BANDEIRA LITHIUM PROJECT

NI 43-101 Technical Report Mineral Resource Estimate Update
Araçuaí–Itinga, Minas Gerais, Brazil

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ABBREVIATIONS, ACRONYMS, AND UNITS OF MEASURE

2-D	two-dimensional
3-D	three-dimensional
AACE	American Association Cost Estimation
AAS	atomic absorption spectrometry
ACT	Avaliação de conformidade técnica
ADA	Directly Affected Area
AMG	Advanced Metallurgical Group
ANM	Agência Nacional de Mineração (National Mining Agency)
APP	Área de Preservação Permanente
AvgD	average Euclidean distance to sample
Bandeira	Alvo Bandeira Lithium
BEV	battery-electric vehicles
BRP	room-and-pillar
BSL	sublevel open stope
BWi	Bond ball mill work index
C$	Canadian dollar
CAGR	compound annual growth rate
CAPEX	capital cost
CAR	Cadastro Ambiental Rural
CBL	Companhia Brasileira do Lítio
CEMIG	Centrais Elétricas de Minas Gerais
CETEM	Centro de Tecnologia Mineral
CFEM	Contribuição Financeira para Extração Mineral
CIF	cost, insurance, and freight
CIM	Canadian Institute of Mining, Metallurgy and Petroleum
EIA	Environmental Impact Study and Environmental Impact Report
CONAMA	Conselho Nacional do Meio Ambiente
COPAM	State Council for Environmental Policy

CSS	closed-side setting
CWi	Bond crushing (impact) work index
DDH	diamond drill hole
Definition Standards	CIM Definition Standards for Mineral Resources & Mineral Reserves
DLS	dense-liquid separation
DMS	dense media separation
DSO	direct-shipped ore
EB	Emergency Brigade
EBITDA	earnings before interest, taxes, depreciation, and amortization
EBPP	Eastern Brazilian Pegmatite Province
ESG	environmental, social and governance
ESS	not spelled out
EV	electric vehicle
Falcon Metais	Falcon Metais Ltda.
FED	Floresta Estacional Decidual
FTIR	Fourier-transform infrared spectroscopy
FW	footwall
G&A	general and administration
GE21	GE21 Consultoria Mineral
Guidelines	CIM Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines
HLS	heavy-liquid separation
HSE	Health, Safety, and Environment
HW	hanging wall
ICE	internal-combustion engine
ICMS	Imposto sobre Circulação de Mercadorias e Serviços
ICP-OES	inductively coupled plasma–optical emission spectroscopy
IDW	inverse distance weighting
IEF	Instituto Estadual de Florestas
IFNMG	Instituto Federal de Educação, Ciência e Tecnologia do Norte de Minas Gerais
impact work index	Bond crushing
IP	induced polarization
IP/IT	intermediate-low P and T
IRA	Inflation Reduction Act
IRR	internal rate of return
ITEP	Instituto Educacional Técnico Polivalente
L&M	L&M Advisory
LCE	lithium carbonate equivalent
LCT	lithium–cesium–tantalum
LHD	not spelled out

LI	Licença de Instalação (Implementation License)
LO	Licença de Operação (Operating License)
LOM	life-of-mine
LP	Licença Prévia (Preliminary License)
LP/HT	low-P/high-T
M&I	Measured and Indicated
MGLIT	MGLIT Empreendimentos Ltda.
MME	Ministério de Minas e Energia
MP/MT	medium-pressure and medium-temperature
MRMR	mining rock mass rating
MSO	Mineable Stope Optimization
MTO	materials take-off
NN	nearest neighbour
NPV	net present value
NYF	niobium–yttrium–fluorine
OK	ordinary kriging
OPEX	operating cost
P	pressure
P–T	pressure–temperature
P100	% passing
PAE	Plano de Aproveitamento Econômico
PCA	Plano de Controle Ambiental (Environmental Control Plan)
PEC	Engenharia e Consultoria Ltda
PRA	price reporting agency
PSA	particle-size analysis
PSER	Plan of Safety and Emergency Response
QA/QC	quality assurance and quality control
QP	qualified person
R$	Brazilian Real
RAIPA	Relatório de Avaliação de Impacto ao Patrimônio Arqueológico
RAIPI	Relatório de Avaliação de Impacto ao Patrimônio Imaterial
RCA	Relatório de Controle Ambiental
RES	resistivity
RL	Reserva Legal (Legal Reserve)
RMR	rock mass rating
ROM	run-of-mine
RQD	rock-quality designation
S1	northwest-dipping schistosity
SEM-EDS	scanning electron microscopy–energy-dispersive X-ray spectroscopy

