large and diffuse discharge areas (Figure 6.1). Geothermal springs were observed flowing into 3Q River, Salado River, and into the west side of 3Q Salt flat.

High levels of dissolved iron and manganese are present in the discharge of the 3Q River, and widespread rust-coloured precipitate of iron hydroxide can be seen in the diffuse flow issuing from the alluvial fan (Photo 6.10). The thick occurrence of this material throughout the discharge zone indicates the flow is anoxic (strongly reducing) prior to discharge. Elevated levels of manganese in this discharge may be the source of the dark colouration noted for Laguna 3Q. The colour of this lake is in obvious contrast to the blue-green colour of Laguna Verde and Laguna Negra.

A program of streamflow monitoring and sampling was started in December 2016, focusing on the three primary river channels noted above, and also on some diffuse discharges. Results are shown in Figures 6.1 to 6.5.

Photo 6.10: Sulphur and iron-stained salts along the diffuse discharge location of 3Q River, on the west side of Laguna 3Q.

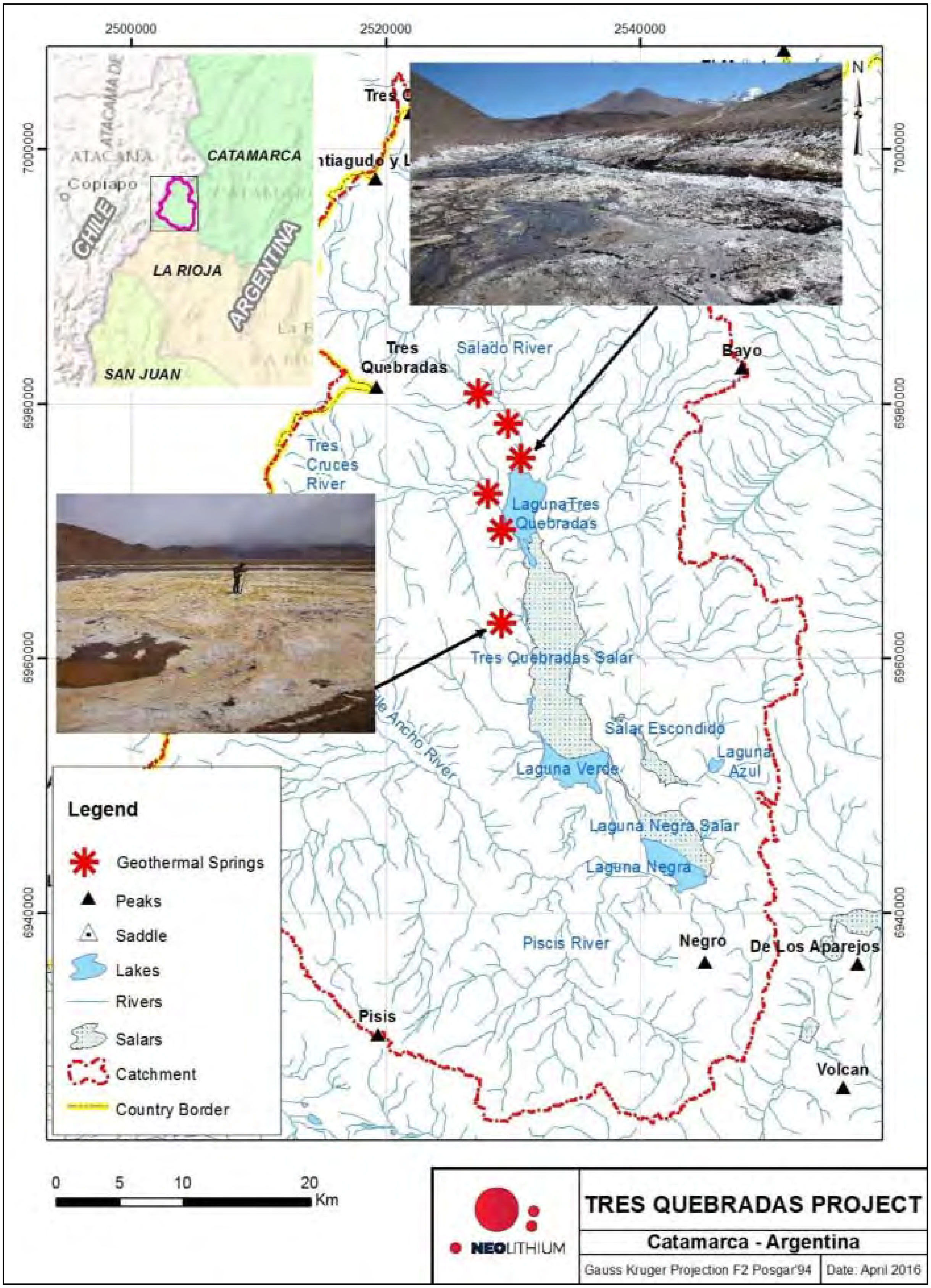


Figure 6.1: Surface Water Features Near the 3Q Salt Flat Complex.

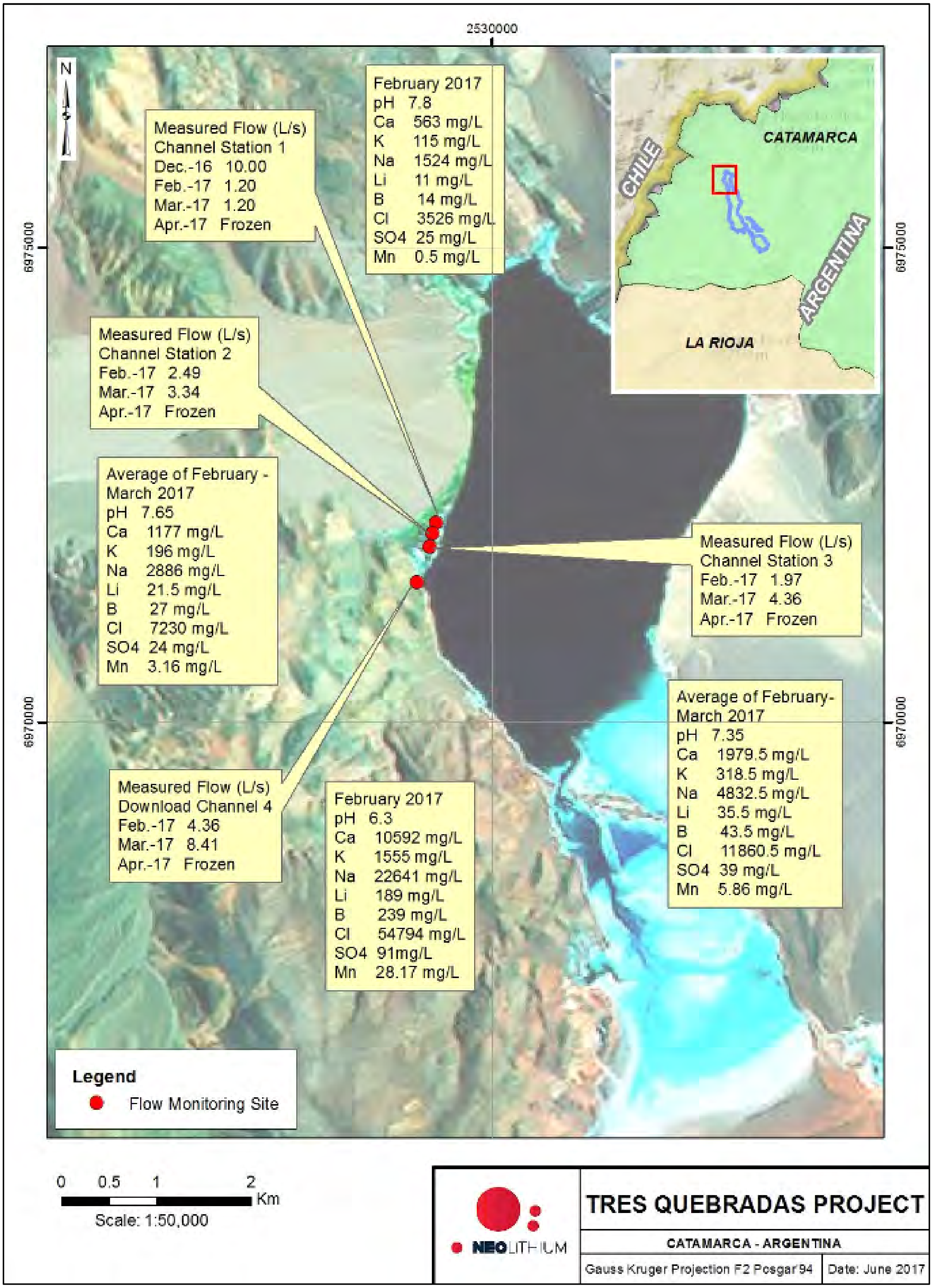


Figure 6.2: Surface Water Monitoring Results for 3Q River (Lower Section).

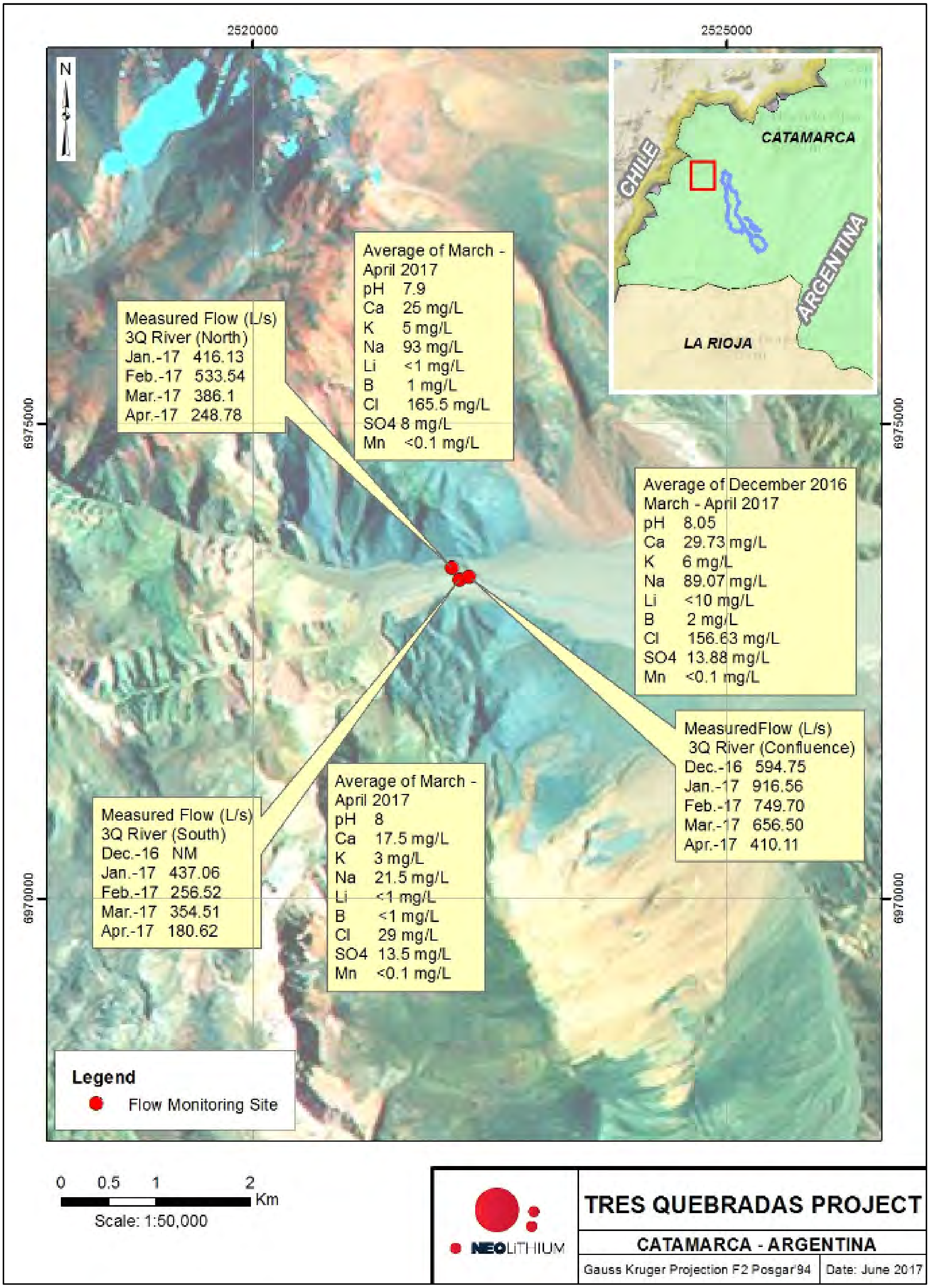


Figure 6.3: Surface Water Monitoring Results for 3Q River (Upper Section).

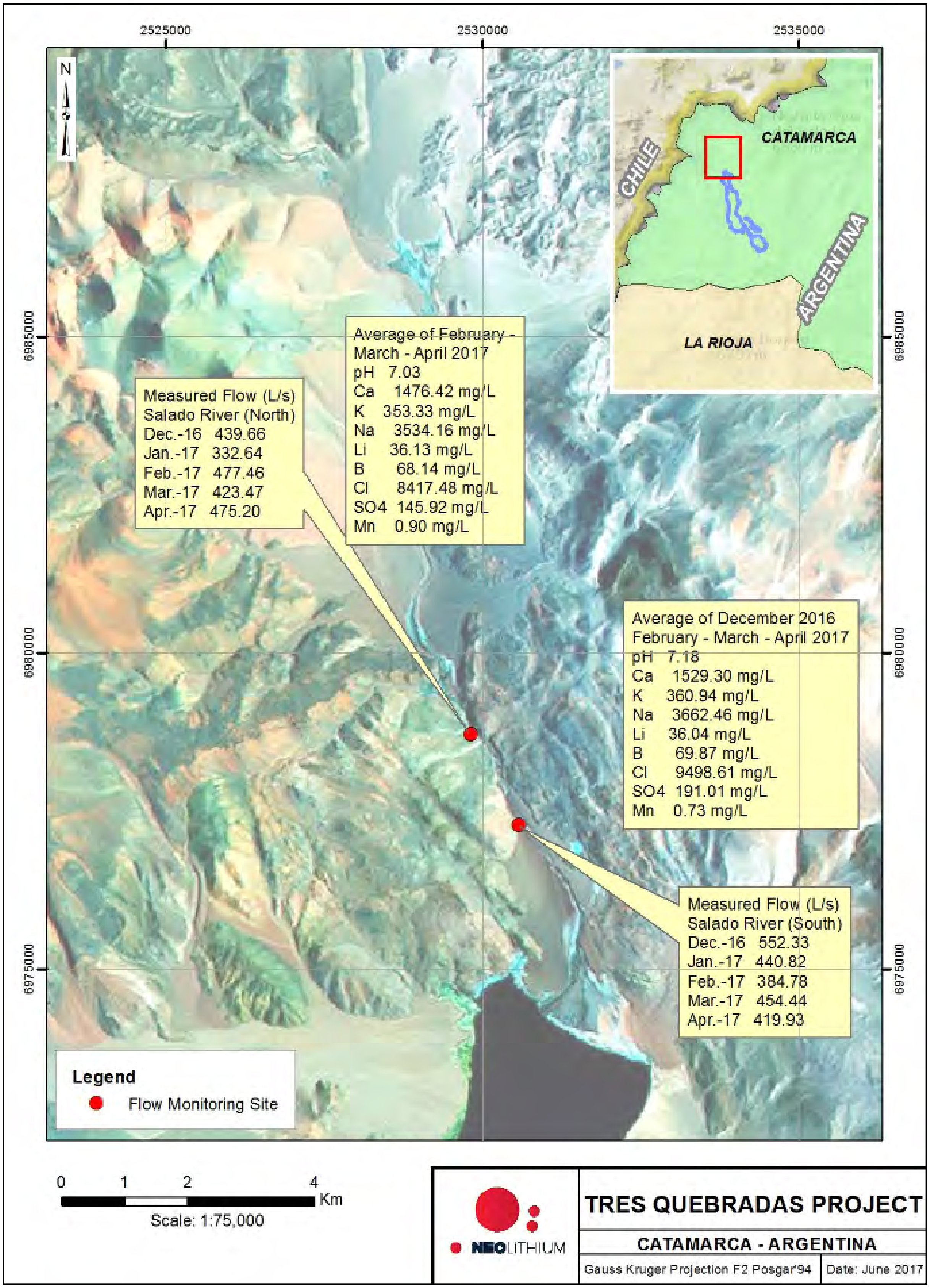


Figure 6.4: Surface Water Monitoring Results for Salado River.

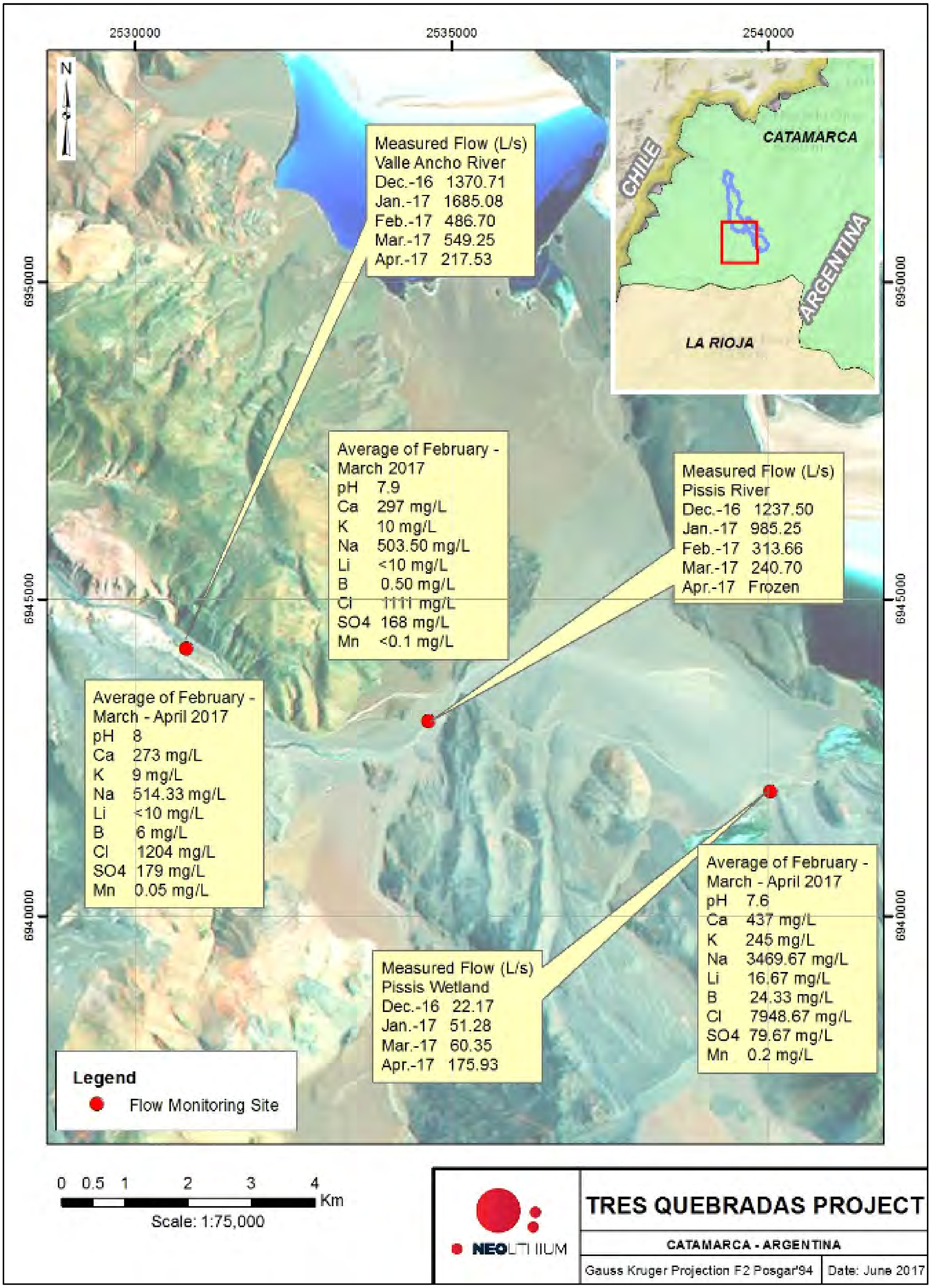


Figure 6.5: Surface Water Monitoring Results Valle Ancho River.

6.4 Groundwater

Detailed investigation of groundwater flow in the 3Q Salt flat Complex has not yet been conducted, and is recommended in follow-up work (Section 19). It is expected that the primary source of groundwater recharge to the salt flats and lakes is through the alluvial fans and geothermal springs. It is noted that much of the surface water flow that approaches the Complex through the three largest rivers (3Q, Salado and Valle Ancho Rivers) infiltrates into large alluvial fans before reaching the Complex. In that way, it enters the Complex either as diffuse surface flow along the fan margins, or as groundwater.

The hydraulic gradient within the 3Q Salt flat Complex is extremely flat, as shown by elevation survey results for the three large surface brine bodies in the complex: Laguna 3Q is 4085.1 masl, Laguna Verde is 4086.5 masl and Laguna Negra is 4085.6 masl. These preliminary data indicate that the central lake (Laguna Verde) is slightly higher than the northern and southern lakes. This indicates that within the Complex, there is a slight tendency for groundwater flow away from the centre, towards both the north and the south. Given the closed nature of the basin, the ultimate outlet for this flow is evaporation.

6.5 Water Balance

Water balance calculations have not yet been conducted for the 3Q Salt flat Complex, and are recommended as part of numerical modeling in follow-up work (Section 19). In general terms, flow inputs to the Complex are expected to occur as direct groundwater discharge primarily through alluvial fans, and as surface streamflow. Geothermal springs are a chemically important source of inflow to the salt flat. Observations along the catchment rivers indicate geothermal springs may also contribute a significant quantity of flow to the salt flat through discharge to rivers.

Water output from the Complex is expected to be entirely attributable to evaporation, given that the catchment is closed and all surface drainage is inward. There may be some potential for water to leave the basin in the subsurface, if a fault system is present that is hydraulically connected to a lower discharge point. The occurrence of outflow by this mechanism is considered remote. However, it should be evaluated through quantitative water balance analysis as part of future exploration activities.

Water inputs and outputs to the 3Q Salt flat Complex are both expected to be largest during the summer months when rates of precipitation, snowmelt, and evaporation are highest.

7. Deposit Types

Brine deposits containing economically important quantities of lithium can form in salt flats where the following favourable conditions are coincident:

- The salt flat catchment is “closed,” which means the outflow of water from the catchment (by processes other than evaporation) is negligible in terms of the catchment water balance.
- A significant portion of the catchment area contains bedrock of suitable composition (i.e., containing lithium that can be leached).
- The rocks in the catchment do not contribute significant impurities (particularly magnesium and sulfates) that could complicate the processing of the brine.
- Geothermal waters have contacted the bedrock through fault systems and have become moderately concentrated in lithium (and other solutes).
- The moderately concentrated waters have accumulated in the low-lying area of the closed catchment.
- The prevailing climate is suitable to promote high rates of evaporation from the accumulated water (i.e., dry air, high winds and minimal precipitation), leading to the formation of evaporite deposits and brine within the salt flat.
- Given the preponderance of lithium-bearing salt flats that are defined by fault-bounded dropped basins, this also appears to be an important condition. The process of basin lowering may provide a more prolonged period and a more focused zone for brine accumulation. The bounding faults may also be a direct source of lithium-enriched geothermal waters to the salt flat.

Information to date indicates that the 3Q Salt flat Complex meets these conditions. The Salt flat catchment is closed with no apparent outflows. Elevated levels of lithium have been detected in geothermal and cold waters flowing into the Complex. There is clear evidence that evaporation has led to the accumulation of evaporites and lithium brines in the near-surface of the salt flat, in lakes, and at depth. Additional economic analysis is required to determine whether the grade and distribution of the lithium brine is economically viable for development.

In terms of infill materials, salt flats that contain brine deposits are of two principal lithologic types: clastic- dominant and evaporite-dominant. The formation of one or the other lithology may depend on the energy of the system during deposition. Evaporite formation may be favoured during relatively dry periods of low inflow, and deposition of clastic materials during higher inflow periods. Similarly, deposition of clastic materials may be favoured around the margins of the salt flat basin, while the more quiescent central zone may be dominated by evaporites. Consequently, both types of deposits may occur at different levels and zones of the salt flat depending on the conditions of deposition.

Evaporite-dominant salt flats contain mostly halite deposits, which can reach hundreds of meters in thickness (Houston et al., 2011). Within approximately 50 m of the surface, the porosity and permeability of halite is amenable to economic extraction of brines. However, deposit permeability may decrease rapidly with depth due to evaporite cementation and recrystallization. Classic examples of evaporite-dominant salt flats include Salt flat Hombre Muerto (Argentina) and Salt flat Atacama (Chile).

Clastic-dominant salt flats are characterized by predominantly clastic strata interbedded with minor evaporites, particularly halite. Porosity and permeability of the clastic layers are controlled by lithology, stratigraphy and structural controls such as faults. Clastic-dominant salt flats are exemplified by the Silver Peak deposit in Nevada and Argentina's Cauchari and Olaroz Salt flats.

The 3Q Salt flat Complex has aspects of both salt flat types, but with an overall evaporite-dominance. Within the salt flat, there is a substantial occurrence of evaporite sequences in excess of 200 m. However, there are also two laterally extensive (but thinner) clastic units (Upper and Lower Clastics). Further, there are frequent small clastic layers, ranging from a few to several cm, within the evaporite units. These small clastic layers tend to increase in frequency and/or thickness, with proximity to the formal clastic units, often forming a gradual transition zone from the evaporite units to the clastic units.

8. Mineralization

The brines of the 3Q Salt flat Complex contain levels of dissolved salts that approach solubility limits at some locations. Brine sampling results from the brine lakes and from salt flat boreholes were used to delineate and estimate Resources, where the highest concentrations of lithium were detected. The Resource Zone includes:

- All of Laguna 3Q (Measured);
- The upper two hydrostratigraphic units in the adjacent 3Q Salt flat (Indicated); and
- The lower three hydrostratigraphic units in 3Q Salt flat (Inferred).

Resources are defined relative to two cut-off values: 400 and 520 mg/L lithium. The 520 mg/L cut-off results in exclusion of the southern half of 3Q Salt flat from the Resource. Sampling methods and results are presented more fully in Sections 9 and 10 and zone delineation criteria are described in Section 15. A summary of the brine characteristics in the Resource Zone is provided in Table 8.1. Table 8.2 compares the chemistry from the 3Q Project with information from other lithium brine projects. As indicated in the table, the concentrations of lithium and potassium in the Resource Zone compare favourably with the other brine sites. The 3Q Project lithium values are in the mid-range of the group represented in the table. Values for potassium are within the range in the group, near the low end.

Two other important brine constituents summarized in Table 8.2 are sulfate and magnesium. These two parameters are considered brine impurities in that they affect the cost of brine processing. As indicated in the table, both magnesium and sulfate compare favourably with the other brines in the group in that their ratios are at the low ends of both ranges. Overall, the information at the 3Q Project indicates that the lithium and potassium grades and the levels of impurities compare favourably against other deposits. Additional study is required to determine the economic viability of the brine distribution.

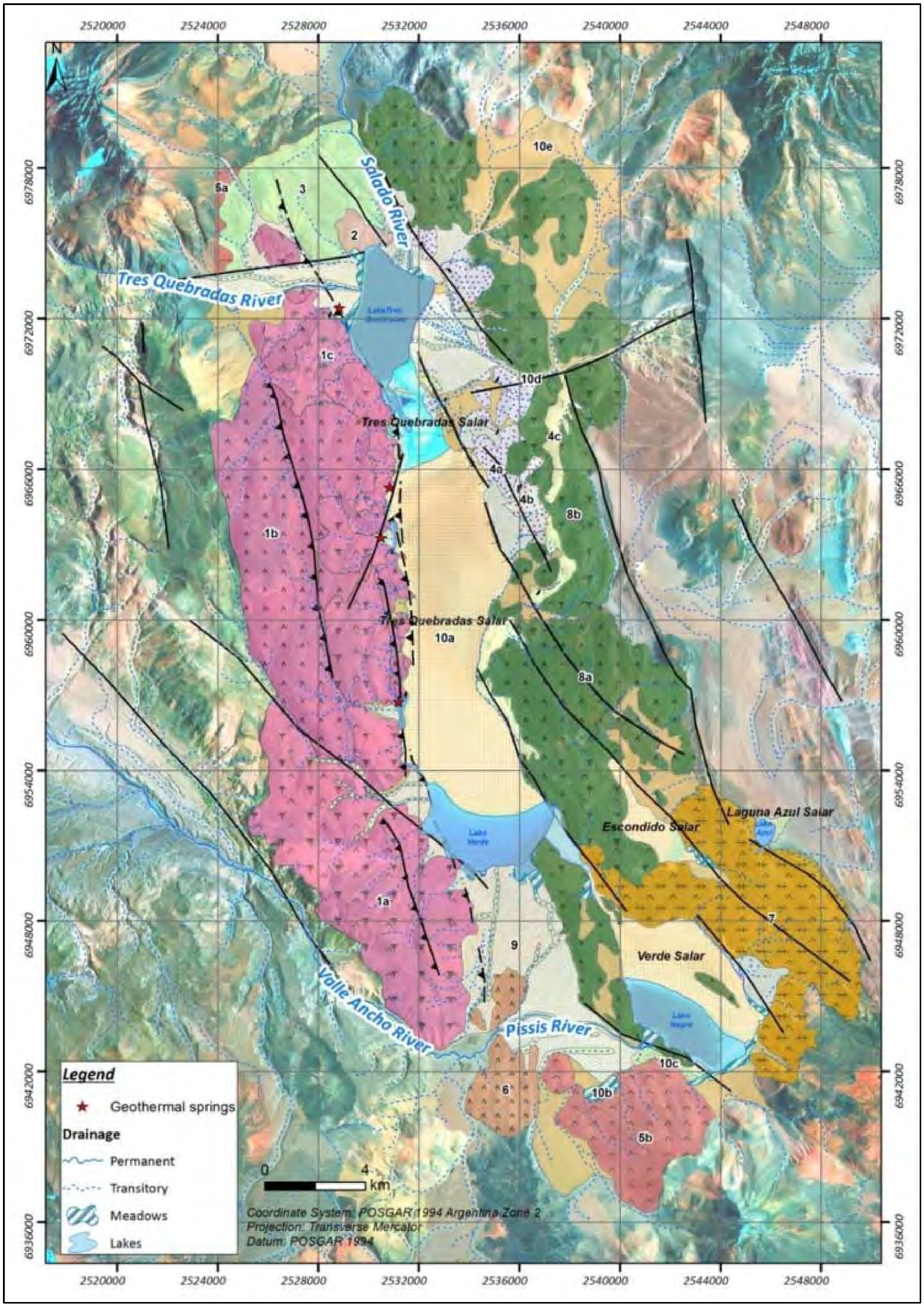


Figure 8.1: Geological Map of the 3Q Project Area (see Figure 8.2, for lithology legend).

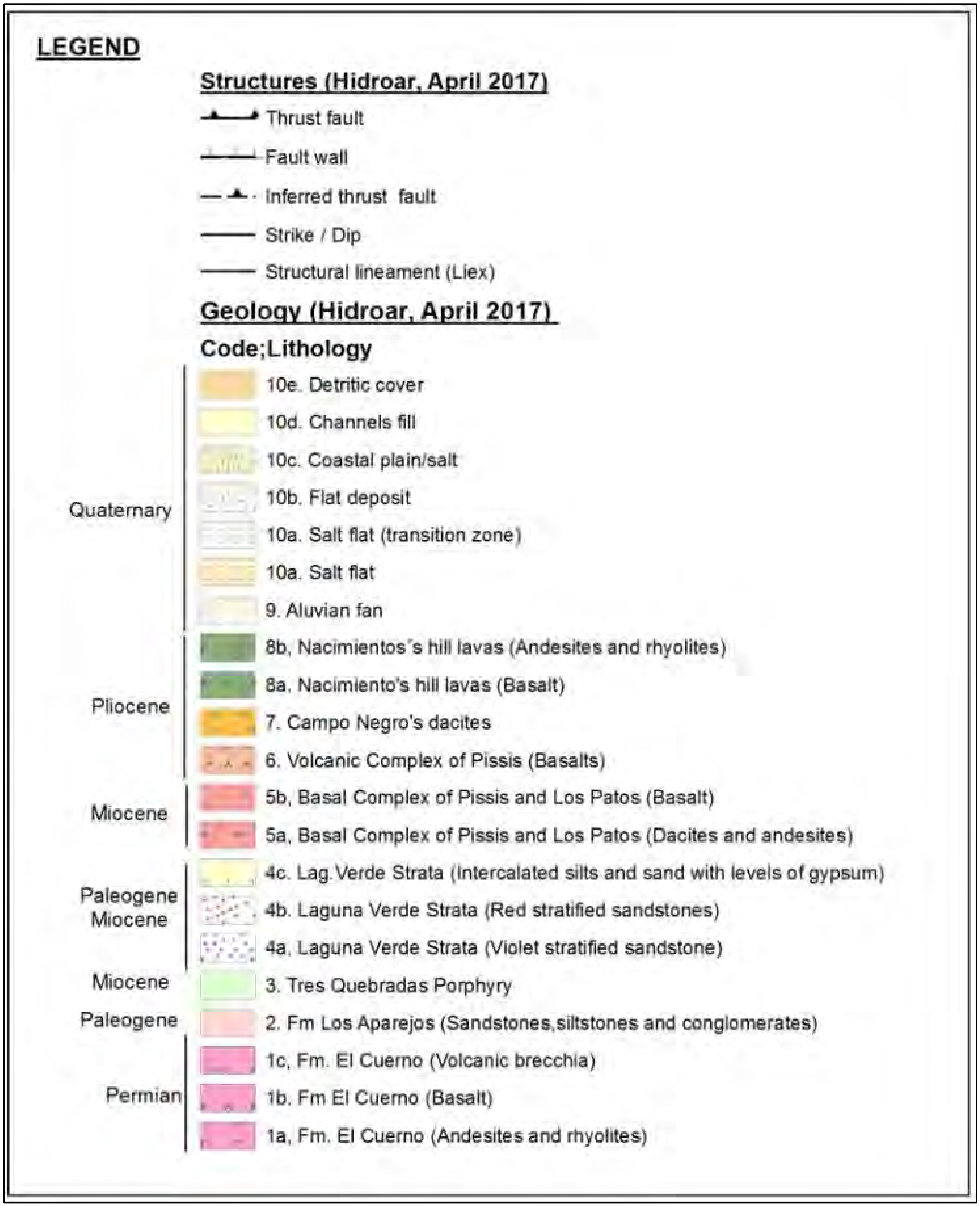


Figure 8.2: Lithostratigraphic references for the 3Q Project map shown in Figure 8.1.

Table 8.1: Volume and Average Composition of the Resource Estimate defined at the 3Q Project (for 520 mg/L lithium cut-off).

Parameter	Measured + Indicated	Inferred
Brine Volume (m^3)	1.875E+8	3.532+8
Lithium (mg/L)	716	713
Mean Potassium (mg/L)	6,506	6,554
Magnesium (mg/L)	1,421	1,477
Mean Sulfate (mg/L)	374	384
Mean Boron (mg/L)	1,010	1,015
Mean Mg/Li Ratio	1.99	2.07
Mean SO_4/Li Ratio	0.52	0.54
Mean Density (g/ml)	1.21	1.21

Table 8.2: Comparison of selected brine chemistry for the Resource Estimate defined at the 3Q Project (for the 520 mg/L cut-off) with other lithium brine deposits.

Company	Location	mg/l					Density	Ratio	Ratio
		Li	K	Mg	SO_4	B	(g/cm^3)	(Mg/Li)	(SO_4/Li)
Comibol	Uyuni, Bolivia [A]	424	8,719	7,872	10,294	242	1.21	18.57	24.29
SQM	Atacama, Chile [B]	1,835	22,626	11,741	20,180	783	1.22	6.40	11.00
Lithium Americas Corp.	Cauchari - Olaroz, Argentina [F]	625	5,123	1,500	18,163	1,066	1.22	2.40	29.07
Rincon Lithium	Rincon, Argentina [E]	403	8,003	3,697	12,383	488	1.22	9.18	30.76
Zhabuye Lithium	Zhabuye, China [C]	1,258	34,241	13	67,963	3,709	1.30	0.01	54.02
FMC	Hombre Muerto, Argentina [A]	747	7,435	1,024	10,279	422	1.21	1.37	13.76
CITIC Guoan	West Taijinair, China [C]	257	101,219	8,447	183,581	380	1.23	32.81	713.05
Orocobre	Olaroz, Argentina [D]	684	5,880	1,908	-	696	-	2.79	-
Western Mining Group	East Taijinair, China [C]	808	86,654	17,404	178,475	1,061	1.26	21.53	220.80
Rodinia Lithium Inc.	Diablillos, Argentina [G]	556	6,206	-	-	646	1.09	-	-
Lithium One Inc.	Hombre Muerto, Argentina [H]	787	8,695	-	-	-	1.19	-	-
Li3 Energy	Maricunga, Chile [I]	1,248	8,976	8,280	720	612	1.20	6.63	0.58
Neo Lithium	**Tres Quebradas [J]**	**716**	**6,506**	**1,421**	**374**	**1,010**	**1.21**	**1.99**	**0.52**

Notes
[A] Data from Roskill, 2009.
[B] SQM: US SEC report Form 2 F 2009.
[C] Data from Dr. Haizhou Ma, Institute of Salt Lakes, China.
[D] Houston and Ehren (2010); density of 1.2 was assumed for converting wt% to mg/L.
[E] Fowler and Pavlovic, 2004.
[F] LAC Feasibility Report (King, et al., 2012); results for Total Updated Resource (500 mg/L cut-off).
[G] Larrondo et al. (2011).
[H] Rosko and Jacks (2012).
[I] Hains and Reidel (2012).
[J] Measured + Indicated Resource at 520 mg/L cut-off; results documented in this Report.
"-" = Not available

9. Exploration

9.1 Overview

Two primary field exploration campaigns have been conducted to date at the 3Q Project, to evaluate the lithium development potential of the deposit. Exploration components are summarized in Table 9.1.

Table 9.1: Summary of Exploration Work Conducted to Date, at the 3Q Project.

Exploration Component	Purpose	Description
Surface brine sampling in the Salt flat and Lakes (1st Round)	Reconnaissance scale sampling to evaluate for lithium presence	41 samples collected
Surface brine sampling in the Salt flat and Lakes (2nd Round; 1st primary campaign)	To map surface brine distributions	255 samples collected (including 61 QA/QC samples)
Surface brine sampling in the Salt flat and Lakes (3rd Round; 2nd primary campaign)	To confirm results from 2nd Round	102 samples collected (including 20 QA/QC samples)
Vertical Electrical Sounding (VES) Surveys	To map subsurface resistivity trends for use in locating boreholes	35 VES locations tested, along 8 sections throughout the salt flat
Diamond Drilling	To collect cores and brine samples; to monitor pumping tests	• 1989 m of drilling in 11 boreholes • Construction of 11 wells • 60 core samples for RBRC
Rotary Drilling	To conduct and to monitor pumping tests in shallow and deep aquifers	• 733 m of drilling in 13 boreholes • Construction of 9 pumping wells and 4 obs wells
Brine sampling from boreholes and wells	To map subsurface brine distributions	127 brine samples (including 23 QA/QC samples) from packers and wells
Pumping Trenches	To conduct pumping tests in the near-surface aquifer	Installation of 2 Pumping Trenches
Pumping Test Program	Determine aquifer characteristics and brine chemistry	• Pumping tests at 5 Pumping Wells (4-72 hr Constant Rate; 1-3 hr Step Test) • 2-6 hr pumping tests in Pumping Trenches

9.2 Vertical Electrical Sounding (VES) Survey

VES surveys were carried out at the 3Q Project to evaluate the types of salt flat infill materials and the presence and distribution of brine. The VES Survey was conducted by Conhidro during October and November 2016. The study was carried out with a CGEG CO Ltd. model DUK - 2 A, self - compensating, direct current with direct reading of resistivity. The survey setup is shown in Photo 9.1.

In total, readings were taken at 35 VES locations throughout the 3Q Project, at the locations shown in Figure 9.1. Figures 9.2 and 9.3 show typical survey profiles from geoelectric lines. Figure 9.4 is an example of the capabilities of the output, showing the depth to the roof of a unit with a diagnostic geoelectric response. As shown in Figures 9.2 and 9.3, the Survey identified four distinct geoelectric units and trends:

- Unit 1 is a very highly conductive zone interpreted as consisting mainly of evaporites and clastic sediments.
- Unit 2 is a zone of medium conductivity interpreted as porous or cavernous evaporitic sequences with possible clastic sequences.
- Units 1 and 2 have a combined thickness of over 90 m in the northern end of the salt flat.
- Unit 3 has lower conductivity and is interpreted to consist of evaporites, extending to an average depth of 200 m.
- Unit 4 is a lower conductivity zone and is interpreted as Tertiary sediments.
- Units 1 and 2 were interpreted to have the best potential for containing brine.

Results from the VES Survey were used to guide the final design of the subsequent drilling program.

Photo 9.1: SEV survey equipment.

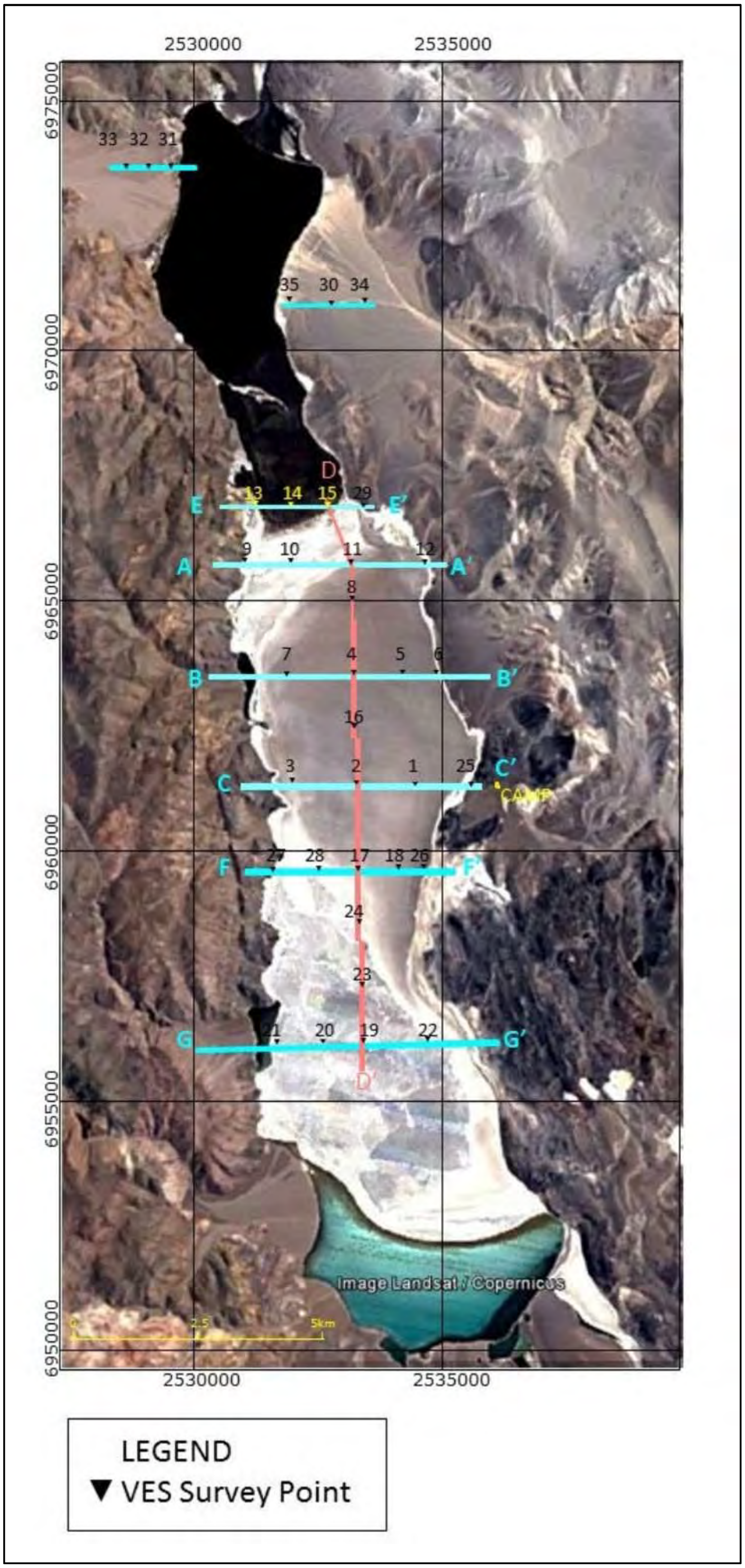


Figure 9.1: VES Locations.

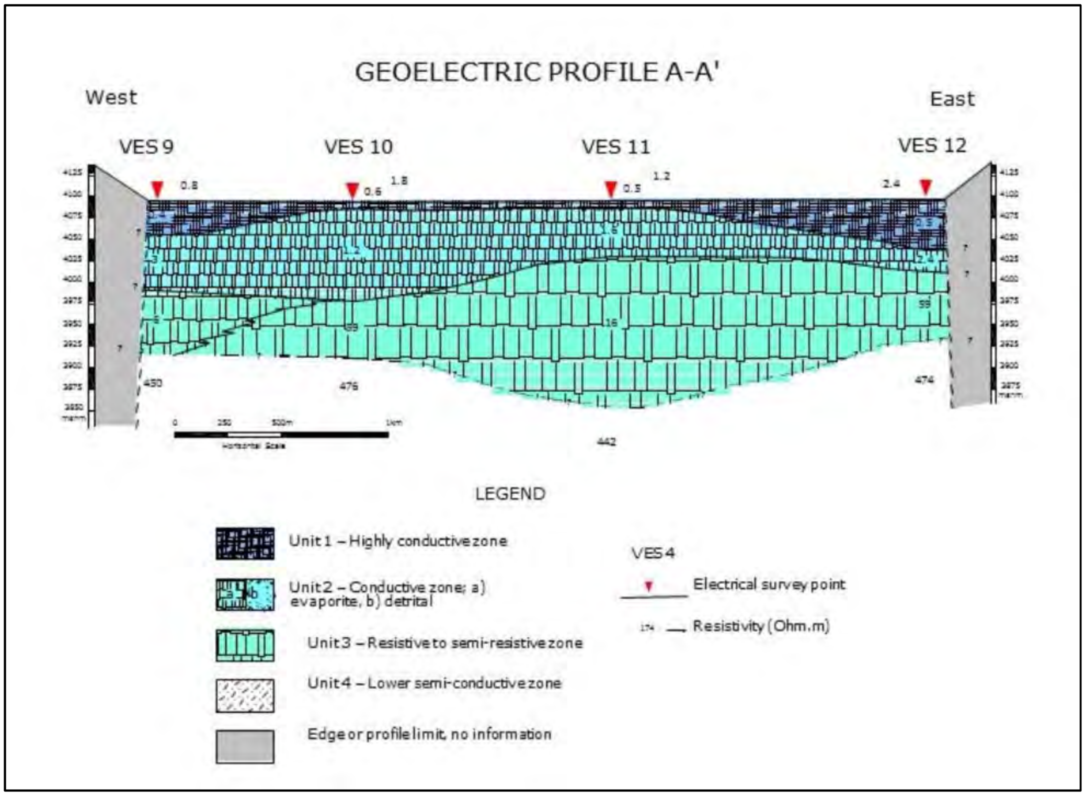


Figure 9.2: Geoelectric Profile A-A'.

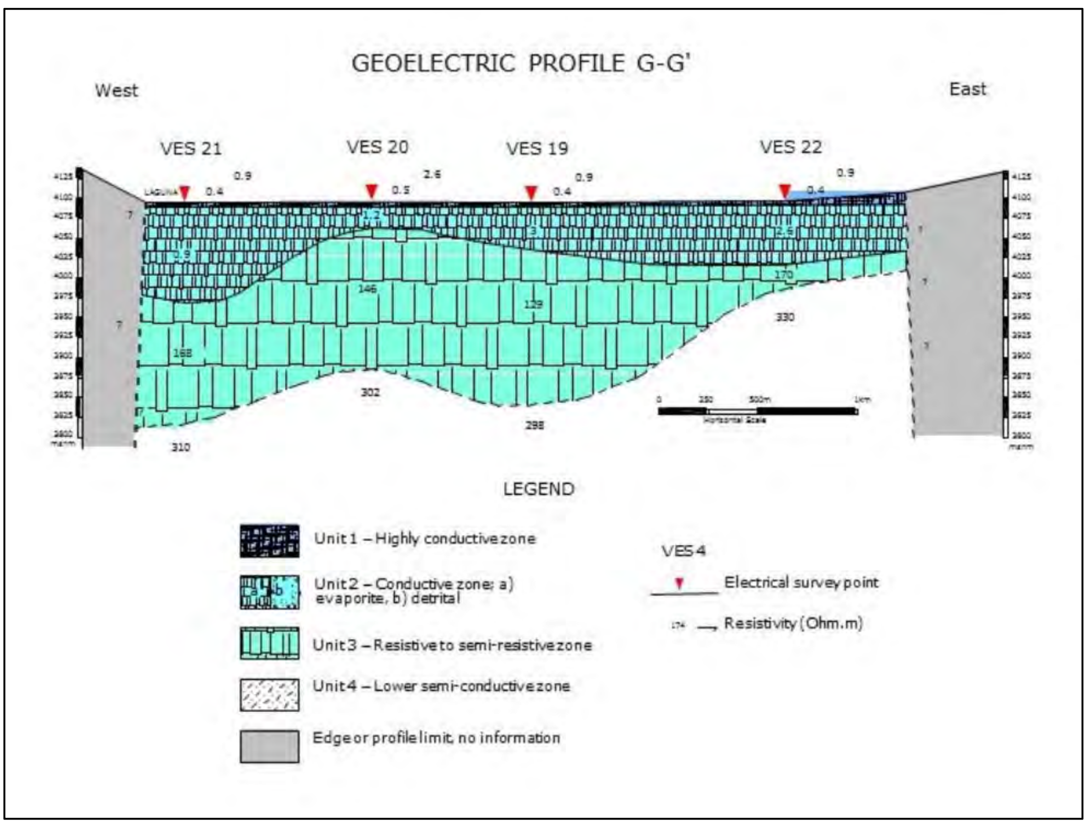


Figure 9.3: Geoelectric Profile G-G'.

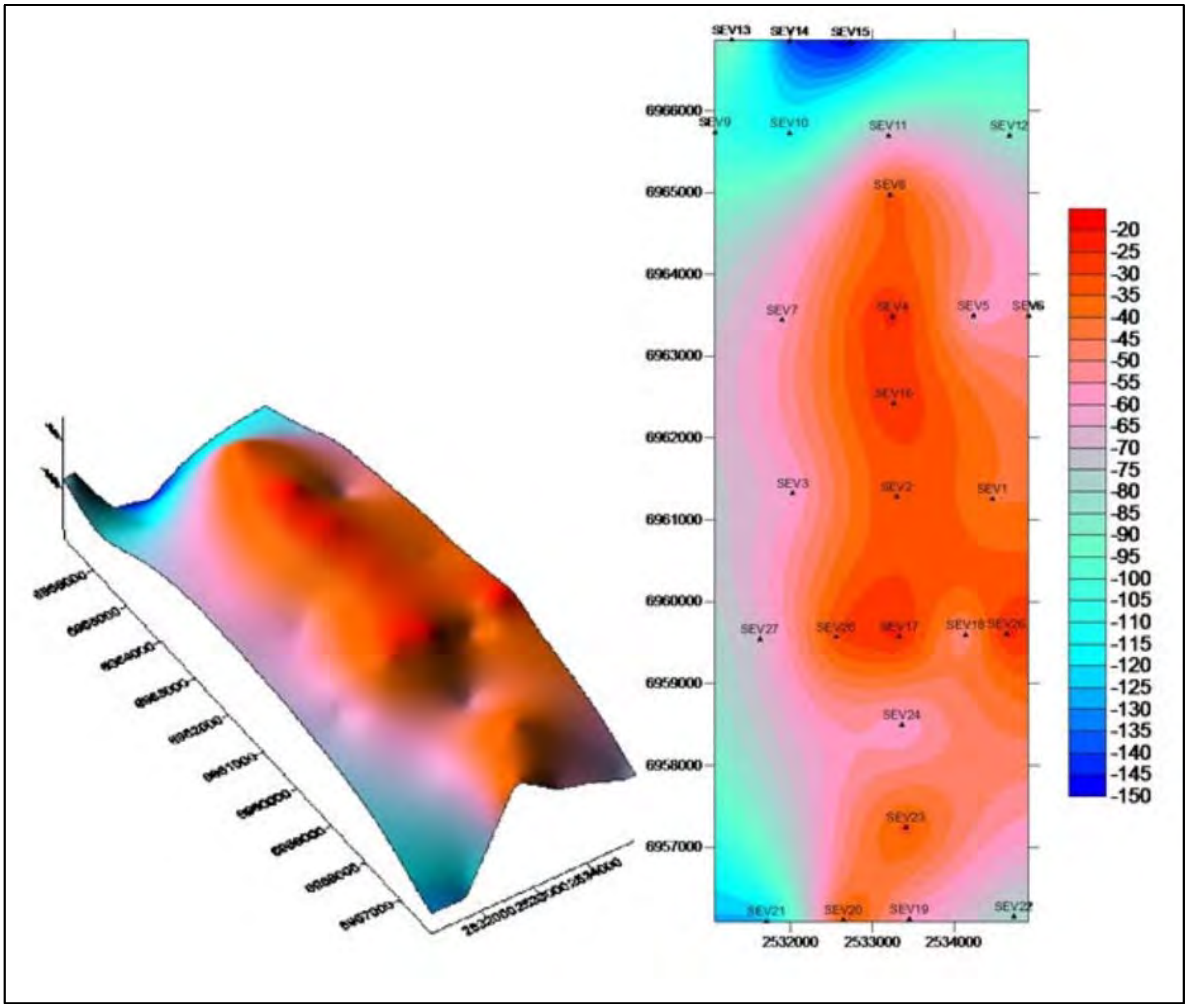


Figure 9.4: Interpreted depth to the top of geoelectric unit 3.