SG&A	general and administrative sales
SGS	SGS Geological Services
SGS	SGS Geosol
SOP	standard operating procedure
SPO	spodumene concentrate
SQUI	spodumene–quartz intergrowth
SRP	spodumene-rich pegmatites
SUDENE	Superintendência do Desenvolvimento do Nordeste
T	temperature
TAH	Taxa Anual por Hectare
TEC	Tarifa Externa Comum
TFRM	Taxa de Controle, Monitoramento e Fiscalização das Atividades de Pesquisa, Lavra, Exploração e Aproveitamento de Recursos Minerários
TIPI	Tabela de incidência do Imposto sobre produtos industrializados
URA	Unidades Regionais de Regularização Ambiental
$	United States dollar
Valitar	Valitar Participações S.A.
WBS	work breakdown structure
WWTP	wastewater treatment plant
XRD	X-ray diffraction
XRT	X-ray transmission

1.0 EXECUTIVE SUMMARY

1.1 Key Facts

This report, titled *Bandeira Lithium Project, National Instrument (NI 43-101) Technical Report Mineral Resource Estimate Update, Araçuaí–Itinga, Minas Gerais, Brazil.* (this Technical Report) updates the Mineral Resource estimate of the previous NI 43-101 dated November 13, 2023. The resource estimate was updated with new exploration data from November 13, 2023, to November 20, 2024.

The financial model and Mineral Reserves have not been updated in light of the Mineral Resource update for the Project. However, the Mineral Resource update does not have a negative impact on or otherwise adversely affect the Mineral Resource inventory that formed the basis of the financial model and Mineral Reserve estimate. The basis for the Mineral Reserve estimates and financial model are the Mineral Resource estimates that were prepared in 2023, which does not include the current Mineral Resource update for the Project. The primary differences between the prior, 2023 Mineral Resource model and the current Mineral Resource model is to include new information obtained from the 2024 drilling campaign and therefore these changes do not have a negative impact on, or otherwise adversely affect, the Mineral Reserves used for the financial model.

1.2 Introduction

The Bandeira Project is a hard-rock spodumene concentrate-producing lithium operation near Araçuaí in the state of Minas Gerais, Brazil. The Project scope is a 1.23 Mt/a underground mining operation supporting a simple crushing and dense-media separation (DMS) concentrator facility. The average life-of-mine (LOM) production is 178 kt/a of 5.5% Li_2O spodumene to be shipped to downstream third-party lithium compound conversion facilities in the global market.

Lithium Ionic is a Canadian-domiciled company and the parent company of the wholly owned subsidiary, MGLIT Empreendimentos Ltda (MGLIT), the Project developer.

MGLIT holds lithium mining rights in the Jequitinhonha Valley in Minas Gerais, and in April 2022 started mineral exploration activities under the Mining Right 832439/2009 called the Bandeira Project. This Project is on a small portion of the total land package LTH holds and does not include resources from other satellite and exploration deposits.

GE21 was contracted to generate the updated Mineral Resource estimate for this Technical Report—all other specifics of the report are unchanged from the NI 43-101 prepared by Horta, de Cerqueira Viana, B. et al. (2024). The Mineral Resource was classified per the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) *CIM Definition Standards for Mineral Resources & Mineral Reserves* (CIM Definition Standards) (CIM, 2014), following *CIM Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines* (CIM, 2019) (CIM Guidelines), geostatistical and classical methods, and economic and mining-appropriate parameters relevant to the deposit type.

MGLIT commissioned SNC-Lavalin (now AtkinsRéalis) to perform engineering and generate the capital cost (CAPEX) estimate for the Bandeira Project feasibility study, with Qualified Persons (QP) in mineral processing, CAPEX development, and infrastructure design.

NeoAgro Ambiental prepared the environmental studies in this Technical Report and the consolidation of the report that was filed for the Project's licensing request with the Minas Gerais Department of Environment.

This Technical Report supports Lithium Ionic in publishing the Bandeira Mineral Resource estimate; studies for the development and mining; processing of the ore; and the economic and financial results calculated for Project implementation.

This Technical Report comprises the results of a study to determine the feasibility of mining spodumene-rich pegmatites. The QPs who signed this Technical Report do not foresee significant aspects or associated risks for the operation of the mine and the industrial processing facility that is the subject of this Technical Report.

The Mineral Resource estimate in this Technical Report is updated for drill data up to November 20, 2024. It supersedes the previous Mineral Resource estimate with an effective date of November 13, 2023. Only the Mineral Resource estimate has been updated.

In accordance with NI 43-101 guidelines, the following QP from AtkinsReális, GE21, and L&M Advisory visited the project on several occasions (Table 1-1).

Table 1-1: List of Qualified Person, Professional Qualifications, and Site Visit Dates

Name of Qualified Person	Designation	Company	Date of Site Visit
Bernardo Horta de Cerqueira Viana	MBA, FAIG	GE21	No site visit
Carlos José Evangelista Silva	M.Sc. AIG	GE21	September 13 and 14, 2023; December 12, 2023; and November 26 and 27, 2024
Ignacy Antoni Lipiec	P.Eng.	AtkinsRéalis	March 13 and 14, 2024
João Augusto Hilário de Souza	B.A.Sc., MBA	L&M Advisory	January 17 to 19, 2024
Porfírio Cabaleiro Rodriguez	B.A.Sc., FAIG	GE21	No site visit
Rubens José de Mendonça	P.Eng., MAusIMM	Planminas	March 13 and 14, 2024

1.3 Reliance on Other Experts

MGLIT contracted Fastmarkets to produce a market analysis for spodumene concentrate and lithium compounds for the next 10 years, which is presented in Sections 19 and 22.