9.3 Surface Brine Sampling Program

Surface brine sampling has been conducted three times at the 3Q Project, for the following purposes:

- An initial reconnaissance program was conducted throughout the 3Q Salt flat Complex during December of 2015, for a general indication of lithium presence or absence at the site.
- Based on encouraging results from initial sampling, a systematic grid program of lake and salt flat surface sampling was implemented in the first quarter of 2016, to resolve trends in lithium and brine distribution.
- Additional surface brine samples were collected during the 2017 program, to assess the stability of the lithium grades measured in the second sampling round.

Figure 9.5 shows the chronology of the surface sampling for samples collected in 3Q Salt flat and the two adjacent brine lakes. The first two sampling sessions were described in detail by King (2016). The third session used methods that were identical, in terms of lake sampling. For salt flat surface sampling, the only difference was that the shallow pits were excavated with heavy equipment instead of by hand. Methods are described in more detail in Section 11.

A bathymetric map of the Laguna 3Q is shown in Figure 9.6. Surface brine samples were analyzed for lithium, potassium, boron, barium, calcium, chloride, iron, magnesium, manganese, sodium, strontium, total dissolved solids (TDS), sulfate, alkalinity, density, and pH. Interpolations of selected surface brine results (lithium, potassium and magnesium:lithium ratio) are shown in Figures 9.7 to 9.9, to provide an indication of distributions in shallow brine. Figures showing additional parameters in surface brine are available in King (2016).

Figures 9.7 to 9.9 are composites, in that they use data from both the 2016 and 2017 sampling programs. This representation is considered reasonable because the data from the two sampling sessions are comparable. The data were interpolated using an inverse distance-weighted method. Sample duplicates were averaged before interpolation.

Lithium and potassium concentrations are generally highest in the north end of the Complex, in Laguna 3Q and the northern sector of the 3Q Salt flat. Laguna Verde and Laguna Negra also show elevated concentrations relative to adjacent salt flat areas.

The distribution of the magnesium:lithium ratio is shown in Figure 9.9. Magnesium represents an impurity with respect to lithium processing in that it increases processing effort. Zones of elevated magnesium occur at both the north and south ends of the Complex, however, the highest concentrations occur in the south, and the ratio is higher in the south.

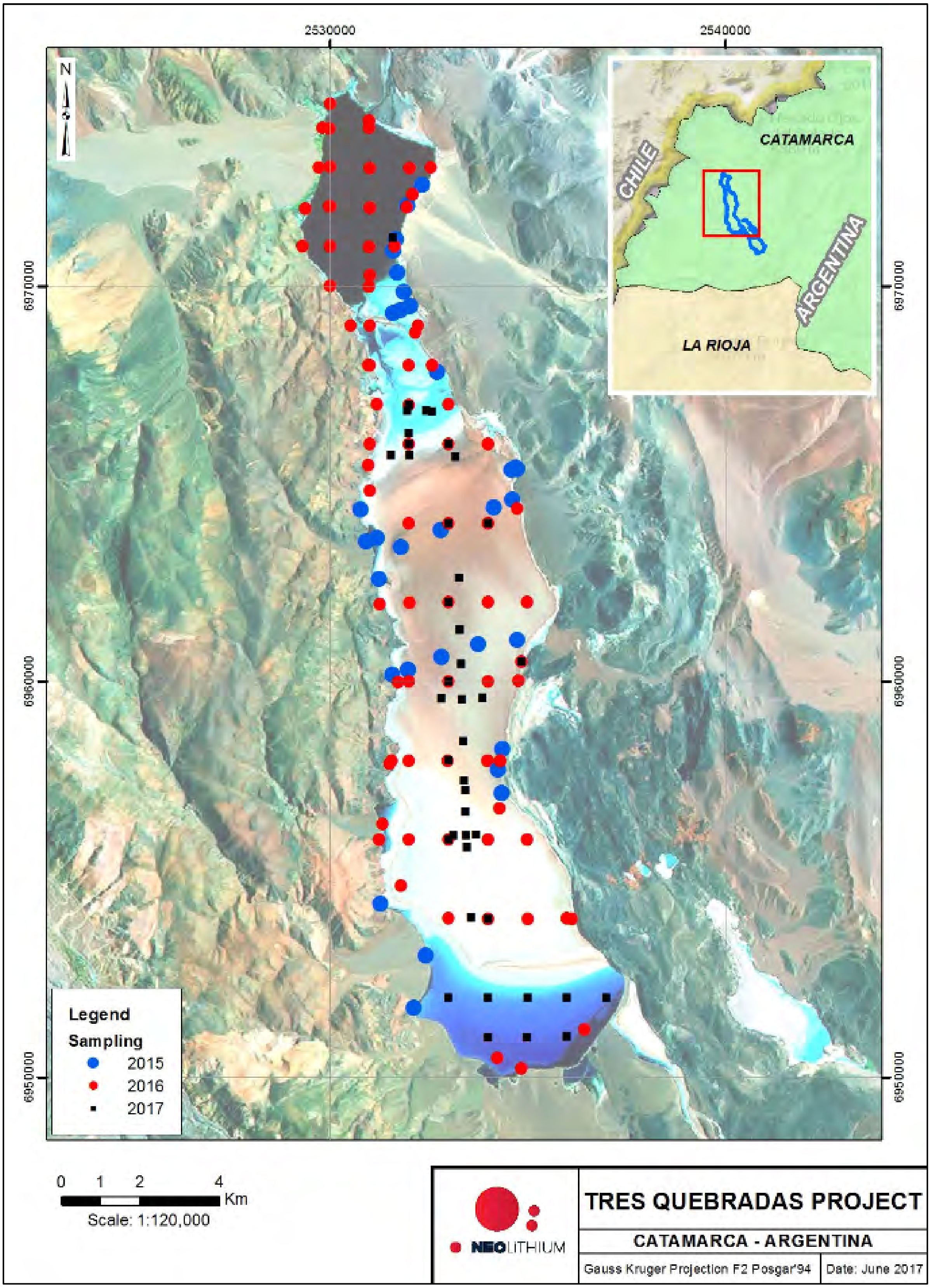


Figure 9.5: Chronology of Surface Brine Sampling in 3Q Salt flat, Laguna 3Q and Laguna Verde.

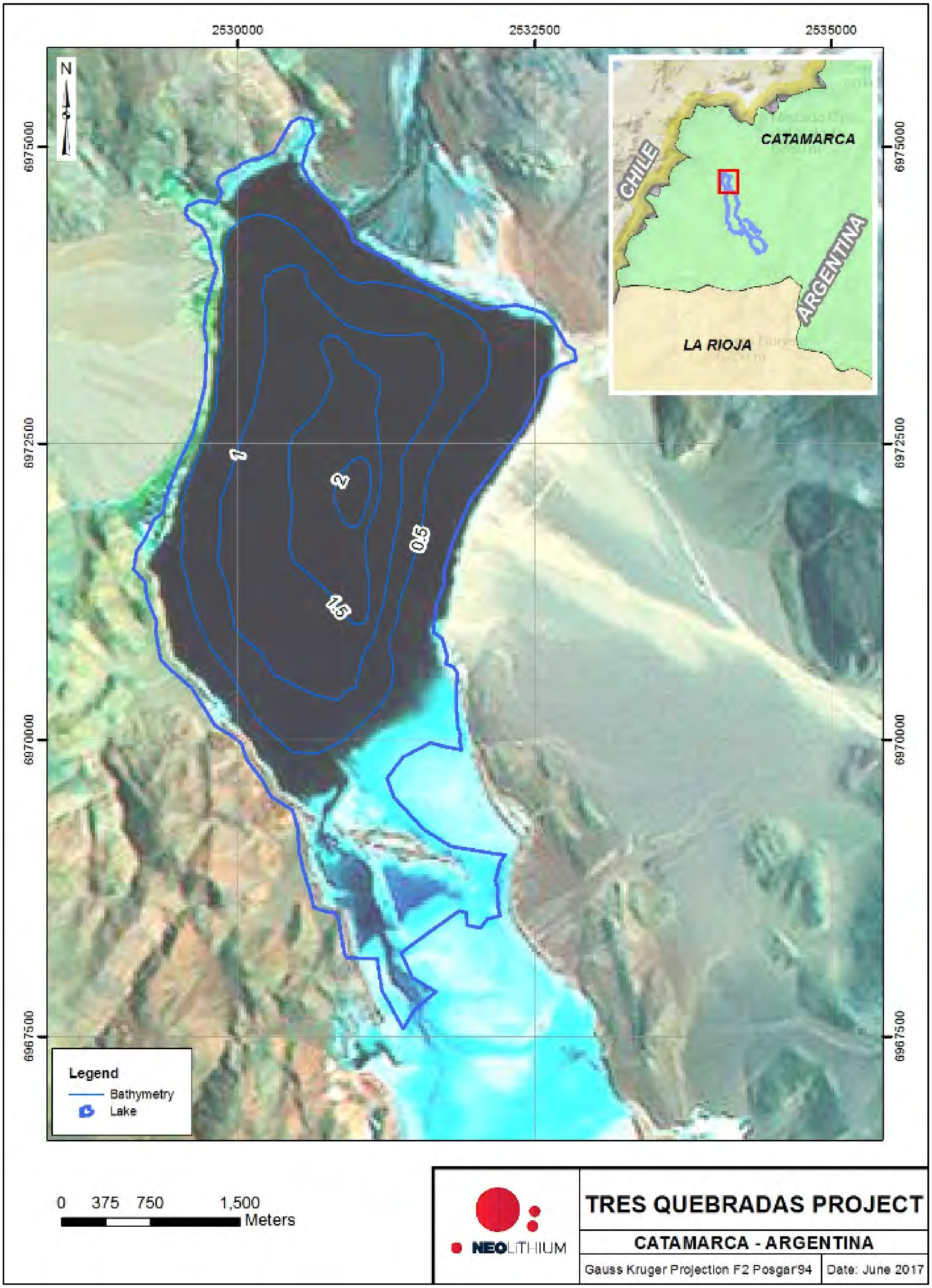


Figure 9.6: Bathymetry of Laguna 3Q.

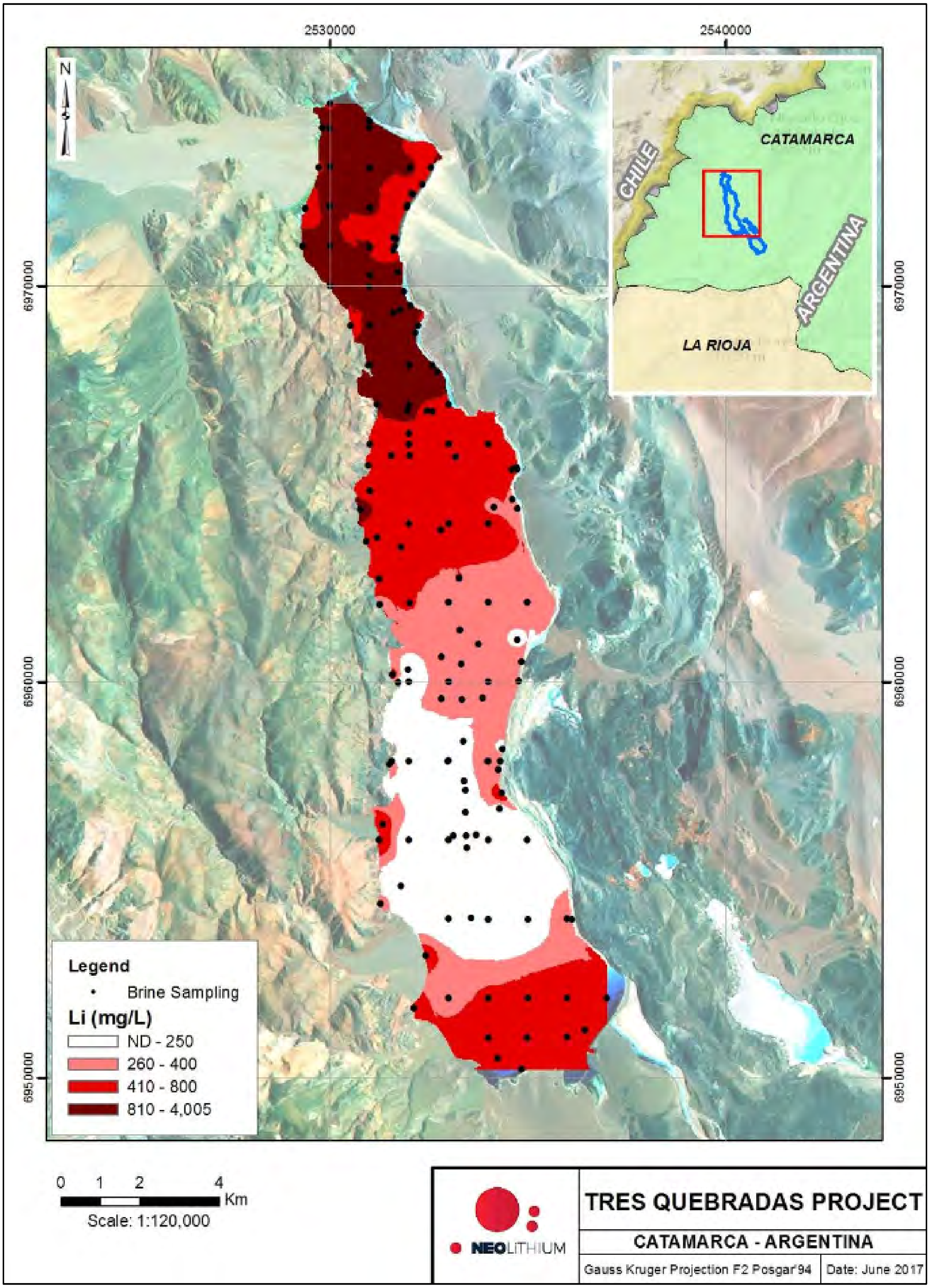


Figure 9.7: Interpolation of Lithium Results from Surface Brine Samples.

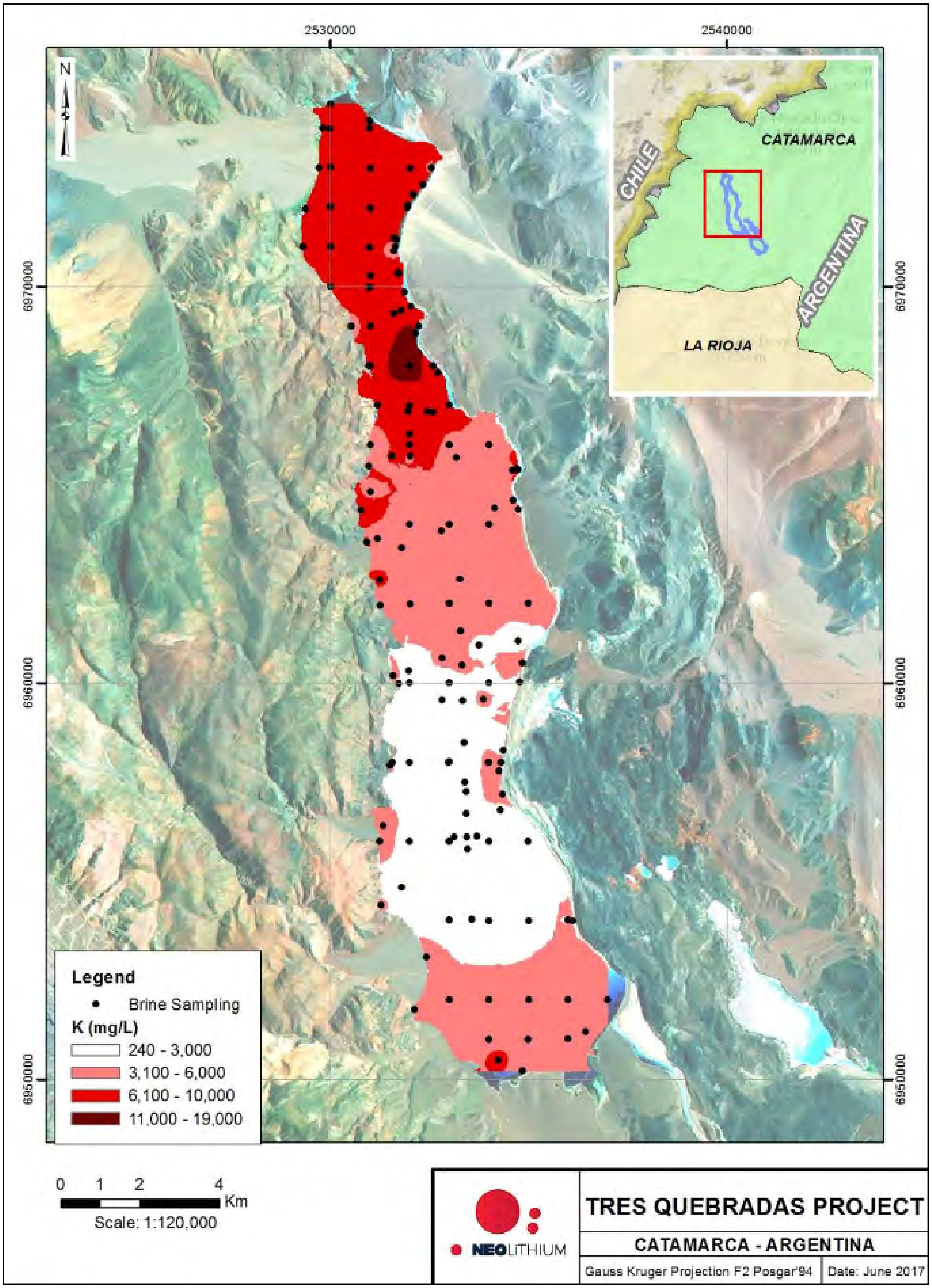


Figure 9.8: Interpolation of Potassium Results from Surface Brine Samples.

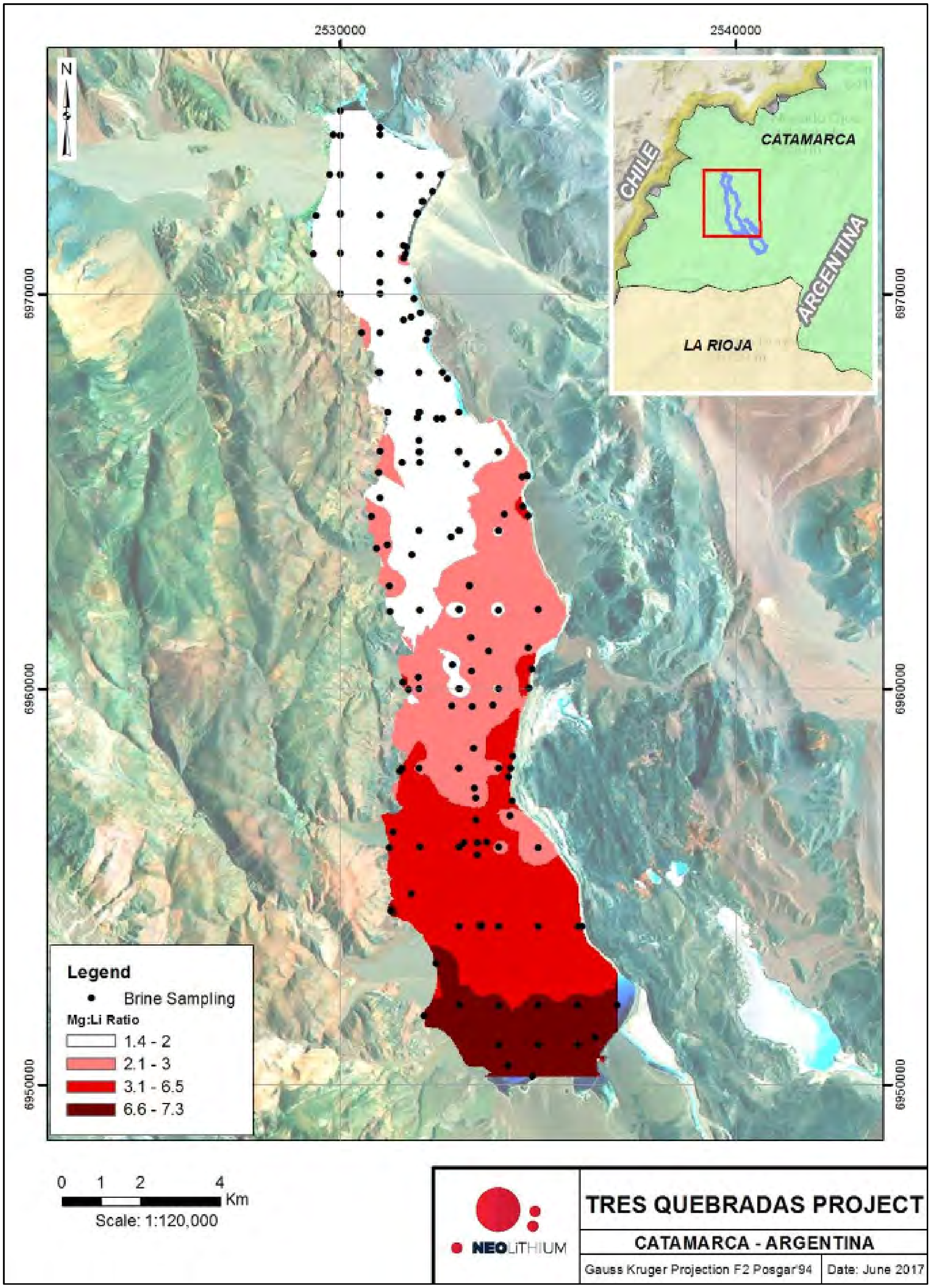


Figure 9.9: Interpolation of the Magnesium:Lithium Ratio in Surface Brine Samples.

9.4 Pumping Test Program

A pumping test program was designed to evaluate the hydraulic parameters of the salt flat aquifers.

9.4.1 Pumping Tests in Wells

Pumping tests were conducted in five pumping wells, each with a corresponding observation well. The purpose of this work was to characterize hydraulic properties of the primary hydrostratigraphic units, to support development of a numerical Reserve modeling in the next stage of the Project (see recommendations in Section 19). These tests, and the analysis of the results, were conducted by the Argentinean company Conhidro. For processing the results, Conhidro used an aquifer modeling package known as StepMaster (version 2.1.0.0) by Starpoint Software. Detailed reports of the testing results and the analysis were provided to NLC.

After the first five wells were tested, the weather became too cold to proceed with further testing. Testing of the remaining pumping wells is recommended for the next field season (Section 19). Test results are summarized in Table 9.2. The locations of the wells used in these tests are shown in Section 10.

9.4.2 Pumping Tests in Trenches

Pumping tests were also conducted in two shallow trenches that were excavated into the surface of the salt flat with heavy equipment. The purpose of these tests was to characterize the shallow salt flat crust for use in subsequent numerical modeling. These tests, and the associated data analysis, were also conducted by Conhidro. For processing the results, Conhidro used a modeling package known as Infinite Extent. Results of trench pumping tests are summarized in Table 9.3. The locations of these trenches are shown in Section 10.

Table 9.2: Summary of Pumping Test Results from Pumping Wells.

Parameter	PB1-R-01	PB1-R-02	PB1-R-03	PB1-R-04	PB1-R-05
Platform	1	2	3	4	5
Test Interval (depths; m)	31 – 52	0 – 82	0 - 43	0 - 71	0-42
Tested Hydrostrat. Unit	Upper Clastics	Upper Clastics	High Porosity Halite	High Porosity Halite and Upper Clastics	High Porosity Halite and Upper Clastics
Test Type	Step	Constant	Constant	Constant	Constant
Number of Pumping Rates	3	1	1	1	1
Duration (hr)	1/rate	72	72	72	53
Flow Rate (m^3/hr)	5.29 7.41 9.63	66.375	73	66.375	72.2
Transmissivity (m^2/d)	11	2,997	6,209	6,089	3,219
Storage Coefficient	0.01316	-	-	-	-
Specific Yield	-	8.43E-6[1]	0.43	0.02[1]	3.95E-3[1]
Effective Porosity	-	-	0.43[2]	-	-

Notes
1. These results appear to be indicative of confined tests, even though the wells are screened to surface.
2. This result was obtained with a tracer test, where a dye tracer was introduced to the observation well and the travel time to the pumping well was monitored.

Table 9.3: Pumping Test Results from Shallow Trenches.

Parameter	Central Trench	North Trench
Test Interval (depths; m)	0 – 1	0 – 1
Tested Hydrostrat. Unit	High Porosity Halite (Salt flat Crust)	High Porosity Halite (Salt flat Crust)
Test Type	Constant	Constant
Duration (hr)	9	9
Flow Rate (m^3/hr)	44	22.6
Transmissivity (m^2/d)	8,339	3,596
Specific Yield	0.46	0.51
Effective Porosity	0.46[1]	-

Notes

1. This result was obtained with a tracer test, where a dye tracer was introduced to the observation trench and the travel time to the pumping trench was monitored.

9.5 Data Processing

Laboratory data and borehole log information was compiled in a Microsoft Access database and processed using Microsoft Excel and Apple Numbers spreadsheet software. All relevant spatial site information and mapping is compiled in ESRI ArcGIS. Google Earth satellite imagery was used to identify topographic and hydrologic features.

10. Drilling

10.1 Overview

Drilling was conducted at the 3Q Project between January and April 2017, with the following objectives:

- To obtain samples for characterizing subsurface brine chemistry;
- To characterize salt flat geology with continuous cores, downhole geophysics, and other drilling information; and
- To install pumping and observation wells for hydrogeological characterization.

Boreholes were planned and grouped in “platforms” where, if feasible, there was a diamond borehole on each platform to guide the installation of rotary boreholes and wells. This approach involved the following planning at a typical platform:

- The diamond borehole was typically drilled first and the core was logged and downhole geophysics were performed, to obtain a detailed and reliable representation of the subsurface at the platform location.
- Packer samples were collected from the diamond borehole during drilling for discrete monitoring of brine at different levels.
- The diamond borehole was completed as a deep observation well for use in subsequent pumping tests.
- On the basis of the diamond core log, downhole geophysics, and field monitoring of the brine, the remaining wells to be located on the platform were designed. One or more pumping wells were designed and installed by rotary methods, to test potentially important brine aquifers.
- If more than one pumping well was installed on the platform (for example, if both a shallow and a deep pumping well were installed) then an additional observation well would be installed to monitor the pumping test of the second well (the diamond drill well would already be configured to monitor the first pumping well).
- If it was not feasible to drill a diamond borehole on the platform (i.e., due to flowing sands) then the pumping well was designed on the basis of recovered rock chips and downhole geophysics; and the associated observation well was installed by rotary method.
- In some cases, only a diamond borehole was drilled on the platform, with potential to install one or more pumping wells on these platforms, at a later date.

Platform and well locations are shown in Figure 10.1. A summary of borehole and well specifications is provided in Table 10.1, and it is noted that all boreholes are vertical.

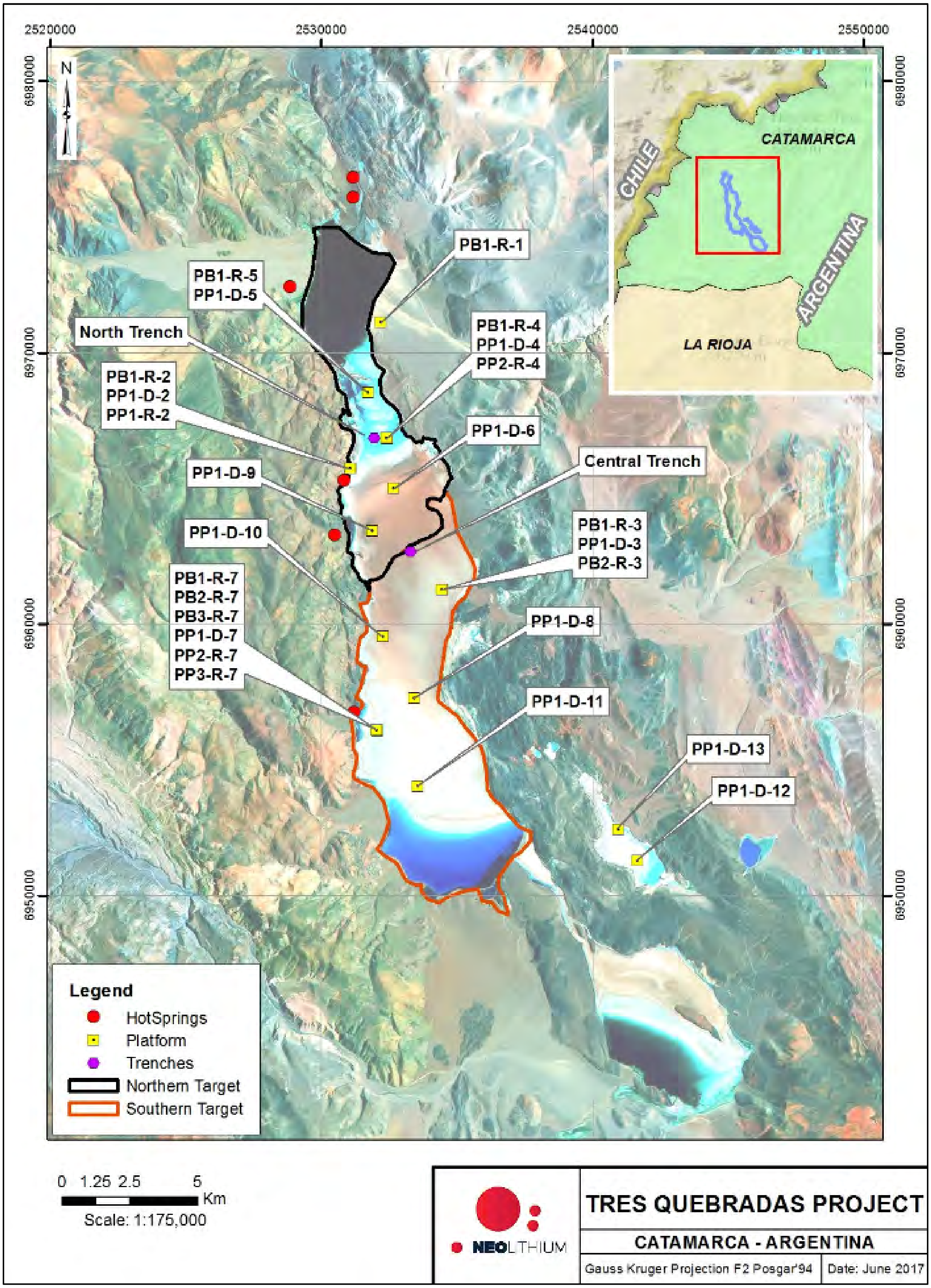


Figure 10.1: Drill Platform and Borehole Locations – 3Q Project.

Table 10.1: Summary of Drilling Specifications – Diamond and Rotary Methods (Vertical Holes).

Platform	Borehole ID	Depth (m)	Drilling Method	Well Construction: Screen/Sand Pack Interval From (upper; m)	Well Construction: Screen/Sand Pack Interval To (lower; m)	Well Construction: Type of Well	Packer Sampling Interval, During Drilling: From (upper; m)	Packer Sampling Interval, During Drilling: To (lower; m)
1	PB1-R-01	126.0	Rotary	31.0	52.0	Pumping Well	-	-
2	PP1-R-02	75.0	Rotary	0.0	75.0	Obs Well	-	-
	PB1-R-02	82.0	Rotary	1.0	82.0	Pumping Well	-	-
3	PP1-D-03	195.5	Diamond	0.0	195.0	Obs Well	16.0 28.0 40.0 50.0 90.0 150.0	17.0 29.0 41.0 51.0 91.0 192.0
	PB1-R-03	43.0	Rotary	0.0	43.0	Pumping Well	-	-
	PB2-R-03	42.0	Rotary	0.0	42.0	Pumping Well	-	-
4	PP1-D-04	69.5	Diamond	0.0	69.5	Obs Well	43.0	49.7
	PB1-R-04	156.0	Rotary	0.0	70.4	Pumping Well	-	-
	PP2-R-04	72.0	Rotary	0.0	72.0	Obs Well	-	-
5	PP1-D-05	62.9	Diamond	0.0	62.9	Obs Well	13.6 31.9	20.2 55.3
	PB1-R-05	42.0	Rotary	0.0	42.0	Pumping Well	-	-
6	PP1-D-06	338.3	Diamond	0.0	338.0	Obs Well	10.0 32.0 65.0 110.0 165.0 206.0	28.0 62.5 100.0 165.0 200.0 251.4
7	PP1-D-07	197.5	Diamond	155.0	197.5	Obs Well	10.0 45.0 72.0 110.0 156.0	44.0 68.0 100.0 160.0 197.0
	PB1-R-07	204.0	Rotary	145.0	204.0	Pumping Well	-	-
	PB2-R-07	132.0	Rotary	28.0	132.0	Pumping Well	-	-
	PP2-R-07	130.0	Rotary	40.0	130.0	Obs Well	-	-
	PB3-R-07	36.0	Rotary	1.0	36.0	Pumping Well	-	-
	PP3-R-07	37.0	Rotary	1.0	37.0	Obs Well	-	-
8	PP1-D-08	357.5	Diamond	0.0	357.5	Obs Well	10.0 50.0 105.0 135.0 200.0 245.0 290.0	30.5 95.0 128.0 175.0 242.0 287.0 329.0
9	PP1-D-09	197.8	Diamond	145.0	197.8	Obs Well	10.5 45.0 85.0 130.0 170.0	45.0 85.0 120.0 170.0 197.8
10	PP1-D-10	219.0	Diamond	0.0	219.0	Obs Well	10.0 44.8 95.0 145.0 185.0	39.7 83.9 135.0 181.5 219.0
11	PP1-D-11	251.3	Diamond	0.0	251.3	Obs Well	10.3 40.0 85.0 125.0 161.3 195.0	30.1 80.5 120.1 161.3 194.8 236.0
12	PP1-D-12	90.0	Diamond	0.0	5.9	Obs Well		
13	PP1-D-13	13.4	Diamond	0.0	11.8	Obs Well		

10.2 Diamond Drilling

- The diamond drilling program, and observation well installation, was conducted by two companies:
- AGV Drilling installed PP1-D-3, PP1-D-4, PP1-D-7 and PP1-D-8; and
- Energold Drilling installed PP1-D-5, PP1-D-6, PP1-D-9, PP1-D-10, PP1-D-11, PP1-D-12 and PP1-D-13.

The diamond boreholes were drilled in HQ diameter, to the depth that the equipment was able to penetrate. At that point, the gear was changed to NQ diameter for drilling to the target depth. Core was recovered during drilling and transferred to core boxes. A range of biodegradable additives were used for the drilling, including: Toqueez, Sand Drill, AMC Superlube-Lubricante, AMC Ezee Pac R, AMC CR 650, and Amc Xan Bore.

Borehole logging was conducted by Conhidro at the Project site, with initial oversight by Hidroar and the IQP. A subsequent independent comparison and review of all cores and logs was conducted by Hidroar. A final comparison and review of all cores and logs was conducted by the IQP.

During logging, cores were sampled for analysis of Relative Brine Release Capacity (RBRC). Samples were collected with the objective of obtaining an approximate thickness weighted coverage of the lithological units encountered in the cores. Samples were placed in 2-inch diameter PVC sleeves, caps were tightly fitted on both ends, and plastic foil was wrapped around the entire sample.

Samples were shipped to D.B. Stephens and Associates Laboratory in Albuquerque, New Mexico, USA, for RBRC analysis, according to a methodology developed by the laboratory. The RBRC method provides an estimate of the standard hydrogeological property know as specific yield (Sy), which is the volume of solution that will readily drain from a geologic material (see Section 1.4.2).

To conduct the analysis, the undisturbed (or remolded) sample is saturated in the laboratory using a site-specific brine solution. The bottom of the sample is attached to a vacuum pump using tubing and permeable end caps. 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. The sample is then subjected to a suction of 0.33 bars for 18 to 24 hours.

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 "relative brine release capacity".

A total of 60 samples were collected, and a summary of results is provided in Table 10.2. Two samples were removed from the averages calculation, due to results that were considered unrealistically high, possibly due to disturbance of samples at some point in the sampling, shipping, or analysis process.

Table 10.2: Summary of Relative Brine Release Capacity (RBRC) Results from the Diamond Cores.

Lithological Unit	RBRC	Number of Samples
High Porosity Halite	18.2	4
Upper Clastics	7.8	8
Porous Halite	10.5	31
Massive Halite	2.2	10
Lower Clastics	6.3	5
Total		**58**

As the drilling progressed, brine sampling was conducted with double and simple packer systems, depending on the lithological conditions. Observation wells were constructed in the diamond boreholes with two inch PVC casing and screen. After construction, the wells were developed and cleaned by air lift methods, evacuating the brine until clear fluid was produced.

Monitoring, logging and downhole geophysics services (short and long normal resistivity) for the diamond drilling program was provided by Conhidro. For the AGV Drilling boreholes, the results of these services were summarized in a consolidated report. Excerpts from a typical Conhidro diamond drilling report are provided in Appendix 22.1. An AGV Drilling setup at Platform 3 is shown in previous Photo 4.1, and initial core review is shown in Photo 10.1.

Photo 10.1: Group review of early core from the diamond drilling program.

10.3 Rotary Drilling

Andina Perforaciones SRL was responsible for conducting the rotary drilling, and also the pumping tests. The drilling was traditional, with circulation of bentonite mud, prepared with brine that was obtained at each drilling platform. This method was used for installation of both pumping wells, and for any observation wells that were required in addition to those installed by diamond drilling.

The pumping wells were drilled with tricone bit, at 8, 12 and 15-inch diameter, with installation of 8 inch PVC casing and screen, with gravel placement around the screen. After installation, wells were cleaned with a four-inch submersible pump, until clear fluid was produced. Observation wells were drilled at 6 or 8-inch diameter and were installed with 2 inch PVC screen and casing.

Monitoring, logging and downhole geophysics services (normal resistivity (short and long), single point resistance, and spontaneous potential) for the rotary drilling program was provided by Conhidro. Excerpts from a typical Conhidro rotary drilling report (including pump testing) is provided in Appendix 22.2.

11. Sampling Method and Approach

11.1 Surface Brine and Stream Methods

During the 2016 surface brine sample program, samples were collected throughout the salt flat and the Laguna 3Q, on a grid basis. In the 2017 follow-up work, sampling was conducted at accessible locations, to evaluate the variability of shallow brine composition over time. The 2017 samples were typically collected in shallow pits excavated with heavy equipment, along the salt flat roads constructed to support the drilling program. The methods for collecting samples on the salt flat surface were as follows:

- The salt flat surface crust was excavated with a pick and shovel or with heavy equipment, to a depth of approximately 1 m (Photo 11.1).
- The excavated hole was purged of brine and the brine level was allowed to recover.
- Samples were collected in 500 mL plastic bottles.

Photo 11.1: Collecting brine samples from shallow hand-excavated pits.

Extensive brine sampling of Laguna 3Q was not conducted in 2017 because this brine lake was grid sampled in 2016. However, Laguna Verde was grid sampled in 2017 because it was only lightly sampled in 2016. The method for collecting lake brine samples (and simultaneous bathymetry information) was as follows:

- Samples were collected on a 1x1 km grid (in the case of Laguna Verde), collecting the sample at mid-depth.
- Deeper sectors were sampled from an inflatable boat; shallower sectors with hip waders.
- A 2.2 L water collection device was used which could be closed at the desired depth by dropping a weight down the suspension line (see Photo 11.2).
- When the sample is retrieved from depth, it is transferred to a 500 mL bottle.
- The depth to the bottom of the lake is measured, with a weighted rope.

Photo 11.2: Collecting samples.

Sampling and flow monitoring of surface water streams and rivers was conducted throughout the area that drains to the 3Q Complex. The methods used were as follows:

- Water velocity is measured at several points across a reach of the stream using a current meter (Photo 11.3). Back in the office, the velocity measurements and the associated cross-sectional areas are used to calculate flow through the reach.
- A streamflow sample is collected in a 500 mL plastic bottle.
- Field parameters are measured (pH, Eh, temperature, conductivity) (Photo 11.4).

Photo 11.3: Measuring flow.

Photo 11.4: Measuring field parameters.

11.2 Subsurface Brine Sampling

Packers were used to collect brine samples from discrete formation levels in the diamond boreholes. Samples were collected primarily with a simple packer apparatus, with some use of a double packer. The simple packer method for brine sampling from the diamond drill boreholes is as follows:

- When the diamond machine drills to the bottom of the desired sampling interval, the bars are raised to just above the top of the interval.
- A fluorescein dye solution sufficient to tint all the water in the borehole, is injected through the bars.
- The packer is lowered by wireline to the top of the desired sampling interval. It is then inflated from the surface, which isolates the sampling interval from the remaining (higher) section of the borehole.

- A compressor is used to conduct airlift-type purging of the fluid from inside the bars, which is hydraulically connected to the sampling interval, through the packer assembly.
- When the fluorescein tint is no longer evident in the purged brine, a brine sample is collected into a 500-mL container. At least three borehole volumes are purged before sample collection.

The double packer method is as follows:

- When the diamond machine drills to the target depth of the borehole, the bars are raised to some distance above the top of the desired sampling interval. This distance may depend on any concerns that the driller may have with regard to borehole caving.
- A fluorescein dye solution sufficient to tint all the water in the borehole, is injected through the bars.
- The double packer is lowered so that it straddles the desired sampling interval. It is then inflated from the surface, which isolates the sampling interval from the remaining (higher and lower) sections of the borehole.
- A compressor is used to conduct airlift-type purging of the fluid from inside the bars, which is hydraulically connected to the sampling interval, through the packer assembly.
- When the fluorescein tint is no longer evident in the purged brine, a brine sample is collected into a 500-mL container.

Subsurface brine samples were also collected during pumping tests, typically at the beginning, middle and end of the test. Samples were collected in 500 mL plastic bottles, directly from pumped brine stream.

11.3 Pumping Tests

The following pumping tests were conducted during the 2017 field season, with the objective of characterizing the hydraulic properties of primary hydrostratigraphic units in the salt flat:

- PB1-R-01: 3-hour Step Test;
- PB1-R-02: 72-hour constant rate test;
- PB1-R-03: 72-hour constant rate test;
- PB1-R-04: 72-hour constant rate test;
- PB1-R-05: 53-hour constant rate test;
- Central Trench: 9-hour constant rate test; and
- North Trench: 9-hour constant rate test.

Test results are summarized in previous Tables 9.2 and 9.3. The tests and the associated analysis, were performed by the Argentinean Company Conhidro, and a full report on each test was provided to NLC. Excerpts from an example of a well pumping test report are provided in Appendix 2. Excerpts from a trench report are provided in Appendix 22.3.

To date, the tests have focused on the upper two hydrostratigraphic units (High Porosity Halite and Upper Clastics). Wells were installed for additional pumping tests in the 2017 field season. However, the onset of cold weather made it impractical to continue the testing program. Testing of the existing wells, and new wells, is recommended for the next season (Section 19). Following is the general methodology for the tests:

- For the pumping wells, the constant rate test was preceded by a step test, conducted for the purpose of determining an effective pumping rate for the constant test. In one case (PB1-R-01) only the step test was performed, and hydraulic properties were estimate with a shorter duration dataset.
- During the well, tests piezometric levels were measured in the pumping well and in the observation well that was paired with the pumping well (i.e., installed in the same hydrostratigraphic unit) with data loggers and manual measurements.
- Test data were interpreted with specialized software, including: Infinite Extent, full version 4.1.0.1; Stepmaster version 2.1.0.0 (both by Starpoint Software INC.,) and Well Functions from the program GWW version 1.10.
- An attempt was made to determine effective porosity through the tests, by injecting a fluorescein tracer into the observation well and recording the time of travel to the pumping well. Initial results indicated that the wells were too distant from each other for tracer capture to occur during the pumping period. Consequently, a subsequent pumping/observation well pair were installed closer together (at PB1-R-03) and a successful result was obtained, with breakthrough occurring at between 42 and 45 hours. Effective porosity was calculated with the method of Custodio and Llamas (1996).
- For the trench tests, pumping was conducted from a pumping trench, with drawdown monitoring in two observation trenches. A fluorescein tracer was used in one of these tests, to provide an estimate of effective porosity, for comparison with conventional specific yield (Sy) calculation. As indicated in previous Table 9.3, results were comparable.

12. Sample Preparation, Analyses and Security

12.1 Overview

All sample collection, QA/QC, and secure transport was performed under the supervision of Waldo Perez, Ph.D., P. Geo. Based on a review of these components, the IQP considers the 3Q Project dataset and QA/QC procedures to be adequate for the evaluation of a brine resource at the 3Q Project.

12.2 Sample Preparation

No preparation was required for the brine samples. The brine samples collected in the field were delivered by NLC company personnel to Andesmar Transport Company in La Rioja, in the province of Rioja. Andesmar delivered the samples by truck to Alex Stewart Laboratories (ASL) in Mendoza, Argentina.

12.3 Brine Analysis

- ASL is an independent commercial ISO 9001-2008-certified laboratory and was selected for assaying all samples from the 3Q Project. ASL used the following analytical methodologies:
- ICP-OES (inductively-coupled plasma—optical (atomic) emission spectrometry) was used to quantify boron, barium, calcium, lithium, magnesium, manganese, and potassium.
- An argentometric method was used to assay for chloride.
- A gravimetric method was used to analyze for sulfate.
- A volumetric analysis (acid/base titration) was used for evaluation of alkalinity (as CaCO3).
- Density and total dissolved solids were determined through a gravimetric method.
- A laboratory pH meter was used to measure pH.

12.4 QA/QC Program

12.4.1 Summary

Primary components of the field QA/QC program for the Project included the following:

- A high-range reference sample was inserted into the sample stream at a frequency of approximately 1 in 15 samples. The bulk sample used for this purpose was obtained from the southeast shoreline of Laguna 3Q where high grades were previously sampled.
- A mid-range reference sample was inserted into the sample stream at a frequency of approximately 1 in 15 samples. The bulk sample used for this purpose was obtained from the eastern shoreline of Laguna 3Q where mid-range grades were previously sampled.

- A Round Robin analysis of the high- and mid-range bulk reference samples was conducted by ASL.
- A low-range reference sample (essentially a field blank) was inserted at a frequency of approximately 1 in 15 samples. The bulk sample used for this purpose was obtained from municipal tap water at the Project office in Fiambala, the nearest town to the site.
- A field duplicate sample was inserted into the sample stream at a frequency of approximately 1 in 15 samples;
- A program of laboratory duplicate sampling was conducted by ASL.
- Sets of independent field duplicate samples were collected by the IQP during both the 2016 and 2017 field programs (Section 13).

12.4.2 Round Robin Analysis of Bulk Reference Samples

The bulk reference samples described above were used as a means of evaluating analytical precision and drift, as the program proceeded. As a first step in using these bulk samples, a Round Robin was conducted by ASL for the mid-range and high-range samples. The purpose was to certify the average content and standard deviation of lithium, potassium and calcium using ICP-EOS analysis from certified laboratories. Full results are provided in Spanish-language reports in Appendix 22.4.

The mid-range reference sample was analyzed by the following laboratories: ASL (Mendoza), ASL (Jujuy), SGS, Segemar and Induser. The high-range reference sample was analyzed by ALS (Mendoza), ALS (Jujuy), SGS, ACTLABS, Sherrit, Segemar and Induser.

The results of the Round Robin analysis provide certified mean values and standard deviations for the three tested analytes, in the mid- and high-range reference samples. These statistics are useful for evaluating for analytical precision and potential drift as the field program proceeds. In subsequent field work at the site, the low-range reference sample should also be included in the Round Robin analysis.

12.4.3 Reference Sample Performance in the Sampling Program

As described above, reference samples were used as a benchmark for ongoing evaluation of analytical drift. Mid- and high-range reference sample performance results for lithium are shown in Figures 12.1 and 12.2, respectively. Figures 12.3 and 12.4 show mid- and high-range results (respectively) for potassium. As shown in the figures, most reference sample results fall within ± two standard deviations of the mean, which is considered the primary control limit for the Project. No samples returned values that exceeded ± three standard deviations from the mean (the level that would trigger a laboratory review).

The IQP is satisfied that results from the field reference sample program are within acceptable ranges and show no evidence of unacceptable analytical drift over time.

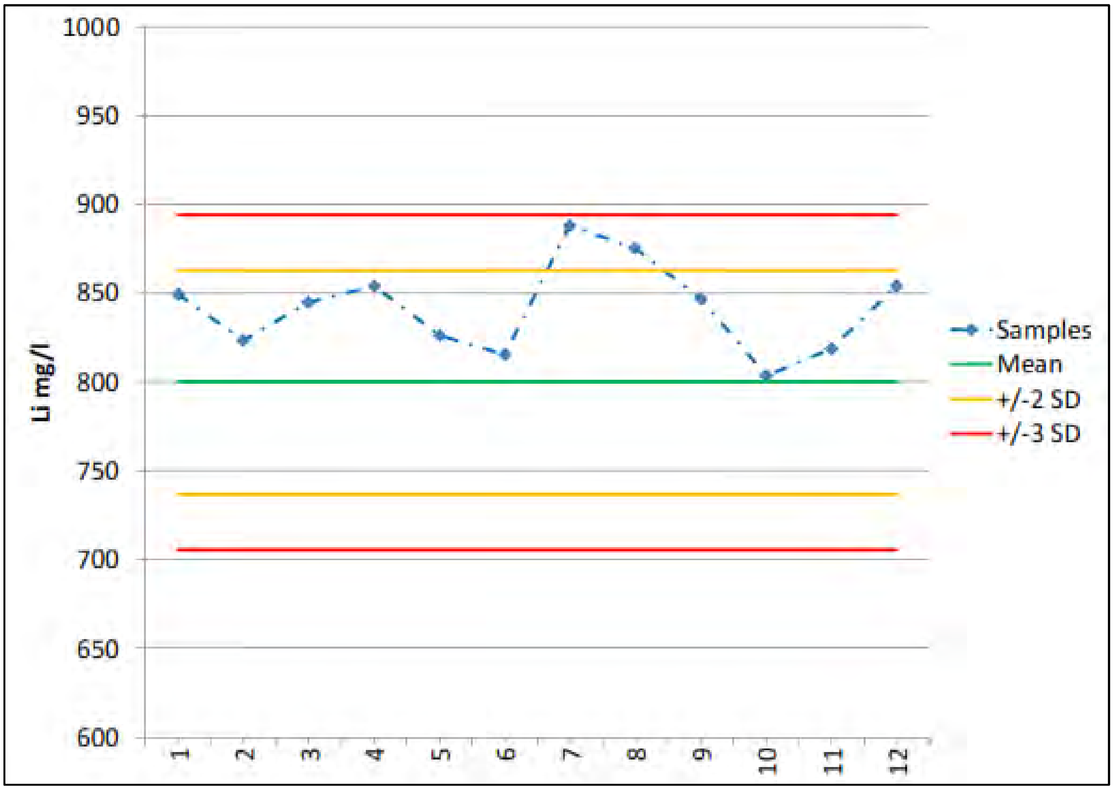


Figure 12.1: Lithium results for mid-range reference samples, compared with Round Robin Mean and Standard Deviation.

Figure 12.2: Lithium results for high-range reference samples, compared with Round Robin Mean and Standard Deviation.

Figure 12.3: Potassium results for mid-range reference samples, compared with Round Robin Mean and Standard Deviation.

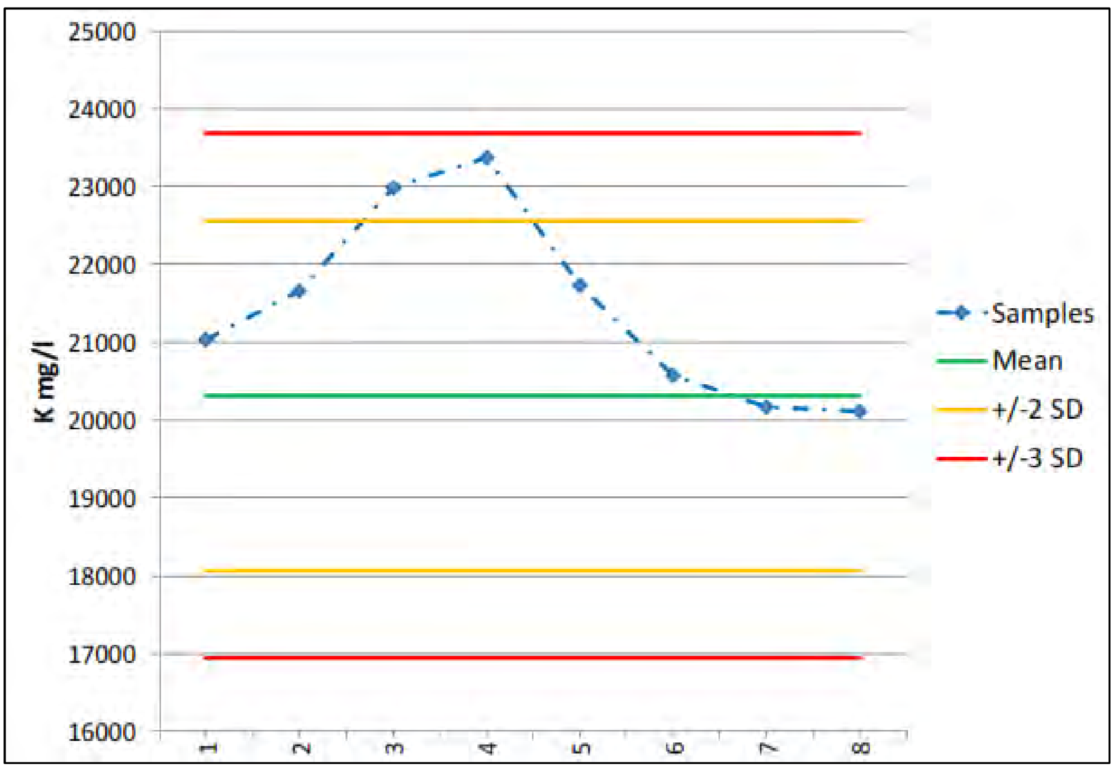


Figure 12.4: Potassium results for high-range reference samples, compared with Round Robin Mean and Standard Deviation.

12.4.4 Field Duplicate Sample Performance

Lithium, potassium and magnesium results for 21 field duplicate samples are plotted in Figures 12.5 to 12.7, respectively, against their original samples. All sample datasets plot close to the respective 1:1 Line, and the overall precision of the data is considered acceptable.

12.4.5 Field Blank Performance

Lithium and potassium results for 17 field blank samples (low-range reference samples) are shown in Figures 12.8 and 12.9, respectively. The results assess for cross-contamination in the laboratory and the field (for example, whether the instrumentation was cleaned sufficiently between analysis of samples). Lithium and potassium were not detected in any blank sample.

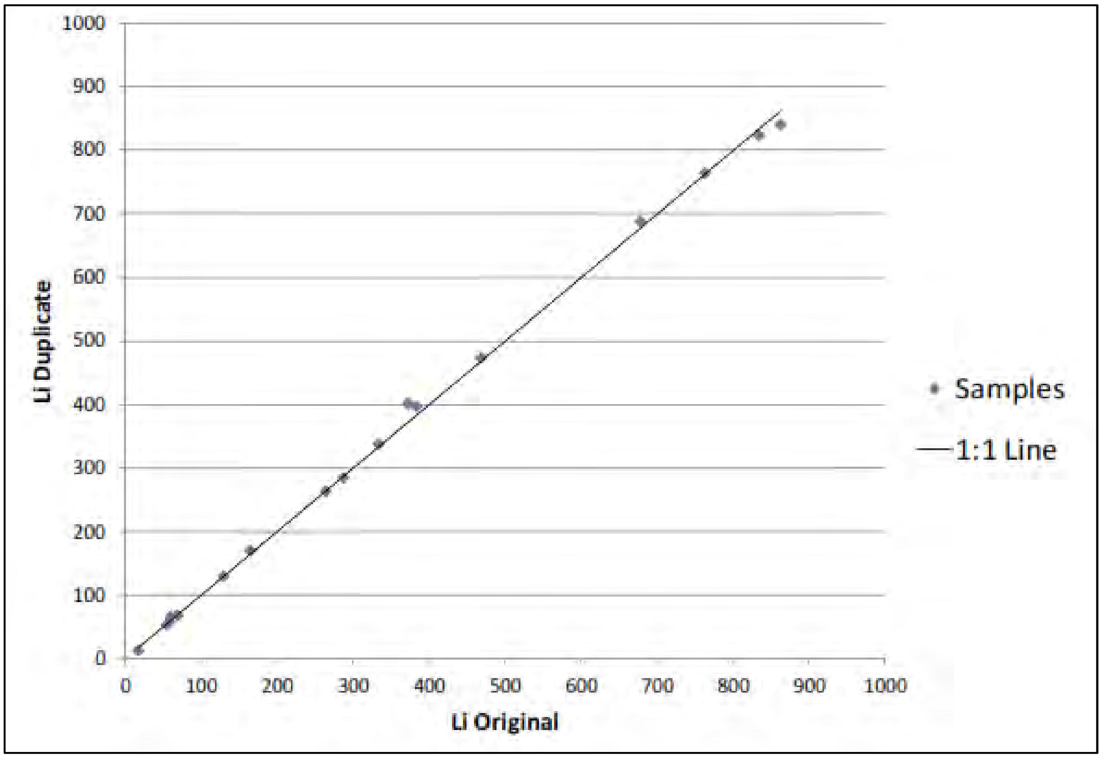


Figure 12.5: Field duplicates versus original sample results for lithium.

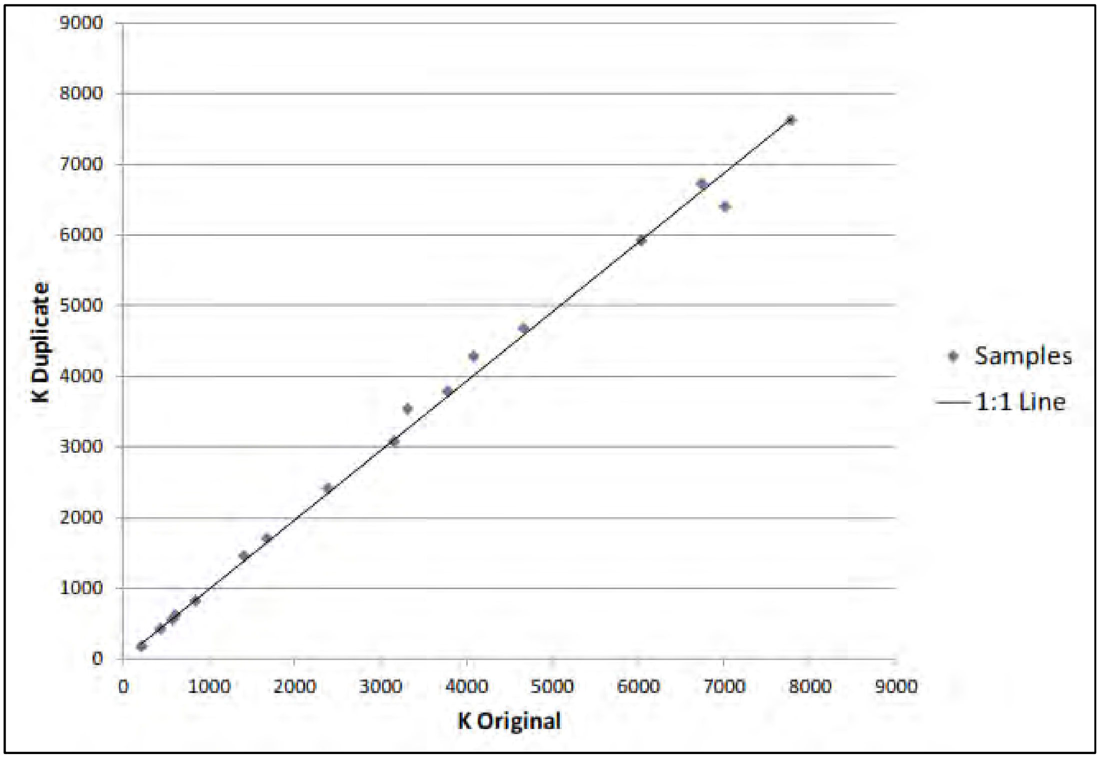


Figure 12.6: Field duplicates versus original sample results for potassium.

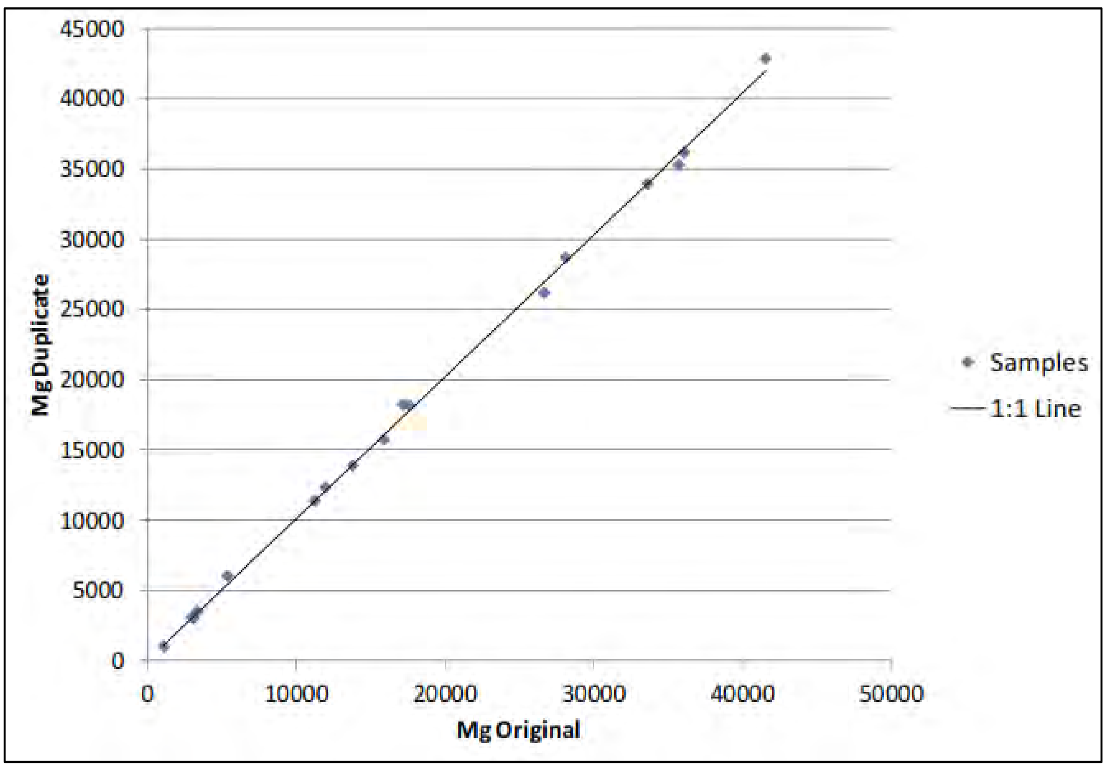


Figure 12.7: Field duplicates versus original sample results for magnesium.

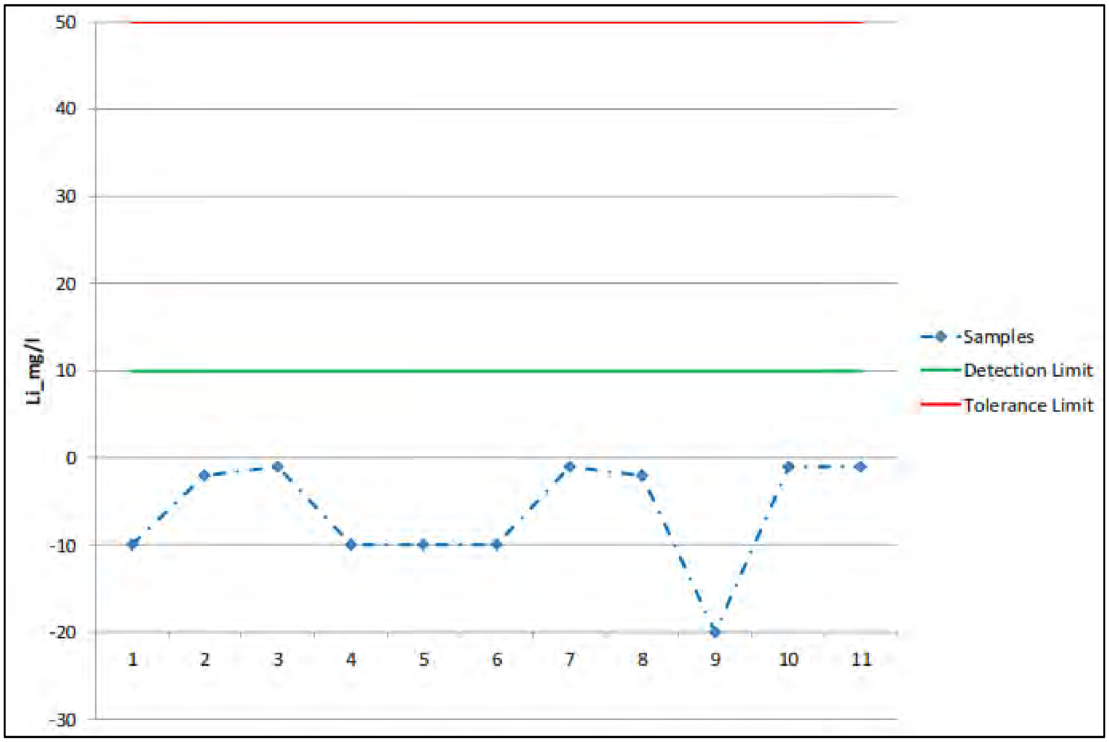


Figure 12.8: Blank sample results for lithium.

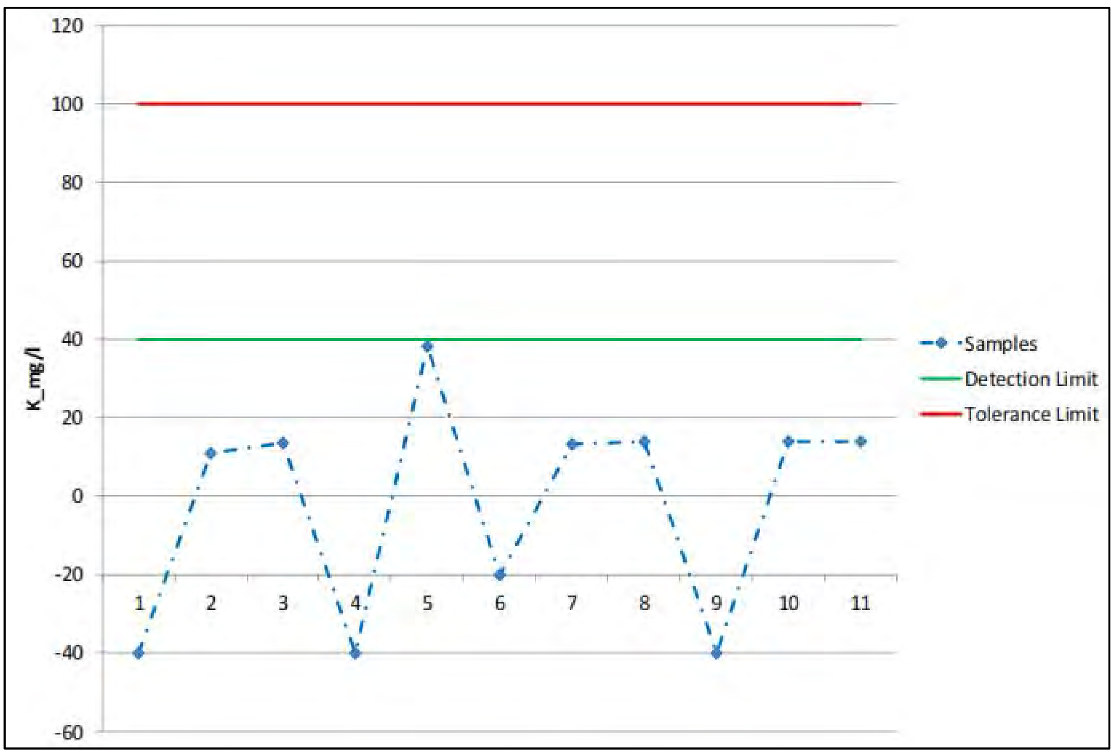


Figure 12.9: Blank sample results for potassium.

12.5 Laboratory Duplicate Analysis

ASL conducts internal laboratory checks on overall analytical accuracy for selected primary parameters. Results for lithium and potassium are shown in Figures 12.10 and 12.11, respectively, for all 25 laboratory duplicate analyses performed by ASL during the program. The QP is satisfied that these results fall within an acceptable range and are considered acceptable for the purposes of this report.

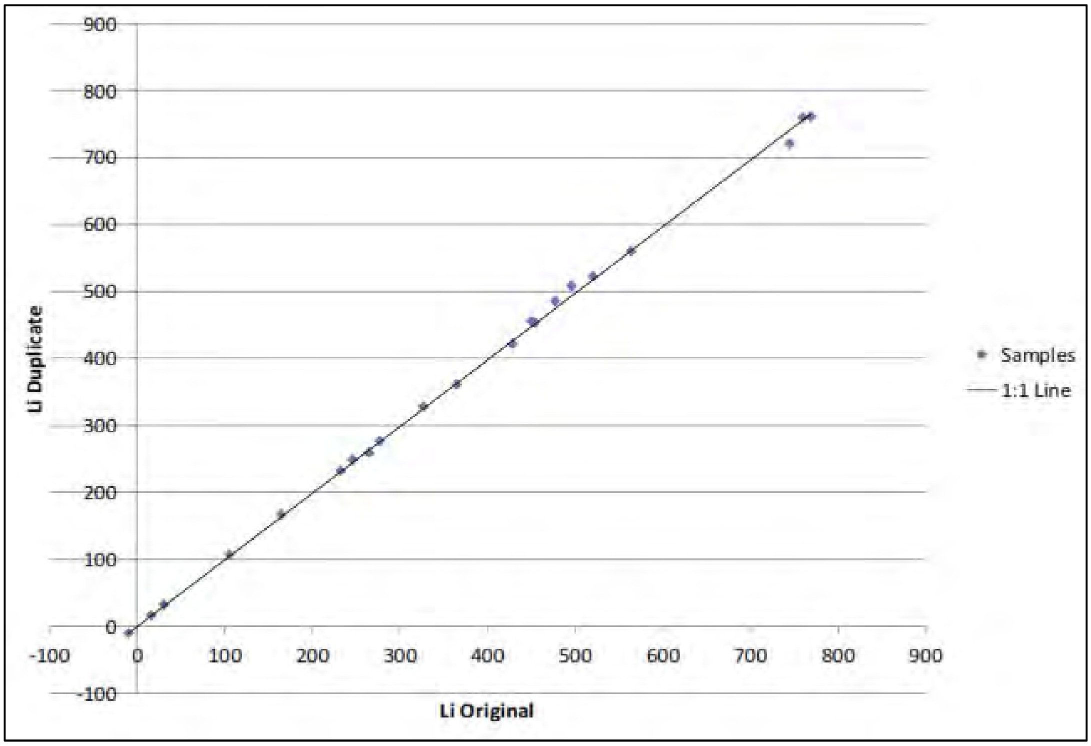


Figure 12.10: ALS internal laboratory duplicate results for Lithium.

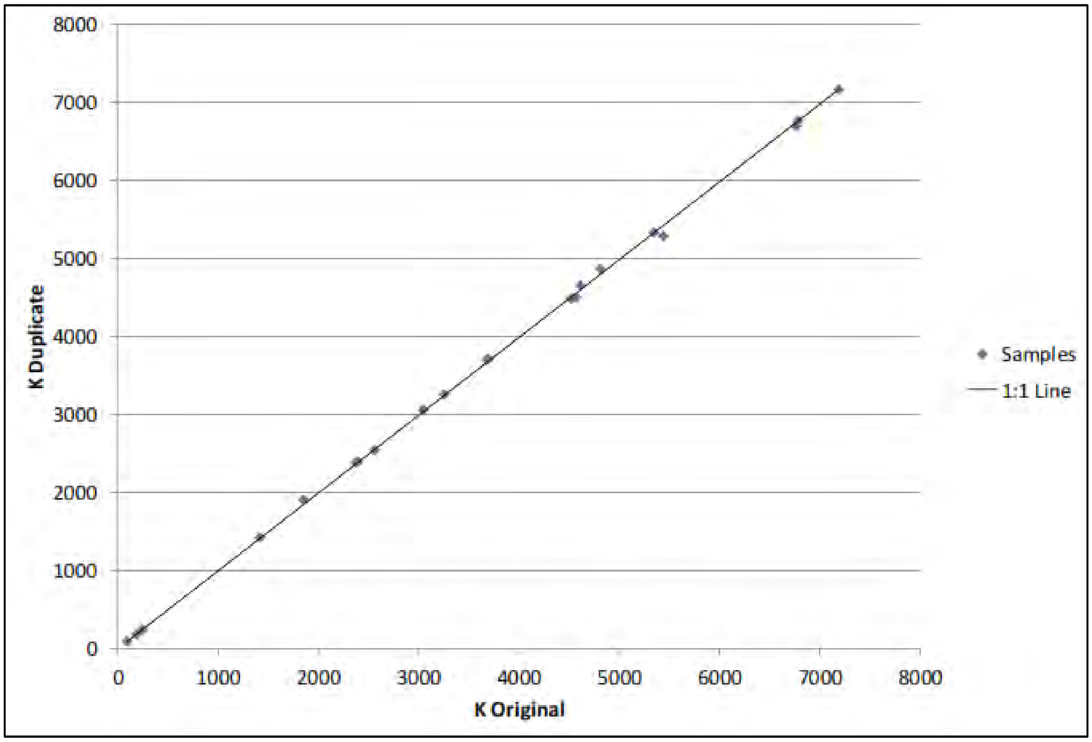


Figure 12.11: ALS internal laboratory duplicate results for potassium.

12.6 Sample Security

An established and firm chain of custody procedure was used for Project sampling, storage, and shipping. Samples were periodically driven in Project vehicles to La Rioja, approximately a seven-hour drive from the 3Q Project. In La Rioja, the samples were delivered to Andesmar Transport for immediate truck shipment to ASL in Mendoza, Argentina. Samples were in the control of qualified staff at all times. The IQP considers that the sample security measures used for the program are acceptable.

13. Data Verification

Dr. Mark King (IQP) provided review and input to the design and execution of the 3Q Project field program. Dr. King visited the 3Q Project for three days in March of 2016 (during the first field program) and then again for three days in January 2017 (during the second program). Sample collection, packaging, and transport as well as field QA/QC procedures and data recording were reviewed before and during both programs. For both programs, the IQP reviewed laboratory results and maintained ongoing technical discourse with Dr. Waldo Perez of NLC.

During the second field visit, a range of field methods were observed, including: packer sampling, sample handling and shipping, diamond drilling, pumping tests, core logging and handling, and shallow trenching. Previous drilling locations were visited, results available to date were reviewed, and future exploration plans were discussed.

On April 24 and 25, 2017, the IQP reviewed all the core and cuttings from the 3Q Project. These materials were stored at Hotel Cortaderas, located approximately three hours' drive from the 3Q Project, on national highway RN60. During this review, the logs were compared with the cores, to evaluate whether they provided a reasonable representation.

From April 25-28, 2017, the IQP worked out of the Mendoza office of NLC with Maria Franciosi. Ms. Franciosi is a geologist with expertise in Target, the software used to quantify the Resource Estimate documented in this Report. During this period, the stratigraphic model and brine distributions were finalized and were input to Target.

Based on these activities, it is the opinion of the IQP that an acceptably rigorous set of field methods and QA/QC procedures (Section 12) were used to assemble the 3Q Project dataset, and that the dataset is valid for evaluating the resource.

Claim and permitting information has not been verified by the IQP. This information was received in the form of a Title Opinion document prepared by the legal offices of Martin and Miguens, based in Buenos Aires (Section 3).

13.1 Independent QA/QC Program

During the first field program (2016) independent QA/QC duplicate sampling was conducted by the IQP. At this time, the IQP collected nine samples from seven sites previously sampled by NLC personnel. Samples were collected from selected, pre-existing, hand-dug holes across the northern portion of 3Q Salt flat and sample sites in Laguna 3Q. Sampling methodology used by the IQP was identical to that used by NLC personnel for the original samples. Samples collected by the IQP were submitted with regular field program samples (collected by NLC personnel) with sample numbering and locations that were known only to the IQP.

The results of lithium, potassium, manganese and magnesium concentrations of the original samples and the duplicate samples are presented in Figure 13.1. IQP lithium results are also shown in Figure 13.2, relative to a 1:1 line. Overall, these duplicate results indicate some potential for lower lithium and potassium concentrations either due to analytical variability or changes in field conditions since the original samples were collected (for example, dilution from precipitation in the intervening period), although the difference is considered minor, relative to potential analytical variability.

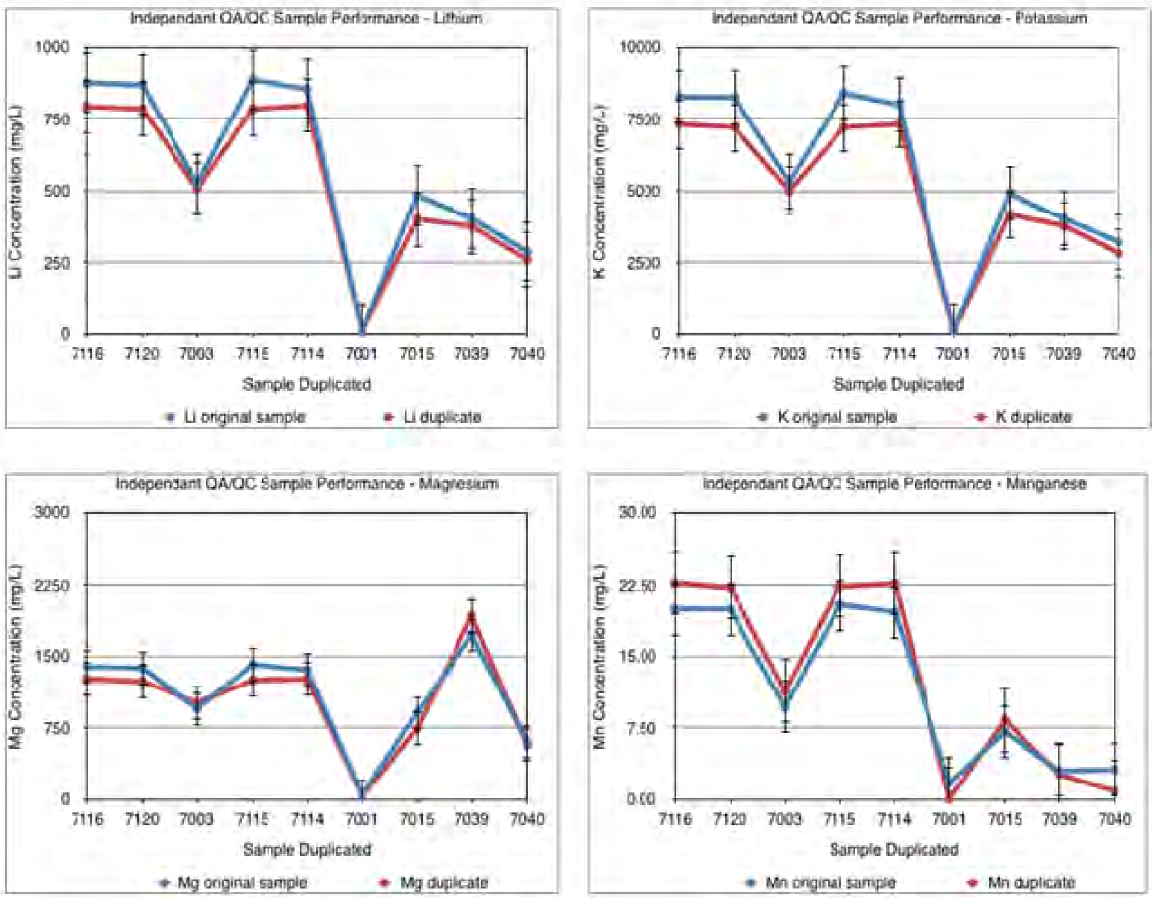


Figure 13.1: Independent duplicate results for Li, K, Mg and Mn (first IQP sample set).

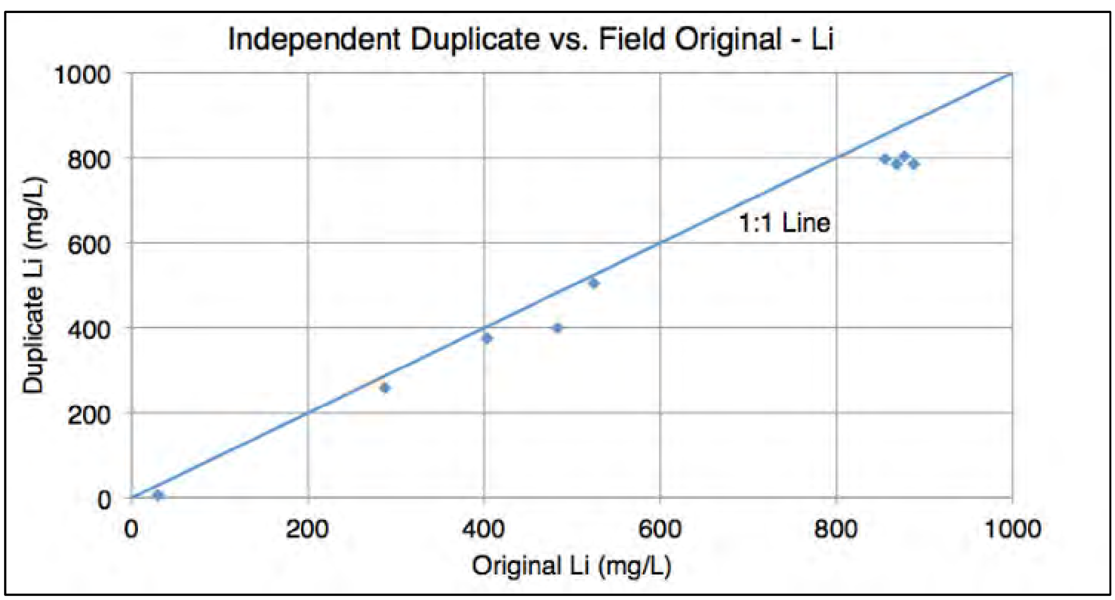


Figure 13.2: Independent duplicate results for lithium (first IQP sample set).

Four additional duplicate samples were collected by the IQP during the second field program. Again, these samples were collected from shallow excavated pits in the northern portion of 3Q Salt flat using sampling methodology identical to that used by NLC personnel for the original samples. The duplicate samples were submitted with regular field program samples (collected by NLC personnel) with sample numbering and locations that were known only to the IQP. Results are presented in Figures 13.3 through 13.6. Results from the second independent duplicate sample set are in reasonable agreement with the original samples, and are considered acceptable.

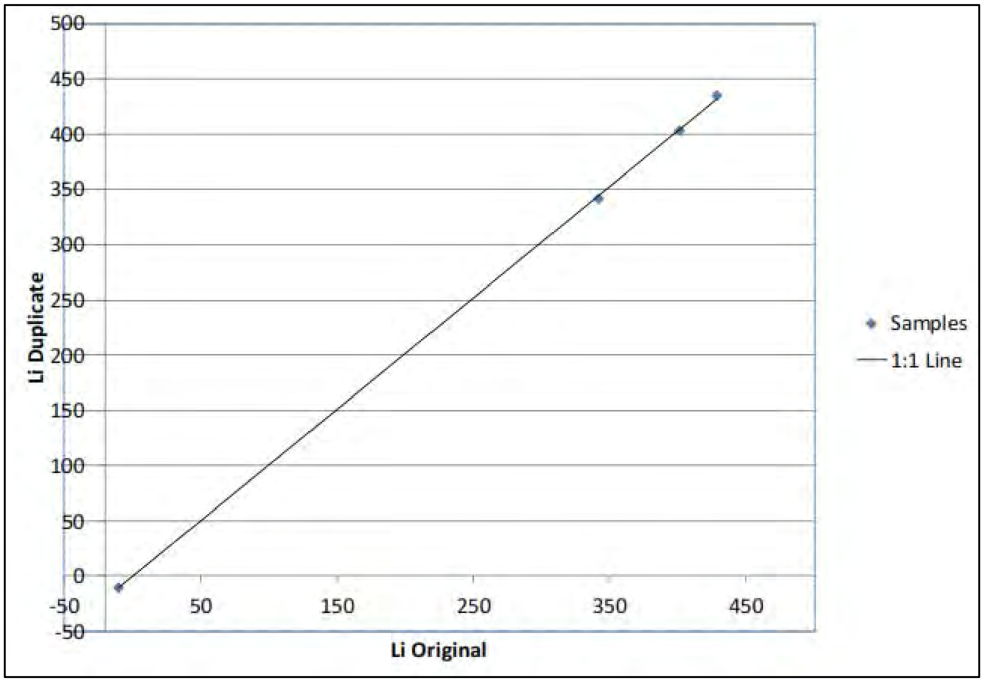


Figure 13.3: Independent duplicate results for lithium (second IQP sample set).

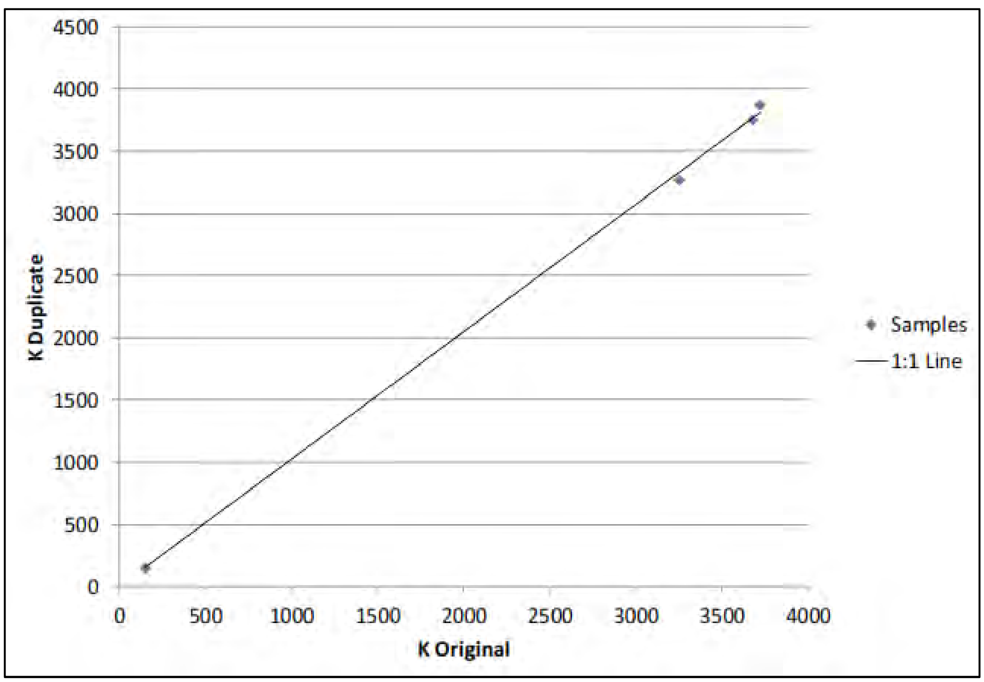


Figure 13.4: Independent duplicate results for potassium (second IQP sample set).

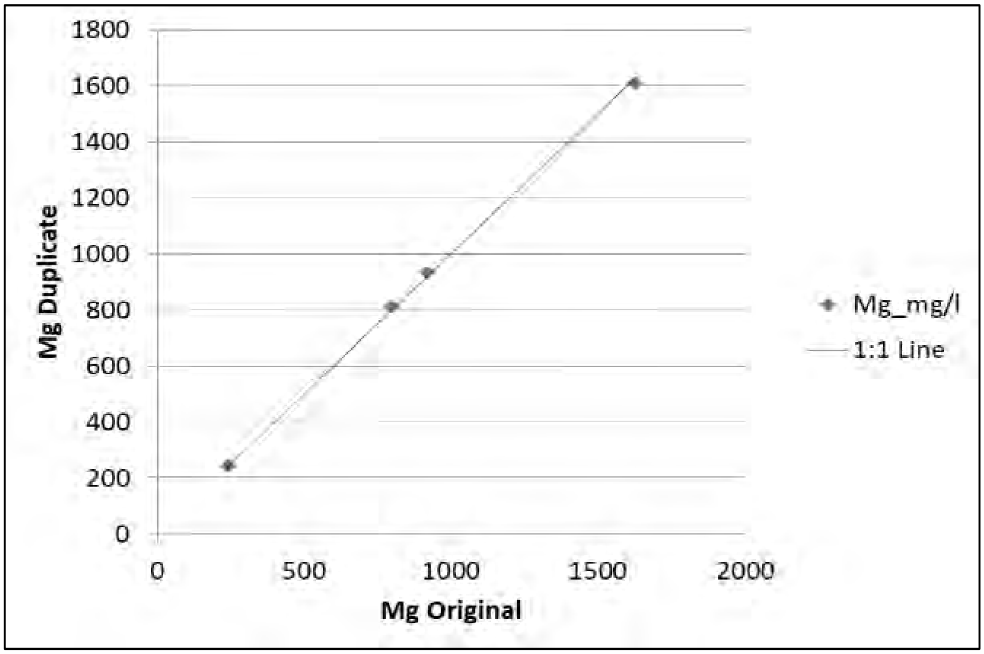


Figure 13.5: Independent duplicate results for magnesium (second IQP sample set).

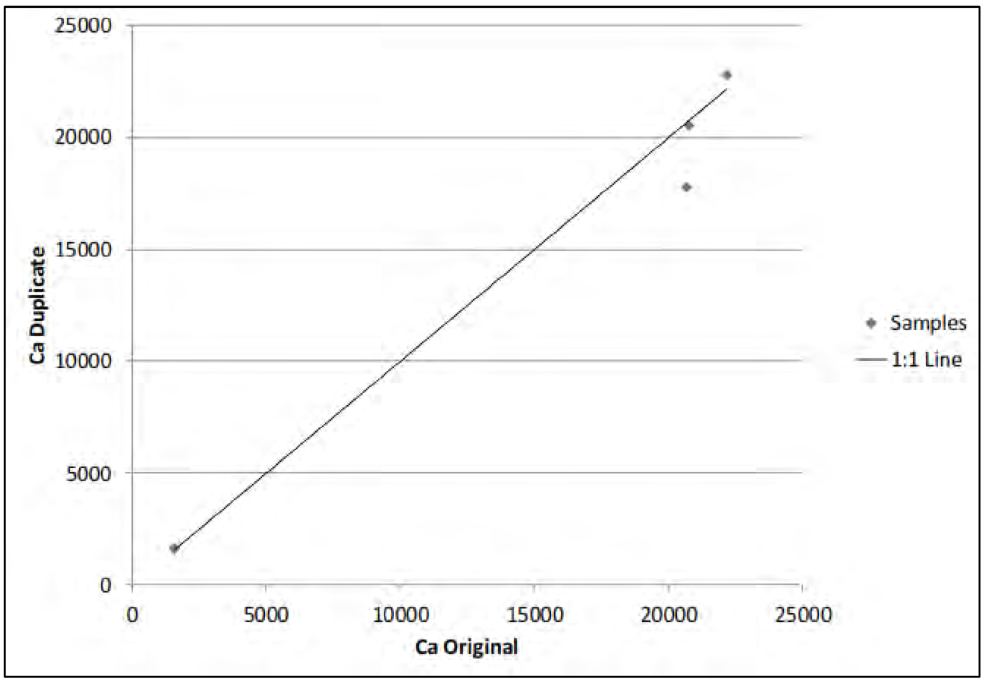


Figure 13.6: Independent duplicate results for calcium (second IQP sample set).

14. Adjacent Properties

There are no known properties adjacent to the 3Q Project where lithium prospecting has been conducted. The only known previous exploration campaign in the catchment was for gold and copper, with work conducted in the western area by El Dorado Gold Corporation in the mid-to late-1990s. The access road to the property was constructed at that time.

The two nearest lithium brine prospects are at Maricunga Salt flat and Laguna Verde (both in Chile). Maricunga is located 56 km to the northwest in Chile. An NI 43-101 Report was prepared on behalf of Lithium Power International, Minera Salar Blanco S.A., and Bearing Lithium Corp (Reidel, Brooker, Ehren, 2017), which documented an updated Measured and Inferred Resource for Maricunga. The Laguna Verde Project is located 50 km NNE, also in Chile. Hinner (2009) prepared an NI 43-101 report for Etna Resources Inc., documenting an evaluation of this lithium prospect.

Further northeast, in the same Province in which the 3Q Project is located (Catamarca), are the Fenix Lithium Mine and the Sal de Vida Project. Both operations are located in the Hombre Muerto Salt flat, 250 km NNE of the 3Q Project.

The IQP has not verified the information with regard to any project described above, and the information on any property other than the 3Q Project is not necessarily indicative of the mineralization on the 3Q Project.

15. Mineral Resource Estimate

15.1 Method Overview

A Resource Estimate was developed for the 3Q Project using the three-dimensional block modeling software known as Geosoft Target for ArcGIS. The software was operated by Argentinean Geologist Marisa N. Franciosi, a specialist and instructor in Geosoft Target. The modelling was supported by geological, hydrogeological and geochemical data and interpretations provided by the IQP and 3Q Project geologists.

The modeling procedure and results were reviewed by the IQP and are considered valid and appropriate for developing a Measured, Indicated and Inferred Resource Estimate, as defined by the CIM and referenced by NI 43-101. The modeling method consisted of the following steps:

1. The footprint of the Resource zone was defined, based on the interpreted boundaries of the salt flat, and the deposit characteristics.
2. Drilling and SEV results were interpreted to identify primary lithologies within the Resource Zone.
3. Drilling and SEV results were interpreted along a series of two dimensional (2D) sections, which were then input to Geosoft Target.
4. Interpolation between the 2D sections was conducted to develop a full 3D geological model.
5. The 3D geological model was discretized into blocks (block model).
6. The total volume of each layer was calculated.
7. RBRC data were used to calculate the drainable volume of each unit.
8. Brine sample results were used to define 3D concentrations distributions.
9. Brine distributions were mapped according to two different cut-off values.
10. Grade and drainable volume were used to determine the quantity of brine constituents in each layer.
11. Measured, Indicated and Inferred categories were assigned base on the degree of certainty in the assessment.

The IQP has reviewed the Target model construction, including an independent review of layer surfaces and volumes, and considers the work to be reasonable and appropriate for Resource Estimation. Additional detail is provided in the subsections below.

15.2 Hydrostratigraphic Model Development

The footprint of the Resource Zone was defined, based on the interpreted boundaries of the salt flat, and the deposit characteristics. Boundary definition included the following:

- The east and west boundaries were defined as the outer bounds of the salt flat basin, based on topography, morphology and VES results;
- The north boundary was defined by the north shore of Laguna 3Q. In other words, Laguna 3Q was included in the Resource Zone;

- The south boundary was defined by the south shore of Laguna Verde, although the brine body itself was excluded from the Resource.

In the next step, drilling (Section 10) and SEV results (Section 9) were interpreted to define primary geological units within the Resource Zone. Geologic and hydrogeologic criteria considered in this step included:

- A visual assessment of relative porosity and permeability in cores, and downhole geophysics;
- Laboratory analytical results for RBRC (indicative of Sy, as discussed in Section 10).
- Lithology; and
- Geo-electric properties from the VES Survey.

For the lithological assessment, there was greater reliance on the diamond boreholes, and the associated cores. Three of the boreholes penetrated to basement rock that underlies the salt flat in-fill units. In the hydrostratigraphic model, basement rock was assumed to contain no brine. At locations where the boreholes were not deep enough to encounter basement rock, it was assumed to occur within 10 m below the bottom of the borehole.

Through this interpretive process, geological materials in the Resource Zone were grouped into the following five primary lithologies, from upper to lower:

- High Porosity Halite (extends from the surface of the salt flat to depths of between 30 and 50 m);
- Upper Clastics (generally thickest on the boundaries of the salt flat and absent in the central zone);
- Porous Halite (ranging up to approximately 100 m in thickness);
- Massive Halite (ranging up to approximately 150 m in thickness; and
- Lower Clastics (relatively thin in terms of penetrated thickness, but with a lower boundary that is largely undefined).

The borehole lithological interpretations and the SEV results were used to interpret 12 sections across the salt flat, at the locations shown in Figure 15.1. The sections were then input to Target, as shown in Figure 15.2. An example section, as represented in Target, is shown in Figure 15.3.

Within the Target model, interpolation was conducted between the sections to produce a full 3D hydrostratigraphic model, with upper and lower 3D surfaces for each of the lithological units. This interpolation took into account all available information, as well as an overall conceptual understanding of deposition in the salt flat. A profile of the model is shown in Figure 15.4, and examples of the build-up of the two upper layers (High Porosity Halite and Upper Clastics) is shown in Figures 15.5 and 15.6.

The volume percentage that each of the five hydrostratigraphic units occupy in the Resource Zone model are as follows:

- High Porosity Halite: 10%;
- Upper Clastics: 13%;
- Porous Halite: 42%;
- Massive Halite: 29%; and

- Lower Clastics: 6%.

In this process, the northern lake (Laguna 3Q) was mapped as a “unit” with 100% porosity, on the basis of depth soundings throughout the lake (Section 9). The upper unit (High Porosity Halite) was assumed to pinch out under both lakes. The two next highest units (Upper Clastics and Porous Halite) were assumed to extend under the lakes, with a total assumed thickness of approximately 50 m.

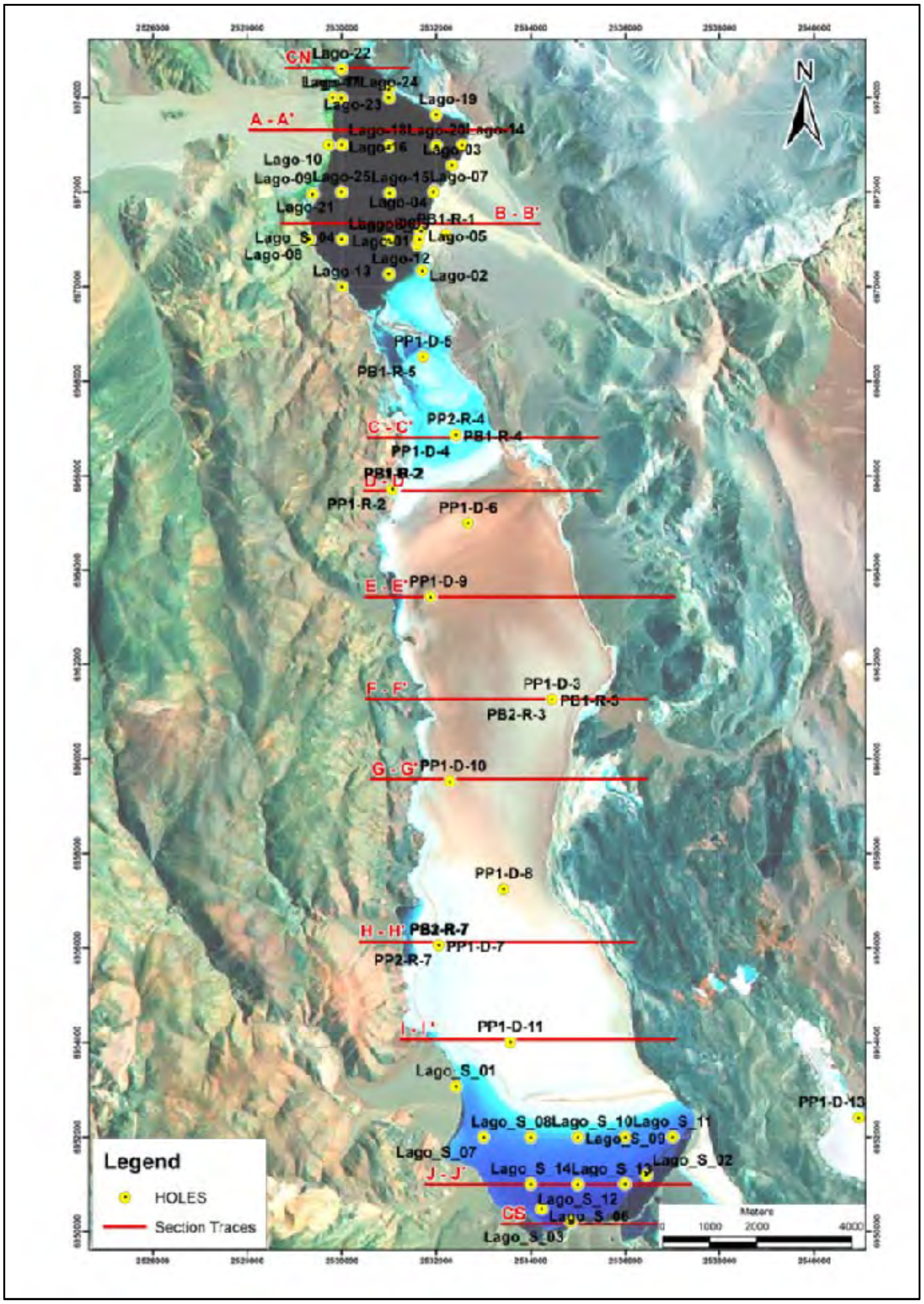


Figure 15.1: Location of the sections drafted on the Resource Zone. Note that the points shown in the northern and southern lakes are lake sampling and sounding locations.

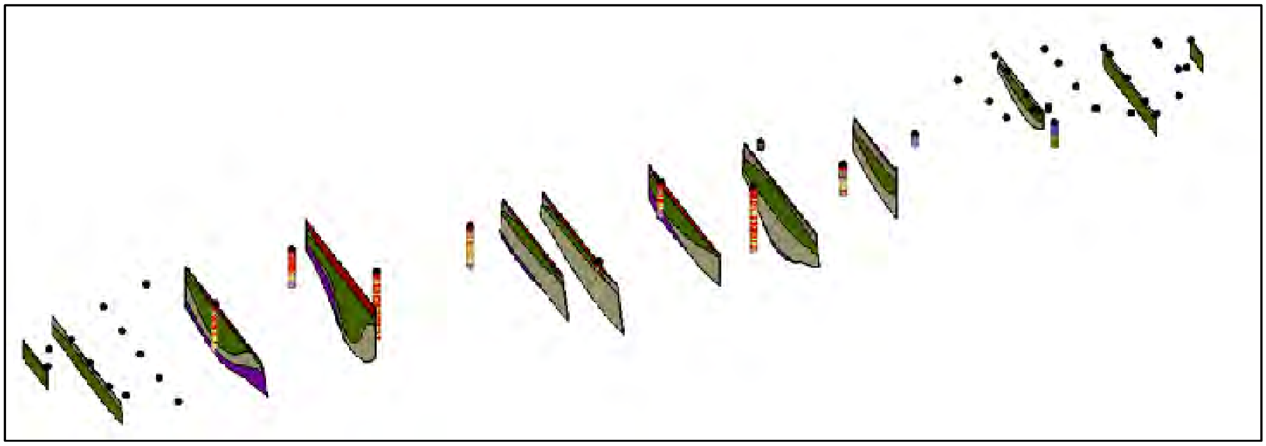


Figure 15.2: Location of the interpreted 2D sections, as input to the 3D Target model (4X vertical exaggeration).

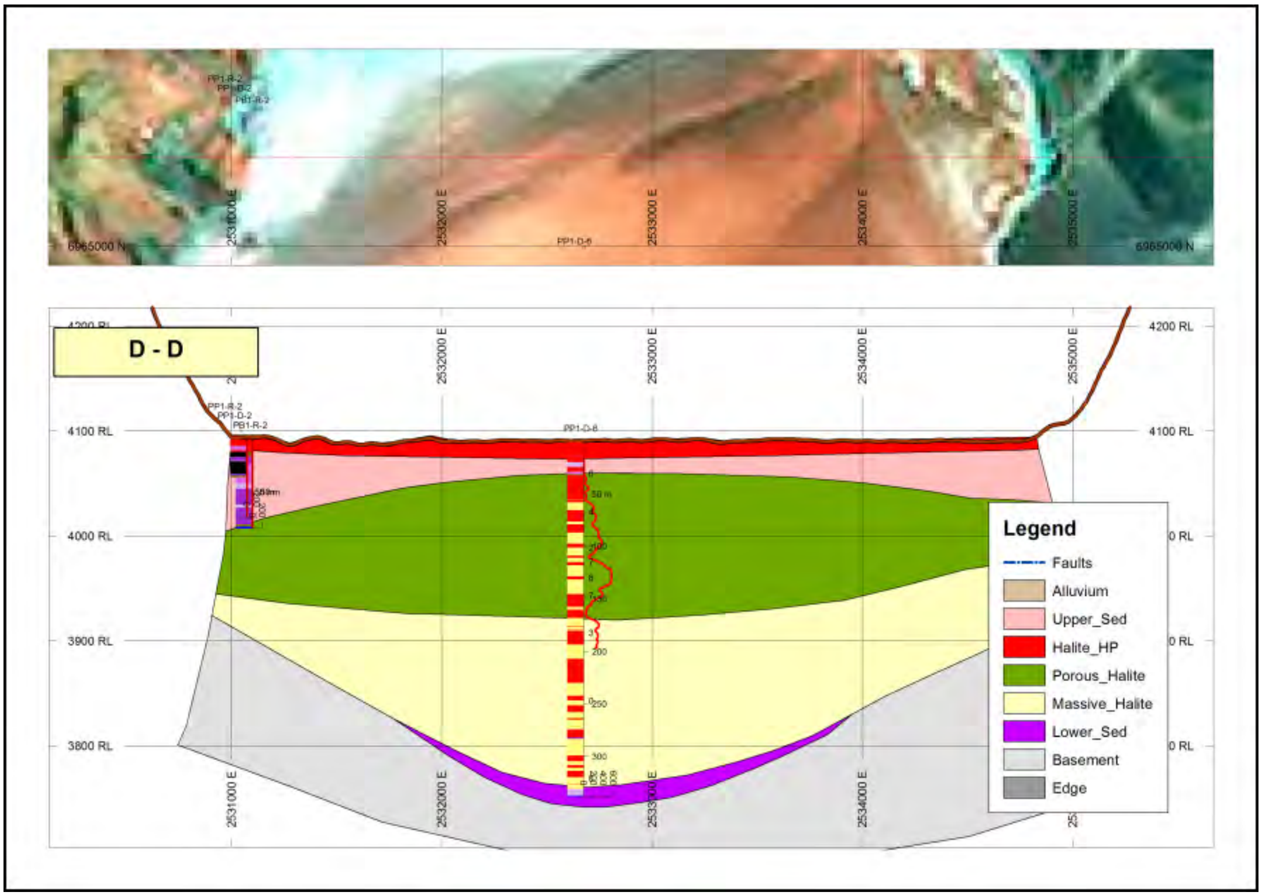


Figure 15.3: Example 2D section, as represented in Target (5X vertical exaggeration).

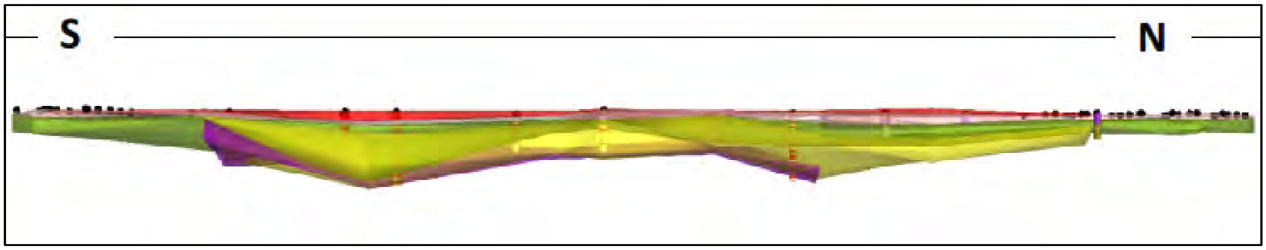


Figure 15.4: Profile of the geological construction in Target (4X vertical exaggeration).