Under the supervision of QP Branca Horta of GE21, NeoAgro Ambiental (2023) produced a report titled *Relatório de Controle Ambiental, Projeto Bandeira, Araçuaí MG, Novembro 2023*, which was filed for environmental licensing. This information, presented in Section 20, supports the Mineral Resource estimate in Section 14, the Mineral Reserve estimate in Section 15, and the economic analysis in Section 22.

QP Bernardo Horta de Cerqueira Viana, with the technical support of Branca Horta de Almeida Abrantes, is responsible for Section 20.

The financial analysis QP, L&M Advisory's João Augusto Hilario Souza, is responsible for the assumptions adopted for taxes and fees used in this Technical Report.

1.4 Property Description and Location

The Bandeira Project, Agência Nacional de Mineração (ANM) Mining Rights No. 832439/2009, 831.116/2016, and 831.117/2016, comprises 174.17 ha in northeast Minas Gerais, near the municipalities of Araçuaí and Itinga, approximately 15 km from Araçuaí and about 620 km from the state capital, Belo Horizonte (Figure 1-1).

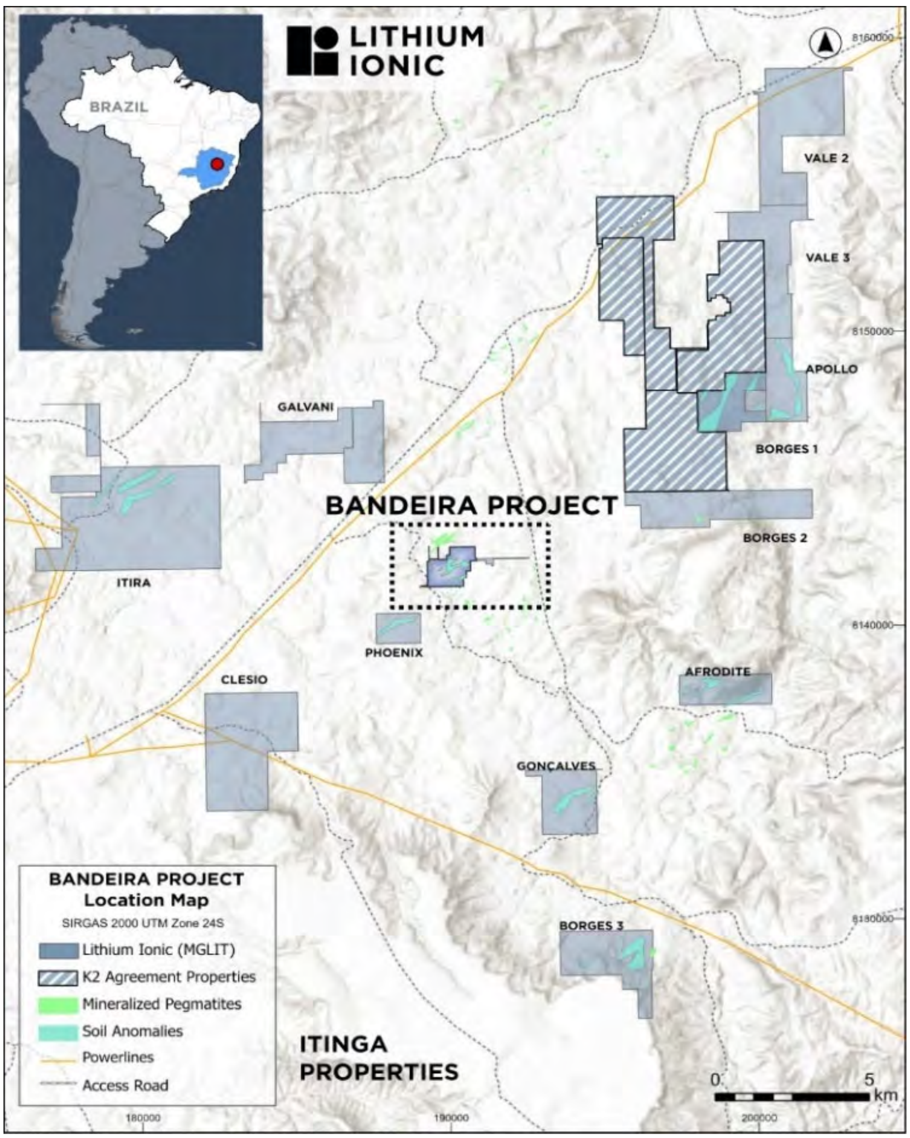


Figure 1-1: Location of the Bandeira Project in the State of Minas Gerais, Brazil

The site is accessed through an established network of paved highways servicing the region. The Piauí River divides the municipalities of Araçuaí and Itinga, and the mineral asset is near the community of Barreiro, near the left bank of this watercourse.