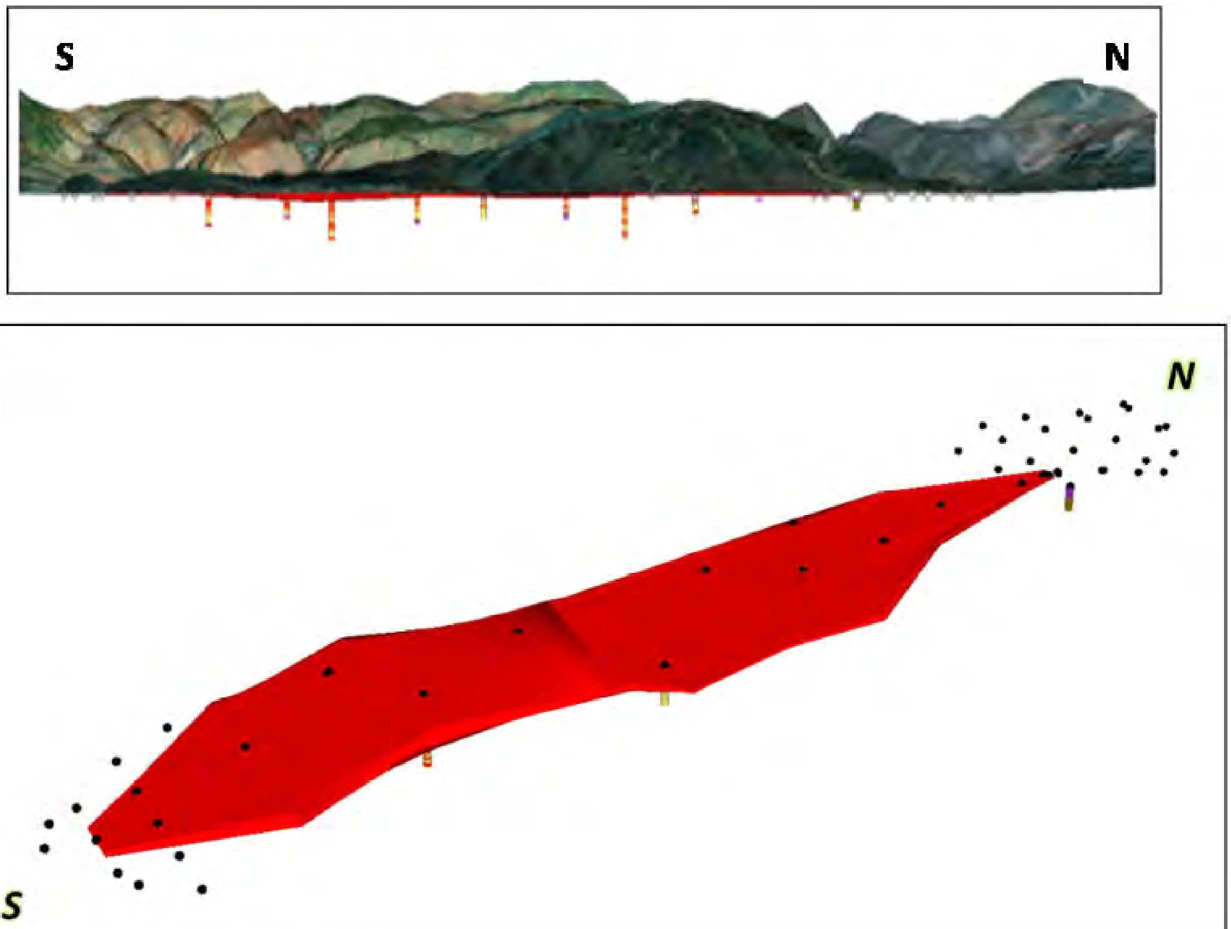


Figure 15.5: Profile and 3D perspective of the High Porosity Halite unit in the Target model. (2X and 4X vertical exaggeration, respectively).

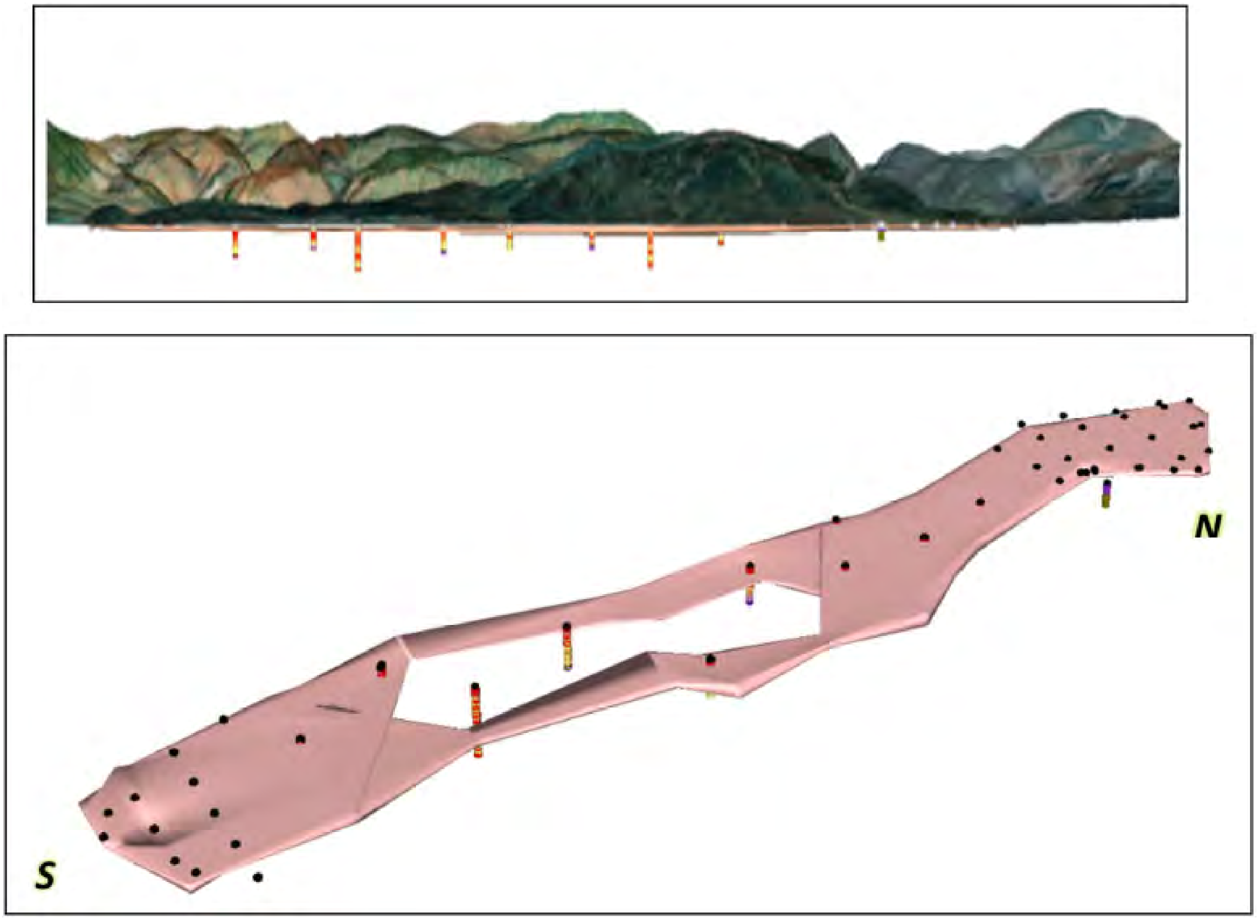


Figure 15.6: Profile and 3D perspective of the Upper Clastics unit in the Target model. (2X and 4X vertical exaggeration, respectively).

15.3 Brine Model Development and Cut-Off

Results for brine samples collected from throughout the Resource Zone were interpolated in Geosoft Target, to generate distributions of brine parameters of primary interest (lithium, potassium, magnesium, calcium, boron and sulfate). Total brine sample numbers are listed in Section 9. The selection criteria for sample to use in the Resource Zone interpolation were as follows:

- All samples collected from observation wells, pumping wells and discrete level packers (during drilling) were initially considered for inclusion.
- When multiple samples were collected from over-lapping depth intervals on the same drilling platform, the samples collected from the smallest interval were selected for use. The intent of this selection criteria was to provide as much vertical resolution in the dataset as possible.
- When samples from pumping tests were used, the last sample collected from the test was selected for use. This intent of this criterion was to use data collected after the longest duration of aquifer purge time.
- Overall, 47 borehole brine samples (from packers, pumping wells, and observation wells) were used in the Resource Estimate, in addition to the lakes samples described below.

- 37 samples from Laguna 3Q were used to characterize the brine grades in this lake. It is noted this surface brine body is well-mixed, with minimal variation in these samples. The brine in Laguna 3Q was included in the Resource Estimate, as described Section 15.4. Further, the sampling results from the lake were included in the interpolation of grades under the lake.
- 12 samples from Laguna Verde were used to characterize brine grades in this lake. Again, this surface brine body is well-mixed, with minimal variation in these samples. The brine in Laguna Verde was excluded from the Resource Estimate. However, the sampling results from the lake were included in the interpolation of grades under the lake.

Sample concentrations were interpolated in Target using kriging, with the parameter settings shown in Figure 15.7. The distribution of lithium within a 400 mg/L cut-off grade is shown in Figure 15.8 (3D perspective) and Figure 15.9 (plan view at near-surface and at two depths). Figures 15.10 and 15.11 present comparable views of lithium within a 520 mg/L cut-off grade. As will be shown in Section 15.4, the lower cut-off value provides a larger resource, while the higher value provides a lower magnesium to lithium ratio.

Figures 15.8 and 15.9, show that within the Resource Zone (as defined by the interpolated 400 mg/L lithium cut-off) there is a decreasing trend from north to south, with grades ranging from greater than 1000 mg/L in isolated northern locations to less than 400 mg/L in isolated southern locations. Comparison with Figures 15.10 (for the 520 mg/L lithium cut-off) shows that grades in excess of 520 mg/L are limited to approximately the northern half of the Resource Zone, and an isolated southern section, under Laguna Verde.

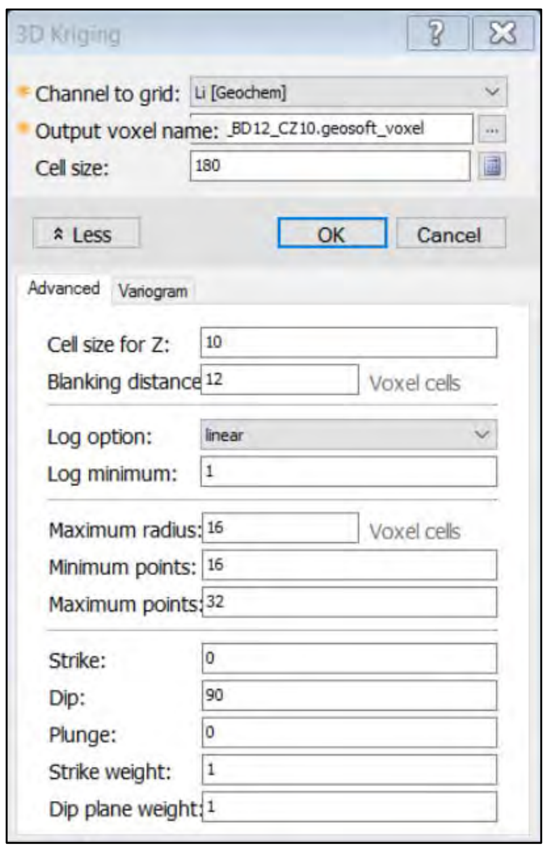


Figure 15.7: Kriging parameter values used in Target.

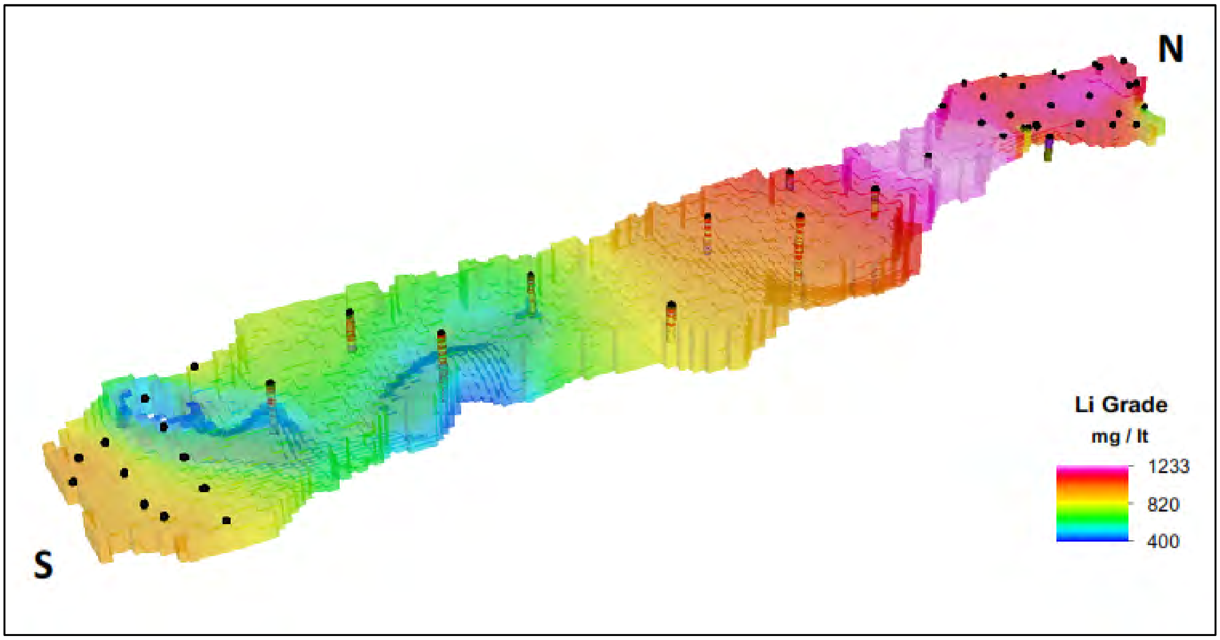


Figure 15.8: 3D perspective of interpolated lithium grade distribution (mg/L) within the 400 mg/L lithium cut-off (4X vertical exaggeration).

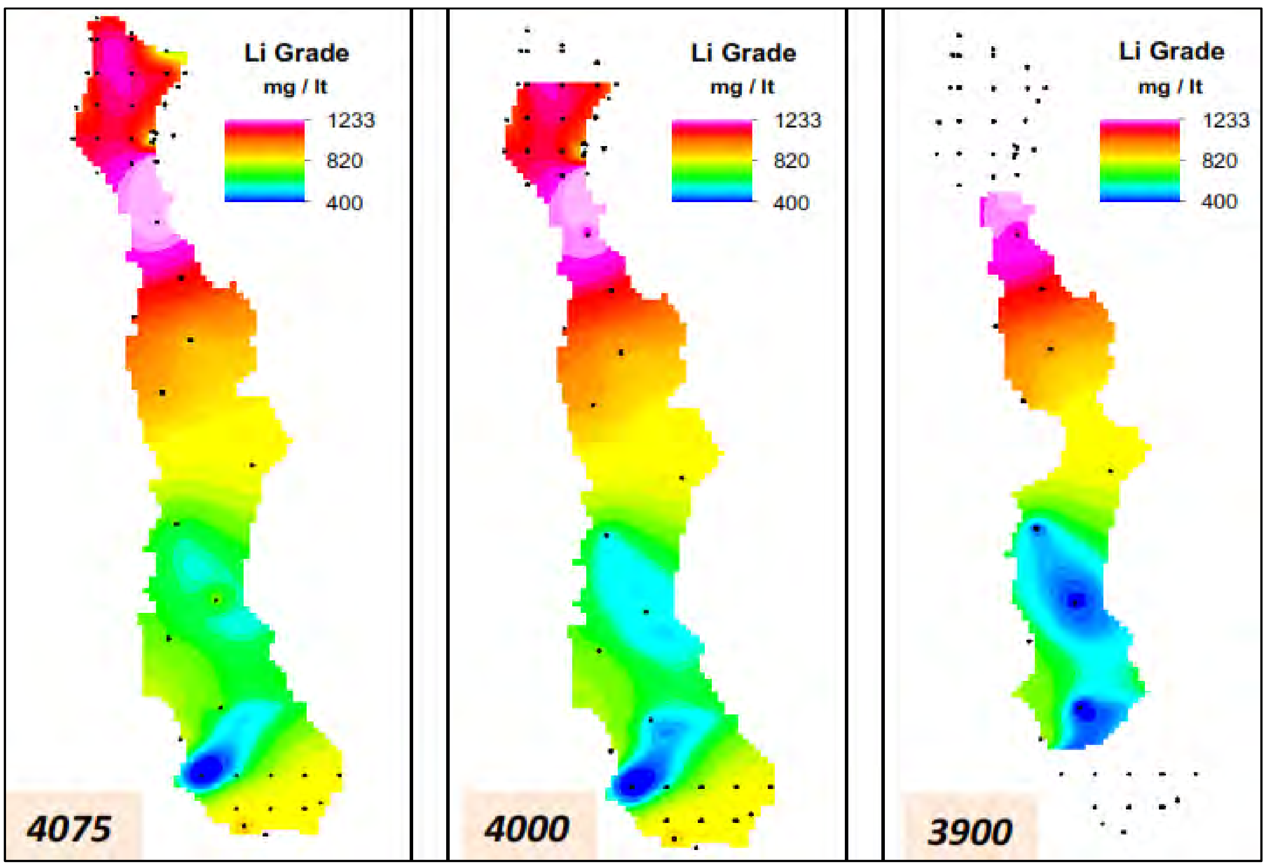


Figure 15.9: Plan views of interpolated lithium distribution at near-surface (4075 masl) and two depths (4000 and 3900 masl), within the 400 mg/L lithium cut-off.

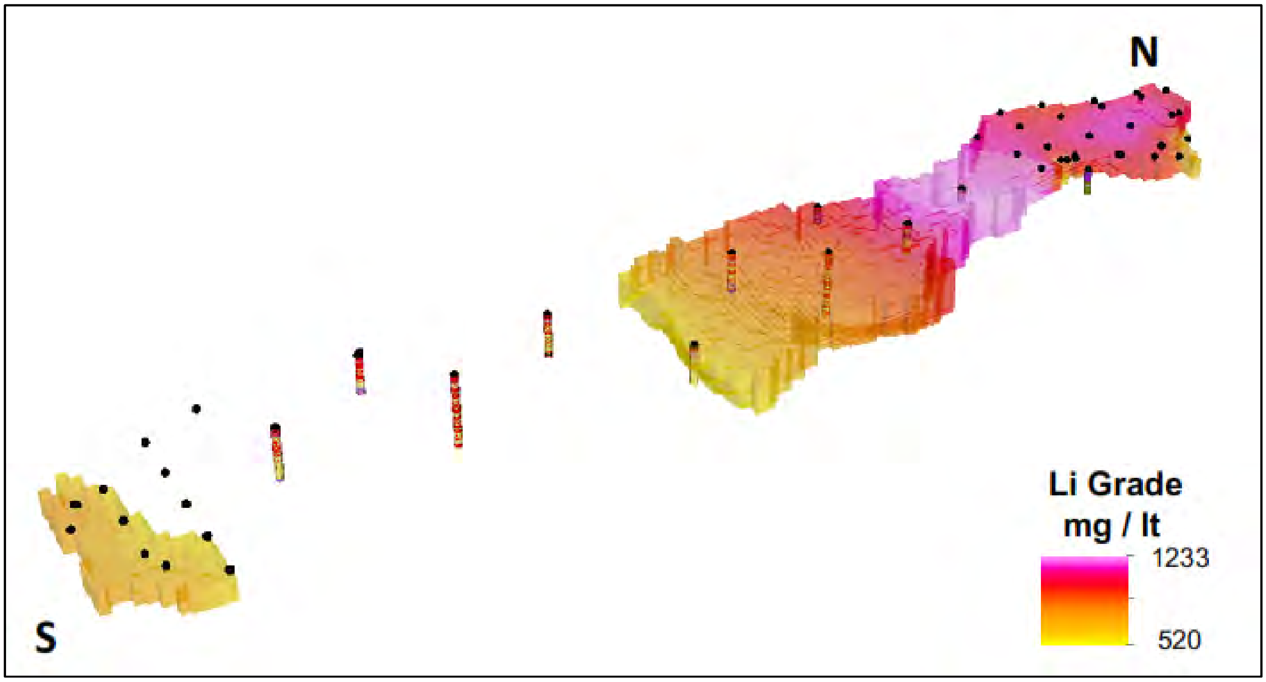


Figure 15.10: 3D perspective of interpolated lithium grade distribution (mg/L) within the 520 mg/L lithium cut-off (4X vertical exaggeration).

15.4 Resource Estimation

The estimation of total contained constituents (lithium, potassium, boron, magnesium, calcium and sulfate) was based on geochemical distributions that were derived by the methods described in Section 15.3, and the average RBRC values for each hydrostratigraphic unit, as described in Section 10.2. In conducting this calculation, the quantity of solute in each resource block was multiplied by the RBRC value for that block, to represent the quantity of brine that could drain from the block if it were de- watered by pumping.

Estimated Resources are summarized in Table 15.1. Resources have been categorized into Measured, Indicated and Inferred based on the following qualitative assessment of the certainty associated with the quantities in each hydrostratigraphic layer:

- Measured Resources – Only the resource component within the Laguna 3Q surface brine body received this classification. The lake is classified as Measured because the volume and grade are known with a relatively high degree of certainty. The composition of the lake is relatively homogenous due to the shallow depth (<2m) and frequent and substantial wave action. The volume of the lake has been measured with basic sounding equipment.
- Indicated Resources – Brine resources within the two upper hydrostratigraphic units (High Porosity Halite and Upper Clastics) were classified as Indicated because they were penetrated at all drilling platforms. Further, the pumping wells tested to date are located in these units.
- Inferred Resources – The degree of estimation certainty for the Resources in the lower three hydrostratigraphic units is less than for the upper two units. The lower three layers were penetrated by fewer boreholes than the upper two, and deep pumping tests have not yet been conducted at the Project. However, the distribution and degree of borehole penetration is considered adequate for an Inferred classification.

Table 15.1: Summary of the Resource Estimate at Lithium Grade Cut-off Values of 400 and 520 mg/L (Effective Date May 23, 2017).

	Lithium Grade Cut-Off of 520 mg/L				Lithium Grade Cut-Off of 400 mg/L			
	Measured	Indicated	M&I	Inferred	Measured	Indicated	M&I	Inferred
	Brine Volume (m^3)				Brine Volume (m^3)			
	1.247E+07	1.751E+08	1.875E+08	3.532E+08	1.247E+07	3.930E+08	4.055E+08	7.418E+08
	Average Concentration (mg/L)				**Average Concentration (mg/L)**			
Lithium	792	710	716	713	792	560	567	567
Boron	1,254	993	1,010	1,015	1,254	779	793	792
Potassium	7,434	6,439	6,506	6,554	7,434	5,335	5,400	5,413
Magnesium	1,267	1,432	1,421	1,477	1,267	1,955	1,934	1,933
Calcium	35,182	33,038	33,181	33,644	35,182	29,759	29,926	30,067
Sulfate	599	358	374	384	599	358	365	356
	Metric ton				**Metric ton**			
Lithium	9,876	124,309	134,185	251,662	9,876	220,135	230,011	420,418
Lithium Carbonate	52,569	661,673	714,242	1,339,546	52,569	1,171,735	1,224,305	2,237,803
Boron	15,643	173,790	189,433	358,317	15,643	306,052	321,695	587,539
Boric Acid	89,468	993,938	1,083,406	2,049,287	89,468	1,750,371	1,839,839	3,360,251
Potassium	92,702	1,127,273	1,219,975	2,314,756	92,702	2,096,655	2,189,357	4,014,932
Potash	176,764	2,149,485	2,326,249	4,413,778	176,764	3,997,901	4,174,666	7,655,672
Magnesium	15,795	250,702	266,496	521,753	15,795	768,386	784,181	1,434,110
Calcium	438,720	5,783,626	6,222,346	11,882,330	438,720	11,694,598	12,133,317	22,302,773
Calcium Chloride	1,214,858	16,015,441	17,230,300	32,903,363	1,214,858	32,383,514	33,598,373	61,758,615
Sulfate	7,472	62,671	70,144	135,767	7,472	140,688	148,160	264,350
	Ratios				**Ratios**			
Mg/Li	1.60	2.02	1.99	2.07	1.60	3.49	3.41	3.41
K/Li	9.39	9.07	9.09	9.20	9.39	9.52	9.52	9.55
SO_4/Li	0.76	0.50	0.52	0.54	0.76	0.64	0.64	0.63
Ca/Li	44.42	46.53	46.37	47.22	44.42	53.12	52.75	53.05

16. Brine Processing

NLC has conducted a complete study for brine characterization of the 3Q Project, in order to develop the necessary process for producing battery grade Lithium Carbonate (Li_2CO_3).

16.1 Brine Chemistry

Table 16.1 presents the characterization of the average brine composition in 3Q Project regarding general elements. According to this data, brine is saturated in sodium chloride (NaCl) and calcium chloride ($CaCl_{2x}6H_2O$) with total dissolved solids (TDS) in the range of 23 and 27% (weight %).

Table 16.1: Average Chemical Composition of Brine in 3Q Project

	H_2O	H_3BO_3	Na^+	K^+	Mg^{++}	Ca^{++}	Li^+	Cl^-	SO_4^{--}
Brine fron Wells	72.67%	0.49%	6.75%	0.55%	0.12%	2.81%	0.06%	16.52%	0.03%

In case of brine of the 3Q Project, high calcium (Ca) content as well as low sulphate (SO_4) content suggests that the addition of an external source of SO_4 is an option to precipitate Ca contained in the brine as Gypsum, and because of the low content of SO_4, a non-significant risk of Lithum losses precipitation as Li_2SO_4 is expected.

Magnesium (Mg) content can also affect recovery of Lithium (Li), due to the potential formation of lithium carnallite salts in the ponds, however in case of brine of the 3Q Project, Mg concentration level is not enough to cause this loss. Nevertheless, in spite of the low levels reported for this element, it must be removed from the brine because in the production of Li_2CO_3 in the chemical plant, the use of soda ash (Na_2CO_3) increases and it turns into a contaminant of the final product.

Boron is also an important element to consider in brine treatment, because it contaminates the final product, as it happens with Mg and Ca. For this reason, boron must be removed by the solvent extraction method (SX) in a stage previous to carbonation in the chemical plant.

Other elements such as strontium and so on, will be studied in detail in the next Feasibility Study stage.

16.2 Brine Processing

NLC has been developing a work plan for 3Q Project in order to develop an appropriate system for brine processing, to obtain a final product of Lithium Carbonate with 99.9% of purity. The plan has included simulation of brine evaporation processes, brine evaporation laboratory tests, and pilot assays of brine evaporation in ponds. In addition, reference stages sequences (benchmarking) has been used for brine processing in plant.

Results of the simulation and lab tests show that the most likely stage sequence for brine processing in 3Q Project is the one showed in Figure 16.1.

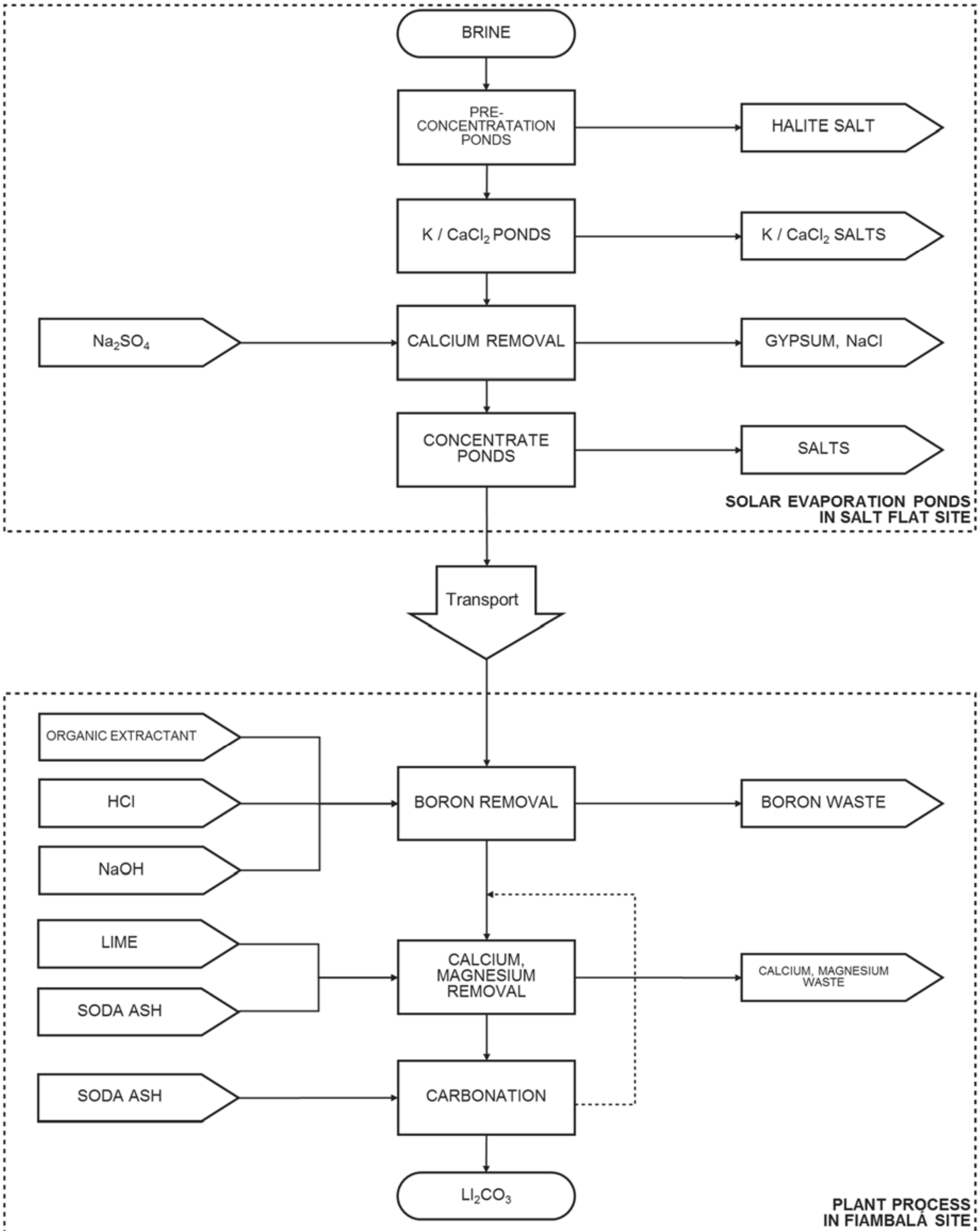


Figure 16.1: Block Diagram of the Process.

16.2.1 Solar Evaporation Ponds

The evaporation process in solar ponds is a cost – effective operation for concentration of large volumes of brine. Figure 16.2 shows a schematic layout of the solar evaporation ponds and the facilities at the salt flat.

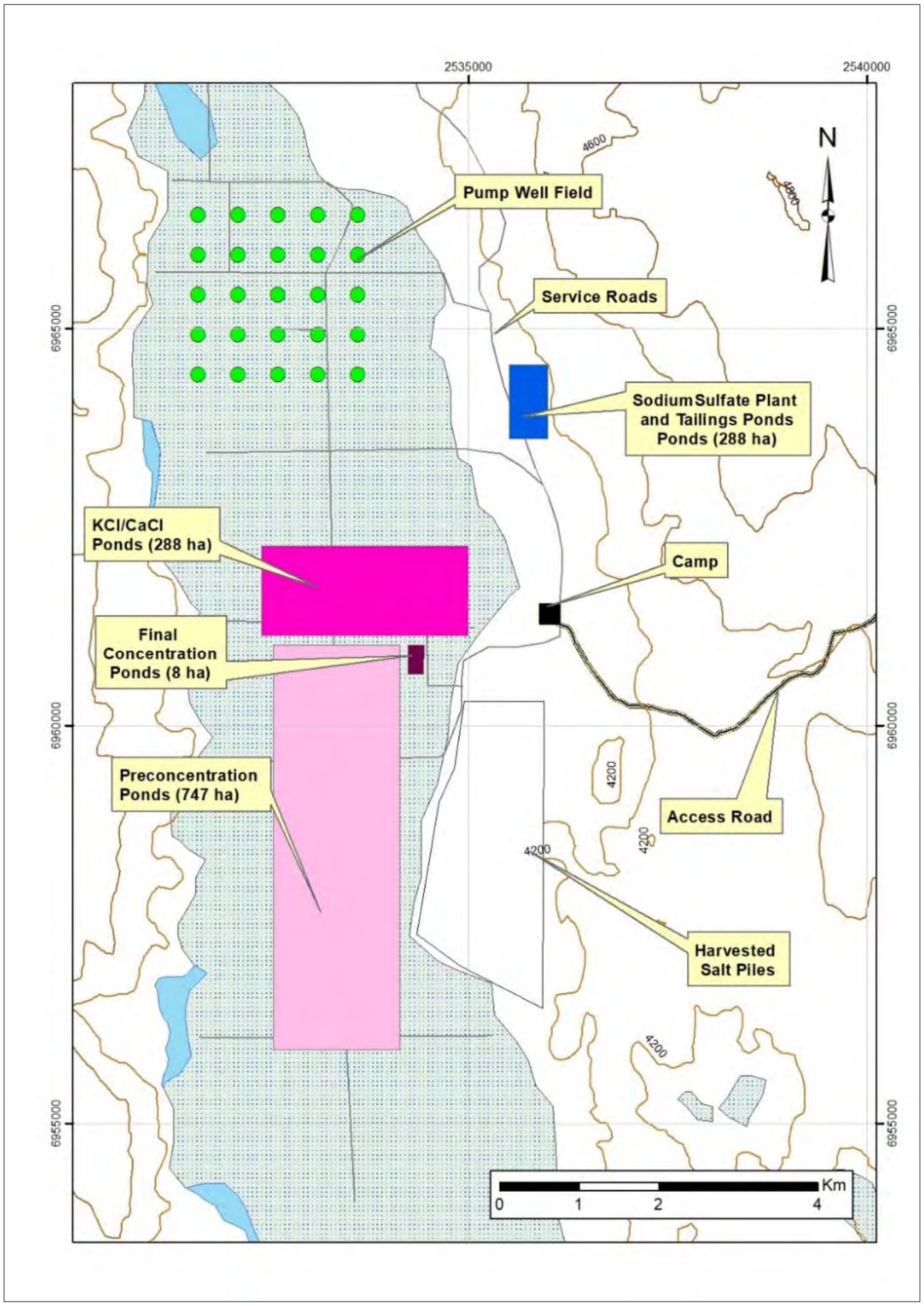


Figure 16.2: Schematic Layout of 3Q Project Solar Evaporation Ponds and Facilities.

Brine is transferred from brine extraction ponds to evaporation ponds by pumps. Once the brine starts the evaporation process in ponds, and water evaporates, brine concentrates, and highly concentrated saline species precipitate along the pond system as well as Lithium concentration reaches the desired value.

A typical cross section of pond is shown in figure 16.3, because the pond will be built on the salt flat, the membrane has to be isolated from the salt crust and the phreatic level by a platform (leveling height) to avoid damages in the membrane. The platform is built with the same material of the ponds walls.

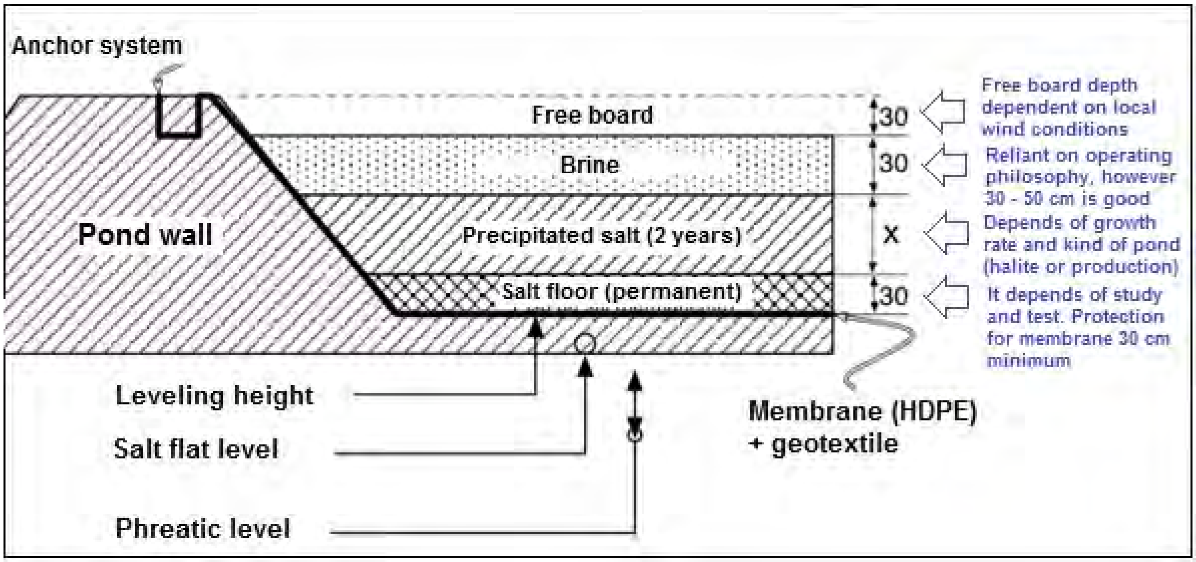


Figure 16.3: Typical Cross Section of Ponds.

To facilitate the operation of salt harvesting, maintenance and other operations, the walls of the ponds are constructed to provide a secure access. There are 3 kind of pond walls: (a) perimeter wall, (b) shared wall (between two ponds) and (c) harvesting main wall. Figure 16.4 shows the ponds walls in detail.

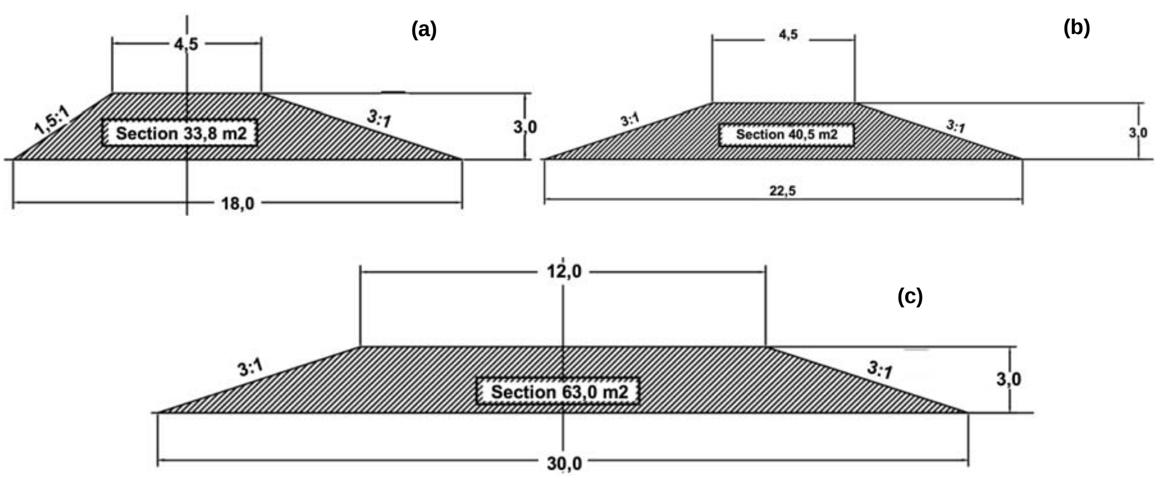


Figure 16.4 Detail of the Wall of the Ponds

Operation of Solar Evaporation Ponds

The solar evaporation pond could be described by phase diagram of Figure 16.5:

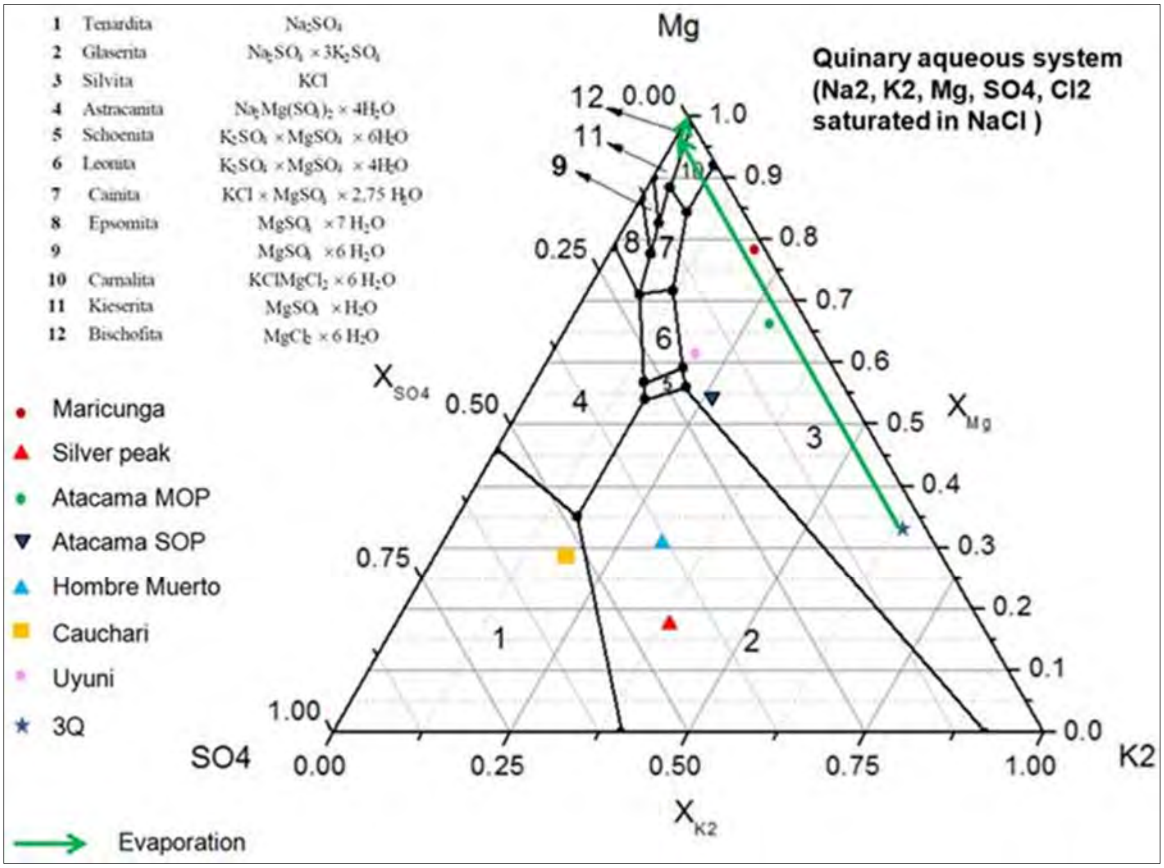


Figure 16.5: Phase Diagram and Brine Behaviour in 3Q Project.

Phase diagrame is the representation of the different saline species that 3Q Project brine wells will produce during the evaporation process. Green line in Figure 16.5 corresponds to the evaporation route, which is the sequence of salt precipitation that will provide the following salts:

- NaCl.
- NaCl – KCl – $CaCl_2x6H_2O$.
- Gypsum, NaCl (addition of Na_2SO_4).
- H_3BO_3 – $KClxMgCl_2x6H_2O$.

The pond design of the 3Q Project has taken into account the evaporation route described above and considered 3 group of ponds:

- Pre Concentration Ponds (PC ponds) where NaCl will precipitate.
- K /$CaCl_2$ Ponds where NaCl – KCl – $CaCl_2x6H_2O$ will precipitate
- Post Concentration Pond (C ponds) ponds where brine will concentrate around 6% Li and will precipitate H_3BO_3 – $KClxMgCl_2x6H_2O$.

Figure 16.6 shows the block diagram of the ponds. The process starts with pumping brine from the production wells to the pre-concentration ponds, in order to remove NaCl as precipitated halite. Subsequently, concentrated brine with lower NaCl content is transferred to K /$CaCl_2$ ponds, whose purpose is mainly to concentrate and precipitate calcium chloride ($CaCl_2$) salts, and to a lesser extent, potassium chloride (KCl) salts.

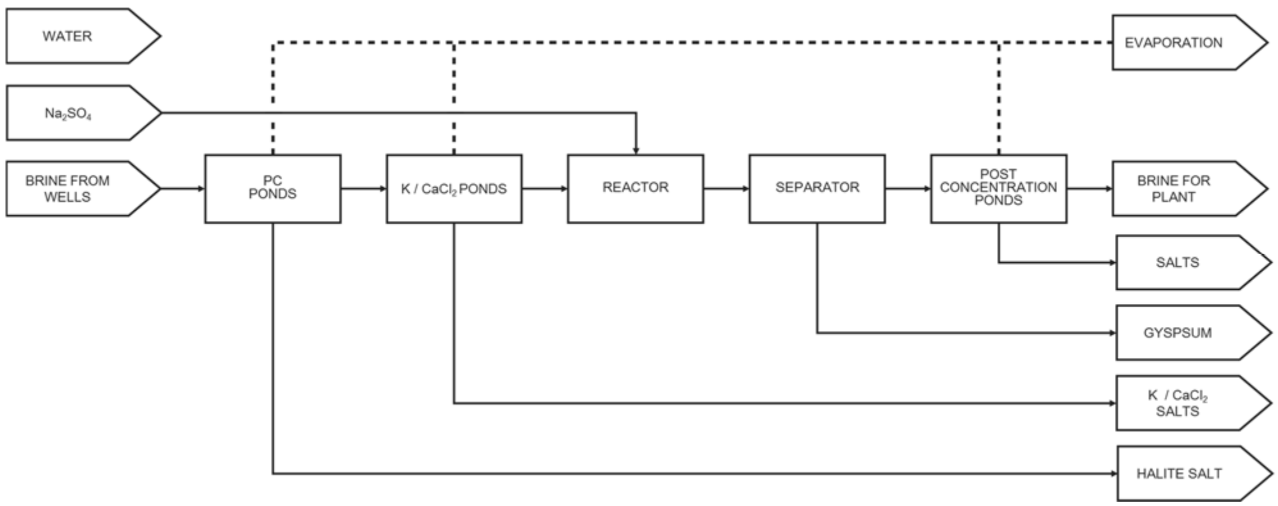


Figure 16.6: Block Diagram of the Solar Evaporation Pond System for the Production of Brine with High Lithium Concentration.

Addition of Anhydrous Sodium Sulfate (Na_2SO_4)

Once brine has been concentrated in K /$CaCl_2$ ponds, it is transferred to the calcium removal stage, by adding anhydrous sodium sulphate (Na_2SO_4) – or another sulphate source, free of magnesium, calcium and boron – resulting in gypsum and NaCl as precipitated salts. This reduction of Ca content in brine is required for increasing Li concentration, reducing Ca concentration, and by doing so, reducing the use of soda ash in the chemical plant.

Equation 16.1, shows the reaction caused by the addition of anhydrous sodium sulphate in this stage:

$$Ca^{2+} + Na_2SO_4 + 2H_2O \rightarrow CaSO_4 \cdot 2H_2O \qquad [16.1]$$

Evaporation of Purified Brine

After removing excess Ca, treated brine is transferred to the last stage of Li concentration, until reaching 6% weight of this element. Table 16.2, shows the results obtained after adding Na_2SO_4 and post-concentration stage.

Table 16.2: Comparison of Brine Entering and Leaving Pond Sector in 3Q Project.

	H_2O	H_3BO_3	Na^+	K^+	Mg^{++}	Ca^{++}	Li^+	Cl^-	SO_4^{--}
Brine entering ponds from wells	72,67%	0,49%	6,75%	0,55%	0,12%	2,81%	0,06%	16,52%	0,03%
Final brine post-concentration ponds	53,62%	1,81%	0,10%	0,93%	1,02%	0,62%	6,03%	35,86%	0.00%

It is important to mention that these are preliminary data and that currently NLC is carrying out brine evaporation tests in pilot ponds located in the 3Q Project site, in order to obtain more accurate results. Photo 16.1 shows the actual operating pilot ponds:

Photo 16.1 Pilot ponds operating at 3Q Project salt flat

16.2.2 Lithium Carbonate Plant

Concentrated brine will be transported in trucks from the salt flat sector of 3Q Project to the SX plant, chemical plant to be located in *Fiambalá* sector. The company has identified a 4000 ha ground that belongs to the Municipality and is working an agreement to convert the area into an industrial park. Figure 16.7 shows the layout of the Lithium Carbonate plant.

Planta SX – chemical plant for the production of Lithium Carbonate includes brine purification stages for concentrated brine, before entering the carbonation stage. For this purpose, the conventional process currently used by Lithium Carbonate plants, taken as a reference, establishes the following:

- Boron removal by solvent extraction (SX).
- Treatment of boron-free brine with mother liquor and subsequently treatment of the purified brine with a mix of slaked lime and soda ash solution to eliminate Mg.

Figure 16.7: Location and Layout of Lithium Carbonate Plant Nearby Fiambalá.

Boron Solvent Extraction

Lithium carbonate production process starts by removing boron content by solvent extraction (SX Plant), where in a first stage pH is adjusted with hydrochloric acid (HCl) until pH 3. After pH adjustment, brine is sent to SX units where it is mixed with a specific extractant dissolved in an appropriate thinner. Subsequently, boron-free brine can be neutralized with mother liquor of Lithium Carbonate. The stripping (re-extraction) of boron from the organic phase is carried out by means of an alkaline aqueous solution, corresponding to a mixture of mother liquor coming from the Lithium Carbonate plant and a 50% v/v of NaOH solution, dosed to keep alkaline pH in re-extraction (pH between 10 and 11). The solution containing boron is discharged in the high-boron tank and, subsequently it is discarded in the disposal ponds.

Removal of Residual Magnesium

Boron-free brine is transferred to the chemical plant, where it is subject to three processing stages:

- Stage 1: The purpose of this stage is to completely remove calcium content and part of the magnesium concentration present in boron-free brine, resulting from the SX boron removal process. In this stage boron-free brine is combined with mother liquor (which contains carbonate solution) from the precipitation stage Lithium Carbonate precipitation stage (Stage 3) at 60°C, diluting lithium content from 6% - 1%, and eliminating part of the Mg as an effect of alkalinity and carbonate, and all calcium content is removed as calcium carbonate. Mg and Ca solids are separated from brine by means of a filtration process.
- Stage 2: Brine from stage 1 is then transferred to stage 2, where it is combined with a solution of Slaked lime and soda ash at a temperature of 65°C, in order to remove residual magnesium. Mg and Ca solids are separated from brine by means of a filtration process.

Lithium Carbonate Precipitation

- Stage 3: Finally, brine from stage 2, purified and containing approximately 1% weight of lithium dissolved as lithium chloride (LiCl) – a concentration that is reached by dilution with soda ash and/or recycled mother liquor from the plant – is transferred to three reactors in series, where Lithium Carbonate is precipitated by adding a sodium carbonate solution (at 28% weight). The reaction takes place at a temperature of 70°C to favor Lithium Carbonate solubility. The product of the reaction is filtered, separating the liquid phase - called mother liquor – from the solid phase, which is the Lithium Carbonate (Li_2CO_3) product.

Subsequently, this product is washed with soft water (water with Na and Cl with no more than 50 ppm), in order to meet the expected purity of 99.9% (battery grade product). Finally, the product is dried, classified and packed.

16.3 Global Mass Balance

Global mass balance of the process, as described in section 16.2, has been estimated and results in metric tons per year (TPY) are shown in Table 16.3. Process mass flows in the table should be read in conjunction with the schematic flow diagram of Figure 16.8.

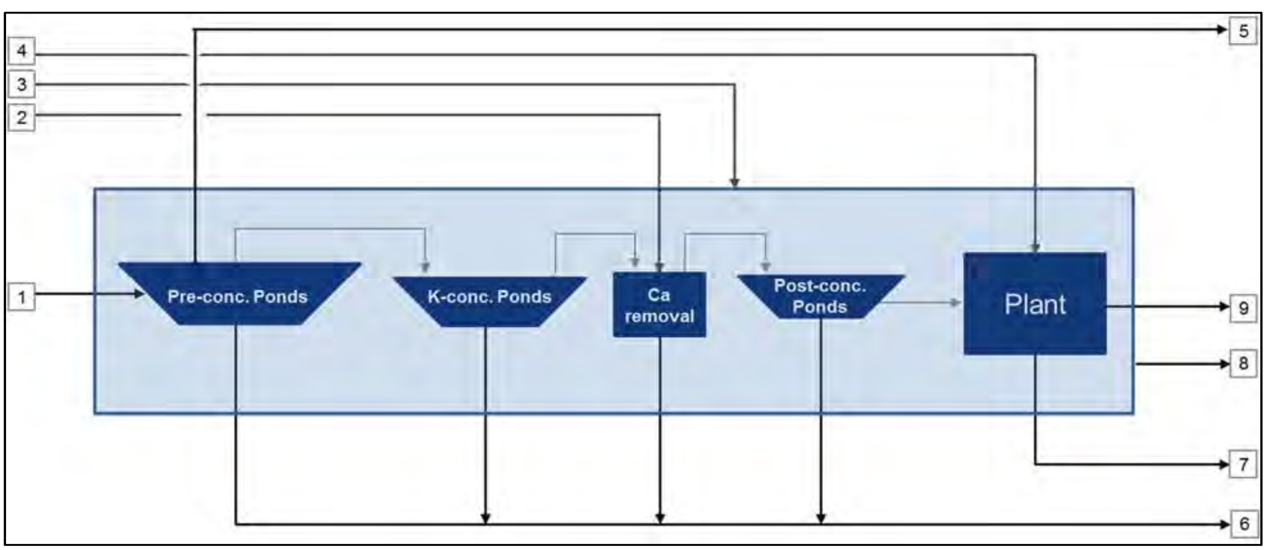


Figure 16.8: Schematic Flow Diagram for Global Mass Balance.

16.4 Process Mass Flow Requirements for the Solar Evaporation Area

Results of process simulation in case of brine entering at 10°C, for an annual production of 35,000 TPY Lithium Carbonate (LCE – Lithium Carbonate equivalent) are shown in Table 16.3.

Table 16.3: Process Mass Flows for 35,000 TPY Li2CO3.

Description	Unit	Capacity
Mass Balance		
Feed Brine	metric ton/year	24,676,069
Average brine flow	L/s	637
Total evaporation area (90% availability)	m^2	10,420,000
Total evaporation area	m^2	9,375,800
Ponds		
Pond Area	m^2	9,378,000
Brine to be treated	metric ton/year	467,873
Na_2SO_4 Consumption	metric ton/year	224,832
Process water	metric ton/year	246,761
Losses due to Entrainment and Leaks	metric ton/year	813,730
Precipitated salts	metric ton/year	8,136,567
Lithium recovery in ponds	%	53.6
Li_2CO_3 Plant		
Concentrated Brine from ponds	metric ton/year	128,920
Li concentration	%	6.03
Na_2CO_3 consumption	metric ton/year	61,555
Process water	metric ton/year	549,536
Lime consumption	metric ton/year	2,555
Plant yield	%	83
LCE Production	**metric ton/year**	**35,000**

16.5 Complementary Process

Brine evaporation route described in section 16.2 shows the production of by-products, which are calcium chloride ($CaCl_2$) as main by-product and potassium chloride (KCl) in a low percentage.

17. Additional Requirements for Technical Reports on Development Properties and Production Properties

17.1 Mining

17.1.1 Well Design

NLC has carried out an extractive well drilling program at industrial capacity (productive well). Figure 17.1 shows a schematic diagram of a productive well of 172 m^3/h (48 L/s) and 50 m depth.

Productive wells differ from each other according to the geological and hydrogeological characteristics such as flowrate, porosity and other parameters, therefore are specifically designed to match the productive brine aquifer in the drilling site.

The preliminary design of the well field was done by Conhidro 2017, using available pump test data. Figure 16.2 shows the location and distribution of the well field and Figure 17.1 shows a typical productive well desidn.

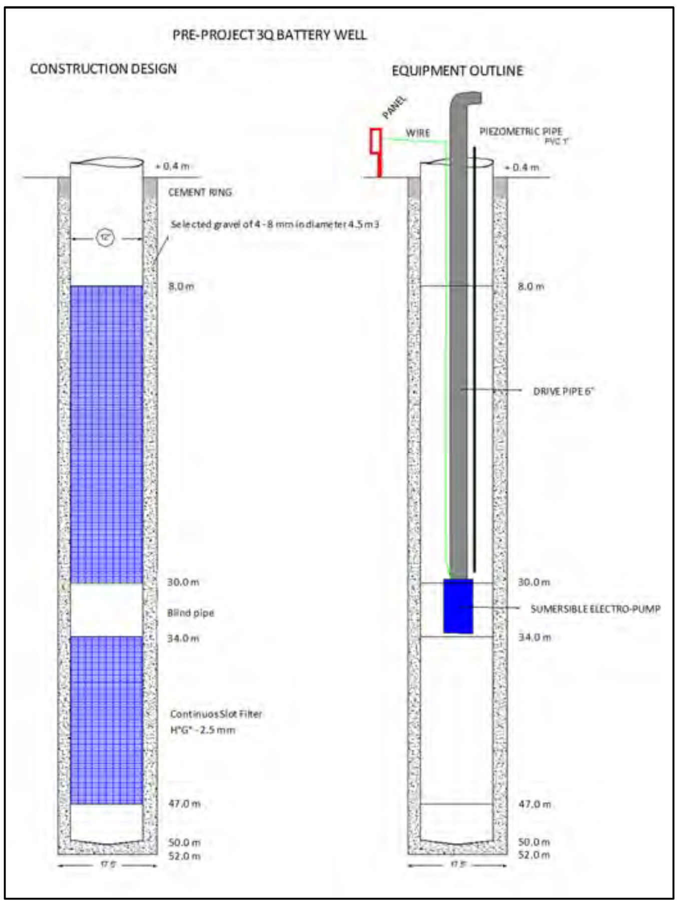


Figure 17.1: Productive Well Scheme.

17.1.2 Mining Method

The depth of the productive well will depend on the depth where the aquifer is located. Electrical submersible pumps installed in the well pump the brine from productive wells to the pipe network, which transport the brine to the solar evaporation ponds.

17.1.3 Mining Infrastructure

In brine extraction, the basic mining infrastructure is the following:

- Consolidated access road for the rig units and well services.
- Consolidated Pad for drill location, suitable for rig units, drilling materials, drilling fluids/drill cuttings and pump pits, parking area, technical supervision and crew cabin, power source, fuel storage capacity, pipe/casing/drilling bars manipulation, etc.
- Production wells
- A network of pipes connecting the wells and the solar ponds

17.1.4 Mining Auxiliary Task

Auxiliary tasks for drilling and pumping are as follows:

- Pipe road.
- Surveying service.
- Fresh water and brine services.
- Soil movement services.
  - Access and drill location construction.
  - Drilling fluids and other purposes pit construction.
  - Environmental remediation.
- Environmental & Safety support/supervision.
- Well services.
  - Casing assembly
  - Final production design assembly
  - Screening washing work
  - Geophysical services
- Mine operation staff.
  - Miner operation shift.
  - Mine operation supervision.
  - Pipe & welding shift.
  - Electrical maintenance shift.
  - Mechanical maintenance staff.

17.1.5 Mine Technical Service Activities

The company has currently developed a Resource Estimate using the three-dimensional block modeling software as described in chapter 15 of this report.

Current ongoing activities as at the date of this report are:

- Pumping test at different locations in salt flat to determine aquifer characteristics.
- Further infill drilling to upgrade inferred into measured and indicated resources
- Seismic Geophysics to better characterize the basin
- Completing one-year monitoring of all inflows from rivers
- Trenching in the surrounding of the salar to determine boundary conditions
- Construction of a final hydrogeological numerical model (including a quantitative water balance) of the site, for use in evaluating Reserves.

17.1.6 Mining Dilution and Recovery

In brine mining the concepts of Dilution and Recovery are different from hard rock mining. Dilution of the brine occurs over time as a result of the influx of fresh water into the salt flat as the brine is extracted. The exact rate at which this process happens is going to be studied using a dynamic hydrological model currently under construction. Examples from other mines such as Silver Peak are known to have experienced a drop in the grade of over 50% over a period of 50 years of continuous production.

The concept of Recovery involves the ratio of the specie of interest effectively extracted from a porous media. The extraction depends on many factors including density, viscosity, interconnectivity of the porous space, etc. These parameters have been introduced into the hydrostratigraphic model.

17.1.7 Mineral Reserves

Mineral Reserves have not been defined during the preparation of this report; in this stage only in situ measured, indicated and inferred resources have been defined to date, as mentioned in chapter 15 of this report.

17.1.8 Mine Planning

The mining plan designed to identify the number and location of wells needed to feed the solar evaporation ponds on a sustainable basis is explained as a Resource Estimate in chapter 15 of this report.

17.1.9 Harvested Salt Piles

The evaporation process in the ponds leaves considerable amounts of salts on the bottom of the ponds. These salts must be removed ("salt harvesting") from the ponds and transported to nearby piles. The quantity of salt to be harvested is approximately 8.1 M metric tons/year. The harvesting and transport operation could be performed by an outside contractor, using mining type front end loaders and trucks for this purpose.

The salt piles normally are up to 20 m high and will be built in the location showed in Figure 16.2. It is estimated that approximately 500 ha of piles will be built over a 20-year period and these piles will be built at an estimated distance of 8 km from the pond area.

The composition of the precipitated salts is mainly Sodium Chloride (NaCl), Calcium Chloride ($CaCl_2$) and Potassium Chloride in lesser proportion. These precipitated salts can be considered as inert because the salts are generated from the brine already present in the salt flat and do not introduce foreign compounds to it. Sodium Chloride and Calcium Chloride make up over 80% of this waste.

The accurate design of the salt piles is under study and the allocation of these piles will be carried on from the load & haul optimization point of view with all the environmental considerations.

17.1.10 Production Equipment Selection

The equipment required for the field of productive wells are submersible electric pumps, located at depths that ensure they will always be submerged in lithium-rich brine. For this reason, a slotted "casing" was designed, to be located in the largest lithium concentrated water tables.

For brine transfer between production wells and evaporation ponds, self-priming pumps will be used. The Project considers 23 submersible electric pumps.

Other equipment required are:

- Trucks for HDP's pipe transportation inside the Brine Well Field.
- A Hydro – Crane for many pipe manipulation purposes.
- Two HDP's Welder.
- 8,000 to 14,000 litres. Water trucks.
- Cable reel truck, for electrical network.
- Electrical substations, for proper power distribution.
- A First Aid / Evacuation Ambulance.

17.1.11 Service Equipment

Pond design and operation, makes it necessary to remove the salt deposits formed on their bottom. For this purpose, typical earthmoving machinery will be used, such as bulldozers, frontal loaders and dump trucks. This service could be sub-contracted.

17.2 Process Plant Design

17.2.1 Process Design Criteria

Weather Data

Meteorological data, obtained from Vaisala weather station, considered for process design criteria of Solar Evaporation Ponds is based on Meteorological Reports prepared by Luis Gutiérrez, Senior Meteorologist. Table 17.1 shows compiled weather data:

Table 17.1: 3Q Project Meteorological Data – Salt Flat Site.

Parameter	Vaisala Meteorological Station (Daily information)		Year
	Summer (Oct – Mar)	Winter (Mar – Oct)	
	Med	Med	
Temperature (°C)	6.0	-1.4	2.3
Humidity (%)	26.5	24.5	25.5
Pressure (hPa)	623.5	622.2	622.9
Wind (m/s)	6.2	8.0	7.1
Solar Global Radiation(Watt/m^2)	351.8	221.5	285.6
Evaporation (mm) (Vaisala weather station)	5.9	3.7	4.8
Rain Precipitationaccumulated in the period (mm)	52.8	18.6	71.4

Areas and Ponds Dimensions

From mass balance of section 16.3, the pond system was design considering building the system ponds completely in the salt flat centre, a scheme of evaporation ponds is shown in Figure 17.2 and the dimensions of the ponds are shown in Table 17.2.

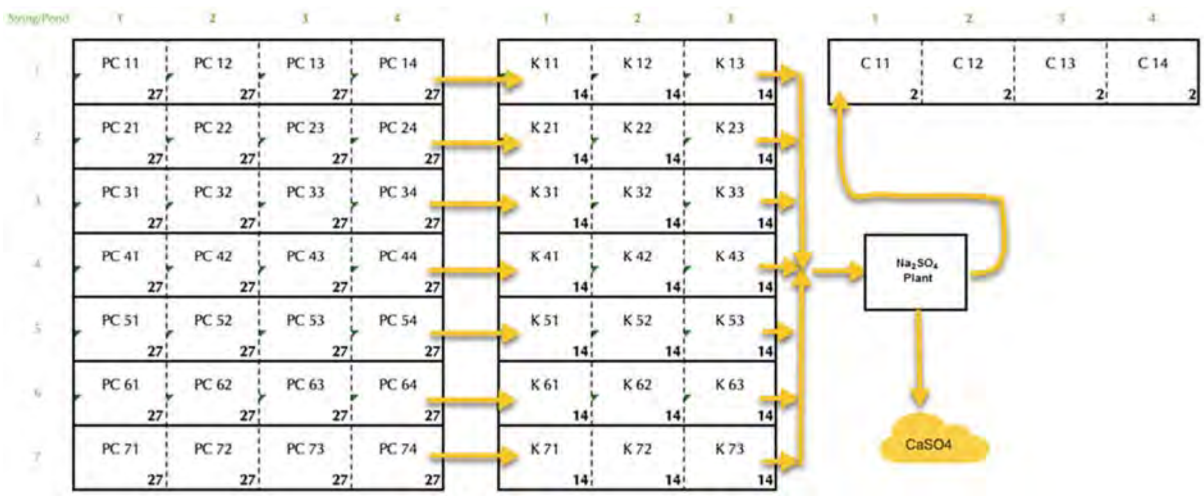


Figure 17.2: Schematic Evaporation Ponds layout.

Table 17.2: Areas to be used in Ponds System – Salt Flat Site.

Item	Unit	Pre-Concentration Ponds	K / $CaCl_2$ Ponds	Post-Concentration Ponds
N° of Strings	u	7	7	1
N° of Ponds by String	u	4	3	4
Depth	m	2,5	2,5	2,5
Total Area (90% availability)	m^2	7,170,000	2,880,000	80,000
	ha	717	288	8
Retention time	days	160 – 180	80 – 100	30

The concentrated brine obtained in the Post – Concentration ponds at salt flat site will be transported by cistern trucks to the concentrated brine storage ponds located in the facilities of the Lithium Carbonate Plant nearby Fiambalá. The Lithium concentration in the brine is approximately 6%.

Dimensions of concentrated brine storage ponds and other store ponds are shown in Table 17.3.

Table 17.3: Storage and Waste Ponds Dimensions – Lithium Carbonate Plant Site.

Item	Unit	Concentrated brine ponds	Industrial water ponds	ML(1,2) purge ponds	Stripping waste high B conc (2)
N° of Ponds	u	2	2	1	1
Depth	m	2.5	2.5	2.5	2.5
Total Area	m^2	4,000	8,750	46,419	270,000
	ha	0.4	0.9	4.6	27.0
Capacity	m^3	10,000	21,875	116,048	675,000

Note (1): Mother liquid.
Note (2): 5 working year’s capacity.

Plant Operating Criteria

The 3Q Project plans the following operational criteria:

- Plant Operational time: 330 days per year (90% availability)
- Lithium concentration of brine fed to Boron SX stage of Lithium Carbonate Plant is around 6% p/p.
- A mix of alcohol and organic solvent will be used in the Boron SX stage. The yearly make-up of the mix will be 20% of the daily mass flow used in the circuit of extraction and stripping.
- Lately, the Boron free brine will be adjusted by the addition of a 50% v/v NaOH; then the solution will be mixed with mother liquor recirculated from Step 3 stage so large proportion of Mg content and most Calcium content of the brine will be removed. Lithium concentration is around 1%.
- Brine coming from Step 1 will be fed to the Step 2 stage and remaining Mg in the brine will be precipitated by the addition of a mix of Sodium Carbonate solution 28% v/v and slaked lime.
- The purified brine will be fed to the Step 3 stage (carbonation stage) where precipitation of Lithium Carbonate (Li2CO3) will occur through the addition of Sodium Carbonate solution 28% p/p.
- Carbonation stage temperature will be 70°C.
- Lithium Carbonate Plant yield will be 83%.
- During the ramp up stage, the product will be Lithium Carbonate Technical Grade, once the plant reaches design capacity, the product will be purity Lithium Carbonate Battery Grade 99.9% p/p and particle size will be approximately 10 microns.
- A reverse osmosis (RO) plant will be necessary for the preparation of Sodium Carbonate solution, Slaked lime, Sulfuric acid solution and Hydrochloric acid solution. The RO water requirement will be 1,910 m3/d.
- Lithium Carbonate Battery Grade will be packed in 1 metric ton maxi bags for dispatching and shipping to costumer through embarkation ports.

17.2.2 Sodium Sulphate Plant Description

Figure 17.3 shows the Sodium Sulphate Plant: brine extracted from productive well field will be pumped to the Pre-Concentration Ponds, where evaporation process begins. Subsequently the brine will be transferred by pumps to the K / $CaCl_2$ Ponds where the brine will saturate in Calcium Chloride and Sodium Chloride and in consequence, both salt species will precipitate in larger proportion and Potassium Chloride will precipitate in lower proportion.

Later, the brine will be transferred by pumps to the Sodium Sulphate plant where the brine is mixed with Sodium Sulphate salt to precipitate Gypsum and Sodium Chloride. The solid precipitated will be separated by filtration and will be disposed in a waste pond.

The main infrastructure and equipment for this plant are the following:

- 1 Sodium Sulphate Storage Cellars.
- 1 Sodium Sulphate Crusher.
- 1 Brine Storage Tank.
- 2 Centrifugal Pumps for transferring brine from storage tank to reactors (1 Operating + 1 Stand-by).
- 2 Agitated Reactors (1 operating + 1 Stand-by).
- 2 Centrifugal Pumps for transferring brine from the reactor to solid liquid separation stage (1 Operating + 1 Stand-by).
- 1 Solid - Liquid Separation Equipment and 2 Centrifugal Pumps (1 Operating + 1 Stand-by).
- 1 Receiving Tank and 2 Centrifugal Pumps (1 Operating + 1 Stand-by).
- 1 Receiving Feed Bin to pick up solids coming from Solid – Liquid separation stage.
- 1 Waste Pond for solid discharged from Solid – Liquid separation stage.

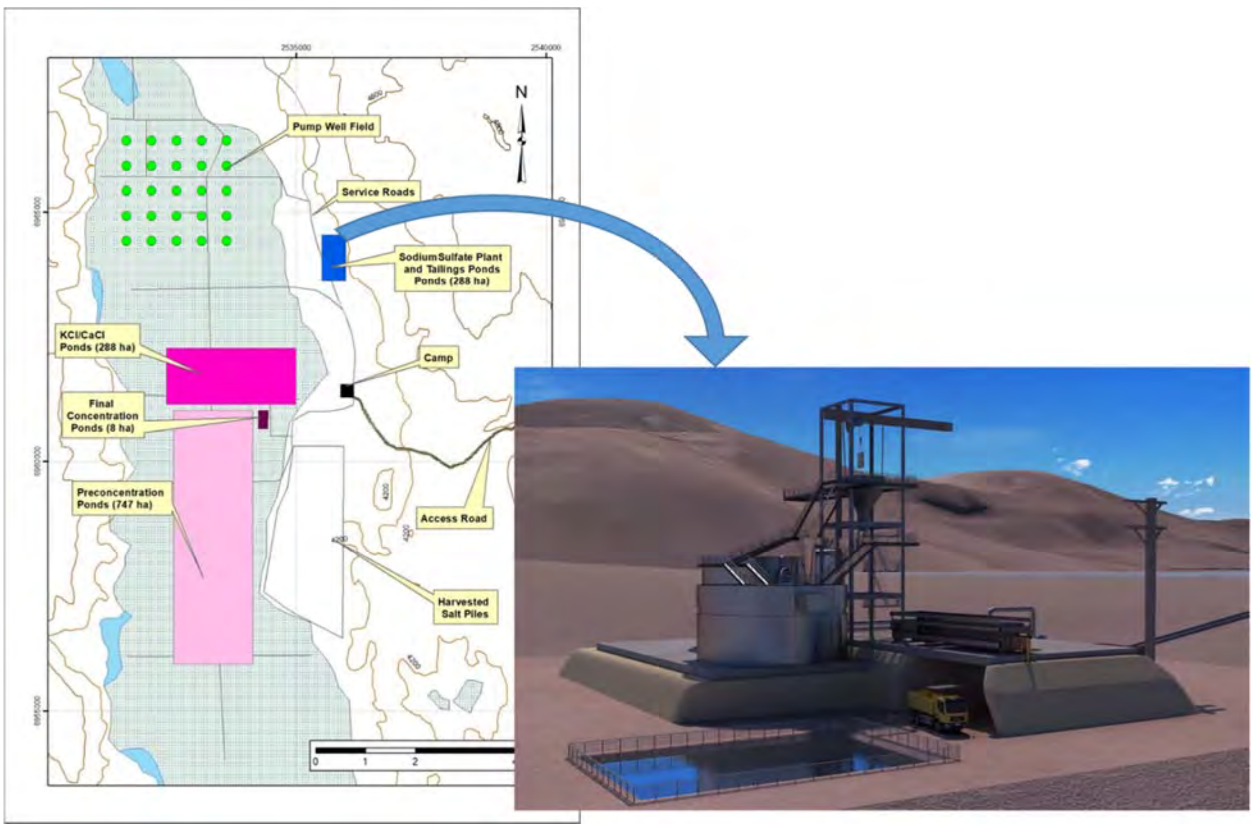


Figure 17.3: Sodium Sulphate Plant Location

Calcium Removal by-Sodium Sulphate Addition

As mentioned above, brine coming from K / $CaCl_2$ Ponds will be fed to the Sodium Sulphate plant where the brine which already has lost considerable quantity of Calcium by precipitation in ponds, will be contacted with Sodium Sulphate salt or other Sulphate source free of Mg, Ca and B, giving as a reaction product a Gypsum and /or Dihydrate Calcium Sulphate and Sodium Chloride slurry.

Calcium Separation Stage

The Gypsum and Sodium Chloride slurry will be fed to a Solid – Liquid Separation stage. The liquid phase which is the brine with lower Calcium content will be fed to a receiver tank and subsequently will be fed to Post-Concentration Ponds to complete the evaporation route and reach the desire concentration of Lithium (6% approximately).

The solid phase coming from the Solid – Liquid Separation stage will be discharged in a feed bin which will fed a hopper truck. The truck will transfer the solid to a discharge pond.

These solids residues are Gypsum and Sodium Chloride and the solid discharge ponds will be design considering 20 years of lifetime and regarding the full achievement of the environmental considerations and current regulations.

Services

As complementary services for the salt flat site equipment such as productive well pumps, transferring pond pumps, and Sodium Sulphate plant, it has been considered a Hybrid System of Power Supply that includes a photovoltaic panel system (solar energy) and diesel generation system.

The Hybrid System includes diesel generators configured to operate in parallel in synchronism and control of the electric charge distribution in order to define the power generators automatic drive considering the electric charge demand and the engine rotation operation according to the operation hours.

The system considers 1 Hybrid System of Power Supply feeding the following areas.

- Productive well field.
- Ponds system.
- Sodium Sulphate plant

The Power Plants will consist of Hybrid System with generators to assure the critical loads power supply and the solar panels will be an input to the electrical system during the day as long as the weather conditions allow. Total electric requirement at Salt Flat Site is 4.6 MW. Recommended Power Supply by system are shown in Table 17.4.

Table 17.4: Recommended Power Supply in Salt Flat Site.

Area	Power Photovoltaic Plant (kW)	Power Diesel Plant (kW)
Salt Flat Generation Plant	1,400	4,680

Industrial water will be needed for dilution water service in the pond pumps. The water demand for different operation at salt flat site will be 47.5 l/s.

The 3Q Project considers a Total Evaporation Pond area of 10,042,000 m^2, and a total area of 5,800 m^2 for the Sodium Sulphate plant. Other areas are: 35,000 m^2 for Gypsum and Sodium Chloride discharge pond and 10,000 m^2 for offices, warehouse, laboratories and other services and 500 ha for harvested salts as mentioned in section 17.1.9.

17.2.3 Lithium Carbonate Plant Description – Chemical Plant Site

The concentrated brine coming from the Post – Concentration Ponds at the salt flat site, contains around 6% p/p Li, and will be transported by cistern trucks to the Lithium Carbonate plant nearby Fiambalá. The concentrated brine will be discharged in the storage ponds to be lately fed to the Lithium Carbonate plant and to be processed to produce 35,000 TPY of Li_2CO_3 battery grade.

The Lithium Carbonate plant of 3Q Project includes the following stages for brine processing:

- Boron Solvent extraction (SX) and Stripping
- Step 1: First purification stage
- Step 2: Second purification stage
- Step 3: Carbonation stage
- Drying, compaction, micronizing and packing stages

The main infrastructure and equipment included in the Lithium Carbonate Plant is:

- 35 Tanks.
- 18 Reactors.
- 6 Solid – Liquid contact units.
- 3 Separator units.
- 34 Agitators.
- 100 Pumps.
- 1 fire control system.
- 3 Press filters.
- 1 Thickener.
- 2 Centrifuges (includes discharge screw).
- 2 Drum filters.
- 2 Belt filters.
- 8 Plate Heat Exchanger.
- 1 Belt conveyor.
- 3 Screw feeders.
- 1 Indirect dryer.
- 1 Micronizer.
- 3 Storage bins.
- 2 Heaters.
- 2 Blowers.
- 2 Compressors.
- 3 Basket elevators.

- 1 Compactor.
- 1 Cyclone.
- 1 Liming plant.
- 1 Sodium Carbonate plant.
- 1 RO water plant.
- 1 Packing System.
- 2 Industrial water storage ponds (4,375 m^2 each).
- 2 Concentrated brine storage ponds (2,000 m^2 each).
- 1 Discharge pond for Mother Liquor purge (46,419 m^2).
- 1 Discharge pond for Boron stripping solution (270,000 m^2).
- 1 Discharge pond for $CaCO_3$ / $MgCO_3$ / $Mg(OH)_2$ solid discharge (76,752 m^2).

Boron Removal by Solvent Extraction (SX)

The Solvent Extraction process consisted of two stages: Extraction and Stripping. Concentrated brine coming from storage pond will have a pH adjustment with Hydrochloric acid (HCl) until reach pH 3, then the acidulated brine (aqueous phase) will be put in contact in counter current with a mix of alcohol and organic solvent (organic phase) to promote the Boron transferring from the brine to the organic phase as Boric Acid (H_3BO_3) and obtain a Boron free concentrated brine as product.

Subsequently, the Boron loaded organic flow will be processed in the Stripping stage to recover the organic phase and to eliminate the Boron. In this case, organic phase will contact in counter current way with an alkaline aqueous solution that promotes the Boron transfer as borate (BO^-_3) from the organic phase. The alkaline aqueous solution is ML coming from Step 3 with addition of NaOH to supply the lack of alkalinity. In the other hand, organic phase will be conditioned with an acid solution in the Scrubbing stage and later recycled to the SX process

For the estimation of the area necessary to discharge the high Boron concentration coming from the Stripping stage, will be design considering 5 years of life time and after that it could be increase the pond area or increase the height of the pond's wall, regarding the full achievement of the environmental considerations and current regulations.

Step 1: First Purification Stage

The Step 1 or first purification stage is the beginning of the Lithium Carbonate Plant Wet Area and the aim of this stage is eliminating Calcium and reduce Magnesium from the Boron free brine. The brine will be mixed in agitated reactors with a 50% v/v solution of NaOH to adjust pH and then mixed with Mother Liquor (ML) coming from Step 3 at 60°C to ensure the total precipitation of Ca and part of Mg. Lithium concentration is around 1%; Calcium will be removed as $CaCO_3$ and Magnesium will be removed as $MgCO_3$ / $Mg(OH)_2$.

The brine will be transferred to a thickener to separate the brine from the solids, the overflow is the brine free of Boron and almost all Calcium and will be transferred to the Step 2 stage meanwhile the slurry coming from the underflow of the thickener will be discharged in a drum filter and subsequently in a feed bin to be send to the discharge pond by hopper truck. The truck will transfer the solid to a discharge pond.

5 years of life time and after that it could be increase the pond area or increase the height of the pond's wall, regarding the full achievement of the environmental considerations and current regulations.

Step 2: Second Purification Stage

The aim of the Step 2 is the removal of the remaining Magnesium in the 1% p/p Lithium brine coming from Step 1. This brine is preheated at 65°C and mixed with Sodium Carbonate solution 28% v/v and slaked lime in agitated reactors, the product of this reaction is Magnesium Hydroxide ($Mg(OH)_2$) and Magnesium Carbonate ($MgCO_3$).

The slurry obtained as a product of the reaction will be fed to a press filter where the solid discharged will go to a feed bin and subsequently to a hopper truck to be discharged in a discharge pond. In the other hand, the purified brine will be transferred in a tank and subsequently will be fed to the Step 3 reactors.

5 years of life time and after that it could be increase the pond area or increase the height of the pond's wall, regarding the full achievement of the environmental considerations and current regulations.

Step 3: Carbonation Stage

The purified brine coming from Step 2 will be preheated at 70°C and then fed to the reactors of the Step 3 stage, the carbonation stage where the 1% p/p Lithium brine will be mixed with Sodium Carbonate solution 28% v/v to produce the precipitation of Lithium Carbonate battery grade.

The Lithium Carbonate slurry will be fed to centrifuges to separate the solid (Li_2CO_3) from the brine (Mother Liquor); the Lithium Carbonate is fed to a belt filter to wash with RO water at 70°C the solid and to eliminate any trace of Magnesium, Sodium remaining.

A proportion of the Mother liquor is recirculated to the previous stages to make use of the alkalinity, the fraction that is not recirculated will be discharged from the plant to a discharge pond by pumps. A fraction of the weak filtrate coming from the belt filter will be reused in the plant.

The Lithium Carbonate washed cake will be send to the drying stage.

5 years of life time and after that it could be increase the pond area or increase the height of the pond's wall, regarding the full achievement of the environmental considerations and current regulations.

Drying, Compaction, Micronizing and Packing Stages

The washed cake of Lithium Carbonate will be fed to an indirect dryer by a system comprised by belt conveyor, bin and feeding screw, where the product will get the desired humidity. The hot air is produced in a burner and transported by blower.

The dried Lithium Carbonate will be 99.9% Li_2CO_3 battery grade and will be fed to the processes of compacting and micronizing and according the quality standards will be packed in maxi bags of 1 metric ton. The packed product is then stored in a warehouse, ready to be shipped to different markets.

Services

The Lithium Carbonate plant facilities will require services such as power supply and will be provided by a Hybrid System of Power Supply that includes a photovoltaic panel system (solar energy) and diesel generation system in order to supply a total demand of 8.7 MW.

Other services are Industrial water, compressed air and fluids for heating and cooling the different solutions.

The 3Q Project considers an industrial area of 1,032,000 m^2. The different areas that comprises the industrial complex is shown in Table 17.5 and Figure 17.5.

Table 17.5: Lithium Carbonate Plant - Industrial Area Breakdown.

Item	Facility	Total Area (m^2)
1	Offices	450
2	Canteen	300
3	First Aids Center	300
4	Change house	150
5	Laboratory	150
6	Maintenance area and Warehouses	700
7	Water / Steam / dry Air	1,400
8	Lithium Carbonate Storage	4,000
9	Drying, compaction, micronizing and packing of Li_2CO_3	2,500
10	Li_2CO_3 Chemical Plant	10,500
11	Storage and preparation of Na_2CO_3 solution	5,800
12	Discard Pond of High Boron solution (*)	270,000
13	Solar panels	24,000
14	Power plant	1,890
15	Fuel Tanks	1,890
16	Storage and Liming Plant	7,000
17	Industrial water storage ponds (2 ponds / 7 days capacity)	8,750
18	Concentrated brine storage ponds (2 ponds / 30 days capacity)	4,000
19	Solvent Extraction Plant	6,000
20	Wastewater treatment plant	600
21	Waste solids discard area	1,050
22	Solid discharge ponds $CaCO_3$ / $MgCO_3$ / $Mg(OH)_2$ (*)	76,752
23	Parking	5,000
24	Mother Liquor Discharge pond (*)	46,419

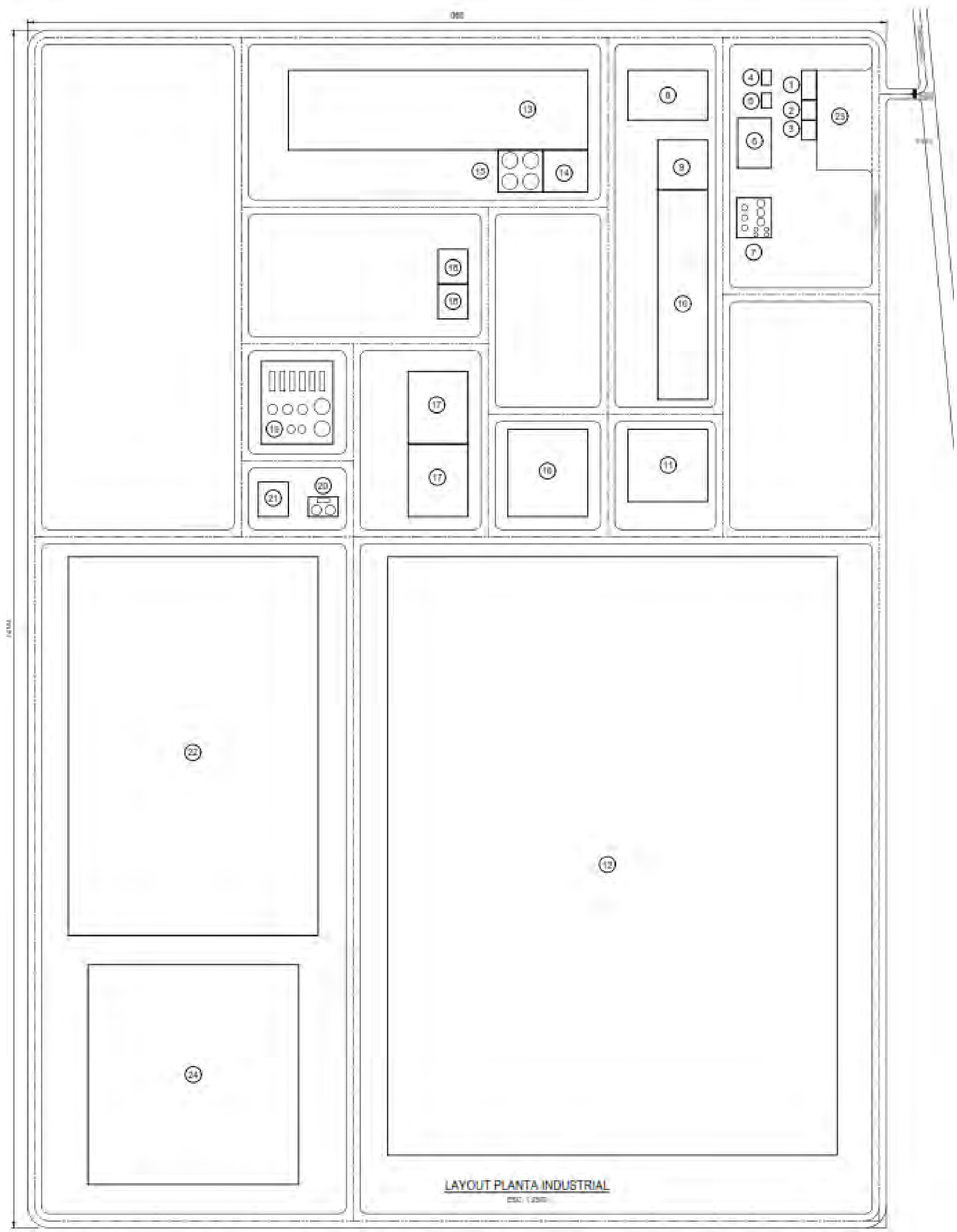


Figure 17.4: Layout of Lithium Carbonate Plant.

17.2.4 Process Diagram

The complete process of Lithium Carbonate production is shown in Figures 17.5, 17.6 and 17.7.

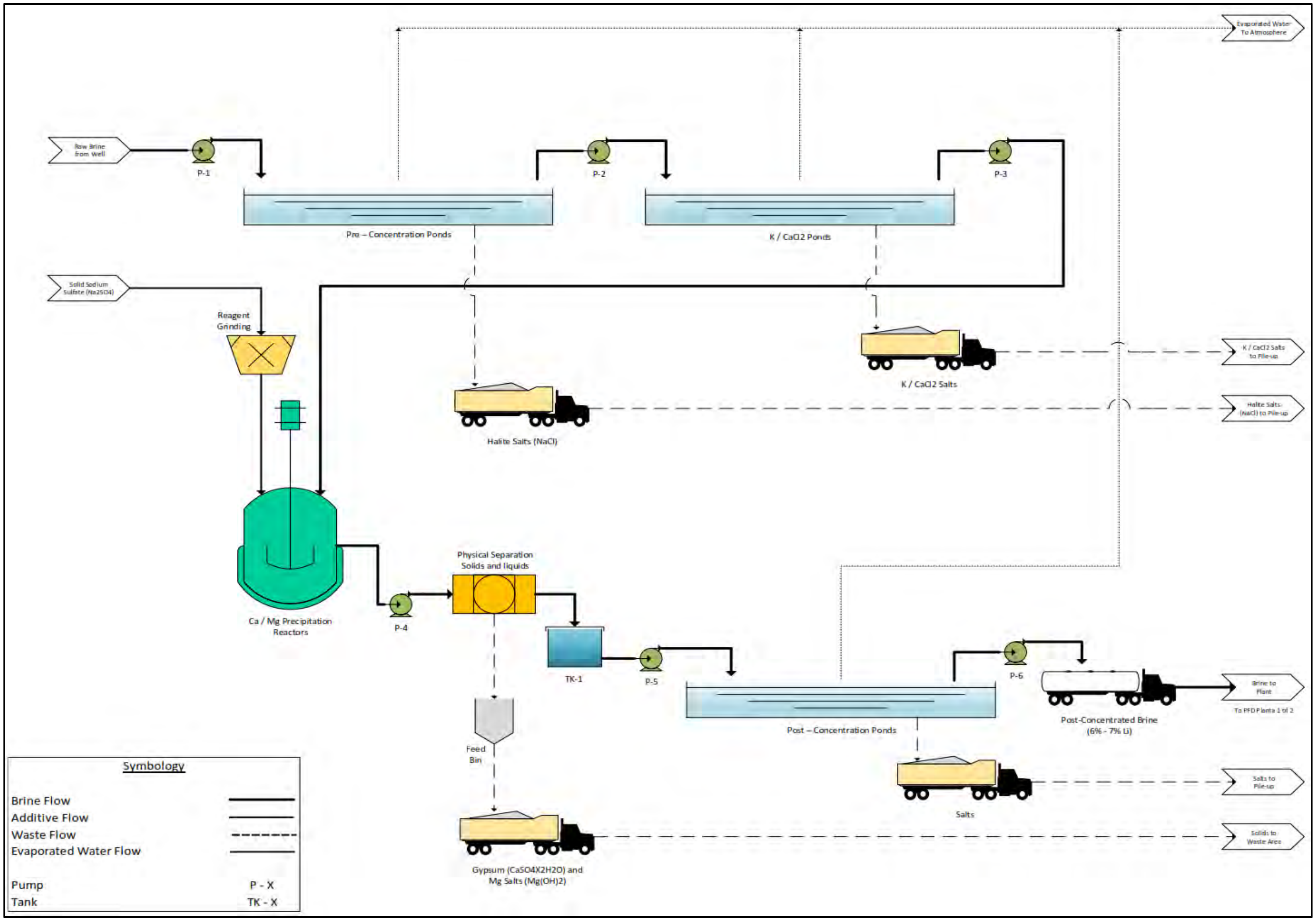


Figure 17.5: Process Flow Diagram of Solar Evaporation Ponds and Sodium Sulphate plant – salt flat site.

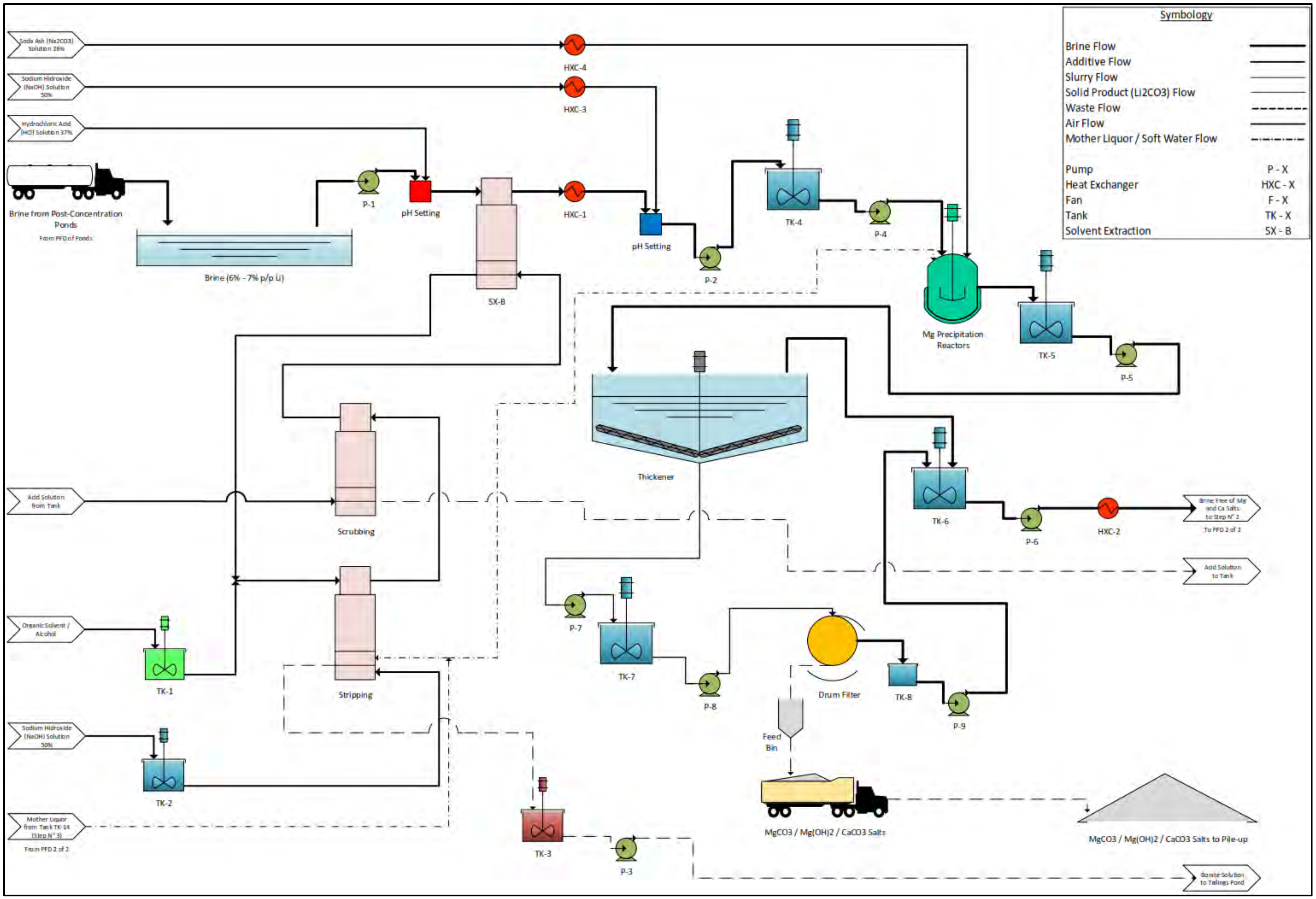


Figure 17.6: Process Flow Diagram of SX Plant and Step 1 stage – Lithium Carbonate Plant (1/2).

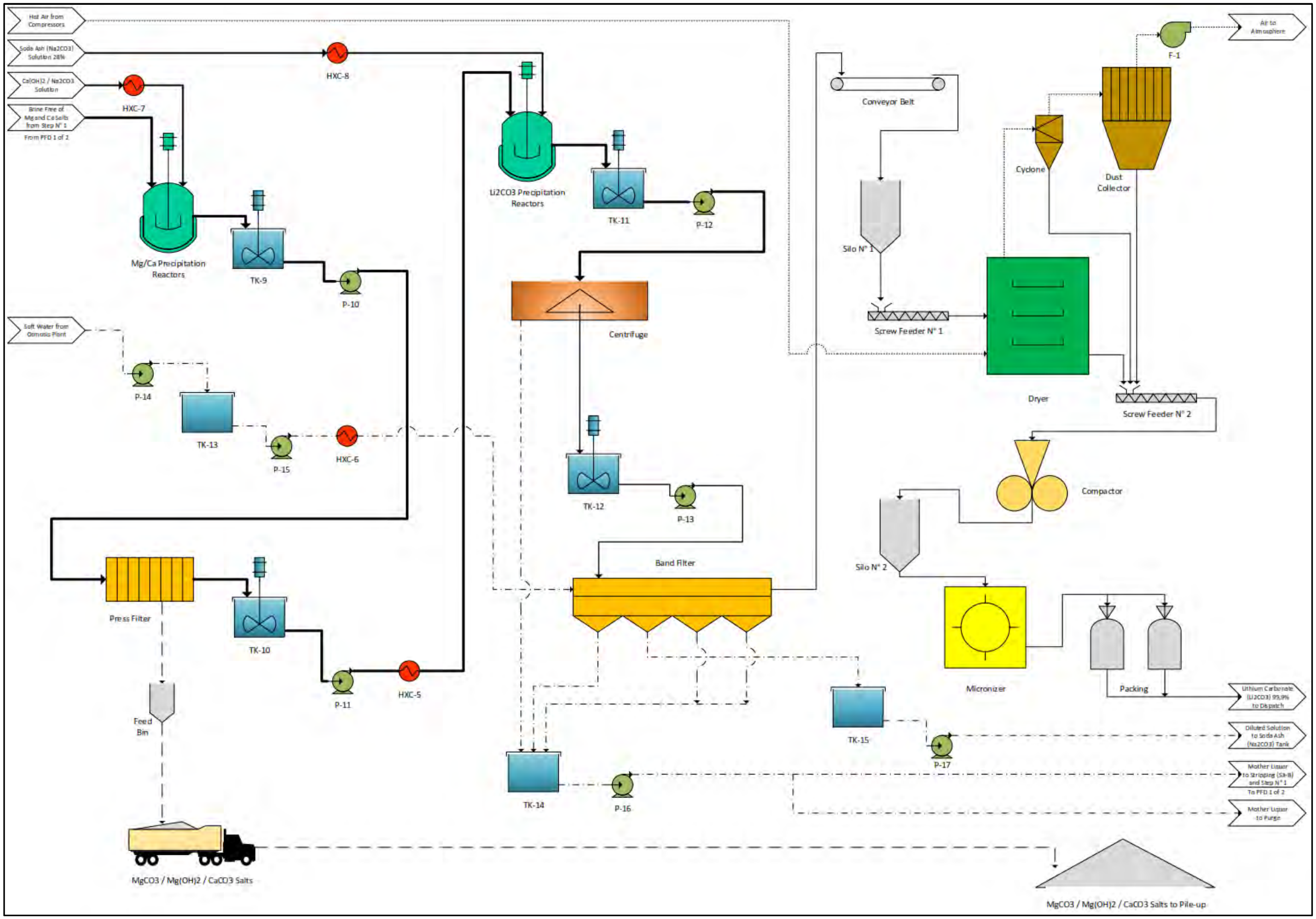


Figure 17.7: Process Flow Diagram of Step 2, Step 3 and Drying, compaction, micronizing and packing stages Lithium Carbonate Plant (2/2).

17.3 Site Infrastructure and Support System

17.3.1 Processing Buildings

The process characteristics and the high quality of the product lead to consider closed buildings for the Lithium Carbonate Plant, close to Fiambalá in order to assure the isolate the different stages of the Chemical Plant and its ancilary services.

The construction and plant design, storage facilities, Laboratories and working places will assure the achievement of the national and international regulations.

17.3.2 Administration and Warehouse Buildings

The warehouse buildings of inputs such as Sodium Sulphate, Sodium Carbonate and Lime will be constructed with steel framework and metallic coating.

The Lithium Carbonate will be storaged in closed facilities to avoid any contact with dust, humidity and other pollutants.

17.3.3 Security

A metallic perimeter fence will be built surrounding the Lithium Carbonate plant nearby Fiambalá. Given the location of the salt flat site, is not considered close the industrial facility.

Regarding on the lighting of the facilities in the salt flat and the chemical plant, the Project considers luminaires in both sites.

17.3.4 Access and Site Roads

Chapter 3 of this Report mentioned that the access to 3Q Project is 60 km on dirt road to Ruta Nacional 60 (RN60). This road will be conditioned to allow the transit of Sodium Sulphate transportation trucks to the salt flat site and allow the transit of cistern brine truck from the salt flat site to the Lithium Carbonate Plant nearby Fiambalá.

The Lithium Carbonate Plant will be located aside RN 60, allowing easy transportation of inputs, fuel and raw material, and in the other hand, allowing the transportation of Lithium Carbonate to the freight rail station in Recreo Station close to Catamarca and from then to river ports of Zárate and / or Rosario.

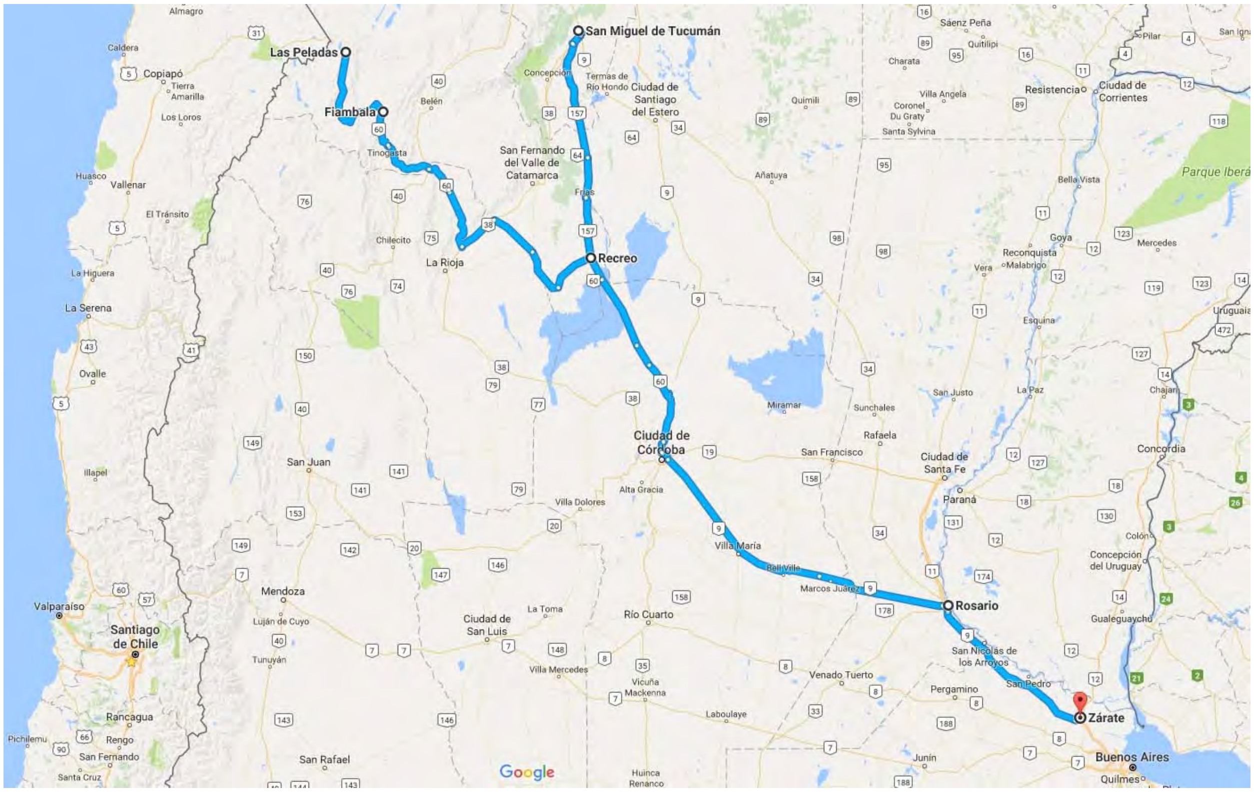


Figure 17.8 Access and Side Roads

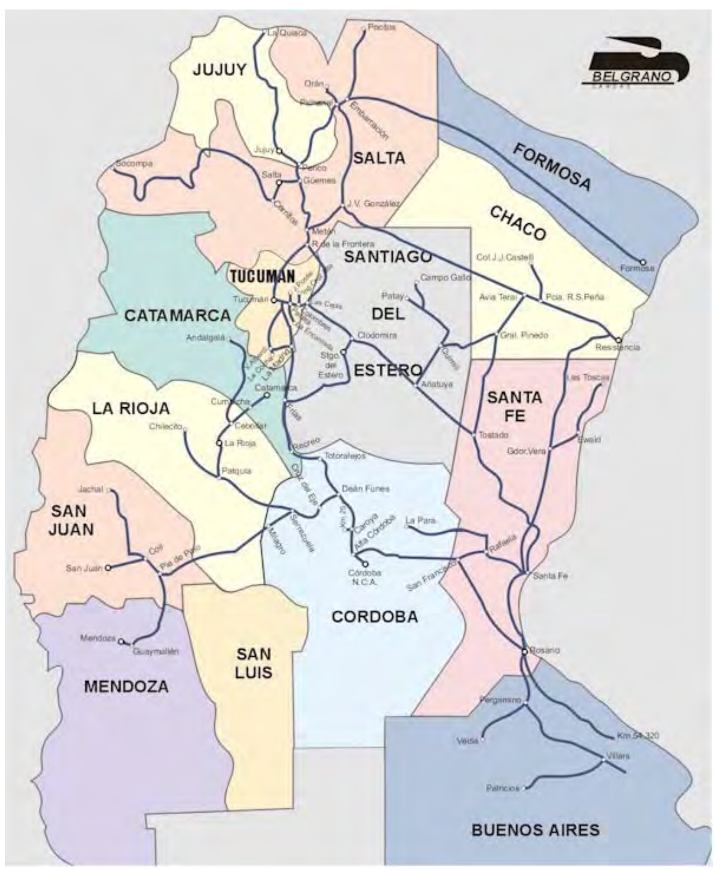


Figure 17.9 Freight Rail Network of Argentina - Belgrano – Plan.

17.3.5 Fuel Storage

The 3Q Project is located in a place with no current availability of Power Supply, therefore it is relevant to have a self-generation system. As mentioned before, the Project considers a Hybrid System of Power Supply with generators to assure the critical loads power supply and solar panels.

For generator operations there will be fuel storage tanks. National Regulations will be fulfilled.

17.3.6 Fresh and Potable Water

Lithium carbonate Plant will need 20 – 30 l/s of industrial water supply during the period of 20 years of operation. The plant site location near Fiambalá will be fed with industrial water wells in sustainable way.

17.3.7 Fire Protection

The industrial facilities at salt flat site and Lithium Carbonate plant site wil have a fire control system supplied by water from the industrial water pond, will allow fighting fire emergencies throughout the whole plant.

The Solvent Extraction Area will have a proper fire control system to control any incident if ocurrs.

17.3.8 Sanitary Treatment and Waste Disposal

The Project considers for both salt flat site and Lithium Carbonate plant near Fiambala a wastewater plant. These will be disposed of in avoiding pollution, in accordance with existing environmental regulations for salt flat site and Fiambalá.

17.3.9 Power Supply and Distribution

The Lithium Carbonate plant considers Hybrid System of Power Supply that includes a photovoltaic panel system (solar energy) and diesel generation system.

The Hybrid System includes diesel generators configured to operate in parallel in synchronism and control of the electric charge distribution in order to define the power generators automatic drive considering the electric charge demand and the engine rotation operation according to the operation hours.

The power demand of the Lithium Carbonate plant will be of 8.8 MW. The recommended power supply is shown in Table 17.6:

Table 17.6: Recommended Power Supply – Lithium Carbonate Plant.

Area	Power Photovoltaic Plant (kW)	Power Diesel Plant (kW)
Lithium Carbonate plant Generation Plant	2,592	8,800

The Photovoltaic system have to consider a control unit of Fuel Save Controller which alows at any moment and according to radiation and phtovoltaic generation, to switch between diesel generated energy or photovoltaic generated energy. With this, the power supplied is steady at any moment.

17.4 Tailings Disposal

The Project defined the location for the disposal of the solid generated at the Sodium Sulphate plant at orient of the pond area, on the alluvial slope, location with no wildlife nor human settlements. The area estimated for the solid disposal is 3.5 ha considering 20 years of operation.

About harvested salts coming from solar evaporation ponds, the estimated area for stockpiling is 500 ha, showed in Figure 16.2.

17.5 Tailings Dam Construction

The Lithium Carbonate plant near Fiambalá will produce liquid and solid wastes that will be sent to ponds whose volume is greatly reduced using the area's evaporative capacity. These ponds will be lined with water proof lining materials, to avoid soil contamination and fulfiling enviromental considerations and current national and local regulations. Capacities of this ponds are shown in section 17.2.3 and layout of the ponds is shown in Figure 17.10.

The sodium sulphate plant located at 3Q site will produce solid wastes and they will be sent to ponds lined with water proof lining materials according to enviromental considerations and current national and local regulations. Location of the plant and wastes are in figure 16.2. The capacity of the pond is shown in section 17.2.2.