The Project is in a prolific lithium mining and exploration district otherwise known as Brazil's "Lithium Valley." The Project site is on rural land, adjacent to active hard-rock lithium mines operated by Companhia Brasileira de Lítio (CBL) and Sigma Resources.

The spodumene concentrate produced will be exported through the port of Ilhéus in the south of the state of Bahia, to regions with lithium-compound conversion facilities, such as Asia, North America, and Europe.

1.5 Accessibility, Climate, Local Resources, Infrastructure, and Physiography

The Project is easily accessed 3 km from the BR367 Federal highway, which connects the city of Gouveia in Minas Gerais with the city of Porto Seguro in Bahia, passing through the cities of Araçuaí and Itinga. It is an asphalt road that recently received an asphalt cover and is in excellent condition on the stretch between Diamantina and Araçuaí.

Araçuaí is served by a municipal airport with a 1,120 m-long asphalt runway, which is used by small private aircraft. The regional airports with regular flights are Vitória da Conquista, Bahia, 275 km from the Project; Montes Claros, Minas Gerais, 330 km from the Project; and Salinas, Minas Gerais, 120 km from the Project.

The region is characterized by a hot, dry, semi-arid climate. The average temperature is 24.5°C, with an average rainfall of 750 mm. The driest period of the year is June, and the rainiest period is December. There is no harsh cold season. Geological exploration activities can take place year-round, with minor interruptions for a short period of heavy rains. The topography of the region where the Project will be implemented presents hills and valleys with elevation differences of less than 100 m. The Piauí River borders the western side of the operational area. Site administrative facilities will be west of the river, and mining and processing operations will be east of the river. A bridge constructed early in the Project timeline will span the river and provide easy access to the full Project area from the nearby highway.

The site staffing plan comprises a local workforce supported by regional cities and communities. Staff members are to be bussed into site from accommodations in nearby Aracuaí and Itinga. The Araçuaí Campus of the Instituto Federal de Educação, Ciência e Tecnologia do Norte de Minas Gerais (IFNMG) (Federal Institute of Education, Science and Technology of North Minas Gerais) and the Araçuaí Instituto Educacional Técnico Polivalente (ITEP) (Polyvalent Technical Educational Institute) can train technicians in surveying, mining, environment, informatics, and occupational safety. In addition, higher education courses in administration; systems analysis and development; agricultural and environmental engineering; and health management can prepare residents for wok with MGLIT.

A 138 kV Centrais Elétricas de Minas Gerais (CEMIG) (Minas Gerais Power Plants local power utility) transmission line that is supplied by the Irapé hydroelectric plant passes within 3 km of the Project area and will supply 7 MW of low-carbon power to the site. The cities of Araçuaí and Itinga and surrounding region will supply the Bandeira Project with various services, such as food, transportation, logistics, labour, and accommodation.

1.6 History

MGLIT started its activities in November 2021, with seven mining rights in the municipalities of Araçuaí and Itinga, totalling about 1,300 ha. In May 2022, Lithium Ionic was listed on the Toronto Venture Stock Exchange under the symbol LTH-V.

The area to the north of the Bandeira Project has been actively mined by CBL since 1991 using similar underground mining and DMS processing methods. In 2023, Sigma Resources, directly northeast of the Project, began open pit operations and commissioned its Xuxa DMS concentration plant. Several other exploration companies remain active in the Lithium Valley area.

The Bandeira Project area was unexplored until initial drilling began with LTH and MGLIT in 2022. By March 2023, there were sufficient geological data to reasonably support an industrial spodumene-concentration operation. As a result, AtkinsRéalis, an engineering company, was engaged to carry out an economic feasibility study for the Project. In parallel to this, GE21 completed a preliminary economic analysis on an earlier resource statement, published in November 2023.

In June 2023, SGS published an initial NI 43-101-compliant Mineral Resource estimate on the Bandeira Project. Using this information, GE21 published a Mineral Resource update in August 2023. Additional drill data up to November 2023 further added to the geological database, and form the basis used by GE21 to generate the Mineral Resource estimate used in this report.

On April 12, 2024, Lithium Ionic and GE21 published an incremental Mineral Resource estimate update containing Measured and Indicated resources of 23.68 Mt grading 1.34% Li_2O, or 783 kt of Lithium Carbonate Equivalent (LCE)—along with Inferred resources of 18.25 Mt grading 1.37% Li_2O, or 618 kt of LCE. The Mineral Resource estimate presented in this technical report is incremental to the November 2023 technical report, and the April 12 Mineral Resource update.