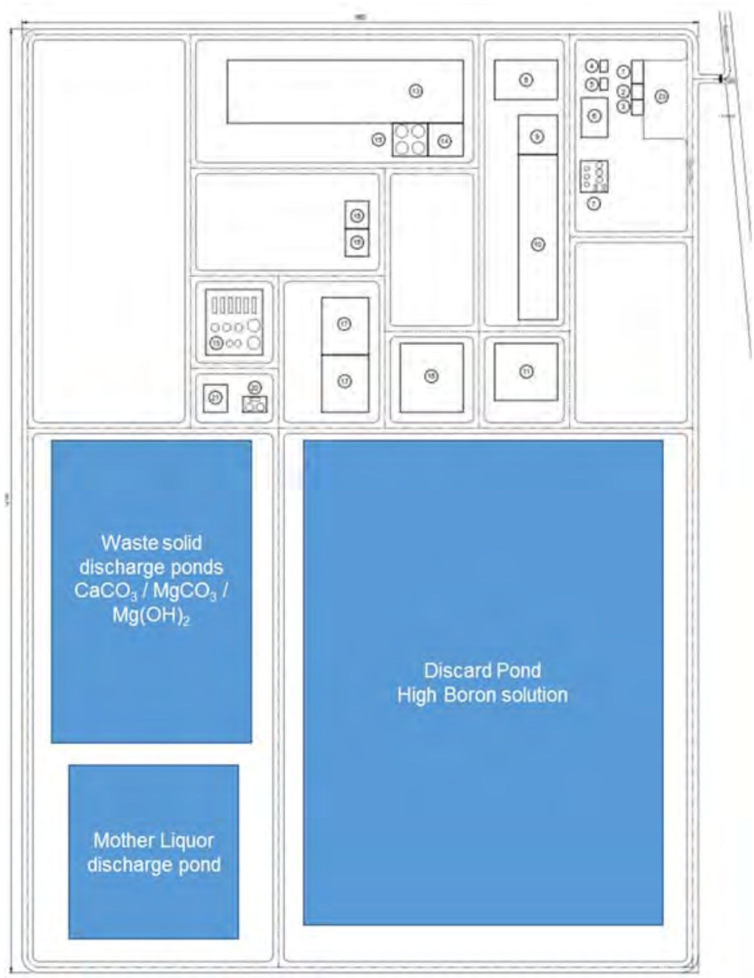


Figure 17.10: Lithium Carbonate Plant Layout - Tailings Dam Construction Location.

17.6 Environmental Consideration

17.6.1 Introduction

LIEX S.A. in compliance with current environmental regulations governing mining activities in Catamarca province, Argentina, and other international regulations, engaged geologists Gustavo Báez for the development of an Environmental Impact Report for the exploration stage of 3Q Project. LIEX S.A assigned him environmental-related responsibilities during the project execution stage, in order to liaise with people that is in charge of the execution of the activities comprised in that stage, to ensure that their activities comply with environmental commitments established in the environmental impact report approved by the regulatory authority (Secretaría de Estado de Minería de Catamarca).

LIEX S.A. develops an environmental baseline study for the Project, instrument that is required for the preparation of the Environmental Impact Report for the Exploitation Stage, once the technical & financial feasibility study has concluded. In this context, LIEX hired GT Ingeniería S.A. to develop an Environmental Baseline Study and coordinate field campaigns for the 3Q Project. The baseline study is a fundamental tool required to prepare by GT, the Environmental Impact Report for Exploitation Stage. GT members Mario Cuello (Geologist), Bernardo Parizek (Biologist), Valeria Angela (Engineer), and Pedro Alcaraz (Engineer) will lead this baseline study that will start upon completion of technical study

17.6.2 Permits and Regulatory Authorities

Argentina is a federal republic; Article 124 of the National Constitution states, “Provinces have original ownership of natural resources that exist in their territories”.

The State Secretary for Mining Affairs of Catamarca Province approved the Environmental Impact Report (EIR) of the exploitation stage of 3Q Project, by resolution S.E.M. Nº 738/2016. With the approval of the EIR and according to the proposed work plan, LIEX S.A. started in September of the same year the works in the operation area:

1. Adaptation of the access road to the Project’s operation area and construction of service roads
2. Campsite construction
3. Drilling platforms
4. Construction of testing ponds
5. Rotary and diamond core drilling
6. Construction of trenches for exploration
7. Installation and operation of on-site laboratory
8. Assembly of meteorological station
9. Hydrology study of the basin
10. Environmental baseline studies

LIEX S.A. regularly informs their progress to the State Secretary for Mining Affairs and provides immediate response to requests for information issued by the regulatory authority.

From the beginning of their operation, LIEX S.A. manages their solid domestic and industrial waste: equivalent to urban, inert and hazardous waste. Domestic (household) solid waste is disposed in the landfill of Fiambalá. With their corresponding documentation and in the role of Hazardous Waste Generator holding Environmental Certificate Nº 599 issued by the Province Directorate of Environmental Management of the State Secretary of Environment, LIEX S.A. disposes and delivers category Y8-Y48 hazardous waste (used oil, oil rags) resultant from maintenance and cleaning operation of engines and mechanical equipment, to an operator authorized by the mentioned regulation authority, as established by National Law 24051 on Hazardous Waste.

A request has been made to the Province Irrigation Department, for water catchment for use at the 3Q Project campsite.

The archaeologists engaged by LIEX S.A. has initiated relevant requests to carry out the archaeological assessment of the Project site. In spite of this being an area with low archaeological sensitivity, as reported by the expert, an exhaustive control of the areas subject to intervention was performed in order to achieve the release of the sites to be used in the stage, staff received training on how to proceed if archaeological evidence was found, and finally, an archaeological report will be produced, releasing the areas projected for the evaporation ponds and complementary facilities, corresponding to the exploitation stage.

17.6.3 Environmental Commitments

3 Quebradas Project is subject to regulatory controls by Argentinian authorities. In addition, the Project design will comply with the guidelines established by the "Equator Principles." The Equator Principles represent a financial-industrial point of reference to make sure that projects funded by the lender institutions are executed in a socially responsible manner and with solid environmental management practiced in place (Equator Principles, 2006). In case of *3Q* Project, observance of Equator Principles requires that the project be executed in full compliance with the IFC's Environmental and Social Performance Standards.

Political Context

The mining industry in Argentina has experienced a growth since 1992, when the government implemented a strategy to open that sector to private sector investors.

Key factor of this transformation of the mining industry was the new and competitive framework related to taxes and legislation for investment in mining projects. Mining Investment Law Number 24196 of 1993.

A second driver of the legal and political reform of the mining sector was the need for establishing rules for protecting the environment. The 1994 reform to the Argentinian Constitution includes the right for all inhabitants to enjoy a healthful and balanced environment, fit for human development[1]. In compliance with the Constitution, the Law for the Protection of Mining Activities (1995) was passed and included in the Mining Code.

[1] Art. 41 of the National Constitution "All inhabitants enjoy the right to a healthful, balanced environment fit for human development, so that productive activities satisfy current needs without compromising those of future generations and have the duty to preserve the environment."

Legal Context

In Argentina, the original title deed of mining resources corresponds to the provinces.

However, national regulations, mainly the Mining Code, Law No. 1919, provides considerable mining legislation. Provinces keep control and jurisdiction over procedures required to grant licenses to private parties and the power to monitor compliance by the mining licensees of applicable regulations, obligations and procedures.

The 3Q Project is subject to the authority of the Electoral and Mining Court of Record of Catamarca Province and to the monitoring authority of the Secretary of Mining Affairs of Catamarca Province. The Electoral and Mining Court of Record is the authority governing licenses and compliance of the legal obligations established in the Title Deed Document (document of the Electoral and Mining Court of Record in which the title deed of a mining property is granted), with technical support of the Secretary of Mining Affairs.

The Secretary of Mining Affairs is the administrative authority governing environmental and technical issues related to the conferment of mining titles, the payment of a fee to keep the mining title, and of technical aspects related to the mining investment plan of each mining property.

Environmental Protection in relation to Mining Activities

Whilst the objective of the reform to the law and policies carried out in the 90's was to establish the terms and conditions for private investment, an additional interest was to establish rules for protecting the rights of people and the environment in the context of mining operations.

Law N° 24.585 on Environmental Protection in Mining Activities, enacted in 1995 and incorporated to the Mining Code, introduces the concept of sustainable development and promotes mechanisms to prevent damages to the environment. Particular emphasis was placed on the coordination of national and provincial levels and in providing a framework for managing compliance of environmental regulations in the mining sector.

Environmental Management Framework for the Mining Sector in Catamarca Province

Law N° 24585 establishes the main documents for environmental management:

- The "Environmental Impact Report" (EIR), which must be submitted by the proponent
- The "Environmental Impact Statement" (EIS), which documents the approval of the EIR.

Province government is responsible for ensuring that these instruments are correctly applied and issued. In case of 3Q Project, the relevant authority is the Secretary for Mining Affairs (SMA) of Catamarca Province.

A main purpose of the EIR is to provide a basis for further informed decision-making. Public participation in the EIR process plays an important role for ensuring quality, understanding and effectiveness of the EIR. The State Secretary for Mining Affairs of Catamarca Province conferred public consultation and audiences procedures the category of mandatory. LIEX S.A. together with the SMA of Catamarca carried out a Public Audience in Fiambalá, to provide information to the participants with respect to the Exploratory Stage of *3Q* Project.

17.6.4 Environmental Baseline Studies

Baseline studies started in October 2016. To date, the following studies have been carried out: flora & fauna study (spring, autumn; and winter studies already completed; summer study is planned for next month); soil sampling and analysis in the laboratory of the School of Agronomy of Universidad Nacional de Catamarca; the soil study will be completed in the next summer season; microbial ecosystems; socio-economic study including interviews to qualified informers and surveys; archaeological studies to be completed in October this year; paleontological studies in Tertiary and Quaternary sedimentary deposit outcrops present in the Project site; from the beginning of the activities hydrology studies have been carried out to establish surface water inflows to the set of lakes; measurement of hydrology parameters in situ; and sampling for lab tests. The purpose of the exploration stage of Tres Quebradas salt flat is to establish brine quality and the prevailing hydrogeological conditions. A drilling program was developed for summer season 2016-2017 with their corresponding detailed hydrogeological studies, and a second drilling campaign will be carried out in the beginning of the dry season which starts in September for the southern hemisphere. Air quality will be measured and meteorological data will be gathered and analysed on a regular basis.

Both baseline and exploration impact reports will be critical to develop a detailed evaluation of environmental liabilities, which has not been yet formally completed for this Project. These reports will provide early indications of potential impacts associated with production that can be effectively mitigated though appropriate pro-active management techniques.

A brief summary of the studies in process:

Weather: *3Q* Project is located in the arid region of the transition zone between the mountain range and the puna (ecosystem of the high Central Andes). Meteorological data are gathered from the beginning of the operations and weather characterization is carried out with information from nearby weather stations located near the mountain range area in the neighbor country, Chile. The Project area has a significant temperature range during each season, with average temperatures of 6 and -1.4°C in Summer (Oct – Mar) and Winter (Mar – Oct), respectively and annual average of 2.3 °C. The humidity values recorded in Summer (Oct – Mar) and Winter (Mar – Oct) were of 26.5 and 24.5 % with annual average of 25.5%. The wind speed in Summer (Oct – Mar) and Winter (Mar – Oct) were 6.2 and 8 m/s with average of 7.1 m/s. Average evaporation in Summer (Oct – Mar) and Winter (Mar – Oct) were 5.9 and 3.7 mm/day, respectively, and in the year, 4.8 mm/day. Average precipitation accumulated in Summer (Oct – Mar) and Winter (Mar – Oct) were of 52.8 and 18.6 mm and in the year 71.4 mm. This harsh weather also receives large amounts of radiation during most part of the year, which favors extraction of some minerals such as lithium through methods that use evaporation.

Water quality: The assessment of the quality of surface- and ground waters are permanent activities in the development of *3Q* Project. Not all water bodies are made of hyper-saline brine saturated with sodium chloride and other elements, particularly calcium, potassium, boron, magnesium and other minor elements including iron, barium and manganese.

A unique characteristic of Laguna *Tres Quebradas* located in the north are of the Project is that brine is acid (pH 5), as opposed to hyper-saline water bodies of the south sector in Laguna Verde and Laguna Negra, which are neutral (pH 7).

Air quality: Air quality baseline study will be carried out in dry season, which starts in September in the Southern Hemisphere, in order to establish the different elements to be measured (PM10, nitrogen dioxide, sulfur dioxide, carbon monoxide, ozone, photochemical oxidants, hydrogen sulfide and lead).

Soils: The vast territory comprising the system of interconnected lakes of 3Q Project includes deposits accumulated in the slopes, alluvial fans and meadows.

The accumulation deposits located along the eastern edge of the system are composed of detrital material of different granulometry, ranging from fine sands to blocks of approximately 20 cm, with evidence of transport by rapid runoff and blocks of different dimensions, close to elevations that form andesite and basalts of Volcanic Association IV (Miocene-Pliocene), from which they fall due to gravity, after detachment as a consequence of physical weathering processes caused by the alternation of freezing events and interstitial water melting in fractures and bedding planes. There is no evidence of soil formation; these are detrital deposits with little or no organic matter, which appear totally devoid of vegetation.

Alluvial fans in the most relevant water courses show, near the water system, granulometry ranging from gravel to sands and even silt. As in the previous case, under the outdoor conditions the materials are exposed to, there is no possibility of edaphic development.

According to the Soil Taxonomy System classification, these “soils” are of the Entisol order, Typic Torrifluvents sub-order characteristic of arid climates, where potential evapo-perspiration largely exceeds precipitation, therefore, water does not infiltrate through the profiles and no edaphic layers are developed.

Typic torrifluvent soils are soils of fragmented texture (boulders and blocks) in the foothills, and of silty texture in the intermountain valleys. Materials in this subgroup are of colluvial, alluvial and alluvio-eolic origin.

Meadows and wetlands are vegetation formations of an edaphic environment, mainly organic, characterized by a permanent water saturation condition. These formations have a rich biological diversity compared to the surrounding areas, with a large number of vegetal species which are specific of these systems, habitat and a source of food for some animals.

Soil study will be analyzed in depth, mainly in the wetlands ecosystem.

Soil use: No farms or exploitation activities are present in the study area (agriculture, livestock or industry), because there are no population settlements in the area, climatic conditions are extreme and all water bodies are hypersaline and not suitable for human or animal life.

The Laguna Negra meadow, located south and outside of the Lithium Project, receive freshwater coming from Mt. Pissis, creates an oasis, this is a RAMSAR site.

Flora: The exploration area (Tres Quebradas salt flat) is included in the Altoandina ecoregion, and a major portion of the existing access road, the first section of road from Ruta Nacional Nº 60, which throughout the report is identified as the route in La Coipa up to the height of 4,000 m.a.s.l., corresponds to the Unit, as well as the large proportion of the trace of the mining footprint. On the other hand, the first section of the access road to La Coipa and until 4,000 m.a.s.l. corresponds to the *Puna* ecoregion.

Most of the Project area covering the 35,000 hectares is located on the salt flat and hyper-arid sectors with scarce or no vegetation at all. The extreme salinity conditions in the salt flat prevent the development of any type of vegetation. Although there are species resistant to salinity, it is clear that the conditions prevailing at this site prevent the establishment and subsequent development of native flora. High hyperosmotic pressures are lethal to plant roots, in addition to the toxicity of the salts in the protoplasm. In the Project area there is a thin steppe with small Stipa frígida bushes (“*pasto vicuña*”).

The biggest wetland is located outside of *3Q* Lithium Project, south of the Laguna Negra, with its meadow forming a functional significant ecosystem with native grassland with an interesting diversity of flora species and with permanent humidity.

A second, much smaller meadow is located inside the lithium Project, west of Laguna *Tres Quebradas* and meadow spots east of this lagoon.

In some cases, we can see wetlands or swampy areas of infra-aquatic origin where vegetation grow forming vast and compact cushions. Wetlands or high-plains tundra formations are a valuable forage resource for the local fauna species. In interaction areas, where sub-surface runoff freshwater reaches the limits of the salt flat or of *Laguna Tres Quebradas*, we can find gramineae-type area (costal grass) with cushions of rhizome herbs. In the surface, this area has variable width between 1.5 to 4 meters and a length between 25 and 35 meters. These are poorly developed grasses and some areas are dead due to the increase in the level of salty water of the lake.

Fauna: Fauna baseline study has not been completed yet. The presence of different bird species, among them the *parinas*, and mammals (vicuña), is clearly associated with the resources provided by this ecosystem, i.e. to the availability of food and freshwater in the approximately 340 hectares, *Laguna Negra* meadow outside of *3Q* Project.

North of Laguna Negra, that is, inside the 3Q Lithium Project, there is no presence of birds or mammals, which relates to the extreme weather conditions of the territory comprised in the exploration of *Tres Quebradas* salt flat, the lake of the same name, and their area of influence. Exceptionally, two lizards (*Phymaturus*) were observed, a genus of iguana lizards of rocky areas, with restricted distribution in the foothills and low reproduction rate.

Landscape: A visual analysis of the landscape units in *3Q* Project shows a territory with outstanding aesthetic beauty. Along the Project access road, from Ruta Nacional N° 60 onwards, it is possible to observe different landscapes, long valleys with green humid areas (meadows) and rich presence of birds and mammals (among them the vicuña); alternation of steep relief and soft slopes, lakes and salt flats. The Project area has a series of extinguished volcanoes, among them *Pissis* mountain, comprising the touristic attraction called *Seismiles*. This volcano and the lakes comprising the lakes & salt flat complex in *3Q* Project, have a renowned viewpoint called "*Pissis* balcony".

Paleontological study: Preliminary observations allow to conclude that the area has no paleontological relevance. However, the presence of tertiary and quaternary sedimentary deposits has made it necessary for LIEX S.A. to engage professional experts for the development of a paleontological study.

Archaeological study: Even though this is an area of low archaeological sensitivity, as explained in the approved EIR of the exploration stage, an exhaustive control was performed on the areas subject to intervention in order to to achieve the release of the sites to be used in that stage; staff received training on how to proceed if archaeological evidence was found. With regard to potential issues of archeological concern, a preliminary investigation conducted for NLC by Dr. Norma Ratto (Ratto, 2016) indicates that there is low probability of archeological discoveries in this area.

Three archaeological sites were found outside the exploratory area, their assessment will be completed in November. The area for the evaporation ponds and complementary facilitates required for the exploitation stage will be released.

Social aspects: The Project developed by LIEX S.A. is located in the mountain ridge area of Tinogasta Department, NE of Fiambalá, Catamarca Province.

LIEX's sustainability policy establishes the following values: quality, safety, health, environment and community. In addition to strict compliance of current legal obligations, the company also considers socio-environmental responsibilities required to provide a satisfactory response to the expectations of the stakeholders regarding the Project.

LIEX S.A. commits to develop and implement strategies to promote sustainable development, protecting the environment and the wellbeing of the people that might be affected by the operations of the mining Project.

From a territorial perspective, which provides a meaning to the social and cultural development, relevant aspects where considered in relation to the socio-economic component of the area of influence of the mining Project. A baseline was developed that helps to know and characterize the current scenario and future tendency of the area of influence of the Project, which is a reference for potential changes that may occur due to the Project.

Urban centers of *Tinogasta* and *Fiambalá* have a balanced spatial relation with the area that is directly connected to the Project, and are subregional centers capable of providing human resources, supplies, logistics, specialized services and other services related to policies and administration.

Other Studies: GIS Geographic Information System-, Maps, direct concerning areas, indirect involvement areas, compiling all the baseline and Project geographic information.

Limnology and microbialites 3rd campaign (already completed).

Hydrology and hydrogeology Baseline study, partially completed.

Legal, National, Provincial and Municipal Compendium, partially completed.

17.6.5 Impacts

Once the mining Project has been defined, the process, its financial feasibility and the environmental impact study for Exploitation Stage will be completed. Based on the general work plan and previous environmental studies, the main impacts have been identified in relation to the Project. Environmental impacts will be moderate during the construction and operation stages of the Project and can be reverted or mitigated in the short, medium and long term. The following potential impacts were identified:

- Changes to the landscape due to the occupation of the physical space in the area of 3Q Project, in the access road and in the area that will be established for the construction and operation of the process plant in Fiambalá.
- Changes to topography and soils, due to the permanent construction of evaporation ponds.
- Noise level increases caused by the use of equipment, machinery and vehicles in the Project, in the road connecting the Project site and the process plant; and due to the operation of the process plant to be constructed in Fiambalá.
- Deterioration of air quality, due to the emission of particles and combustion gas resulting from the operations carried out in the salt flat and in the evaporation ponds, salt removal, construction of landfills, the operation of the process plant in Fiambalá and the use of equipment, machinery and vehicles in both locations.
- Alteration, limited to a specific area, of flora processes and dynamics due to the emission of dust and air-contaminants resulting from the Project operations.

- Alteration to fauna habitats due to partial reduction of vegetation cover, emission of noise and vibrations, and the site camp.

The development of the Project will have socio-economic impacts on Fiambalá, resulting in negative or positive changes such as:

- Modification to the socio-economic dynamic of Fiambalá and Tinogasta due to a higher demand of goods and services.
- Increase in the cost of living, resulting from a higher purchasing power of the local people working in the Project, with an impact in the cost of living of the people that is not involved in the Project. This higher purchasing power of one part of the population would increase the cost of living depending on its relative importance in the community.
- Impact due to the presence and use of large-size vehicles that may affect the local population other people visiting the Ruta Nacional N° 60 and urban- and peri-urban roads in Fiambalá due to dust, noise and higher traffic flow.

Modifications to the socio-economic dynamics of urban centers and subsequent increases to the cost of living would cause negative impacts of moderate significance that can be reverted and stabilized in time, and by the implementation of mitigation measures.

On the other hand, the development of the Project will have a moderate positive impact on the direct and indirect employment rate, resulting in a more dynamic labor market both locally and for the province. Economic impact will be increasingly positive as Project operations generate more income and benefits. There will be winnings in terms of added value, because the Project will generate local benefits related to the payment of taxes, royalties and the wages of the workers.

Alternatives will be studied for the location of each component of the Project. Once the Project has been defined, the project-environment matrix will be adjusted and environmental monitoring and management plans will be defined, as well as environmental contingency plans.

17.6.6 Community Participation Plan

LIEX S.A. has developed a Community Participation Plan (CPP), designed as a tool for managing community affairs, aimed at strengthening the relationship between the company and the communities in *Tinogasta* department.

The purpose of the CPP is to create instances for communication with the local population, as well as strengthening the communication and connection with institutions and public agencies of *Fiambalá* and *Tinogasta* municipalities, present in the area of influence of the Project.

The purpose of LIEX S.A. is to collaborate for improving que quality of life of *Tinogasta – Fiambalá* micro-region, so that these locations can be part of the regional opportunities for development. Collaborative work with the communities to build local relationships is based on five core pillars that shape the course of action: education, health, production, cultural activities and sports.

Cooperation and coordination among the community, the company and the municipalities are key for integration, resulting in solid models of sustainability, social responsibility and communication.

In terms of corporate social responsibility, LIEX S.A. commits to ethical relation with the communities and takes the challenge of generating initiatives and actions that, as previously mentioned, contribute to the improvement of the quality of life of the community and comply with the Equator Principles.

The CPP is based on action strategies proposed in the programs established in the present document, regarding activities, training courses, and short-term collaborative actions with the communities present in the direct / indirect areas of influence of the Project.

The department of Community Relations will implement and develop the CPP through different programs throughout the development of the Project and will implement a system for program follow-up and assessment to ensure their effectiveness, efficacy and a positive social impact in the direct and indirect areas of influence of the Project.

Programs developed by LIEX S.A. are:

- Communication to the Community.
- Generation of Local Employment Opportunities.
- Local Contract and Purchase of Goods and Services.
- Development of Production and Training Projects.
- Support to Sport, Cultural and Educational Activities.
- Community Visits to the 3Q Project.

17.7 Marketing Study

This section presents a brief summary of the Lithium Market Overview and Outlook produced and generated by several market research groups for the purposes of this study. Neo Lithium's marketing and sales team is led by Carlos Vicens (Chief Financial Officer) .

17.7.1 Introduction

Lithium is the lightest and least dense solid element in the periodic table, symbol Li and atomic number 3. Lithium is part of the alkali metal group of chemical elements, along with sodium, potassium, rubidium, cesium and francium. It does not occur in nature in the metallic form but in the silicate minerals, spodumene, petalite, lepidolite and amblygonite, contained in pegmatites. In its metallic form, however, it is a soft, silver white metal. Its main attribute is the strong heat and electric conductivity.

Lithium is a metal with many final uses, and is widely used in the aluminum industry, for glass and ceramic manufacturing, greases and lubricants, continuous casting, air treatment, rubber and thermoplastic manufacturing, pharmaceuticals and batteries. Major consumers of this metal are countries and regions such as: USA, China, Japan, Europe, South Korea, Canada and Russia.

The U.S. Geological Survey (USGS), market research and company data show production of lithium minerals and products by company and country of as shown in Figure 17.12 is highly concentrated. In terms of Lithium Carbonate Equivalent (LCE), Albemarle, SQM, Tianqi and FMC have almost 80% of the world production. While Chile, Australia and Argentina have over 80% of all LCE production worldwide. Chile, Argentina, USA and approximately 20% of China's production is brine production, while the remaining production corresponds to pegmatite (spodumene) production.

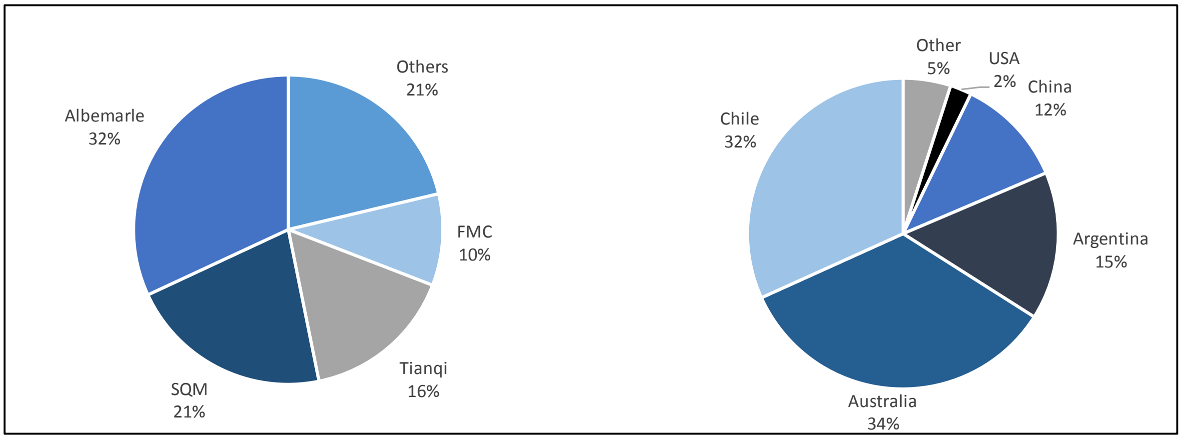


Figure 17.11: Production of LCE by Company 2016 (left). Production of LCE by Country 2016 (right).

17.7.2 Demand Analysis

Lithium consumption has shown a rising trend over the last 3years (from 2013 to 2016), growing at a 11% annual compound rate since 2013 from 150,000 metric tons of LCE to just over 200,000 metric tons of LCE in 2016. Figure 17.13 shows world consumption during this period for LCE and current projections up to 2025 based on market research and company data. Average demand from the current set of market research for 2021 is 350,000 metric tons LCE for 2021 and 775,000 metric tons of LCE for 2025.

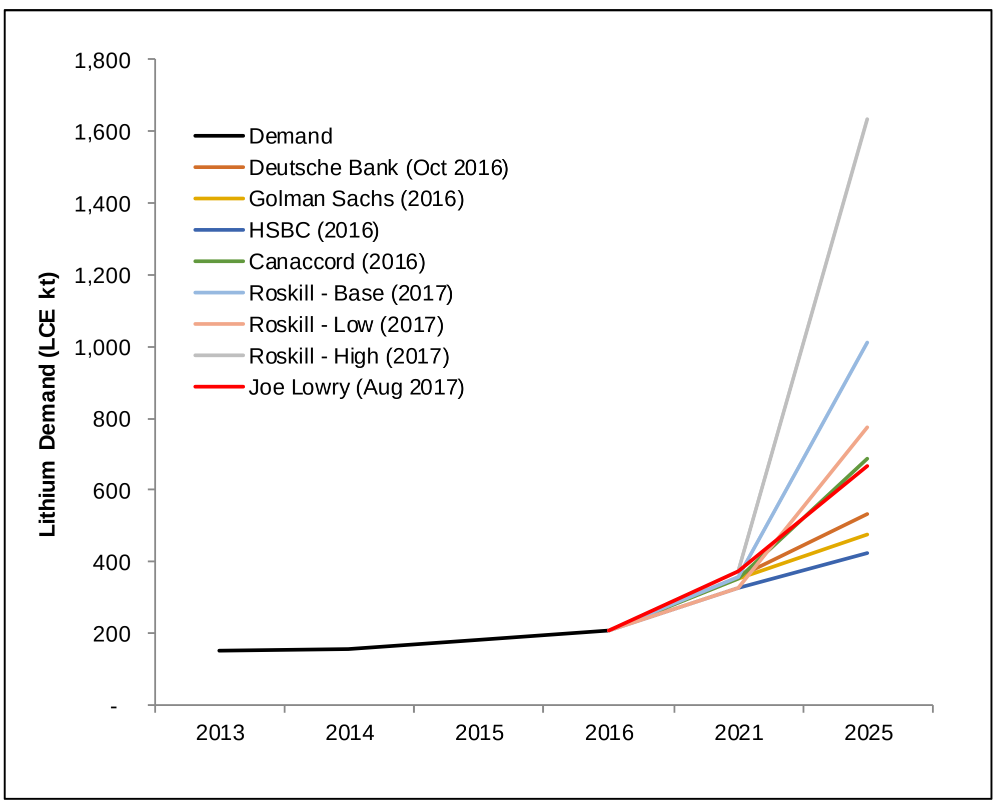


Figure 17.12: World Consumption for LCE and Current Projections up to 2025.

Historically, demand for lithium has been largely driven by the increasing penetration of consumer electronics (mobile phones, laptops, tablets) and non-battery applications (Glass and ceramics). However, the ever-increasing number of environmentally conscious people and the initiatives taken by countries in Asia, North America and Europe to reduce their carbon footprint will continue to transform lithium demand dynamics for years to come.

To that end the projections are based on the anticipation of the penetration of electric vehicles (from approximately 3% to 12% by 2025) in the automotive market displacing the internal combustion engine. Current requirements for full electric vehicles can range from 20kg to 65kg of LCE. However, on-going improvements in battery technology will dictate future size and lithium requirements. A change in electric vehicle penetration can change demand and it is estimated that a 1% change in electric vehicle penetration can have an impact of 50,000 to 75,000 metric tons of LCE per year.

17.7.3 Supply Analysis

It is well known that some of the possible sources of lithium are continental brines, geothermal brines and oilfield brines, as well as from mineral sources corresponding to pegmatites and clay mineral hectorite. Among all these sources, just a limited number have the technical conditions for a profitable extraction of lithium. The lithium world production is led by ore bodies associated to continental brines and mineral deposits roughly at 50% each. Lithium production from continental brines came mainly from Chile and Argentina and to a lesser extent from USA and China, while lithium production from mineral deposits came mainly from Australia, China, Zimbabwe and Brazil.

When discussing Lithium associated with continental brines, lithium concentration increases the value of the ore body. Similarly, the presence of other minerals, such as potassium, boron and other by-products, may increases the value of the deposit but market prices fluctuate and some by-products are currently not profitable. Additionally, the value of the deposit also increases with the evaporation rate, as this accelerates the production process. On the contrary impurities may reduce the value of the deposit: for example, a high ratio of Magnesium to Lithium or Sulphate to Lithium reduces the value of the brine deposit, as this makes the production process more costly.

Although lithium markets vary by location, Figure 17.14 shows the global end-use markets are estimated as follows: rechargeable batteries, 45%; ceramics and glass, 30%; lubricating greases, 8%; continuous casting mold flux powders and polymer production, 5% each; air treatment, 3%; and other uses, 10%. Lithium consumption for batteries has increased significantly in recent years because rechargeable lithium batteries are used extensively in the growing market for portable electronic devices and increasingly are used in electric tools, electric vehicles, and grid storage applications. Lithium minerals were used directly as ore concentrates in ceramics and glass applications.

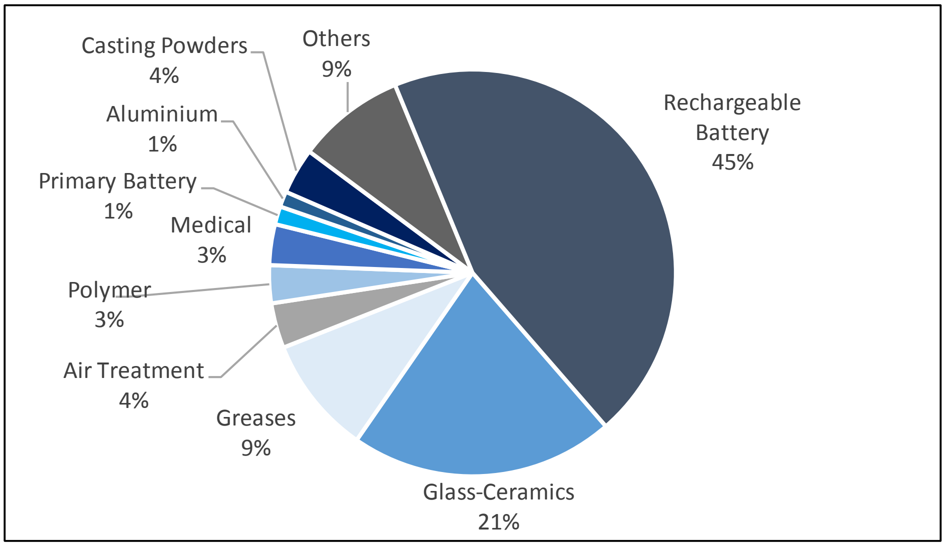


Figure 17.13: Lithium Market by Global End-Use 2016 (Estimated).

Neo Lithium follows over 50 lithium projects worldwide, from the most advanced to exploration projects (mostly in South America's Lithium Triangle, Australia, Canada and the USA). Views are mixed about how future demand will be met. Supply estimates are still based on a mix of approximately 50% brine and 50% mineral deposits. However, this supply will depend on market pricing and relative operating costs of each type of deposit.

Based on average demand estimates between 400,000 metric tons of LCE at the low end and 1,600,000 metric tons of LCE at the high end, the market will need 20,000 and 150,000 metric tons of LCE per year to meet the demand. Neo Lithium believes that the *3Q* Project is well placed to supply LCE to the growing lithium industry.

17.7.4 Lithium Carbonate Pricing

Lithium product pricing respond directly to variations in supply and demand and other market factors in a similar way to most other materials. The three most commonly sold finished lithium products are Lithium Carbonate, lithium hydroxide and mineral concentrate (spodumene). Each is available in an array of concentrations and specifications making pricing somewhat obscure and hard to compare. Lithium products are not traded on any formal or recognized exchange and there are only a few sources of reliable publicly available price data. Most transactions re negotiated between seller in buyer privately and terms are not usually reported publicly. Table 17.7 below shows the historic pricing trend since 2008 to 2017 Q1 (Source: Roskill).

Table 17.7: Historic Pricing Trend Since 2008 to 2017 Q1.

Lithium Carbonate										
CIF (excl. China)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017 Q1
Technical Grade	5,916	5,663	4,595	4,640	5,191	5,809	5,570	5,673	7,341	11,328
Battery Grade	6,261	6,167	5,118	4,837	5,120	5,334	5,124	5,575	7,585	9,789

High demand in mid to late 2016 caused reported spot prices to increase significantly to over $20,000 per metric ton of LCE. Even though, contract pricing al increase is more stable and a measured way to look at forward and future pricing. Current market availability of lithium will continue to be a significant issue for buyers as demand intensifies and supply to responds.

Neo Lithium has reviewed a number of publicly available lithium price forecast and there are some variations between each source. For the purposes of the PEA, Neo Lithium will be using the average pricing assumption as per the Table 17.8 below. For the long-term pricing beyond 2025, the year 2025 average will be used. The Table also shows a “High” and “Low” pricing scenario based on the highest and lowest forecast prices currently available.

Table 17.8: Lithium Carbonate Price Forecast.

Lithium Carbonate Battery Grade – (US$/t)										
Issuer	**Date**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Cormark Securities	*October, 2017*	$14,000	$14,000	$12,000	$10,000	$11,000	$11,000	$11,000	$11,000	$11,000
GMP Securities	*October, 2017*				$10,000	$10,000	$10,000	$10,000	$10,000	$10,000
Global Lithium LLC	*September, 2017*	$12,750	$13,500	$13,750	$13,750	$14,000	$14,000	$14,250	$14,250	$14,500
UBS	*September, 2017*	$11,813	$12,563	$11,625	$10,663	$10,175	$10,214	$10,470	$10,731	$11,000
Deutsche Bank	*July, 2017*	$13,500	$11,532	$10,213	$9,362	$9,362	$10,213	$10,213	$10,213	$10,213
Canaccord Genuity	*June, 2017*	$12,000	$11,468	$11,202	$10,052	$10,044	$9,754	$10,475	$11,012	$11,122
Roskill	*June, 2017*	$11,000	$10,500	$10,000	$11,000	$11,500	$12,000	$12,500	$14,000	$15,000
Average Price - Base Case		**$12,511**	**$12,261**	**$11,465**	**$10,690**	**$10,869**	**$11,026**	**$11,273**	**$11,601**	**$11,834**
High						$14,000	$14,000	$14,250	$14,250	$14,500
Low						$9,362	$10,213	$10,213	$10,213	$10,213

17.8 Capital Cost Estimate (CAPEX)

This Capital Cost estimate (CAPEX) has been developed to a class 4 classification (PIMBOK) with an accuracy of ± 30%. Contingency levels have been calculated as function of direct cost and taking into account visible risk and project unknowns The 3Q Project includes the facilities in the 3Q salt flat and the facilities in Fiambalá. A simple breakdown structure as well as a commodity structure was developed to facilitate cost allocation of the different elements. The breakdown also includes a further allocation into:

- Materials and equipment to be installed (including potential description as local or imported)
- People resources or labor
- Subcontractors (including: tools, facilities and equipment for workers)

The methodology utilised for the estimate combines parametric assumptions with bottom up techniques were quotes were made available for budgetary purposes.

Several items were considered when producing this estimate including: scope baseline, project schedule, human resources, weather, local calendar, risks, maket conditions and country conditions (including taxes).

Secondary objectives of this estimate are:

- Providing the necessary data for the initial economic evaluation of the project, and
- Providing guidance and order of magnitude for the following engineering phase.

Results are shown in the following Tables

17.8.1 CAPEX summary

The summary of the CAPEX for the 3Q Project based on a 35,000 TPY production facility of Lithium Carbonate (Li_2CO_3), as function of commodities and facilities, are shown Tables 17.9 y 17.10 respectively.

Table 17.9: Capital Cost of the Project.

Summary	Equipment $		Construction						Total Cost $
	Imported	National	Material $	Labor (All In)		Subcontract		Total Cost $	
	$	$		Total HH	Total Cost $	Total HH	Total Cost $		
Direct Cost									
Earthworks	0	0	87,568	1,025,914	85,025,206	162,358	22,369,783	107,482,557	107,482,557
Geomembrane	0	0	39,286,081	859,092	9,282,003	0	0	48,568,083	48,568,083
Road (3Q Salt Flatar – Li_2CO_3 plant)	0	0	0	0	0	289,800	23,651,294	23,651,294	23,651,294
Concrete	0	0	2,012,115	479,415	11,488,946	0	0	13,501,061	13,501,061
Metallic Structure	0	0	245,964	6,638	206,698	162,820	17,459,400	17,912,062	17,912,062
Arquitecture	0	0	0	0	0	238,361	18,188,090	18,188,090	18,188,090
Mechanical Equipment	6,932,644	10,687,584	3,337,215	92,204	3,585,671	38,800	17,599,570	24,522,456	42,142,684
Tanks	0	1,380,750	3,525,900	28,756	1,118,289	0	0	4,644,189	6,024,939
Piping	0	0	12,650,432	408,353	14,708,274	0	0	27,358,706	27,358,706
Electrical Equipment	7,927,500	5,040,000	0	36,305	880,451	0	0	880,451	13,847,951
Power cables and Electrical conduit	0	0	0	0	0	8,771	1,449,900	1,449,900	1,449,900
Instrumentación	0	924,000	0	12,056	292,376	0	0	292,376	1,216,376
Total Direct Cost	**14,860,144**	**18,032,334**	**61,145,275**	**2,948,733**	**126,587,913**	**900,910**	**86,718,037**	**274,451,224**	**307,343,702**
Indirect Cost									
Insurance and Freight	1,188,812	721,293	785,722	0	0	0	0	785,722	2,695,826
Fee	0	0	0	0	0	0	0	0	0
Spare parts	743,007	901,617	0	0	0	0	0	0	1,644,624
Vendor	594,406	721,293	0	0	0	0	0	0	1,315,699
Engineering (Pre-Feasibility & Feasibility)	0	0	0	0	0	0	6,426,874	6,426,874	6,426,874
EPCM									
Engineering	0	0	0	0	0	0	9,640,311	9,640,311	9,640,311
Procurement	475,525	577,035	1,956,649	0	0	0	0	1,956,649	3,009,208
Management	0	0	0	0	0	0	51,911,437	51,911,437	51,911,437
Commissioning	0	0	0	0	0	0	2,249,406	2,249,406	2,249,406
Owner's Costs	0	0	0	0	0	0	9,640,311	9,640,311	9,640,311
Total Indirect Cost	**3,001,749**	**2,921,238**	**2,742,370**	**0**	**0**	**0**	**79,868,339**	**82,610,709**	88,533,696
Total	**17,861,893**	**20,953,572**	**63,887,645**	**2,948,733**	**126,587,913**	**900,910**	**180,586,376**	**371,061,933**	**409,877,399**
Contingency	**3,715,036**	**4,508,084**	**15,286,319**	**737,183**	**31,646,978**	**225,228**	**25,179,509**	**72,112,806**	**80,335,926**
TOTAL CAPITAL COST	**21,576,929**	**25,461,656**	**79,173,964**	**3,685,916**	**158,234,891**	**1,126,138**	**205,765,885**	**443,174,739**	**490,213,324**

Table 17.10: Capital Cost Summary Breakdown

Summary	Equipment $		Construction						Total Cost $
	Imported	National	Material $	Labor (All In)		Subcontract		Total Cost $	
	$	$		Total HH	Total Cost $	Total HH	Total Cost $		
Direct Cost									
Brine Extraction Wells	0	1,171,275	1,537,745	54,343	1,882,055	13,090	2,856,000	6,275,800	7,447,075
Preconcentration Ponds	0	1,543,500	36,590,729	1,625,981	74,485,781	99,774	13,288,470	124,364,981	125,908,481
K / $CaCl_2$ Ponds	0	572,565	10,650,026	518,364	25,853,687	40,266	5,354,102	41,857,815	42,430,380
Post concentration Ponds	0	216,878	597,063	30,208	1,290,870	3,790	490,605	2,378,538	2,595,416
Na_2SO_4 Ponds	405,300	418,320	3,302,908	238,811	6,107,518	5,440	380,605	9,791,031	10,614,651
Li_2CO_3 Plant									
Storage and Tailings Ponds	0	1,427,633	1,067,148	98,345	6,088,187	0	0	7,155,334	8,582,967
Boron Solvent Extraction Plant	0	829,500	2,030,382	50,495	1,430,243	0	0	3,460,625	4,290,125
1st Step Purification	852,600	1,243,935	1,018,117	42,326	1,312,209	0	0	2,330,326	4,426,861
2nd Step Purification	1,323,000	632,783	936,502	31,837	1,011,231	0	0	1,947,733	3,903,516
3rd Step Li_2CO_3 Precipitation	2,472,244	951,825	741,300	14,125	549,292	0	0	1,290,592	4,714,661
Li_2CO_3 Plant Facilities	0	0	1,152,415	119,052	3,038,253	99,000	10,934,000	15,124,668	15,124,668
Drying, Compacting, Micronizing and Packing Plant	1,832,250	2,026,500	592,845	40,993	1,222,209	55,000	5,467,000	7,282,054	11,140,804
Utilities	0	36,120	560,595	19,053	504,225	0	0	1,064,820	1,100,940
Vendor	47,250	997,500	367,500	16,440	639,327	38,800	3,599,570	4,606,397	5,651,147
Power Plant	7,927,500	5,964,000	0	48,361	1,172,827	8,771	1,449,900	2,622,727	16,514,227
Supporting Buildings – 3Q Salt Flat	0	0	0	0	0	15,686	1,264,040	1,264,040	1,264,040
Supporting Buildings – Li_2CO_3 Plant	0	0	0	0	0	231,495	17,982,450	17,982,450	17,982,450
Road access 3Q Salt Flat – Li_2CO_3 Plant	0	0	0	0	0	289,800	23,651,294	23,651,294	23,651,294
Site Vehicles	0	0	0	0	0	0	14,000,000	14,000,000	14,000,000
Total Direct Cost	**14,860,144**	**18,032,334**	**61,145,275**	**2,948,733**	**126,587,913**	**900,910**	**100,718,037**	**288,451,224**	**321,343,702**
Indirect Cost									
Insurance and Freight	1,188,812	721,293	785,722	0	0	0	0	785,722	2,695,826
Fee	0	0	0	0	0	0	0	0	0
Spare parts	743,007	901,617	0	0	0	0	0	0	1,644,624
Vendor	594,406	721,293	0	0	0	0	0	0	1,315,699
Engineering (Pre-Feasibility & Feasibility)	0	0	0	0	0	0	6,146,874	6,146,874	6,146,874
EPCM									
Engineering							9,640,311	9,640,311	9,640,311
Procurement	475,525	577,035	1,956,649	0	0	0	0	1,956,649	3,009,208
Management	0	0	0	0	0	0	51,911,437	51,911,437	51,911,437
Commissioning	0	0	0	0	0	0	2,249,406	2,249,406	2,249,406
Owner's Costs	0	0	0	0	0	0	9,640,311	9,640,311	9,640,311
Total Indirect Cost	3,001,749	2,921,238	2,742,370	0	0	0	79,868,339	82,610,709	88,533,696
Total	**17,861,893**	**20,953,572**	**63,887,645**	**2,948,733**	**126,587,913**	**900,910**	**180,586,376**	**371,061,933**	**409,877,399**
Contingency	**3,715,036**	**4,508,084**	**15,286,319**	**737,183**	**31,646,978**	**225,228**	**25,179,509**	**72,112,806**	**80,335,926**
TOTAL CAPITAL COST	**21,576,929**	**25,461,656**	**79,173,964**	**3,685,916**	**158,234,891**	**1,126,138**	**205,765,885**	**443,174,739**	**490,213,324**

17.8.2 CAPEX Estimation Basis

Growth Factors

The growth factor used for Capital Cost Expenditures estimation for 3Q Project are shown in Table 17.11. These factors were developed to ensure adequate consideration was given to the early stage of the design and the fact that potentially some quantities could increase once developed in detail.

Table 17.11: Growth Factors.

Item	Quotation	Design	Estimation	Losses
Earthworks	0%	5%	3%	0%
Geomembrane	0%	5%	5%	5%
Concrete	0%	5%	5%	15%
Metallic Structure	3%	5%	5%	5%
Architecture	0%	3%	4%	5%
Mechanical Equipment	5%	0%	0%	0%
Tanks	5%	0%	0%	0%
Piping	0%	5%	2%	2%
Power Equipment	5%	0%	0%	0%
Power cables and Electrical conduit	0%	5%	5%	8%
Instrumentation	5%	5%	0%	5%
Road access 3Q salt flat – Li_2CO_3 Plant	0%	0%	0%	0%

Labor All In

Productivity factor defined to be used in Labor costs estimation for Project construction and assembly activities are presented in Table 17.12. These productivity factors were developed following the information below and taking into account multiple factors like: location. weather, temperature, seasons, altitude, intensity congestion, facilities and human resources available.

Table 17.12: Productivity Factors

Working	Value	Unit
Working day	day x day	
Working days by shift	days	10
Working Regular hours by shift	hours	10
Regular hours by month	hours	100
Labor days per year	days	185
Work Cycle per year	Working cycle	18.5
Labor hours per year	Hours	1,850
Days lost per year:		
Weather	days	0
Environment	days	0
Winter Operation	days	0
Chore entrance	days	0
Shift beginning (Cycle)		
Hours Lost beginning of the cycle	Hour	1.0
Days lost per year	days	1.9
Shift ending (Cycle)		
Hours Lost end of the cycle	Hour	1.0

Working	Value	Unit
Days lost per year	days	1.9
Unscheduled shut down		
Hours Lost per day	Hour	0.5
Days lost per year	days	9.3

Daily losses	Unit	Value
Transport to change house	min	0
Change house	min	25
Transport to industrial facilities	min	20
Daily Safety Meeting	min	5
Job Risk Analysis Meeting	min	5
Authorization signature	min	5
Lock	min	0
Shift Manager awaiting	min	0
Change house	min	20
Transport to canteen	min	0
Lunch + Services	min	45
Transport to industrial facilities	min	0
Change house	min	20
Unlock	min	0
Change house	min	20
Transport to camp	min	0
Total	min	165
	hr /day	2.8
	hr / year	**518**
External causes losses	**Unit**	**Value**
Weather	hours	0
Environment	hours	0
Winter Operation	hours	0
Entry	hours	0
Shift Starting	hours	34.2
Shift Ending	hours	34.2
Unscheduled shut down	hours	92.5
Total	**hr / year**	**161.0**
Time Lost Causes	**Unit**	**Value**
Daily losses	hours	518.0
Time lost external causes	hours	161.0
Total Hours lost	hours	679.0
Hours available	hours	1,850.0
Productivity factor		**1.37**

Unitary cost of Project construction Labor is shown in Table 17.13. These units were derived from parametric estimates (in house) or budgetary quotes were allowed.

Table 17.13: Labor Unitary Cost (Labor All In).

Item	Salary	Construction Equipment	Overhead costs & profits	Total
Earthworks	6.70	51.08	25.13	82.91
Geomembrane	6.70	0.83	3.28	10.81
Concrete	6.70	10.00	7.26	23.96
Metallic Structure	6.70	15.00	9.44	31.14
Architecture	6.70	10.00	7.26	23.96
Mechanical Equipment	7.10	20.00	11.79	38.89
Tanks	7.10	20.00	11.79	38.89
Piping	7.10	18.00	10.92	36.02
Power Equipment	6.90	10.00	7.35	24.25
Power cables and Electrical conduit	6.90	5.00	5.18	17.08
Instrumentation	6.90	10.00	7.35	24.25
TOTAL	**6.78**	**23.15**	**13.02**	**42.94**

Construction Equipment

Construction equipment cost estimation of earthworks carried out at Project's salt flat facilities aredetailed in Tables 17.14. The tables show the classification of cost according to the construction cycle that will be carried out in the salt flat:

Table 17.14: Main Construction Equipment Fleet Salt Flat

Earthworks	u / month	Months	$ / month	$
Motor Grader Cat 120M	1	12	8,000	96,000
Cistern truck	1	12	4,500	54,000
Geomembranes	**u / month**	**Months**	**$ / month**	**$**
Geomembrane Service truck	3	12	3,280	118,080
Service truck Geotextile	2	12	3,280	78,720
Generator 20 KVA	15	12	1,230	221,400
Welding machine	15	12	1,640	295,200
Excavation	**u / month**	**Months**	**$ / month**	**$**
Front Loader Cat 962H	5	48	20,800	4,992,000
Truck 30 Ton	14	48	7,460	5,013,120
Cistern truck	2	48	4,500	410,400
Backfill DR70%	**u / month**	**Months**	**$ / month**	**$**
Front Loader Cat 962H	11	48	20,800	10,982,400
Truck 30 Ton	28	48	7,460	10,026,240
Bulldozer D8R	8	48	19,450	7,468,800
Motor Grader Cat 120M	1	48	8,000	384,000
Roller	4	48	5,870	1,127,040
Cistern truck	5	48	4,500	1,123,200
Backfill DR80%	**u / month**	**Months**	**$ / month**	**$**
Front Loader Cat 962H	9	12	20,800	2,246,400
Truck 30 Ton	23	12	7,460	2,058,960
Bulldozer D8R	7	12	19,450	1,633,800
Motor Grader Cat 120M	1	12	8,000	96,000
Roller	7	12	5,870	493,080
Cistern truck	5	12	4,500	253,800
Discarded material to dump	**u / month**	**Months**	**$ / month**	**$**
Motor Grader Cat 120M	14	12	20,800	3,494,400
Cistern truck	5	12	7,460	447,600

17.8.3 Exclusions

The following items are not included in the CAPEX estimation:

- Sunk costs.
- Legal Costs.
- Incentives and special compensations.
- Interests and financing costs.

17.9 Operating Cost Estimate

17.9.1 Operating Expenses (OPEX) summary

Class 4 Operating and Maintenance Expenses estimation has been developed for 3Q Project for a year production of 35,000 metric tons. Direct and Indirect cost summary is shown in Table 17.15.

Table 17.15: Operational Cost Summary (OPEX).

Description	$ / yr	$ / metric tons Li_2CO_3
Direct Costs		
Chemical Reactives and Reagents	53,934,214	1,541
Salt Removal and Transport	14,746,649	421
Energy	10,820,055	309
Manpower	4,713,192	135
Catering & Camp Services	1,659,000	47
Maintenance	1,581,389	45
Brine Transportation from Salt flat to Plant	6,167,763	176
Li_2CO_3 Transport to Zárate Port	2,705,850	77
Total Direct Costs	**96,328,112**	**2,752**
Indirect Costs		
General & Administration - LO	1,359,400	39
Total Indirect Costs	**1,359,400**	**39**
TOTAL OPERATIONAL COST	**97,676,553**	**2,791**

17.10 Economic Analysis

17.10.1 Introduction

The purpose of this section is to assess the economic viability of the 3Q Project. For the base case analysis, the production rate has been set at 35,000 TPA of lithium carbonate.

In order to perform the economic evaluation of the Project, a pre tax and after tax cash flow model was generated. This model was built with the capital and operating costs estimates presented in the previous sections, as well as the assumed production program and pricing estimates derived in the marketing section.

Results obtained from the model include NPV at different rates, IRR and payback period. All of these parameters were calculated for different pricing scenarios. In addition, a sensitivity analysis on the most important revenue and cost variables was constructed.

17.10.2 Evaluation Criteria

- Project life: Construction of the Project starts on Q3 2019, the date by which all environmental and construction permits must have been obtained. Commissioning of the Project ends in Q4 2020 and a ramp up phase from 2021 to 2023. Operating period is 20 years.
- Pricing has been obtained from the marketing study whose summary is presented in section 17.7.
- Production for the Project has been estimated as 35,000 TPA of lithium carbonate commencing in year 1, assuming a ramp up rate of 20% for year one and 50% for the second year of production.
- 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 owner's equity.
- Even though the brine composition might allow production of other salts or other chemical compounds, these options have not been included in this report.
- The economic evaluation has been carried out on a constant money basis, therefore there is no provision for escalation or inflation on costs or revenue.
- The exchange rate assumed is ARS $17.5/US$.

17.10.3 Taxes and Royalties

The following taxes are applied to the Project:

- Federal taxes: The Project will be subject to the Argentinean Federal mining law, whose main provisions indicate that capital goods brought into the country are exempt of customs duties, the income tax rate is 35% and the Provincial royalty rate is set at a maximum of 3%. The law includes a provision for accelerated depreciation of capital goods, which is set at three years. This provision results in losses for tax purposes in the early operating phase of Project, which can be carried forward. The law also allows for direct recovery from the government of VAT paid during the construction period.
- All capitalized Project expenditures in the exploration phase can be used as depreciation once the Project starts operations.
- Provincial royalties according with the maximum set in the federal law, is fixed at 3% of the product value "at the exit of the mine pit", which in this case is understood as the head of the well, the cash flow calculation takes this royalty at the standard 3% rate. To estimate the value of the brine at the well head, in accordance with tax regulations, it has been taken the FOB value of the product and deducted from it transportation costs and all pond, brine treatment, plant and administration related costs.
- An Assignment of Rights Agreement, dated April 5, 2016, between Pérez, Gonzalez and Pindar (the "Transferors") and LIEX S.A., establishes a royalty of 1.5%. Pursuant to this agreement, the Transferors assigned to LIEX S.A., all of their respective rights, title and interest in and to the 3Q properties (including, without limitation, Lodomar I to Lodomar VI, and all surface rights

in respect thereof), and wherein it was fixed, as a portion of the consideration, a royalty of 0.5% over gross revenues from production from the 3Q properties for each Transferor, totaling an aggregate royalty of 1.5% over gross revenues from production from the 3Q properties, once the production stage starts.

17.10.4 Capital Expenditures

As indicated in section 17.8.1., total capital expenditures for the 3Q Project, including equipment, materials, indirect costs and contingencies during the construction period is estimated to be US$490.2 million.

Table 17.16: Capital Cost Schedule.

Description	Total Capex US$000			
	2019	2020	2021	Total
Brine Extraction Wells	$5,680	$5,680	$0	$11,361
Pre-concentration Ponds	$96,037	$57,622	$38,415	$192,075
K/CaCl2 Ponds	$32,364	$19,418	$12,946	$64,728
Post-concentration Ponds	$1,980	$1,188	$792	$3,959
Na2SO4 Ponds	$0	$16,193	$0	$16,193
Li2CO3 Plant	$0	$31,306	$31,306	$62,611
Drying, Compacting, Micronizing and Packing Plant	$0	$8,498	$8,498	$16,995
Utilities	$0	$840	$840	$1,679
Vendor	$0	$8,621	$0	$8,621
Power	$12,596	$12,596	$0	$25,193
Supporting Buildings – 3Q Salt Flat	$0	$964	$964	$1,928
Supporting Buildings – Li2CO3 Plant	$0	$13,716	$13,716	$27,432
Road access 3Q Salt Flat – Li2CO3 Plant	$36,080	$0	$0	$36,080
Site Vehicles	$0	$10,679	$10,679	$21,357
Total Capex	**$184,738**	**$187,321**	**$118,154**	**$490,213**

17.10.5 Production

As previously mentioned statements, for economic evaluation purposes, lithium carbonate production has been set at 35,000 TPA.

Table 17.17: Production Schedule and Ramp Up.

Year	2021	2022	2023	2024	2025	2030	2035	2040	Total
	1	2	3	4	5	10	15	20	
Li_2CO_3	7,000	17,500	35,000	35,000	35,000	35,000	35,000	35,000	**654,500**

Production Ramp Up % of Full Capacity			
Year	**1**	**2**	**3**
Li_2CO_3	20%	50%	100%

17.10.6 Operating Costs

As indicated in section 17.9.1, direct operating costs per tonne of lithium carbonate are estimated to be US$2,752 per tonne. In the same manner, indirect operating costs are estimated to be US$38 per tonne. Thus, total estimated operating costs are US$2,791 per tonne.

Estimated operating costs for this project compare very favourably with other existing and projected lithium carbonate facilities.

Table 17.18: Production Costs.

Description	2021	2022	2023	2024	2025	2030	2035	2040	Total
	1	2	3	4	5	10	15	20	US$000
Direct Costs									
Chemical Reactives and Reagents	$40,451	$53,934	$53,934	$53,934	$53,934	$53,934	$53,934	$53,934	**$1,065,201**
Salt Removal	$0	$7,373	$14,747	$14,747	$14,747	$14,747	$14,747	$14,747	**$272,813**
Energy	$8,115	$10,820	$10,820	$10,820	$10,820	$10,820	$10,820	$10,820	**$213,696**
Manpower	$4,713	$4,713	$4,713	$4,713	$4,713	$4,713	$4,713	$4,713	**$94,264**
Catering & Camp Services	$1,659	$1,659	$1,659	$1,659	$1,659	$1,659	$1,659	$1,659	**$33,180**
Maintenance	$949	$1,581	$1,581	$1,581	$1,581	$1,581	$1,581	$1,581	**$30,995**
Brine Transportation from Salar to Plant	$1,234	$3,084	$6,168	$6,168	$6,168	$6,168	$6,168	$6,168	
Li_2CO_3 Transport to Caldera	$541	$1,353	$2,706	$2,706	$2,706	$2,706	$2,706	$2,706	**$50,599**
Total Direct Costs	**$57,661**	**$84,518**	**$96,328**	**$96,328**	**$96,328**	**$96,328**	**$96,328**	**$96,328**	**$1,760,748**
Indirect Costs									
G & A Local	$1,359	$1,359	$1,359	$1,359	$1,359	$1,359	$1,359	$1,359	**$27,188**
Total Indirect Costs	**$1,359**	**$1,359**	**$1,359**	**$1,359**	**$1,359**	**$1,359**	**$1,359**	**$1,359**	**$27,188**
Total Production Costs	**$59,021**	**$85,877**	**$97,688**	**$97,688**	**$97,688**	**$97,688**	**$97,688**	**$97,688**	**$1,903,273**

17.10.7 Production Revenues

Production revenues have been estimated on the basis of the three price scenarios identified on section 17.7.4., and the production schedule shown on section 17.10.5. Possible revenue from other potential by-products has not been considered. Resulting revenue projection is shown below.

Table 17.19: Revenue Projections (Base, High and Low Price Scenarios).

Production Income Li2CO3 - Base (US$000)									
Year	2021	2022	2023	2024	2025	2030	2035	2040	Total
	1	2	3	4	5	10	15	20	
Li_2CO_3	$76,083	$192,955	$394,555	$406,035	$414,190	$414,190	$414,190	$414,190	**$7,696,668**
Total Revenue	**$76,083**	**$192,955**	**$394,555**	**$406,035**	**$414,190**	**$414,190**	**$414,190**	**$414,190**	**$7,696,668**

Production Income Li2CO3 - High (US$000)									
Year	2021	2022	2023	2024	2025	2030	2035	2040	Total
	1	2	3	4	5	10	15	20	
Li_2CO_3	$98,000	$245,000	$498,750	$498,750	$507,500	$507,500	$507,500	$507,500	**$9,460,500**
Total Revenue	**$98,000**	**$245,000**	**$498,750**	**$498,750**	**$507,500**	**$507,500**	**$507,500**	**$507,500**	**$9,460,500**

Production Income Li2CO3 - Low (US$000)									
Year	2021	2022	2023	2024	2025	2030	2035	2040	Total
	1	2	3	4	5	10	15	20	
Li_2CO_3	$65,534	$178,728	$357,455	$357,455	$357,455	$357,455	$357,455	$357,455	**$6,678,452**
Total Revenue	**$65,534**	**$178,728**	**$357,455**	**$357,455**	**$357,455**	**$357,455**	**$357,455**	**$357,455**	**$6,678,452**

17.10.8 Cash Flow Projections

Based on the results and assumptions of the previous sections, pre tax and after tax cash flow projections were developed for the three price scenarios – High, Base and Low. Results for the "Base" case scenario, which project a long-term lithium carbonate price of US$/tonne 11,834, were taken as the base case for sensitivity analysis purposes.

Project net present value (NPV) is calculated based on the cash flow projections at different discount rates, however 8% is considered as the base case discount rate for valuation purposes. The cash flow projections (only for the Base case lithium carbonate pricing scenario) and economic indicators for all three lithium carbonate pricing scenarios for the 3Q Project are presented in the following tables.

Table 17.20: Cash Flow Lithium Carbonate Plant Project 35,000 TPY, Base Case (2019 – 2029)

Year	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**
Period	**-1**	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Revenues											
Li_2CO_3 Sales	0	0	76,083	192,955	394,555	406,035	414,190	414,190	414,190	414,190	414,190
Total Revenues	**0**	**0**	**76,083**	**192,955**	**394,555**	**406,035**	**414,190**	**414,190**	**414,190**	**414,190**	**414,190**
Expenses											
OPEX	0	0	-59,021	-85,877	-97,688	-97,688	-97,688	-97,688	-97,688	-97,688	-97,688
Transaction Tax	0	0	0	0	0	0	0	0	0	0	0
Finder's Fee Royalty (1.5% gross revenues)	0	0	-1,141	-2,894	-5,918	-6,091	-6,213	-6,213	-6,213	-6,213	-6,213
Provincial Royalties (3%)	0	0	0	0	-94	-94	-96	-96	-97	-94	-94
Water Permits	0	0	-4	-5	-5	-5	-5	-5	-5	-5	-5
Mining Licenses	0	0		-45	-45	-45	-45	-45	-45	-45	-45
Total Expenses	**0**	**0**	**-60,166**	**-88,822**	**-103,750**	**-103,922**	**-104,047**	**-104,047**	**-104,047**	**-104,044**	**-104,044**
Operating Margin	**0**	**0**	**15,917**	**104,133**	**290,805**	**302,113**	**310,143**	**310,143**	**310,143**	**310,146**	**310,146**
Profit Before Taxes											
Depreciation	0	0	-98,043	-98,043	-98,043	-98,043	-98,043	0	0	0	0
Amortization	0	0	-2,000	-2,000	-2,000	-2,000	-2,000	-2,000	-2,000	-2,000	-2,000
Remediation Allowance	0	0	-3,008	-4,441	-5,187	-5,196	-5,202	-5,202	-5,202	-5,202	-5,202
Profit Before Taxes	**0**	**0**	**-87,134**	**-351**	**185,575**	**196,874**	**204,898**	**302,941**	**302,940**	**302,943**	**302,943**
Income Taxes	**0**	**0**	**0**	**0**	**-34,332**	**-68,906**	**-71,714**	**-106,029**	**-106,029**	**-106,030**	**-106,030**
Profit After Taxes											
Depreciation, Amortization, Remediation All.	0	0	103,051	104,484	105,230	105,239	105,245	7,202	7,202	7,202	7,202
Profit After Taxes	**0**	**0**	**-87,134**	**-351**	**151,243**	**127,968**	**133,184**	**196,912**	**196,911**	**196,913**	**196,913**
Operating After Tax Cash Flow	**0**	**0**	**15,917**	**104,133**	**256,473**	**233,207**	**238,429**	**204,114**	**204,114**	**204,115**	**204,115**
Non-Operating Cash Flow											
Total Investment Li_2CO_3	-184,738	-187,321	-118,154	0							
VAT on CAPEX	-19,397	-19,669	-12,406	0	0	0	0	0	0	0	0
Refund VAT on CAPEX			19,397	19,669	12,406	0	0	0	0	0	0
Sustaining Capital 1st Phase			0	0	0	0	0	0	0	0	0
Working Capital		0	-14,755	-6,714	-2,953	0	0	0	0	0	0
VAT		0	-8,957	-13,507	-15,340	-15,340	-15,340	-15,340	-15,340	-15,340	-15,340
VAT Refund			0	8,957	13,507	15,340	15,340	15,340	15,340	15,340	15,340
Total Non-Operating Cash Flow	**-204,135**	**-206,990**	**-134,875**	**8,404**	**7,621**	**0**	**0**	**0**	**0**	**0**	**0**
Cash Flow Before Interest and Tax	**-204,135**	**-206,990**	**-118,958**	**112,537**	**298,426**	**302,113**	**310,143**	**310,143**	**310,143**	**310,146**	**310,146**
Accumulated Cash Flow (Before Interest and Tax)	-204,135	-411,125	-530,083	-417,546	-119,119	182,994	493,137	803,280	1,113,423	1,423,568	1,733,714
Income Taxes (35%)	0	0	0	0	-34,332	-68,906	-71,714	-106,029	-106,029	-106,030	-106,030
After Tax Cash Flow	**-204,135**	**-206,990**	**-118,958**	**112,537**	**264,095**	**233,207**	**238,429**	**204,114**	**204,114**	**204,115**	**204,115**
Accumulated Before Tax Profits	**0**	**0**	**-87,134**	**-87,484**	**98,091**	**294,965**	**499,863**	**802,804**	**1,105,744**	**1,408,688**	**1,711,631**
Accumulated Cash (Flow Net of Tax)	**-204,135**	**-411,125**	**-530,083**	**-417,546**	**-153,451**	**79,756**	**318,185**	**522,299**	**726,412**	**930,528**	**1,134,643**

Table 17.21: Cash Flow Lithium Carbonate Plant Project 35,000 TPY, Base Case (2030 – 2040)

Year	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	Total $ 1000s
Period	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	
Revenues												
Li_2CO_3 Sales	414,190	414,190	414,190	414,190	414,190	414,190	414,190	414,190	414,190	414,190	414,190	**7,696,668**
Total Revenues	**414,190**	**414,190**	**414,190**	**414,190**	**414,190**	**414,190**	**414,190**	**414,190**	**414,190**	**414,190**	**414,190**	**7,696,668**
Expenses												
OPEX	-97,688	-97,688	-97,688	-97,688	-97,688	-97,688	-97,688	-97,688	-97,688	-97,688	-97,688	-1,903,273
Transaction Tax	0	0	0	0	0	0	0	0	0	0	0	0
Finder's Fee Royalty (1.5% gross revenues)	-6,213	-6,213	-6,213	-6,213	-6,213	-6,213	-6,213	-6,213	-6,213	-6,213	-6,213	-115,450
Provincial Royalties (3%)	-94	-94	-94	-94	-94	-94	-94	-94	-94	-94	-94	-1,698
Water Permits	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-101
Mining Licenses	-45	-45	-45	-45	-45	-45	-45	-45	-44	-43	-45	-852
Total Expenses	-104,044	-104,044	-104,044	-104,044	-104,044	-104,044	-104,044	-104,044	-104,043	-104,042	-104,044	-2,021,374
Operating Margin	310,146	310,146	310,146	310,146	310,146	310,146	310,146	310,146	310,147	310,148	310,146	5,675,294
Profit Before Taxes												
Depreciation	-82	-82	-82	0	0	-323	-578	-578	-255	-578	-255	-493,024
Amortization	-2,000	-2,000	-2,000	-2,000	-2,000	-2,000	-2,000	-2,000	-2,000	-2,000	-2,000	-40,000
Remediation Allowance	-5,202	-5,202	-5,202	-5,202	-5,202	-5,202	-5,202	-5,202	-5,202	-5,202	-5,202	
Profit Before Taxes	302,862	302,862	302,862	302,943	302,943	302,620	302,366	302,366	302,690	302,368	302,689	5,041,201
Income Taxes	-106,002	-106,002	-106,002	-106,030	-106,030	-105,917	-105,828	-105,828	-105,941	-105,829	-105,941	-1,764,420
Profit After Taxes												
Depreciation, Amortization, Remediation All.	7,284	7,284	7,284	7,202	7,202	7,525	7,780	7,780	7,457	7,780	7,457	634,092
Total Profit After Taxes	196,860	196,860	196,860	196,913	196,913	196,703	196,538	196,538	196,748	196,539	196,748	3,276,781
Operating After Tax Cash Flow	204,144	204,144	204,144	204,115	204,115	204,228	204,318	204,318	204,205	204,319	204,205	3,910,873
Non-Operating Cash Flow												
Total Investment Li_2CO_3	0	0	0	0	0	0	0	0	0	0	0	-490,213
VAT on CAPEX	0	0	0	0	0	0	0	0	0	0	0	0
Refund VAT on CAPEX	0	0	0	0	0	0	0	0	0	0	0	0
Sustaining Capital 1st Phase	0	0	-245	0	0	0	0	-969	-764	0	0	-1,978
Working Capital	0	0	0	0	0	0	0	0	0	0	24,422	0
VAT	-15,340	-15,340	-15,340	-15,340	-15,340	-15,340	-15,340	-15,340	-15,340	-15,340	-15,340	-298,577
VAT Refund	15,340	15,340	15,340	15,340	15,340	15,340	15,340	15,340	15,340	15,340	15,340	283,237
Total Non-Operating Cash Flow	0	0	-245	0	0	0	0	-969	-764	0	24,422	-507,531
Cash Flow Before Interest and Tax	**310,146**	**310,146**	**309,901**	**310,146**	**310,146**	**310,146**	**310,146**	**309,177**	**309,382**	**310,148**	**334,567**	**5,188,686**
Accumulated Cash Flow (Before Interest and Tax)	2,043,860	2,354,005	2,663,906	2,974,052	3,284,197	3,594,343	3,904,489	4,213,665	4,523,048	4,833,195	4,548,233	0
Income Taxes (35%)	-106,002	-106,002	-106,002	-106,030	-106,030	-105,917	-105,828	-105,828	-105,941	-105,829	-105,941	-1,764,420
After Tax Cash Flow	204,144	204,144	203,899	204,115	204,115	204,228	204,318	203,349	203,441	204,319	228,626	3,403,342
Accumulated Before Tax Profits	2,014,493	2,317,355	2,620,217	2,923,160	3,226,103	3,528,724	3,831,089	4,133,455	4,436,145	4,738,513	4,436,144	43,952,564
Accumulated Cash (Flow Net of Tax)	1,338,787	1,542,931	1,746,830	1,950,946	2,155,061	2,359,290	2,563,607	2,766,956	2,970,397	3,174,716	2,995,583	27,560,587

Table 17.22: Economic Indicators.

Price Case	Low	Base	High
	(US$ Million)		
CAPEX	$490	$490	$490
Values, year 20 (US$ Million)			
Revenue	$357	$414	$508
OPEX	$98	$98	$98
EBIDTA	$260	$317	$410
Pre Tax (US$ Million or otherwise noted)			
NPV 6%	$1,889	$2,400	$3,307
NPV 8%	$1,471	$1,889	$2,640
NPV 10%	$1,148	$1,495	$2,125
IRR	29%	34%	41%
PAYBACK	1 Y, 9 M	1 Y, 5 M	0 Y, 10 M
After Tax (US$ Million or otherwise noted)			
NPV 6%	$1,212	$1,545	$2,136
NPV 8%	$927	$1,200	$1,691
NPV 10%	$707	$933	$1,345
IRR	24%	28%	34%
PAYBACK	1 Y, 11 M	1 Y, 8 M	1 Y, 2 M

17.10.9 Sensitivity Analysis

To investigate the impact on the Project's economic results (in NPV and IRR) for changes in key variables, a sensitivity analysis was carried out. The studied variables are:

- Initial Capital Expenditure
- Lithium Carbonate Price (Long Term Price)
- Lithium Carbonate Production
- Total Operating Cost

Table 17.23: Project NPV 8% Pre Tax Sensitivity - Base Case.

Driver variable	Base Case Values		Project NPV 8% Pre Tax (US$ Million)				
			75%	90%	100%	110%	125%
Initial Capital Expenditure	*US$ Million*	$490	$2,006	$1,936	$1,889	$1,843	$1,773
Lithium Carbonate Price	*US$ per tonne*	$11,834*	$1,077	$1,564	$1,889	$2,213	$2,698
Lithium Carbonate Production	*Tonnes/yr*	35,000	$1,096	$1,572	$1,889	$2,206	$2,679
Operating Costs	*US$ per tonne*	$2,791	$2,108	$1,977	$1,889	$1,800	$1,666

* For reference only, lithium carbonate prices change from 2021-2025 indiviually and then the same thereafter

Figure 17.14: Project NPV 8% Pre Tax Sensitivity Chart - Base Case.

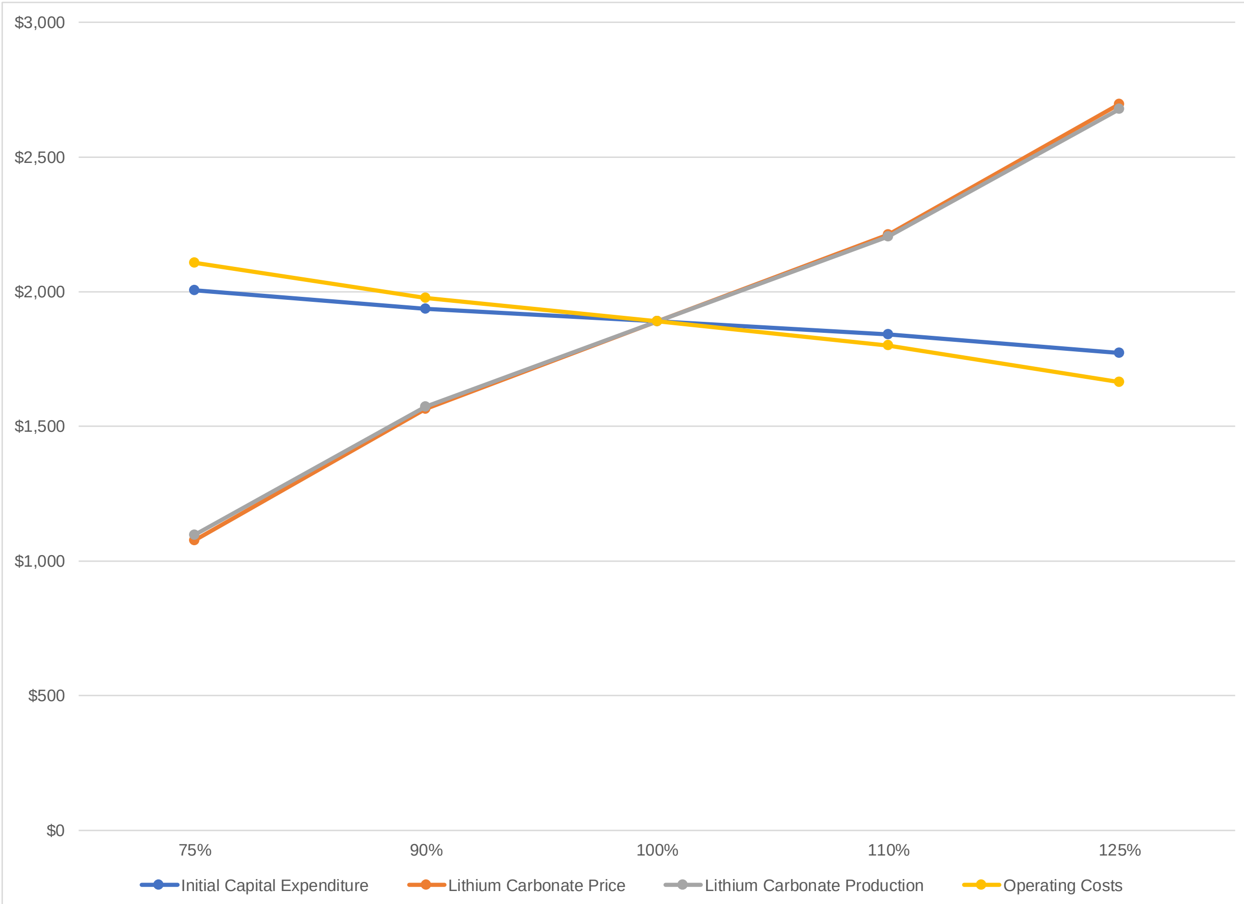


Table 17.24: Project NPV 8% After Tax Sensitivity - Base Case.

Driver variable	Base Case Values		Project NPV 8% After Tax (US$ Million)				
			75%	90%	100%	110%	125%
Initial Capital Expenditure	*US$ Million*	$490	$1,287	$1,235	$1,200	$1,166	$1,114
Lithium Carbonate Price	*US$ per tonne*	$11,834*	$669	$988	$1,200	$1,411	$1,728
Lithium Carbonate Production	*Tonnes/yr*	35,000	$681	$993	$1,200	$1,407	$1,716
Operating Costs	*US$ per tonne*	$2,791	$1,342	$1,257	$1,200	$1,142	$1,055

* For reference only, lithium carbonate prices change from 2021-2025 indiviually and then the same thereafter

Figure 17.15: Project NPV 8% After Tax Sensitivity Chart - Base Case.

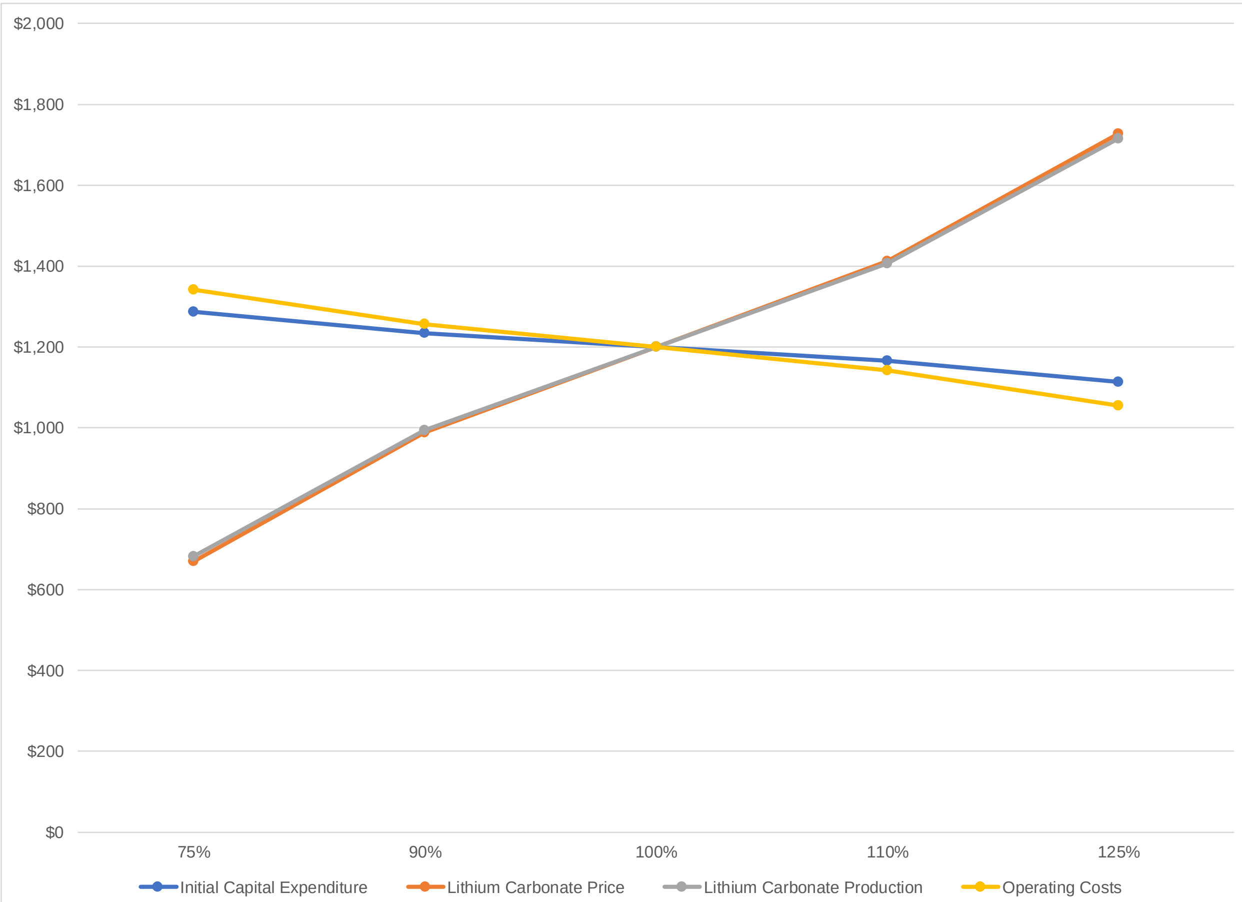


Table 17.25: Project IRR Pre Tax Sensitivity - Base Case.

Driver variable	Base Case Values		Project IRR Pre Tax (%)				
			75%	90%	100%	110%	125%
Initial Capital Expenditure	*US$ Million*	$490	40%	36%	34%	32%	29%
Lithium Carbonate Price	*US$ per tonne*	$11,834*	25%	30%	34%	37%	42%
Lithium Carbonate Production	*Tonnes/yr*	35,000	25%	30%	34%	37%	41%
Operating Costs	*US$ per tonne*	$2,791	36%	35%	34%	33%	31%

* For reference only, lithium carbonate prices change from 2021-2025 indiviually and then the same thereafter

Figure 17.16: Project IRR Pre Tax Sensitivity Chart - Base Case.

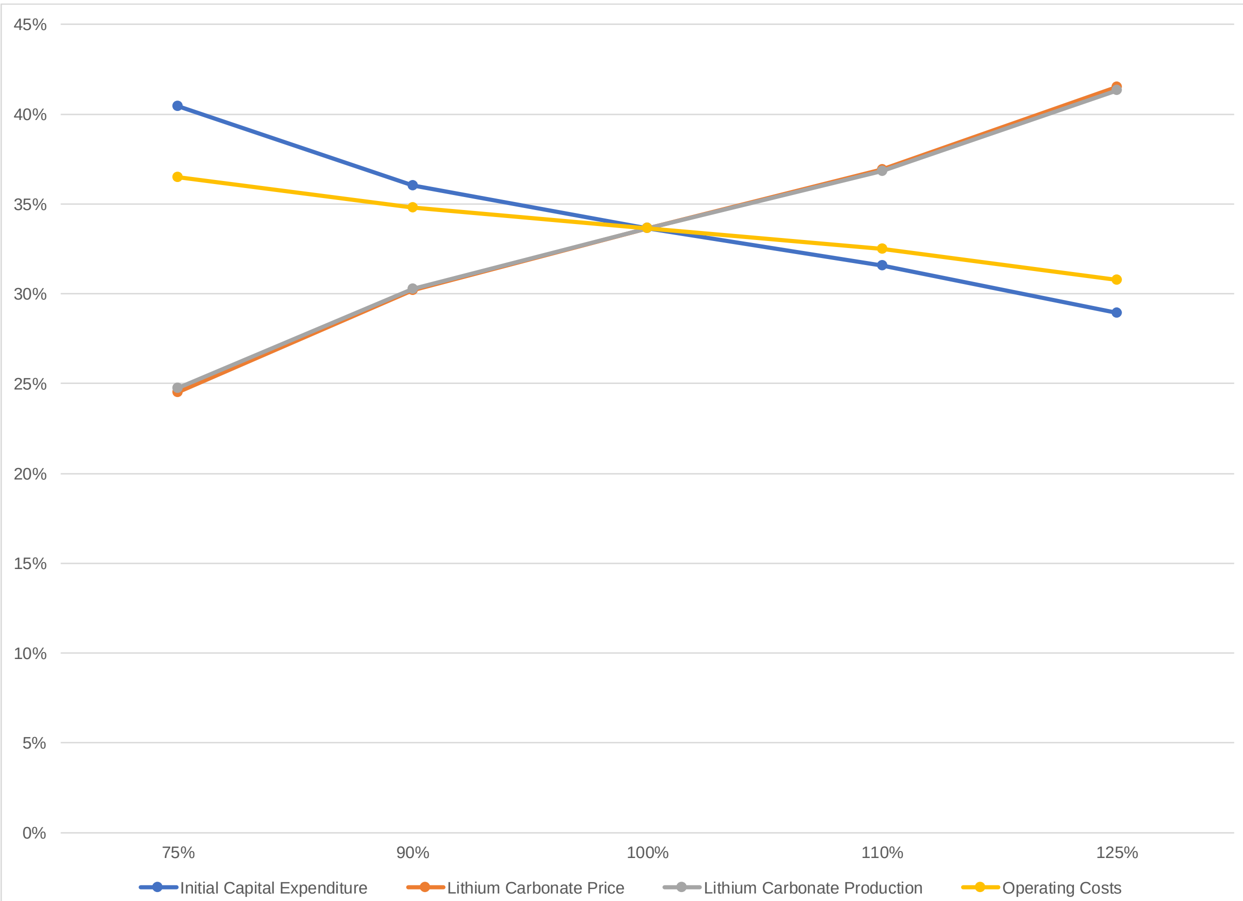
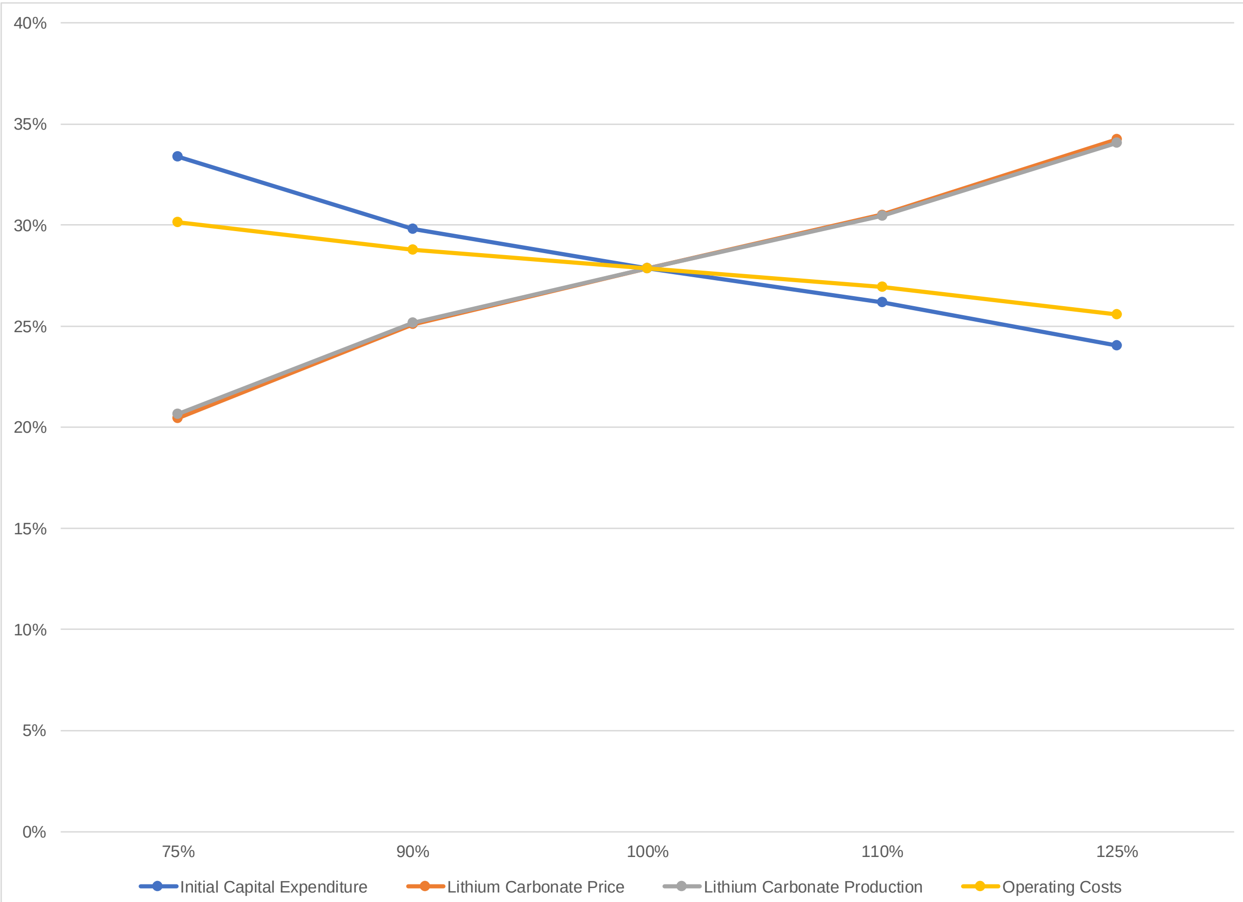


Table 17.26: Project IRR After Tax Sensitivity - Base Case.

Driver variable	Base Case Values		Project IRR After Tax (%)				
			75%	90%	100%	110%	125%
Initial Capital Expenditure	*US$ Million*	$490	33%	30%	28%	26%	24%
Lithium Carbonate Price	*US$ per tonne*	$11,834*	20%	25%	28%	31%	34%
Lithium Carbonate Production	*Tonnes/yr*	35,000	21%	25%	28%	30%	34%
Operating Costs	*US$ per tonne*	$2,791	30%	29%	28%	27%	26%

* For reference only, lithium carbonate prices change from 2021-2025 indiviually and then the same thereafter

Figure 17.17: Project IRR After Tax Sensitivity Chart - Base Case.



Revenue driver variables are the Lithium carbonate price and Lithium carbonate production, these have the highest impact on the Project's NPV and IRR, regardless of whether these are measured on a Pre Tax or After Tax basis.

17.10.10 Economic Analysis

- Project cash flow analysis for all thre pricing scenarios indicates that the Project appears to be economically viable even under unfavorable conditions.
- Project NPV and IRR results remain positive even with significant negative variations on the driver variables, which indicate the economic strengths of the 3Q Project.

- The Project excluding any by-product revenue is strong, which means there could be significant potential for upside in analysing sub-sequent product sales. However, there is no assurance that any sales could happen or if the sale of any by-products is feasible.
- The capital costs for 3Q Project including equipment, materials, indirect costs, and contingencies during the construction period is estimated to be US$490.2 million.
- The main capital cost driver are the pond construction and all relevant assoiciated costs, which represents ~58% of the total Project capital costs. Pond capital costs are driven by two variables, evaporation rate, and unit cost.
- An operating cost for Lithium Carbonate for a 35,000 TPA facility is estimated at US$2,791 per tonne. This figure includes pond and plant chemicals, energy, labor, salt waste removal, maintenance, camp services and transportation.
- Project economic sensitivity analysis show that revenue driver variables – Lithium Carbonate Price and Production – are the ones with the highest impact on Project NPV and IRR results, regardless of whether these are measured as on a Pre Tax or After Tax basis. Also, because of the upfront nature of the capital costs, the Project IRR results are sensitive to capital costs.

17.11 Project Schedule

The Schedule starts on December 2017 with Hydrogeological program (reserve estimation) and ends on December 2020 with the Start Up of the Li_2CO_3 plant.

During this early stage in the study basic activity lists have been developed to conform the bar chart to level 2 and Level 1 as shown below.

The schedule and the project management plans will be developed in conjunction for the next phase of the project. The historical information utilised to determine the timeline for this schedule has been developed by the team. The activities included in the schedule assume multiple tasks could be developed in paralellel but do not represent a fast track approach to the project.

The schedule has taken into account: government timelines and requirements; availability of key resources, Project management information systems, software requirements and development plans.

Calendars utilised follow Argentinean regulations and have been utilised considering productivity factors, weather conditions, seasons, etc.

Some of the budgetary quotes received provided information utilised to produce the high-level schedule shown in the chapter. This basic schedule model assumes that sufficient workforce and equipment are available to accomplish the activities as scheduled.

Table 17.27: 3Q Project Schedule.

ID	Task Name	Duration	Start	Finish
1	**3Q project up to completed it**	**36.43 mons**	**13/12/17**	**9/12/20**
2	Pea Published	0 mons	13/12/17	13/12/17
3	Hydrology programa (Reserve)	12 mons	13/12/17	7/12/18
4	**Process Developvment Program**	**12 mons**	**13/12/17**	**7/12/18**
5	Modelling Program	2 mons	10/01/18	10/03/18
6	Pilot Test Programa at university	12 mons	13/12/17	7/12/18
7	Pilot Test program at site	2 mons	10/01/18	10/03/18
8	Enviromental Studies Program	3 mons	13/12/17	12/03/18
9	Basic Engineering	8 mons	13/03/18	7/11/18
10	Feasibility Study	4 mons	22/08/18	19/12/18
11	Financing of project	2 mons	12/12/18	9/02/19
12	Detail Engineering	9 mons	6/02/19	2/11/19
13	Precommitment	10 mons	29/05/19	23/03/20
14	Construction	15 mons	21/08/19	12/11/20
15	Comissioning	6 mons	13/06/20	9/12/20
16	Start Up	0 mons	9/12/20	9/12/20

18. Interpretations and Conclusions

18.1 Geology and Resources

Results from the second field campaign and the associated Resource Estimate at the 3Q Project help to define the following important interpretations and conclusions:

- It is apparent that conditions in the 3Q Salar Complex have led to the accumulation of significant amounts of brine with significant grades of lithium.
- The data indicate a trend of increasing lithium grade towards the north, in all levels of the Resource Zone (Figure 15.9). This may be due to the gentle northward trend in hydraulic gradient within the salar, as indicated by slightly higher brine level in Laguna Verde than in Laguna 3Q. In this way, the north end of the salar is the focal point for evaporation, and therefore for accumulation of lithium. It is also possible that the addition of lithium from hotsprings (Figure 6.1), either directly or through river discharge (Figures 6.2 and 6.4), may influence the chemical composition of brine in the northern sector of 3Q Salar.
- The brine resource present in Laguna 3Q was relatively straightforward to quantify (Measured Resource). The resource present in the upper units (Upper Clastics and High Porosity Halite) was tested by drilling and pumping tests and is therefore considered Indicated. The deeper units (Porous Halite, Massive Halite and Lower Clastics) have only been assessed by drilling, and are considered to contain Inferred Resources.
- A trend of decreasing magnesium to lithium ratio is also indicated towards the north. This trend is shown in surface brine (Figure 9.9) and is also present in deeper brine.
- Throughout much of the Resource Zone, the bottom of the Lower Clastics unit remains undefined.
- Given that the existing dataset show no indication that brine is decreasing with depth, further delineation of the Lower Clastics unit is of interest.
- Hydraulic testing conducted to date has been limited to the upper two units of the Resource Zone (High Porosity Halite and Upper Clastics). Results indicate that these two units are relatively permeable and could potentially support production pumping rates.
- The trend of lower surface brine grades at the south end of 3Q Salar (north of Laguna Verde; Figure 9.7), also extends below the surface in this zone, although subsurface grades are higher (Figures 15.8 and 15.9). Given that higher grades occur to the north, to the south, and at depth, it appears that the lower grade surface body may be due to shallow inflow of water from adjacent border areas of the salar, that is then subject to evaporation in the near-surface of the salar.

18.2 Mining

Mining a brine resource is a very different activity than mining a solid reserve. While mining a solid reserve involves extraction and transportation of rock and soil, mining a brine resource involves collecting and transportating a liquid brine through the use of wells, trenches, pumps and pipelines. As with the NLC Project most brine projects involve the desired mineral in very low concentrations, usually measured in parts per million (ppm). The use of evaporation ponds to concentrate the mineral is a commmon practice in the brine mining industry.

Brine mining is dependent on both the mineral concentration and the geohydraulic properties of the hydrostratigraphic units. Figure 17.1 shows a generalized extraction well design and Figure 17.2 shows the tentative location of the well field. In future studies both the well design and the well locations will have detailed design. This design will be based on future resource zone modelling, geohydraulic modelling, and optimization based on capital and operating expense.

The mass balance indicates that the total brine flow needed is 48 L/s from the production wells, the design of the well bores and locations in future studies will supply the required brine volume with an appropriate amount of redundancy.

18.3 Process Information and Design

Table 16.1 shows the average chemical composition of brine in 3Q Project. Table 8.2 shows the comparison of selected brine chemistry for the Resource Estimate defined at the 3Q Project (for the 520 mg/L cut-off) with other lithium brine deposits. Lithium brine processes using evaporation are well developed and understood. The 3Q Project process uses existing technologies that have been well proven in current lithium brine operations.

The differences between existing operations and the 3Q Project are:

- Lower Mg/Li ratio.
- Mg content low enough to prevent lithium carnallite salts from precipitating, eliminating lithium loss in the carnalite salts.
- Mg will be removed in the chemical plant but the consumption of soda ash should be less then the consumption in plants with a higher Mg/Li ration.
- High calcium content and low sulphate content.
- Additional external source of sulphate to precipitate calcium contained in the brine as gypsum.
- No risk of lithium loses in precipitate is expected.
- Na_2SO_4 plant at the salt flat site to remove the calcium.
- Boron removed at the chemical plant using a solvent exchange method.
- Other elements contained in the brine such as Barium, Manganese, Strontium and so on, will be studied in detail in the next Feasibility Study stage.

Figure 16.1 shows a block diagram of the process. A key component of the process is the sizing of the evaporation ponds for the projected production rate. The current evaporation pond design is appropriate to the anticipated production volume.

Lithium Carbonate Precipitation, Stage 3, is a well known and understood process.

Ongoing test work is currently underway in 3Q sat flat site to validate the process of evaporation ponds by an on-site pilot ponds.

18.4 Preliminary Economic Assessment Study Results

The economic results for the 3Q Project show very favorable economic indicators. The PEA supports the economic indicators through capital and operating cost estimates consistent with the proposed Project design.

The next step is to move forward as proposed in Table 17.18: 3Q Project Schedule.

18.5 Project Schedule

The program is expected to take 36 months.

Construction of the Project starts on Q3 2019, date by which all environmental and construction permits must have been obtained.

Commissioning of the Project ends in Q4 2020.

19. Recommendations

19.1 Drilling

Follow-up exploration activities are proposed to address the following objectives:

- To further delineate brine grades within and under the Resource Zone identified herein;
- To further assess the distribution of formation permeability and porosity within the Resource Zone;
- To continue collecting baseline and ongoing information pertaining to on-site meteorology and hydrology;
- To continue collecting environmental baseline information;
- To construct a hydrogeological numerical model (including a quantitative water balance) of the site, for use in evaluating Reserves; and

It is considered feasible to advance all these activities in the upcoming 2017/ 2018 field season, although some activities (e.g., meteorological and hydrological monitoring, brine evaporation, etc.) would continue beyond one field season.

19.2 Reserve Estimation

This study has not yet established reserves. Detailed resource zone modelling and geohydraulic modelling will be the basis of establishing measured and indicated resources. The modelling will require additional data from long term pump tests, additonal exploration drilling and testing hydrogeologic properties of core samples. The locations of the additional testing will be determined by optimizing the expense vs. the expected data aquisition.

19.3 Mining

The following list is recommendations for mine design and engineering:

- Develop a detailed resource zone model.
- Develop a detailed geohydrology model.
- Consider trenches to capture near surface brines.
- Evaluate production well timing considering the 270 to 310 days of retention time required for evaporation.
- Optimize well field expenses considering infrastructure needs such as well pads, roads, and pipe lines.
- Study differing well bore diameters considering the geohydrological properties of the strata at a given well location.
- Consider the well locations accounting for the evaporation pond locations.
- Evaluate the economics of individual solar/battery power supply for each well vs. a single power supply and distribution system.

19.4 Base Line Studies

GT Ingeniería S.A. has been hired to develop an Environmental Baseline Study and coordinate field campaigns for the 3Q Project. The baseline study is a fundamental tool required to prepare the Environmental Impact Report for Exploitation Stage.

Baseline studies for the current Project started in October 2016 and are expected to be completed by Q1 2018. It is recommended that the base line studies move forward as described in Section 17.6.

19.5 Infrastructure and Engineering

3Q Project will comprise two separates units, one located at 3Q salt flat and the other nearby Fiambalá town. The Project will have acces to the national railroads system and the national paved highway system to transport the final product to the main ports in Argentina and Chile.

19.6 Process Engineering

The process brine test work program should be actively progressed to advance the process, in line with the next engineering phase, which is to carry out the Full Feasibility Study. The test program is currently underway, with emphasis upon three main areas, as follows:

Process simulation using the gPROMS software. This will allow the confirmation of design parameters for ponds and plant engineering, before the data from field or laboratory tests being conducted becomes available, since both of these require long periods of time to carry out.

Bench scale tests, allowing a preliminary confirmation of simulation data. These tests will also allow the determination of the design and scale of the equipment for a Pilot Plant.

19.7 Full Feasibility Study

The Preliminary Economic Assessment Study indicates favorable economics for the 3Q Project as described. It is recommended that NLC move forward on a full Feasibillty Study and associated tasks, as proposed in Table 17.18: 3Q Project Schedule

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Salinas, R. S., Julio/Agosto 2017. Informe Monitoreo Invierno: Flora Y Vegetación Proyecto Tres Quebradas Minas: Lodomar I A XI Departamento Tinogasta Provincia De Catamarca Argentina. Profesional Interviniente: Roberto S. Salinas (Profesor y Licenciado en Biología) M.P. Colegio de Biólogos de Catamarca N°009.

Zappettini, 2005. Metallogenic Map of South America, Servicio Geologico Minero Argentino. Scale 1:5,000,000.

21. Date, Signature and Certificate

Randy Pitts
2499 W. Long Circle
Littleton, CO 80120
307-871-4899
rpitts@norwestcorp.com

I, Randy Pitts, B. Sc. Mining Eng., am an independent consultant for Norwest Corporation in Denver, Colorado, USA located at 950 S. Cherry Street, Denver, Colorado, USA and have been since June 2013.

I graduated from the Colorado School of Mines with a Bachelor of Science degree in Mining Engineering in 1978. I have been certified as a Qualified Professional by the Mining & Metallurgical Society of America.

Since 1974 I have been involved in industrial minerals mining and processing.

I have read the definition of "Qualified Person" set out in National Instruments 43-101 ("NI 43-101") and certify that by reason of my education, affiliation with a professional association (as defined by NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.

I visited Neo Lithium's 3Q Property in Catamarca, Argentina on the 7th and 8th of March, 2017. I am responsible for supervising the overall preparation of the technical report, titled "Preliminary Economic Assessment (PEA), 3Q Project NI 43-101, Catamarca Province, Argentina", with an effective date of December 12, 2017 relating to the 3Q Property.

As of the effective date of the technical report, 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.

I am independent of Neo Lithium Corporation in accordance with the application of Section 1.4 of National Instruments 43-101. I have no prior involvement with the Property that is the subject of this report. I have read National Instrument 43-101, and this report has been prepared in compliance with that instrument and form.

Dated in Denver, Colorado this 12th day of December, 2017

Randy T. Pitts

Randy T. Pitts

22. Appendix

22.1 Example Diamond Borehole Log – From Conhidro Report for PP1-D-03

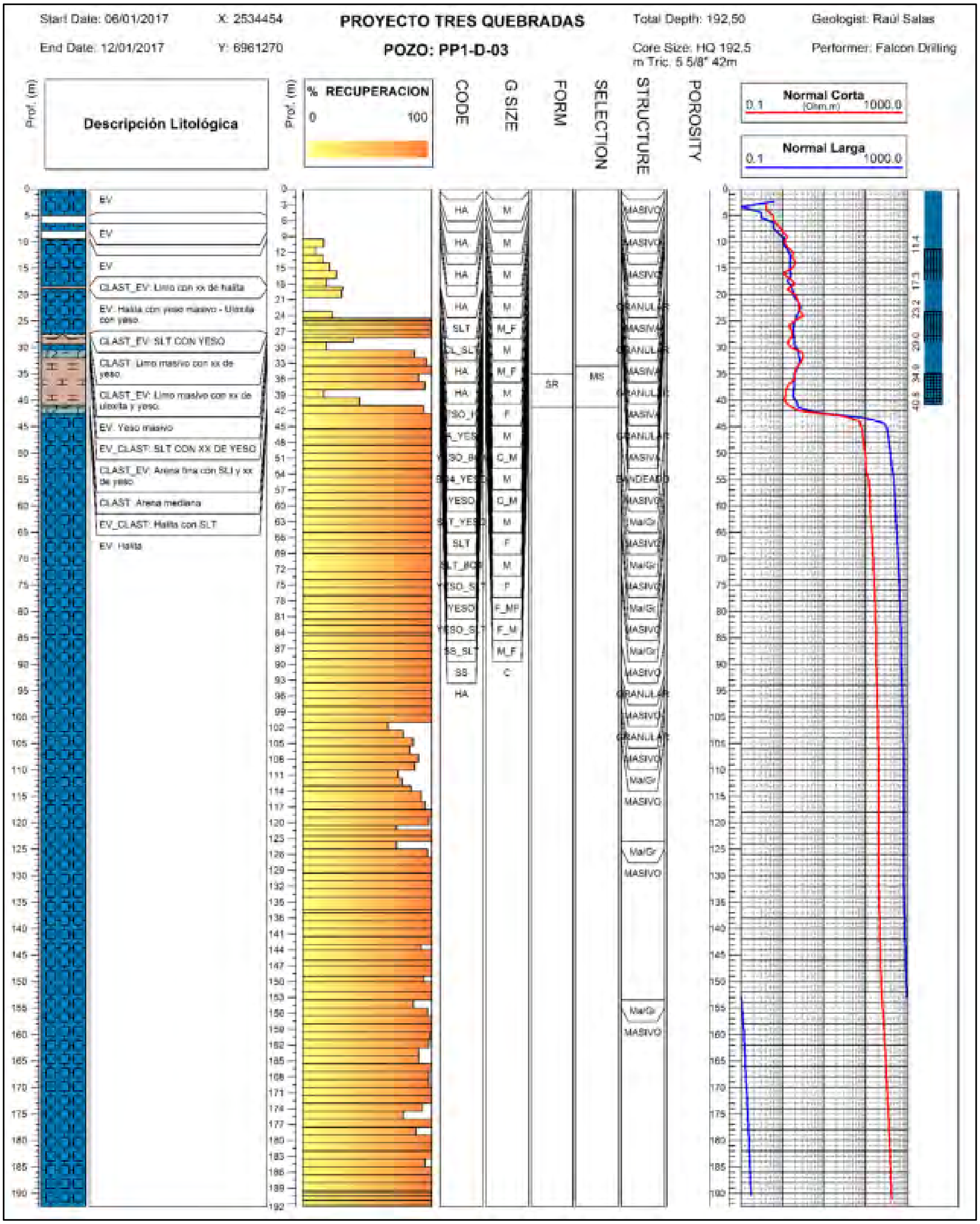

Figure 22.1: Diamond Borehole Log from Conhidro Report for PP1-D-03.