1.7 Geological Setting and Mineralization

The Bandeira Project lies in the Middle Jequitinhonha River valley, northeastern Minas Gerais—the Lithium Valley. The region is part of the Eastern Brazilian Pegmatite Province (EBPP), one of the largest pegmatite provinces in the world, with about 150,000 km^2 (see synthesis and references in Pedrosa-Soares et al., 2011, 2023). The EBPP resulted from the magmatic and tectono-metamorphic events that formed the Araçuaí Orogen from the Early Ediacaran (ca. 630 Ma) to the Late Cambrian (ca. 490 Ma). The major EBPP pegmatite populations found within the Araçuaí Orogen have been grouped into twelve pegmatite districts that include residual pegmatites (representing late silicate melts released by fractional crystallization of parent granites) or anatectic pegmatites (formed directly from partial melting of country rocks). Among them, the Araçuaí Pegmatite District includes hundreds of residual pegmatites of distinct subclasses, types, and sub-types of the rare-element class (B, Be, Cs, Li, Sn, Ta). They comprise two main groups of rare-element pegmatites:

- The generally thick (up to 100 m), zoned, complex lithium–cesium–tantalum (LCT) pegmatites with several lithium minerals (e.g., elbaite, lepidolite, Li-phosphates, petalite, or spodumene)
- Rare-element minerals (e.g., beryl, Bi-minerals, cassiterite, pollucite, schorlite, Ta-minerals), displaying roughly concentric to irregularly shaped primary zones (marginal, graphic or wall, and intermediate zones, and quartz cores) cut by albite-bearing replacement bodies and fracture fillings with gem-bearing pockets.
- The deposit hosts relatively thinner, non-zoned to poorly zoned, spodumene-rich pegmatites (SRP) with rather simple mineralogical assemblages that include spodumene (up to 35 vol%), albite, perthite, quartz, and muscovite (together forming up to 90 vol%–95 vol%), and accessory minerals, such as cookeite, Li-phosphates, petalite, cassiterite, Nb-Ta oxides, graphite, Fe-Mn oxides, and zabuyelita.

Both LCT pegmatites and SRP bodies commonly show unidirectional solidification textures outlined by minerals (e.g., mica, spodumene, tourmaline) oriented roughly orthogonal to the contacts with the host rocks (or to any other lower-temperature surface inside the pegmatite, such as host rock xenoliths). The rare-element pegmatites of the Araçuaí District are related to granitic intrusions, mostly composed of peraluminous (S-type), sub-alkaline to alkaline, muscovite-bearing leucogranites with pegmatoid cupolas, of the Cambrian (535–500 Ma) post-collisional (post-tectonic) G4 supersuite of the Araçuaí Orogen.

The Itinga Pegmatite Field, in the central part of the Araçuaí Pegmatite District, contains the most important discoveries of lithium deposits in Brazil since the 1950s, both in terms of economic resources and geological potential. As with other lithium-rich pegmatite populations worldwide, the favourable geological conditions for the outstanding abundance of both SRP and LCT pegmatites in the Itinga Field are due to the relatively low-pressure and high-temperature regimes of the regional and contact metamorphisms, recorded in the dominant country rocks (quartz-mica schists with andalusite or cordierite or sillimanite).

The profusion of two-mica granite intrusions with pegmatoid cupolas is emplaced in relatively shallow crustal levels.

The Itinga Pegmatite Field includes the spodumene mines and deposits of CBL and Sigma Lithium, as well as MGLIT´s properties of its Bandeira Project. The lithium ore bodies exploited since the early 1990s in CBL's underground mine display a closely spaced swarm of relatively narrow (6 m thick on average) but long (up to 700 m along strike) non-zoned SRPs. In the Sigma Lithium properties, where several large SRPs are found (e.g., Barreiro, Murial, and Xuxa), an open pit mine is being developed on the Xuxa SRP deposit (15 m thick x 1,800 m long x 500 m). Regardless of their sizes, most pegmatites of the Itinga Field are (sub-)parallel to the prominent northeast–southwest structural trend outlined by the regional ductile foliation (the schistosity S1: NE strike/NW dip) and late-spaced cleavage (S2: NE strike/SE dip). However, flat-lying, or high-angle dip joint systems can also host some lithium-mineralized pegmatites.