22.2 Example Figures and Photos from Conhidro Drilling and Pumping Test Report for PB1-R-30

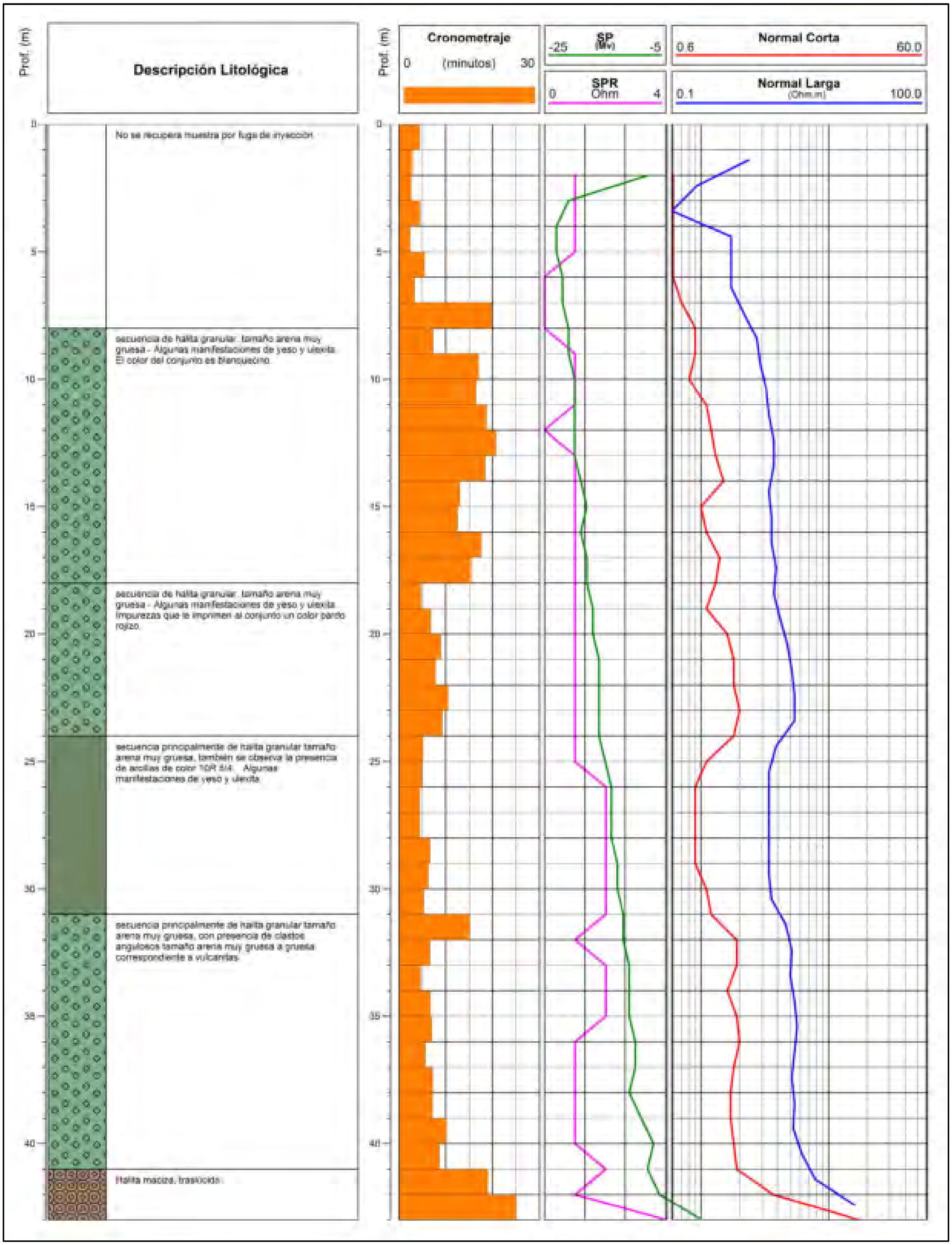

Figure 22.2: Rotary Borehole Log for PB1-R-03.

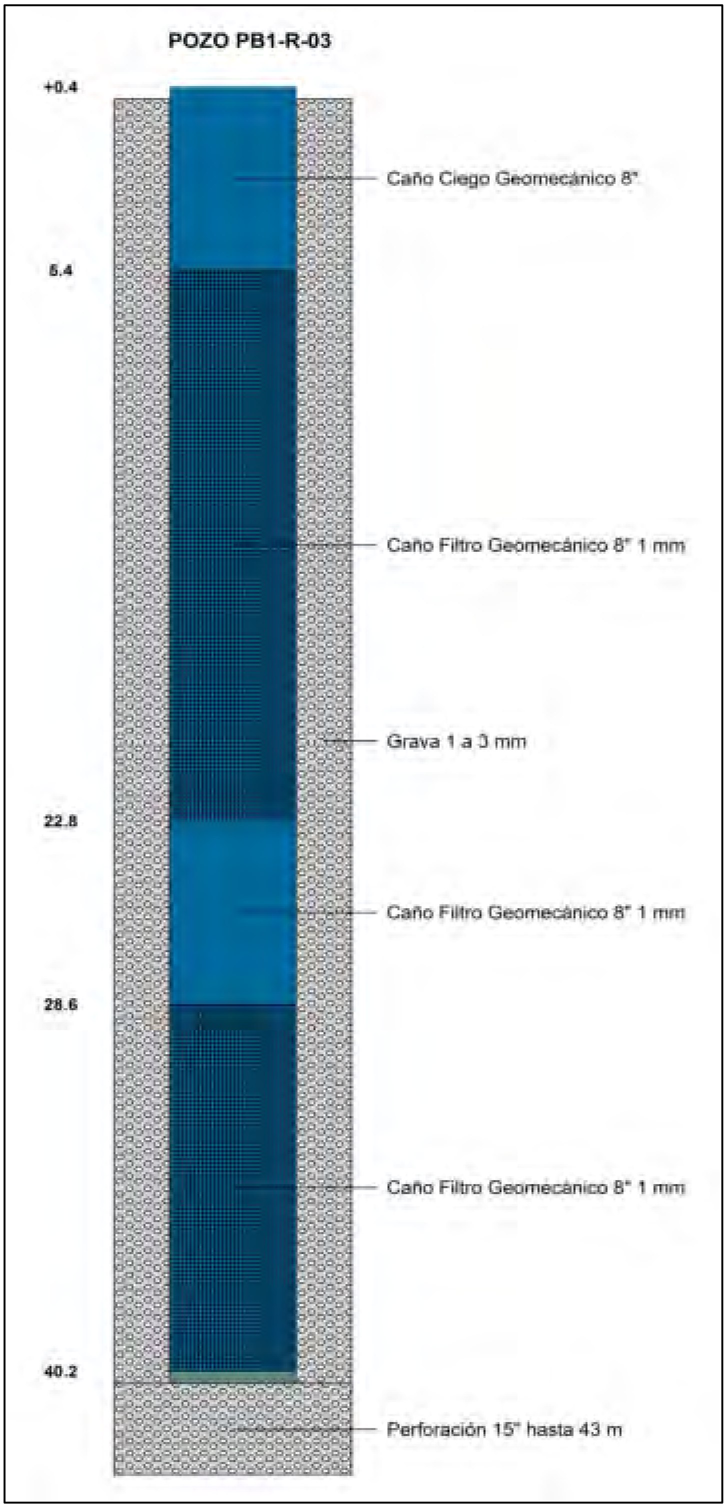

Figure 22.3: Well Design of PB1-R-03.

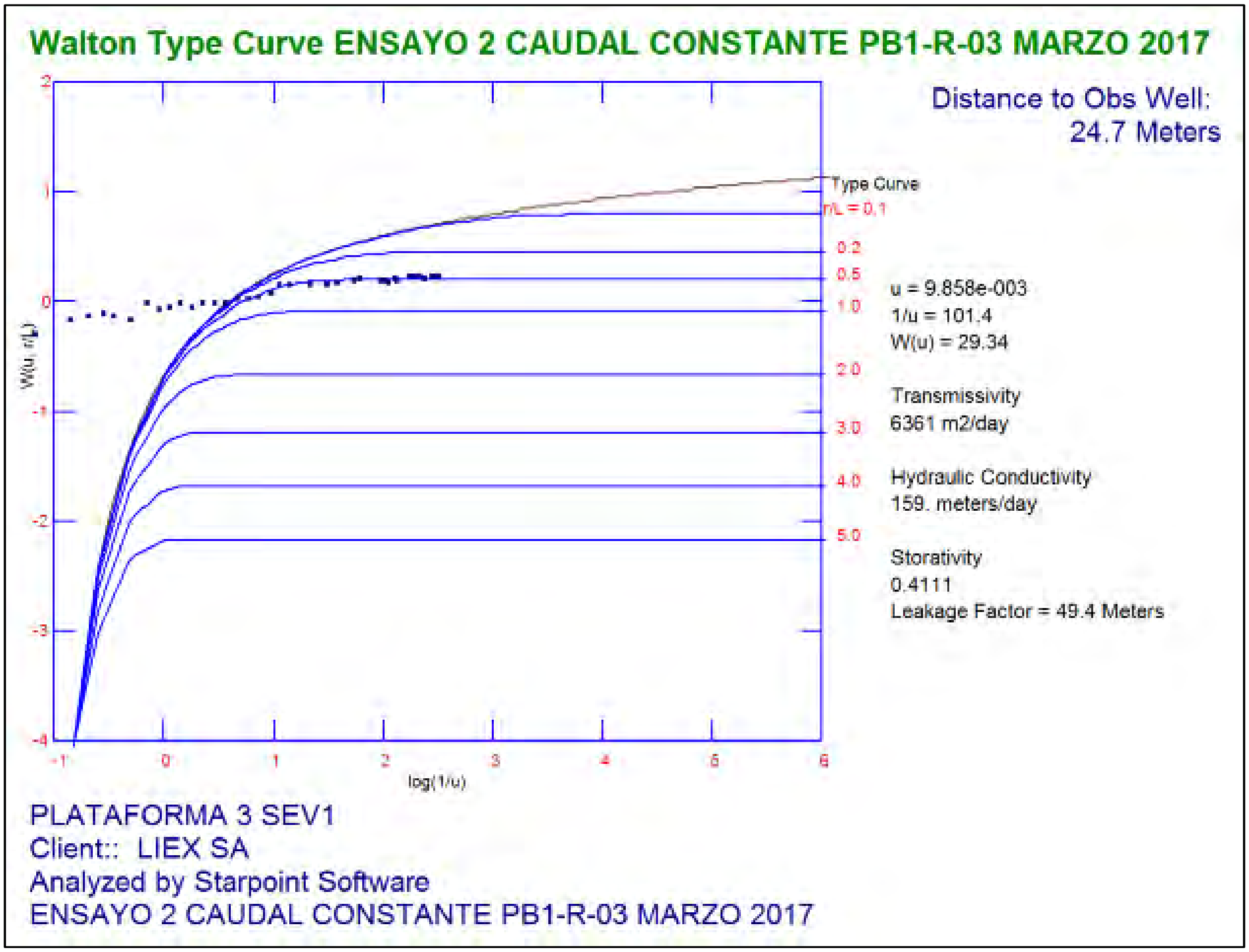

Figure 22.4: Application of the Software Infinite Extent, for Pumping Test Analysis of PB1-R-03.

Photo 22.1: Downhole Geophysical Testing at PB1-R-03.

Photo 22.2: Injection of Fluorescein Tracer into Observation Well PP2-RD-3, during Pumping Test of PB1-R-03.

22.3 Example Figures and Photo from the Conhidro Report for the Central Trench Pumping Test

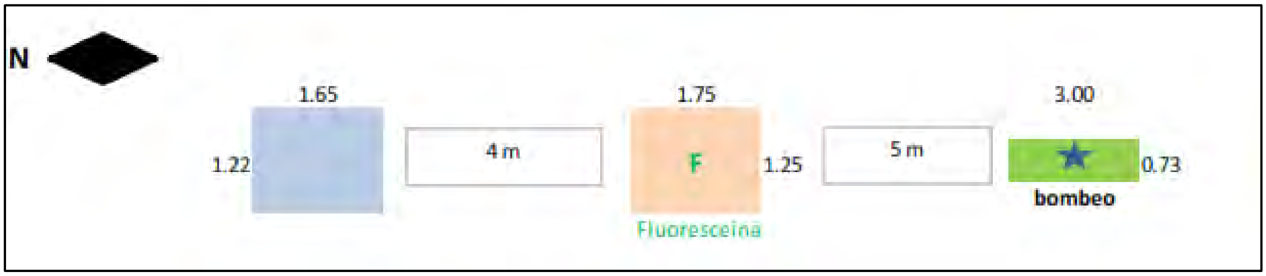

Figure 22.5: Configuration of the Pumping Trench (Bombeo) and Observation Trenches (Pink and Blue).

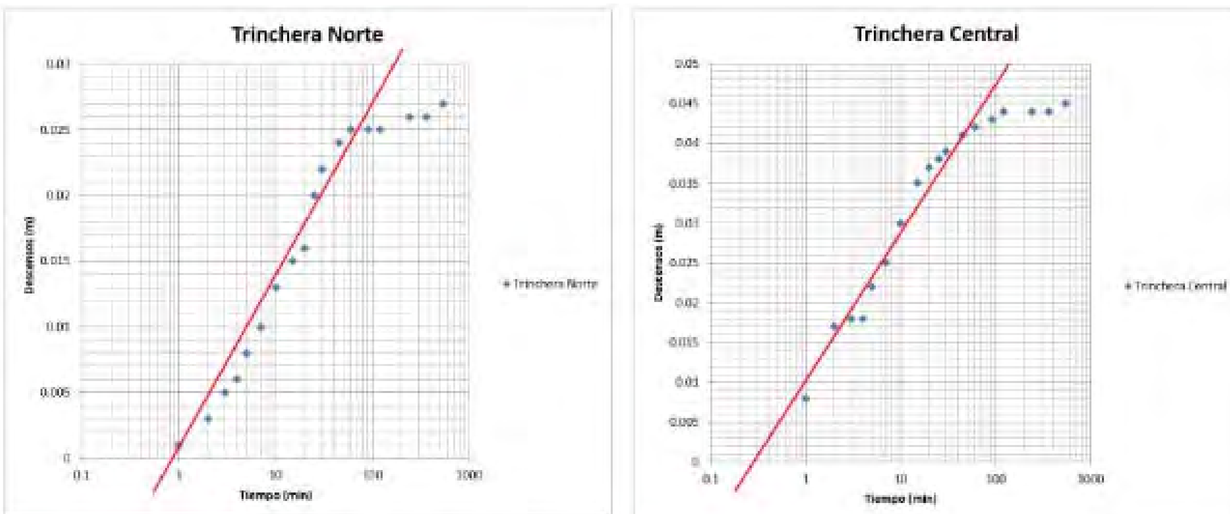

Figure 22.6: Drawdown in the Two Observation Trenches during the Pumping Test.

Photo 22.3: View of the Fluorescein Tracer Placed in the Central Observation Trench.

22.4 Round Robin Reports for Mid-Range and High-Range Reference Samples

Alex Stewart Argentina S.A.
Official ASIC Member

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CERTIFICADO DE ANALISIS

MATERIAL DE REFERENCIA (MR)

Standard	Código de Análisis
MR Salmuera Liquida	M179782

Elemento	Valor Certificado [mg/l]	Incertidumbre Expandida [mg/l]
Litio (Li)	2318	± 237
Potasio (K)	20318	± 2.246
Calcio (Ca)	103508	± 10.519

Método de Análisis

Inductively Coupled Plasma (ICP) (Li, K, Ca)

Compañía: LIEX S.A.
Solicitante: Waldo Perez

Información adicional

El valor certificado fue obtenido a partir de los resultados de un programa de ensayos de interlaboratorios.
La incertidumbre expandida fue calculada para un nivel de confianza de 95% con un factor de cobertura K=2.

Total de muestras analizadas por determinación:	17	(Homogeneidad: 10)
Muestras analizadas por laboratorio:	1	(10 para ASA para el estudio de Homogeneidad)
Laboratorios participantes:	8	(ASA NOA*, Induser, Sherritt, ACTLAB, Segemar, ALS, SGS y ASA*) *nombres simplificados

Origen del material: salmuera liquida
Destino del MR: salmuera liquida para ser utilizado para interlaboratorio

Homogeneidad: se efectuó sobre 5 botellas seleccionados aleatoriamente y por duplicado

Almacenamiento: mantener en envase bien cerrado a temperatura ambiente y libre de humedad.
Forma de empleo: se recomienda homogeneizar el material con agitación antes de usar.
Nota de seguridad: tomar las precauciones normales de trabajo para este tipo de material

El presente material fue evaluado bajo los lineamientos de la norma ISO GUIDE 35:2006E.

Brom. Lorena Llanos	Lic. Rubén Walter Cairo	29 de mayo de 2017
Supervisora de Calidad	Gerente del Departamento Calidad	Fecha de emisión

Para cualquier otra información comunicarse con: atencion.cliente.mza@alexstewart.com.ar

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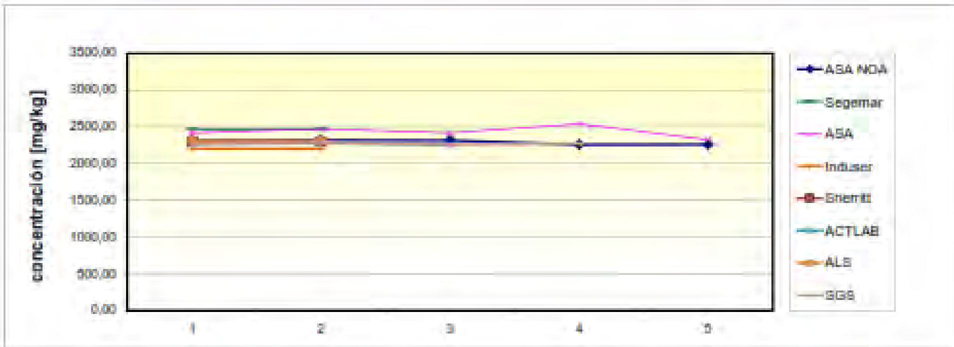
R6.PG.01

Litio (Li)

LABORATORIOS:	ASA NOA	Segemar	ASA	Induser	Sherritt	ACTLAB	ALS	SGS	
MÉTODO:	ICP OES	ICP OES	ICP OES	ICP OES	Spectroscopy	ICP OES	ICP OES	ICP OES	OBSERVACIONES
Concentracion (mg/l)	2311,00	2464,00	2417,28	2200,00	2300,00	2270,00	2310,00	2273,00	
	2316,00	2464,00	2471,89	2200,00	2300,00	2280,00	2310,00	2287,00	
	2317,00		2417,28			2260,00		2261,00	
	2259,00		2539,71					2274,00	
	2262,00		2325,65						
Media	2293	2464	2434	2200	2300	2270	2310	2274	
Desviación Standard	30,2	0,0	76,9	0,0	0,0	10,0	0,0	10,6	
Varianza	910,3	0,0	6227,5	0,0	0,0	100,0	0,0	112,9	

GRÁFICO:



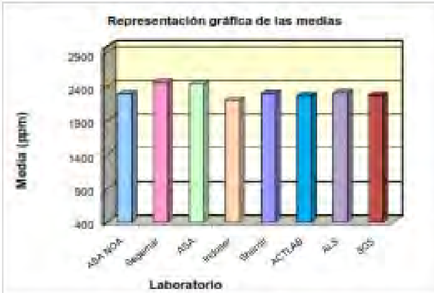
1. Cálculo del valor medio y la desviación standard correspondiente a cada parámetro y cada laboratorio.
En el presente estudio se asume normalidad para cada secuencia de análisis por laboratorio, suponiendo que los métodos empleados están validados.

Laboratorio	Media	Desv std de cada laboratorio	RSD%
ASA NOA	2293	30,2	1,32
Segemar	2464	0,0	0,00
ASA	2434	78,9	3,24
Induser	2200	0,0	0,00
Sherritt	2300	0,0	0,00
ACTLAB	2270	10,0	0,44
ALS	2310	0,0	0,00
SGS	2274	10,6	0,47

Estadística Descriptiva (nivel de confianza 95%)	
Promedio de la Media	**2318,19**
Media	2318,19
Mínimo	2200,00
Máximo	2464,00
Rango	264,00
Suma	18545,51
Mediana	2296,70
Moda	#N/A
Cuenta	8
Coeficiente de Asimetría	0,79
Curtosis	-0,07
S de la Media	**87,86**
RSD%	3,79
Varianza de la muestra	7719,26
Error Estándar	**31,06**

Total de muestras analizadas:	8
Muestras analizadas por laboratorio:	1
Laboratorios participantes:	8

2. Representación gráfica de la media y de la desviación standard por laboratorio :



3. Estudio de Homogeneidad - *Cálculo de la incertidumbre*

Datos provenientes de ANOVA del análisis de varios paquetes o "botellas" de muestras de los cuales se sacan muestras y se analizan

LABORATORIO:					
NUMERO DE BOTELLA	**1**	**2**	**3**	**4**	**5**
Concentracion (mg/l)	*2417,28*	*2539,71*	*2325,65*	*2266,11*	*2556,38*
	2504,69	*2546,57*	*2471,89*	*2417,28*	*2517,46*
Media	***2461***	***2543***	***2399***	***2342***	***2537***
Desviación Standard	***62***	***5***	***103***	***107***	***28***
Varianza	***3820***	***24***	***10694***	***11426***	***757***

Los valores se presentan por orden de análisis acorde a lo suministrado por cada laboratorio para una mejor apreciación de su comportamiento real.

Análisis de varianza de un factor

RESUMEN

Grupos	Cuenta	Suma	Promedio	Varianza
Columna 1	2	4922,0	2461,0	3820,3
Columna 2	2	5086,3	2543,1	23,5
Columna 3	2	4797,5	2398,8	10694,2
Columna 4	2	4683,4	2341,7	11426,3
Columna 5	2	5073,8	2536,9	787,5

ANÁLISIS DE VARIANZA

Origen de las variaciones	*uma de cuadrad*	*Grados de libertad*	*edio de los cuadr*	*F*	*Probabilidad*	*alor crítico para F*
Entre grupos	61017,0	4	15254,3	2,9	0,1	5,2
Dentro de los grupos	26721,7	5	5344,3			
Total	87738,7	9				

$$s_L^2 = \frac{CM_{entre} - CM_{dentro}}{n_0}$$

CM_{entre}	61017,0	*Promedio de los cuadrados*
CM_{dentro}	26721,7	
nro° repeticiones	2	
n° botellas	5,00	

Desviación Standard entre laboratorios $s_L =$ 174,67

Desviación Standard del proceso o repetibilidad $s_r =$ 163,47

Incertidumbre combinada entre botellas $u_{bb} = \sqrt{\frac{CM_{dentro}}{n}} \sqrt[4]{\frac{2}{v_{CMdentro}}}$

v= grado de libertad=n° de análisis totales - 1 9,00

Incertidumbre combinada entre botellas (**U**bb o **L** **u(x) =** 79,362 mg/l

Este es el módulo correspondiente a la homogenización.

4. Calculo de la Incertidumbre Expandida

$$U_{MR} = kraiz(uchar^2 + ubb^2 + ults^2 + usts^2)$$

Incertidumbre expandida (factor de cobertura k=2 $U_{MR} =$ 236,79 mg/l

Suponiendo **U**sts = 0

10,21 %

Conclusion Final:

El valor certificado es **2318,2 ± 236,8 mg/l**

rango de concentración **2081,40 - 2554,98**

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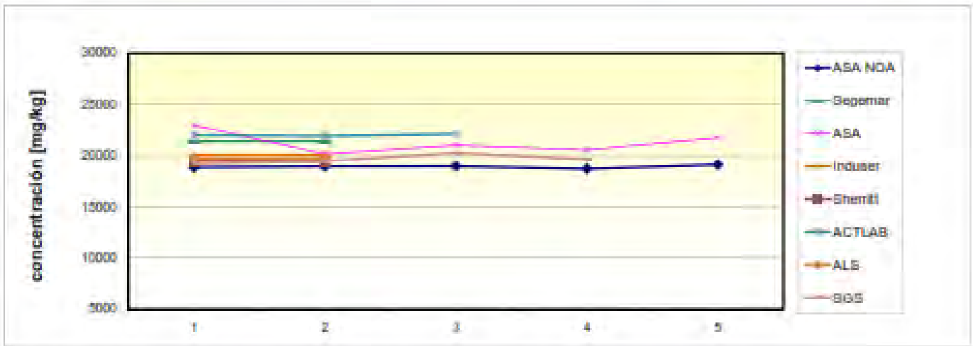
RI PG.01

Potasio (K)

LABORATORIOS:	ASA NOA	Segemar	ASA	Induser	Sherritt	ACTLAB	ALS	SGS	OBSERVACIONES
MÉTODO:	ICP OES	ICP OES	ICP OES	ICP OES	ICP OES	ICP OES	ICP OES	ICP OES	
Concentracion (mg/l)	18845	21414	22965	20080	19500	22000,00	19700,00	19190,00	
	18936	21414	20164	20080	19500	21900,00	19700,00	19469,00	
	18962		21024			22100,00		20285,00	
	18706		20570					19648,00	
	19111		21734						
Media	18912	21414	21291	20080	19500	22000	19700	19648	
Desviacion Standard	149,7	0,0	1102,1	0,0	0,0	100,0	0,0	464,6	
Varianza	22400,5	0,0	1214579,5	0,0	0,0	10000,0	0,0	215856,0	

GRÁFICO:



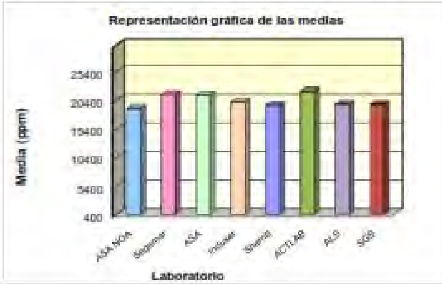
1. Calculo del valor medio y la desviacion standard correspondiente a cada parámetro y cada laboratorio.
En el presente estudio se asume normalidad para cada secuencia de análisis por laboratorio, suponiendo que los métodos empleados están validados.

Laboratorio	Media	Desv std de cada laboratorio	RSD%
ASA NOA	18912	149,7	0,79
Segemar	21414	0,0	0,00
ASA	21291	1102,1	5,18
Induser	20080	0,0	0,00
Sherritt	19500	0,0	0,00
ACTLAB	22000	100,0	0,45
ALS	19700	0,0	0,00
SGS	19648	464,6	2,36

Total de muestras analizadas:	8
Muestras analizadas por laboratorio:	1
Laboratorios participantes:	8

Estadistica Descriptiva (nivel de confianza 95%)	
Promedio de la Media	**20318,2**
Media	20318,2
Mínimo	18912,0
Máximo	22000,0
Rango	3088,0
Suma	162545,4
Mediana	19890,0
Moda	#N/A
Cuenta	8
Coeficiente de Asimetría	0,44
Curtosis	-1,41
S de la Media	**1102,68**
RSD%	5,43
Varianza de la muestra	1215895
Error Estándar	**389,85**

2. Representación gráfica de la media y de la desviación standard por laboratorio :



***3. Estudio de Homogeneidad** - Cálculo de la Incertidumbre*

Datos provenientes de ANOVA del análisis de varios paquetes o "botellas" de muestras de los cuales se sacan muestras y se analizan

LABORATORIO:					
NUMERO DE BOTELLA	**1**	**2**	**3**	**4**	**5**
Concentracion (mg/l)	*22982*	*20164*	*21660*	*20570*	*23378*
	22965	*20113*	*21734*	*21024*	*22965*
Media	***22974***	***20139***	***21697***	***20797***	***23172***
Desviación Standard	***12***	***36***	***52***	***321***	***292***
Varianza	***145***	***1321***	***2694***	***102827***	***85265***

Los valores se presentan por orden de análisis acorde a lo suministrado por cada laboratorio para una mejor apreciación de su comportamiento real :

Análisis de varianza de un factor

RESUMEN

Grupos	*Cuenta*	*Suma*	*Promedio*	*Varianza*
Columna 1	2	45947	22973,5	144,5
Columna 2	2	40277	20139	1321
Columna 3	2	43394	21697	2694
Columna 4	2	41594	20797	102827
Columna 5	2	46343	23171,5	85264,5

ANÁLISIS DE VARIANZA

Origen de las variaciones	*uma de cuadrad*	*Grados de libertad*	*edio de los cuadr*	*F*	*Probabilidad*	*alor crítico para F*
Entre grupos	14049599	4	3512400	91	0	5
Dentro de los grupos	192270	5	38454			
Total	14241869	9				

$$s_L^2 = \frac{CM_{entre} - CM_{dentro}}{n_0}$$

CM_{entre}	14049599	*Promedio de los cuadrados*
CM_{dentro}	192270	
n=nº repeticiones	2	
nº botellas	5,00	

Desviación Standard entre laboratorios **s_L =** 2650,43

Desviación Standard del proceso o repetibilidad **s_r =** 438,49

Incertidumbre combinada entre botellas $u_{bb} = \sqrt{\frac{CM_{dentro}}{n}} \cdot \sqrt[4]{\frac{2}{v_{CMdentro}}}$

v= grado de libertad=nº de análisis totales - 1 9,00

Incertidumbre combinada entre botellas (**U**bb o **U** u(x) = 212,86 mg/l

Este es el módulo correspondiente a la homogenización.

4. Cálculo de la Incertidumbre Expandida

$$U_{MR} = k raiz(uchar^2 + ubb^2 + ults^2 + usts^2)$$

Incertidumbre expandida (factor de cobertura k=2 **U_{MR} =** 2246,06 mg/l

11,05 %

Suponiendo **U**sts = 0

Conclusion Final:

El valor certificado es **20318 ± 2246 mg/l**

rango de concentración **18072 - 22564**

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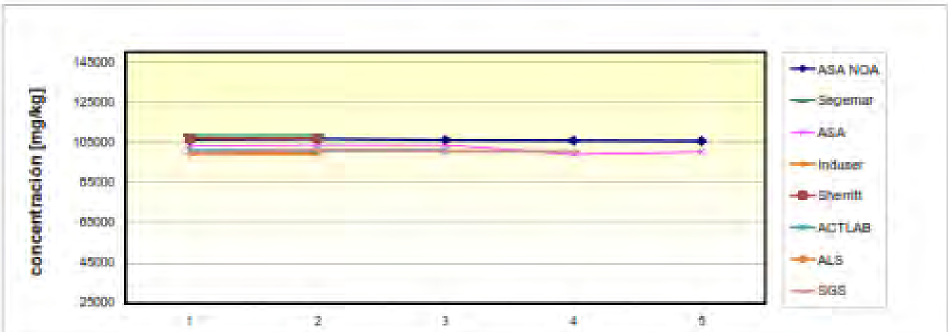
RS-PG.01

Calcio (Ca)

LABORATORIOS:	ASA NOA	Segemar	ASA	Induser	Sherritt	ACTLAB	ALS	SGS	OBSERVACIONES
MÉTODO:	ICP OES	ICP OES	ICP OES	ICP OES	ICP OES	ICP OES	ICP OES	ICP OES	
Concentracion (mg/l)	106314	108623	103349	99200	107000	101000,00		99813,00	
	106749	108623	103658	99200	107000	101000,00		101268,00	
	106166		103722			101000,00		100589,00	
	105893		99091					100557,00	
	105693		100236						
Media	106167	108623	102011	99200	107000	101000	#¡DIV/0!	100557	
Desviación Standard	406,3	0,0	2165,7	0,0	0,0	0,0	#¡DIV/0!	594,4	
Varianza	165112	0,0	4777166	0,0	0,0	0,0	#¡DIV/0!	353360,3	

GRÁFICO:



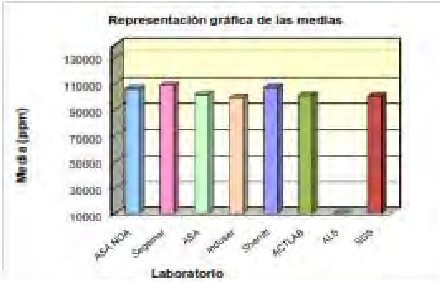
1. Cálculo del valor medio y la desviación standard correspondiente a cada parámetro y cada laboratorio.
En el presente estudio se asume normalidad para cada secuencia de análisis por laboratorio, suponiendo que los métodos empleados están validados.

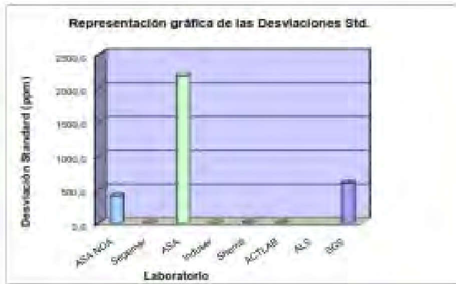
Laboratorio	Media	Desv std de cada laboratorio	RSD%
ASA NOA	106167	406,3	0,38
Segemar	108623	0,0	0,00
ASA	102011	2165,7	2,14
Induser	99200	0,0	0,00
Sherritt	107000	0,0	0,00
ACTLAB	101000	0,0	0,00
ALS			
SGS	100557	594,4	0,59

Estadística Descriptiva (nivel de confianza 95%)	
Promedio de la Media	***103508***
Media	103508
Mínimo	99200
Máximo	108623
Rango	9423
Suma	724558
Mediana	102011
Moda	#N/A
Cuenta	7
Coeficiente de Asimetría	0,33
Curtosis	-1,97
S de la Media	***3679,38***
RSD%	3,55
Varianza de la muestra	13537800
Error Estándar	***1390,67***

Total de muestras analizadas:	8
Muestras analizadas por laboratorio:	1
Laboratorios participantes:	8

***2.** Representación gráfica de la media y de la desviación standard por laboratorio :*





3. Estudio de Homogeneidad - *Cálculo de la Incertidumbre*

Datos provenientes de ANOVA del análisis de varios paquetes o "botellas" de muestras de los cuales se sacan muestras y se analizan

LABORATORIO:					
NUMERO DE BOTELLA	**1**	**2**	**3**	**4**	**5**
Concentracion (mg/l)	103658	102622	90261	103722	99091
	100236	99565	99082	103349	103658
Media	***101947***	***101093***	***94671***	***103536***	***101375***
Desviación Standard	***2420***	***2162***	***6237***	***264***	***3229***
Varianza	***5856305***	***4673236***	***38903256***	***69565***	***10429516***

Los valores se presentan por orden de análisis acorde a lo suministrado por cada laboratorio para una mejor apreciación de su comportamiento real.

Análisis de varianza de un factor

RESUMEN

Grupos	Cuenta	Suma	Promedio	Varianza
Columna 1	2	203894	101947	5856305
Columna 2	2	202187	101093	4673236
Columna 3	2	189342	94671	38903256
Columna 4	2	207071	103536	69565
Columna 5	2	202749	101375	10429516

ANÁLISIS DE VARIANZA

Origen de las variaciones	uma de cuadrad	Grados de libertad	edio de los cuad	F	Probabilidad	/alor crítico para F
Entre grupos	92793959	4	23198497	2	0	5
Dentro de los grupos	59931877	5	11986375			
Total	152725866	9				

$$s_L^2 = \frac{CM_{entre} - CM_{dentro}}{n_0}$$

CM_{entre}	92793959	Promedio de los cuadrados
CM_{dentro}	59931877	
n=nº repeticiones	2	
nº botellas	5,00	

Desviación Standard entre laboratorios $s_L =$ 6811,53

Desviación Standard del proceso o repetibilidad $s_r =$ 7741,57

Incertidumbre combinada entre botellas

$$u_{bb} = \sqrt{\frac{CM_{dentro}}{n}} \cdot \sqrt[4]{\frac{2}{\nu_{CMdentro}}}$$

ν= grado de libertad=nº de análisis totales - 1 9,00

Incertidumbre combinada entre botellas (Ubb o u $u(x) =$ 3756,5 mg/l

Este es el módulo correspondiente a la homogenización.

4. Cálculo de la Incertidumbre Expandida

$$U_{MR} = kraiz(uchar^2 + ubb^2 + ults^2 + usts^2)$$

Incertidumbre expandida (factor de cobertura k=2 $U_{MR} =$ 10519,29 mg/l

10,16 %

Suponiendo Usts = 0

Conclusion Final:

El valor certificado es **103508 ± 10519 mg/l**

rango de concentración **92989 - 114028**

Alex Stewart
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CERTIFICADO DE ANALISIS

MATERIAL DE REFERENCIA (MR)

Standard	Código de Análisis
MR Salmuera Liquida	M167800

Elemento	Valor Certificado [mg/l]	Incertidumbre Expandida [mg/l]
Litio (Li)	799.8	± 63
Potasio (K)	7711	± 880
Calcio (Ca)	37956	± 1.489

Método de Análisis

Inductively Coupled Plasma (ICP) (Li, K, Ca)

Compañía: LIEX S.A.
Solicitante: Waldo Perez

Información adicional

El valor certificado fue obtenido a partir de los resultados de un programa de ensayos de interlaboratorios.
La incertidumbre expandida fue calculada para un nivel de confianza de 95% con un factor de cobertura K=2.

Total de muestras analizadas por determinación:	15	(Homogeneidad: 10)
Muestras analizadas por laboratorio:	5	(10 para ASA para el estudio de Homogeneidad)
Laboratorios participantes:	5	(ASA NOA*, Induser, SGS, Segemar y ASA MAZA*) *nombres simplificados

Origen del material: salmuera liquida
Destino del MR: salmuera liquida para ser utilizado para interlaboratorio

Homogeneidad: se efectuó sobre 5 botellas seleccionados aleatoriamente y por duplicado

Almacenamiento: mantener en envase bien cerrado a temperatura ambiente y libre de humedad.
Forma de empleo: se recomienda homogeneizar el material con agitación antes de usar.
Nota de seguridad: tomar las precauciones normales de trabajo para este tipo de material

El presente material fue evaluado bajo los lineamientos de la norma ISO GUIDE 35:2006E.

Brom. Lorena Llanos	Lic. Rubén Walter Cairo	23 de setiembre de 2016
Supervisora de Calidad	*Gerente del Departamento Calidad*	*Fecha de emisión*

Para cualquier otra información comunicarse con: atencion.cliente.mza@alexstewart.com.ar

Litio (Li)

LABORATORIOS:	ASA NOA	Segemar	ASA	Induser	SGS
MÉTODO:	ICP OES	ICP OES	ICP OES	ICP OES	ICP OES
Concentracion (mg/l)	745.00	770.00	829.73		829.00
			808.00		839.00
			792.00		
			775.00		
			810.21		
Media	770	770	803		834
Desviación Standard			20.6		7.1
Varianza			424.2		50.0

OBSERVACIONES
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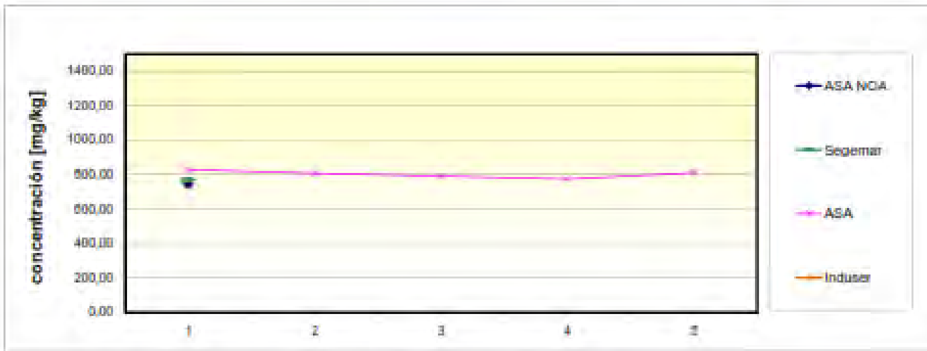
GRÁFICO:



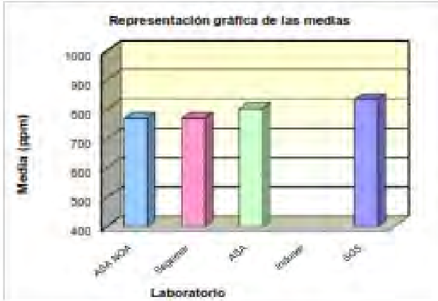
1. Cálculo del valor medio y la desviación standard correspondiente a cada parámetro y cada laboratorio.
En el presente estudio se asume normalidad para cada secuencia de análisis por laboratorio, suponiendo que los métodos empleados están validados.

Laboratorio	Media	Desv std de cada laboratorio	RSD%
ASA NOA	770		
Segemar	770		
ASA	803	20.6	2.56
Induser			
SGS	834	7.1	0.85

Estadística Descriptiva (nivel de confianza 95%)	
Promedio de la Media	**794.25**
Media	794.25
Mínimo	770.00
Máximo	834.00
Rango	64.00
Suma	3176.99
Mediana	786.49
Moda	770.00
Cuenta	4
Coeficiente de Asimetría	0.80
Curtosis	-1.56
S de la Media	**30.73**
RSD%	3.87
Varianza de la muestra	944.16
Error Estandar	**15.36**

Total de muestras analizadas:	9
Muestras analizadas por laboratorio:	1
Laboratorios participantes:	4

2. *Representación gráfica de la media y de la desviación standard por laboratorio :*



3. Estudio de Homogeneidad - Cálculo de la *Incertidumbre*

Datos provenientes de ANOVA del análisis de varios paquetes o "botellas" de muestras de los cuales se sacan muestras y se analizan

LABORATORIO:					
NUMERO DE BOTELLA	*1*	*2*	*3*	*4*	*5*
Concentracion (mg/l)	829.73	808.00	792.00	775.00	810.21
	802.93	822.77	810.43	798.84	820.33
Media	***816.33***	***815.39***	***801.21***	***786.92***	***815.27***
Desviación Standard	***18.95***	***10.44***	***13.03***	***16.86***	***7.16***
Varianza	***359.1***	***109.1***	***169.8***	***284.1***	***51.3***

Los valores se presentan por orden de análisis acorde a lo suministrado por cada laboratorio para una mejor apreciación de su comportamiento real.

Análisis de varianza de un factor

RESUMEN

Grupos	Cuenta	Suma	Promedio	Varianza
Columna 1	2	1632.667679	816.3338395	359.1367519
Columna 2	2	1630.770895	815.3854476	109.0898734
Columna 3	2	1602.428397	801.2141983	169.8026988
Columna 4	2	1573.838496	786.919248	284.1369458
Columna 5	2	1630.542322	815.2711612	51.28313202

ANÁLISIS DE VARIANZA

Origen de las variaciones	ıma de cuadrad	rados de libertad	dio de los cuad	F	Probabilidad	Valor crítico para F
Entre grupos	1325.114864	4	331.278716	1.701566072	0.284940539	5.192167773
Dentro de los grupos	973.4524018	5	194.6904804			
Total	2298.567266	9				

$$s_L^2 = \frac{CM_{entre} - CM_{dentro}}{n_0}$$

CM_{entre}	331.3	Promedio de los cuadrados
CM_{dentro}	194.7	
n=n° repeticiones	2	
n° botellas	5.00	

Desviación Standard entre laboratorios $s_L =$ 12.67

Desviación Standard del proceso o repetibilidad $s_r =$ 13.95

Incertidumbre combinada entre botellas $$u_{bb} = \sqrt{\frac{CM_{dentro}}{n}} \cdot \sqrt[4]{\frac{2}{v_{CMdentro}}}$$

v= grado de libertad=n° de análisis totales - 1 | 9.00

Incertidumbre combinada entre botellas (Ubb o u(x) = 6.774 mg/l

Este es el módulo correspondiente a la homogenización.

4. Cálculo de la Incertidumbre Expandida

$$U_{MR} = k\,raiz(uchar^2 + ubb^2 + ults^2 + usts^2)$$

Incertidumbre expandida (factor de cobertura k= $U_{MR} =$ 62.93 mg/l

7.92 %

Suponiendo Usts = 0

Conclusion Final:

El valor certificado es **794.2 ± 62.9 mg/l** rango de concentración **731.32 - 857.18**

Potasio (K)

LABORATORIOS:	ASA NOA	Segemar	ASA	Induser	SGS
MÉTODO:	ICP OES	ICP OES	ICP OES	ICP OES	ICP OES
Concentracion (mg/l)	7047	7338	8200	8020	7470
			8060		7370
			7984		
			7966		
			7965		
Media	7047	7338	8035	8020	7420
Desviación Standard			100.2		70.7
Varianza			10041.2		5000.0

OBSERVACIONES
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GRÁFICO:

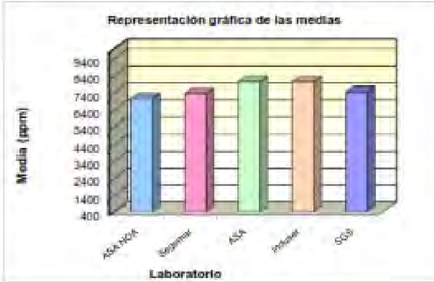
1. Cálculo del valor medio y la desviación standard correspondiente a cada parámetro y cada laboratorio.
En el presente estudio se asume normalidad para cada secuencia de análisis por laboratorio, suponiendo que los métodos empleados están validados.

Laboratorio	Media	Desv std de cada laboratorio	RSD%
ASA NOA	7047		
Segemar	7338		
ASA	8035	100.2	1.25
Induser	8020		
SGS	7420	70.7	0.95

Estadística Descriptiva (nivel de confianza 95%)	
Promedio de la Media	7572.0
Media	7572.0
Mínimo	7047.0
Máximo	8034.8
Rango	987.8
Suma	37859.8
Mediana	7420.0
Moda	#N/A
Cuenta	5
Coeficiente de Asimetría	0.14
Curtosis	-2.39
S de la Media	438.29
RSD%	5.79
Varianza de la muestra	192095
Error Estándar	196.01

Total de muestras analizadas:	10
Muestras analizadas por laboratorio:	1
Laboratorios participantes:	5

2. Representación gráfica de la media y de la desviación standard por laboratorio :



3. Estudio de Homogeneidad - *Calculo de la incertidumbre*
Datos provenientes de ANOVA del análisis de varios paquetes o "botellas" de muestras de los cuales se sacan muestras y se analizan

LABORATORIO:					
NUMERO DE BOTELLA	**1**	**2**	**3**	**4**	**5**
Concentracion (mg/l)	*8200.01*	*8059.61*	*7983.74*	*7965.77*	*7964.91*
	8100.03	*8150.38*	*8078.75*	*8078.98*	*8138.06*
Media	***8150.02***	***8104.99***	***8031.24***	***8022.37***	***8051.49***
Desviación Standard	***70.70***	***64.18***	***67.18***	***80.05***	***122.43***
Varianza	***4997.9***	***4119.4***	***4513.6***	***6408.4***	***14989.6***

Los valores se presentan por orden de análisis acorde a lo suministrado por cada laboratorio para una mejor apreciación de su comportamiento real.

Análisis de varianza de un factor

RESUMEN

Grupos	*Cuenta*	*Suma*	*Promedio*	*Varianza*
Columna 1	2	16300.03128	8150.015638	4997.90172
Columna 2	2	16209.98432	8104.99216	4119.409466
Columna 3	2	16062.48755	8031.243777	4513.561687
Columna 4	2	16044.74756	8022.373778	6408.385072
Columna 5	2	16102.97392	8051.486958	14989.56348

ANÁLISIS DE VARIANZA

Origen de las variaciones	*ma de cuadrad*	*Grados de libertad*	*dio de los cuad*	*F*	*Probabilidad*	*Valor crítico para F*
Entre grupos	23439.07288	4	5859.768169	0.836420971	0.55626526	5.192167773
Dentro de los grupos	35028.82143	5	7005.764285			
Total	58467.8941	9				

$$s_L^2 = \frac{CM_{entre} - CM_{dentro}}{n_0}$$

CM_{entre}	5860	*Promedio de los cuadrados*
CM_{dentro}	7000	
n=nº repeticiones	2	
nº botellas	5.00	

Desviación Standard entre laboratorios $s_L =$ 54.13

Desviación Standard del proceso o repetibilidad $s_r =$ 83.70

Incertidumbre combinada entre botellas $u_{bb} = \sqrt{\frac{CM_{dentro}}{n}} \sqrt[4]{\frac{2}{\nu_{CMdentro}}}$ ν= grado de libertad=nº de análisis totales - 1 9.00

Incertidumbre combinada entre botellas (**U**bb o **u(x) =** 40.64 mg/l Este es el módulo correspondiente a la homogenización.

4. Calculo de la incertidumbre Expandida

$$U_{MR} = kraiz(uchar^2 + ubb^2 + ults^2 + usts^2)$$

Incertidumbre expandida (factor de cobertura k= $U_{MR} =$ 880.33 mg/l Suponiendo **U**sts = 0

11.63 %

Conclusion Final:

El valor certificado es **7572 ± 880 mg/l** rango de concentración **6692 - 8452**

Calcio (Ca)

LABORATORIOS:	ASA NOA	Segemar	ASA	Induser	SGS
MÉTODO:	ICP OES	ICP OES	ICP OES	ICP OES	ICP OES
Concentracion (mg/l)	37462	37915	37321	38400	39100
			37764		39400
			37386		
			37880		
			37380		
Media	37915	37915	37546	38400	39250
Desviacion Standard			256.3		212.1
Varianza			65715.2		45000.0

OBSERVACIONES
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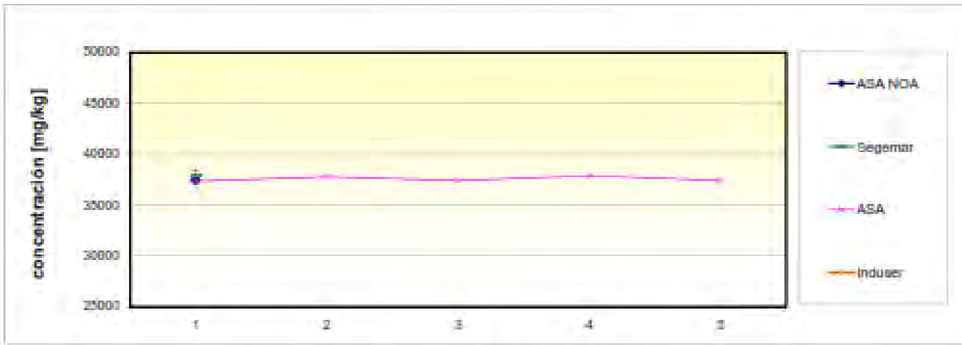

1. Calculo del valor medio y la desviación standard correspondiente a cada parámetro y cada laboratorio.
En el presente estudio se asume normalidad para cada secuencia de análisis por laboratorio, suponiendo que los métodos empleados están validados.

Laboratorio	Media	Desv std de cada laboratorio	RSD%
ASA NOA	37915		
Segemar	37915		
ASA	37546	256.3	0.68
Induser	38400		
SGS	38250	212.1	0.54

Estadística Descriptiva (nivel de confianza 95%)	
Promedio de la Media	38205
Media	38205.24
Mínimo	37546.20
Máximo	39250.00
Rango	1703.80
Suma	191026.20
Mediana	37915.00
Moda	37915.00
Cuenta	5
Coeficiente de Asimetría	1.19
Curtosis	1.30
S de la Media	658.08
RSD%	1.72
Varianza de la muestra	433066.79
Error Estándar	294.30

Total de muestras analizadas:	10
Muestras analizadas por laboratorio:	1
Laboratorios participantes:	5

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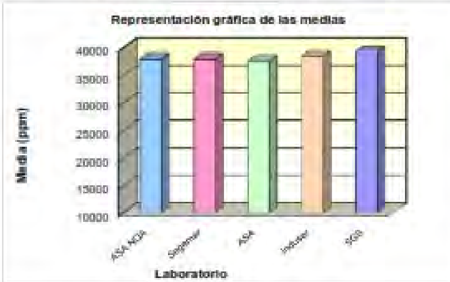
2. *Representación gráfica de la media y de la desviación standard por laboratorio :*



3. Estudio de Homogeneidad - *Calculo de la Incertidumbre*

Datos provenientes de ANOVA del análisis de varios paquetes o "botellas" de muestras de los cuales se sacan muestras y se analizan

LABORATORIO:					
NUMERO DE BOTELLA	1	2	3	4	5
Concentracion (mg/l)	37321	37764	37386	37880	37380
	37491	37076	38851	38878	38609
Media	***37406***	***37420***	***38119***	***38379***	***37995***
Desviacion Standard	***120***	***486***	***1036***	***706***	***869***
Varianza	***14450***	***236672***	***1073113***	***498002***	***755221***

Los valores se presentan por orden de análisis acorde a lo suministrado por cada laboratorio para una mejor apreciación de su comportamiento real

Análisis de varianza de un factor

RESUMEN

Grupos	*Cuenta*	*Suma*	*Promedio*	*Varianza*
Columna 1	2	74812	37406	14450
Columna 2	2	74840	37420	236672
Columna 3	2	76237	38118.5	1073112.5
Columna 4	2	76758	38379	498002
Columna 5	2	75989	37994.5	755220.5

ANALISIS DE VARIANZA

Origen de las variaciones	*ma de cuadrad*	*Grados de libertad*	*edio de los cuad*	*F*	*Probabilidad*	*Valor crítico para F*
Entre grupos	1507849.4	4	376962.35	0.731267971	0.607903529	5.192167773
Dentro de los grupos	2577457	5	515491.4			
Total	4085306.4	9				

$$s_L^2 = \frac{CM_{entre} - CM_{dentro}}{n_2}$$

CM_{entre}	376962	Promedio de los cuadrados
Cm_{dentro}	515491	
n=nº repeticiones	2	
nº botellas	5.00	

Desviación Standard entre laboratorios $s_L =$ 434.14

Desviación Standard del proceso o repetibilidad $s_r =$ 717.98

Incertidumbre combinada entre botellas $u_{bb} = \sqrt{\frac{CM_{dentro}}{n}} \cdot \sqrt[4]{\frac{2}{v_{CMdentro}}}$ v= grado de libertad=nº de análisis totales - 1 9.00

Incertidumbre combinada entre botellas (**Ubb** o $u(x) =$ 348.6 mg/l Este es el módulo correspondiente a la homogenización.

4. Calculo de la Incertidumbre Expandida

$$U_{MR} = k\,raiz(uchar^2 + ubb^2 + ults^2 + usts^2)$$

Incertidumbre expandida (factor de cobertura k=; $U_{MR} =$ 1489.39 mg/l Suponiendo **Usts** = 0

3.90 %

Conclusion Final:

El valor certificado es **38205 ± 1489 mg/l** rango de concentración **36716 - 39695**

GHD

Avda. Americo Vespucio N°100, of. 9, Santiago
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Estado del documento

Rev No.	Autor	Revisor		Aprobado para emisión		
		Nombre	Firma	Nombre	Firma	Fecha
A	O. Alarcón	M. Matus		M. Matus		25/SEP/17
B	O. Alarcón	M. Matus		M. Matus		25/SEP/17
C	K. Merino	M. Matus		M. Matus		19/OCT/17
D	K. Merino	M. Matus		M. Matus		01/DIC/17
E	K. Merino	M. Matus		M. Matus		07/DIC/17
0	K. Merino	M. Matus		R. Robaina		12/DIC/17

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