Also following the regional northeast–southwest structural trend, the Bandeira deposit comprises northeast-striking swarms of SRPs, including concordant SRP bodies, hosted by the northwest-dipping schistosity (S1), and discordant SRP bodies, emplaced along a southeast-dipping fracture system (the S2 spaced cleavage), as well as a few mineralized pegmatites hosted by late, flat-lying joints. They show sharp contacts with a cordierite–quartz–mica schist that may be enriched in decussate micas, tourmaline, and cordierite porphyroblasts, recrystallized along narrow (cm to dm) fringes of contact metamorphism which may also be anomalous in lithium content. The Bandeira pegmatites are tabular bodies with convex, lens-shaped terminations, arranged in tight and staggered (en-echellon) swarms, locally with branched connections linking ore bodies. Single SRP bodies normally reach hundreds of metres along strike, ranging in thickness from a few decameters to decimeters, with the discordant SRP bodies tending to be thicker than the concordant ones. With known downdip-width up to 800 m, several Bandeira SRP bodies remain open in depth. The Bandeira ore bodies show a rather simple mineralogical assemblage, consisting of medium (3 cm–10 cm) to very coarse-grained (>30 cm) spodumene crystals (up to 30 vol%) within a fine- to medium-grained matrix composed of albite, perthitic microcline, quartz, and muscovite, with generally scarce (<5 vol% in total) accessory (montebrasite, Nb-Sn-Ta oxides) and secondary minerals (cookeite, sericite, zabuyelita, Fe-Mn oxides, clay minerals). Petalite has been found in some drill cores and thin sections, mostly occurring in the SRP matrix as very fine- to fine-grained (sub-millimetre to 1 cm) crystals and, more rarely, in coarse-grained crystals locally found in a few core intervals. The thicker SRP bodies generally show a barren external zone rich in albite (which can be rather discontinuous), followed inwards by an internal zone rich in disseminated spodumene (although spodumene may also be more concentrated in some domains than others along the internal zone). The thinner SRP bodies generally lack the external lithium-barren zone, showing disseminated spodumene along the whole ore body. Unidirectional solidification textures outlined by tabular to telescope-shaped spodumene crystals are common in the Bandeira SRP ore bodies. Thin albite-rich pegmatites, barren to poor in lithium, are also found in the Bandeira SRP swarms. The exploration drilling work revealed two main SRP swarms in the Bandeira deposit: the northern swarm, with thicker and longer SRP bodies; and the southern swarm, with smaller SRP bodies.

1.8 Deposit Types

According to the most-accepted petrologic-metallogenetic classification of pegmatites, published by Cerný (1991) and updated by Cerný and Ercit (2005) and Cerný et al. (2012), all the spodumene-rich pegmatites found within the Bandeira deposit, as well as in the whole Cachoeira Pegmatite Group, belong to the rare element class, Li subclass, and albite-spodumene type.

Although generally included in the Lithium-Cesium-Tantalum (LCT) family, the non- to poorly-zoned spodumene-rich pegmatites (SRP) found in the Bandeira deposit, as well as all the orebodies mined in CBL's Cachoeira Mine since the 1990s, the Xuxa and other spodumene-rich deposits of Sigma Lithium (Sá, 1977; Delboni et al., 2023), and the Outro Lado deposit of Lithium Ionic, are relatively poor both in Ta and Cs when compared with the complex zoned LCT pegmatites.

1.9 Exploration

Since 2022, MGLIT has completed a trench-sampling program, rock-chip sampling programs, structural mapping, and geophysical surveys on the Project property. In all, 44 trenches totalling 2,293 m were completed in 2024 at the Bandeira target.

Some basic field data, such as outcrop attitude (strike and dip), foliation, and cleavage were used to locate several occurrences of spodumene previously unknown or unreported. Since this initial discovery, MGLIT rapidly advanced the Project with diamond drill testing of the targets and the pegmatite system.

1.10 Drilling

All drilling activities conducted within the Bandeira Property until November 20, 2024, have been incorporated into the Mineral Resource estimation process (Table 1-2). It is important to note that any drill holes completed after this date, and pending sample assay results, have not been considered in the present Mineral Resource statement.

Table 1-2: Bandeira Diamond Drill-Hole Summary

Drill Type	Year	Drill Hole Count	Length (m)
DDH	2022	49	5,570
	2023	207	46,642
	2024	41	8,089
	Total	297	60,301

1.11 Sample Preparation, Analysis, and Security

Sample intervals in the mineralized zones are defined based on a 1.0 m support. Mineralized samples must have a minimum length of 1.0 m and a maximum length of 1.5 m. In some specific situations, samples shorter than 1.0 m can be generated.

Drill core samples are prepared and analyzed by SGS Geosol, an independent commercial laboratory. The SGS Geosol facility is certified in ISO 9001, ISO 14001, and ISO 17025. The sample shipment was delivered to its Vespasiano facility, in Minas Gerais, via a parcel transport company.

All samples received at SGS Geosol were inventoried and weighed before processing. Samples were dried at 105°C, crushed to 75% passing a 3 mm sieve, homogenized, split (Jones Riffle Splitter), and pulverized (250 g to 300 g of sample) in a steel mill to 95% passing 150 mesh.

Samples are prepared from NQ-diameter drill cores (47.6 mm). The sampling procedures described in this section reflect the current Standard Operational Procedures (SOP) for Lithium Ionic uses.

The sample batch composition includes six Quality Control samples for every 29 regular samples. The Quality Control composition of the batches is described next:

- Coarse (preparation) and fine (analytical) blanks: 5.2% of the batch, or two blanks per batch, one of each type.
- Standards: 5.2% of the batch, or two standards per batch.

- Crushed Duplicates: 2.6% of the batch, or 1 sample per batch.
- Pulverized duplicates: 2.6% of the batch, or 1 sample per batch.

Lithium Ionic has submitted check assay batches for analysis to the ALS Laboratory in Vancouver, British Columbia, Canada. This procedure is used to verify the reliability of the primary laboratory results by cross-checking them with those of a secondary reference laboratory.

The QP finds that the sampling, sample preparation, security, and analytical work carried out by Lithium Ionic, and its contractors are appropriate to support a Mineral Resource estimation study. The quality assurance procedures align with industry best practices, and the quality control results fall within acceptable industry standards, attesting to the reliability of the database information.

1.12 Data Verification

Mr. Carlos José E. Silva, an independent QP for geology exploration and mineral resource estimate, conducted a site visit at the Bandeira Project on September 13 and 14, 2023; December 12, 2023; and November 26 and 27, 2024. Lithium Ionic allowed unlimited access to the Company's facilities during the visits.

All verified procedures related to sampling management, storage, logging, sample preparation, and assay were checked, and they are considered to be within acceptance limits and in compliance with mineral industry practices. The rock-type descriptions fit with the checked mineralization style.

1.13 Mineral Processing and Metallurgical Testing

The coarse mineralization exhibited by the Bandeira deposit allows for a simple processing flowsheet featuring dense-media separation (DMS). No flotation or fines-recovery circuits are included in the process design. The selected flowsheet is consistent with the region and is used at both CBL and Sigma operations. Based on this, a comprehensive testing program was developed to prove that the DMS process would be suitable for ores originating from the Bandeira Project.

Metallurgical samples and composites were prepared to represent the bulk ore body and perform variability studies to ensure geo-metallurgical performance is well understood. A variability study was completed to understand mineralogy and validate the process design criteria. All metallurgical samples were sourced from diamond drill-core samples.

Process characterization benchtop testwork was completed at SGS Geosol in Vespasiano, using heavy-liquid separation (HLS) to determine dense-media separation (DMS) as a viable solution to producing a marketable concentrate. This testwork generated target DMS densities for subsequent rougher and scavenger stage testwork. Initial ore sorting tests were completed using Tomra which demonstrated value in a crushing stage gangue removal process to manage mine dilution.

Follow-up pilot plant operation was completed at Steinert (ore-sorting) and SGS in Belo Horizonte (DMS). This work processed bulk and specific variability samples to determine ideal operating parameters to support generating a 5.5% Li_2O concentrate. The results of this testwork indicated that an overall plant recovery of 68.9% can be achieved with ore-sorting and 2-stage DMS (rougher and scavenger step) to produce 5.5% Li_2O concentrate, with an iron content substantially lower than the target 1% threshold limit in concentrate.

1.14 Mineral Resources Estimate

The updated Mineral Resource estimate contains Measured and Indicated resources of 27.27 Mt grading 1.34% Li_2O, containing 901.0 kt of LCE, along with Inferred Mineral Resources of 18.55 Mt grading 1.34% Li_2O in the Inferred category, or 615.4 kt of LCE (Table 1-3).

Table 1-3: Bandeira Mineral Resource Estimates (Base Case Cut-Off Grade of 0.5 % Li2O)

Deposit/Cut-Off Grade	Category	Resource (Mt)	Grade % Li_2O	Contained LCE (kt)
Bandeira (0.5% cut-off)	Measured	3.36	1.38	115
	Indicated	23.91	1.33	786
	Measured + Indicated	27.27	1.34	901
	Inferred	18.55	1.34	615

Source: GE21 (2025).
Notes:

- The Mineral Resource estimates the effective date is November 20, 2024.
- Carlos J. E. Silva (MAIG #7868) prepared the Mineral Resource estimate using CIM (2014).
- The report meets the Canadian Securities Administrators' NI 43-101 requirements.
- Mineral Resources are not Mineral Reserves and have no economic viability. There is no certainty that any portion of the Mineral Resource will be converted into a Mineral Reserve.
- Figures are rounded to appropriate levels of precision, and discrepancies may occur due to rounding.
- The spodumene pegmatite domains were modelled using composites with Li_2O grades exceeding 0.3%.
- Grade estimation was conducted using OK within Leapfrog Edge 2024.1.3 software.
- The Mineral Resource estimate is confined to the Lithium Ionic Bandeira mining right (ANM) and includes only fresh rock domains.
- The Mineral Resource estimate was restricted by interpreting suitable-grade shells using a 0.5% Li2O cut-off for underground resources.
- Inferred Mineral Resources are conceptual in nature and can only form the basis for economic analyses with further drilling and evaluation.
- The Mineral Resource estimate may be materially affected by environmental, legal, tax, sociopolitical, permitting, title, marketing, and other relevant factors

The Mineral Resource estimate is based on 297 diamond drill holes comprising 60,301 m of drilling completed between April 2022 and November 20, 2024. This update supersedes the November 2023 technical report and April 2024 incremental update.

The resource classification was supported by a grade shell representing the underground mining appliance, reasonable prospect for eventual economic extraction (RPEEE), defined through a restricted wireframe based on a grade shell with a cut-off of 0.5% Li_2O, considering an average feed grade of 1.4% Li_2O for the processing plant.

1.15 Mineral Reserve Estimate

The Mineral Reserve stated in this Technical Report reflects the Mineral Resource estimate with a November 2023 effective date. Table 1-4 shows the Mineral Reserve estimates for the Bandeira Project.

Table 1-4: Bandeira Underground Project Mineral Reserve Estimate, dated February 20, 2024

Category	Mass (dmt)	Grade (diluted) (% Li_2O)	Contained LCE (kt)
Proven	2.30	1.17	66.38
Probable	14.90	1.15	422.66
Total	17.20	1.16	492.15

Notes:

- The Mineral Resource estimate dated November 13, 2023, is the basis for the Mineral Reserve estimate.
- Only the Measured and Indicated Mineral Resources for the Project have been considered as potentially economic for the mining study.
- Conventional sublevel stoping and room-and-pillar mining methods and equipment have been proposed.
- Ore reserve grades are diluted along lithological boundaries and assume a selective mining operation.
- For the sublevel stoping mining method, ore reserve volumes and tonnages assume 90% mine recovery, 14% planned dilution, and 0% operational dilution since the stopes are being cabled.
- For the room-and-pillar mining method ore reserve volumes and tonnages assume 100% mine recovery, 9% of planned dilution and 10% of operational dilution due to over-breaking.
- For the ore from development works, ore reserve volumes and tonnages assume 100% mine recovery, 46% of planned dilution and 10% of operational dilution due to over-breaking.
- Considering all three variations of extraction methods adopted in this Project, the average dilution rate is 17%.
- An original assumed set of optimization parameters was used in the derivation of the current LOM plan, which was issued before the completion of the feasibility study.
- The Mineral Reserve estimate has been reported within an optimized and engineered underground mining project with a total of 3.27 Mt of waste materials originated from the development works, determined assuming a long-term Li_2O price of $1,900/t of concentrate with 5.5% Li_2O content.
- The processing plant is expected to consume at a maximum feed rate of 1.3 Mt/a (dry basis).

1.16 Mining Methods

The mining design of the Bandeira Project encompasses two underground mining methods. Primary mineral bodies or the main ore bodies, representing 16.2 Mt of the deposit, are extracted using a sublevel open-stope method, from bottom up the panel. Simultaneously, the southeast secondary mineral body, comprising 1.0 Mt of ore, will be mined using the room-and-pillar method. The selection of the mining method considers the dip of the ore lenses, with the room-and-pillar portion of the mine being horizontally oriented and the sub-level stope portion being more vertically oriented.

Three geomechanical domains were established through geotechnical characterization based on drill-core samples. This process involved identifying main lithotypes, determining fracture patterns, rock mass rating (RQD) indices, degree of alteration, and spacing of the discontinuities associated with the intervals. The information obtained was sufficient for defining rock resistance properties, supporting geotechnical parameters, and providing the necessary data for the development of mine project work during the feasibility study stage.

The average run-of-mine (ROM) ore production over the LOM is scheduled for 1.23 Mt/a on a dry basis. A gradual increase in ore production will occur over the initial years until reaching the nominal Project capacity in the second year following plant commissioning.

The mine operation schedule will consist of three six-hour shifts per day, with a two-hour interval between shifts for mining ventilation to dissipate blasting gases. The mine will operate 360 days per year, totalling 6,480 hours of planned production per year.

Access to the underground mine of the Bandeira Project will be through two main ramps at the ore body's footwall, with one of them dividing into two supporting the room-and-pillar and sub-level stope portions of the mine.

The optimization process resulted in a diluted ROM mass of 0.97 Mt 1.05% Li_2O for the portion mined by the room-and-pillar method, a mass of 14.27 Mt 1.19% Li_2O for the portion mined by the sublevel open-stope method, and a mass of 1.96 Mt at 0.97% Li_2O for the ore originating from development works.

The mine will be supported with a mechanical ventilation system consisting of fans and exhausts. Clean-air supply to the underground mine will be obtained through the ramps, two air-intake raises, and four exhaust raises.

1.17 Recovery Methods

1.23 Mt/a (average LOM) of ROM containing 1.16% Li_2O from the underground mine will be processed to produce 178 kt/a of concentrate containing 5.5% Li_2O with no penalty elements. The simplified process diagram is shown in Figure 1-2.

ROM will be comminuted through a primary jaw crusher, a secondary cone crusher, followed by classification screens. Two pre-concentration ore-sorters integrated into the crushing circuit will remove non-lithium bearing material from the process prior to DMS processing. As a product of the comminution, classification, and pre-concentration circuits, three flows with different particle-size fractions will be generated: −19.1 +7.5 mm, −7.5 +0.50 mm, and −0.50 mm.

The coarse fraction (−19.1 +7.5 mm) will feed the coarse DMS circuit. The medium fraction (−7.5 +0.50 mm) will feed the medium DMS circuit. Each DMS circuit will consist of protective screens, dense medium cyclones, magnetic separators, degaussing coils, dense-media recovery system, tanks, boxes, pipes, and pumps for handling.

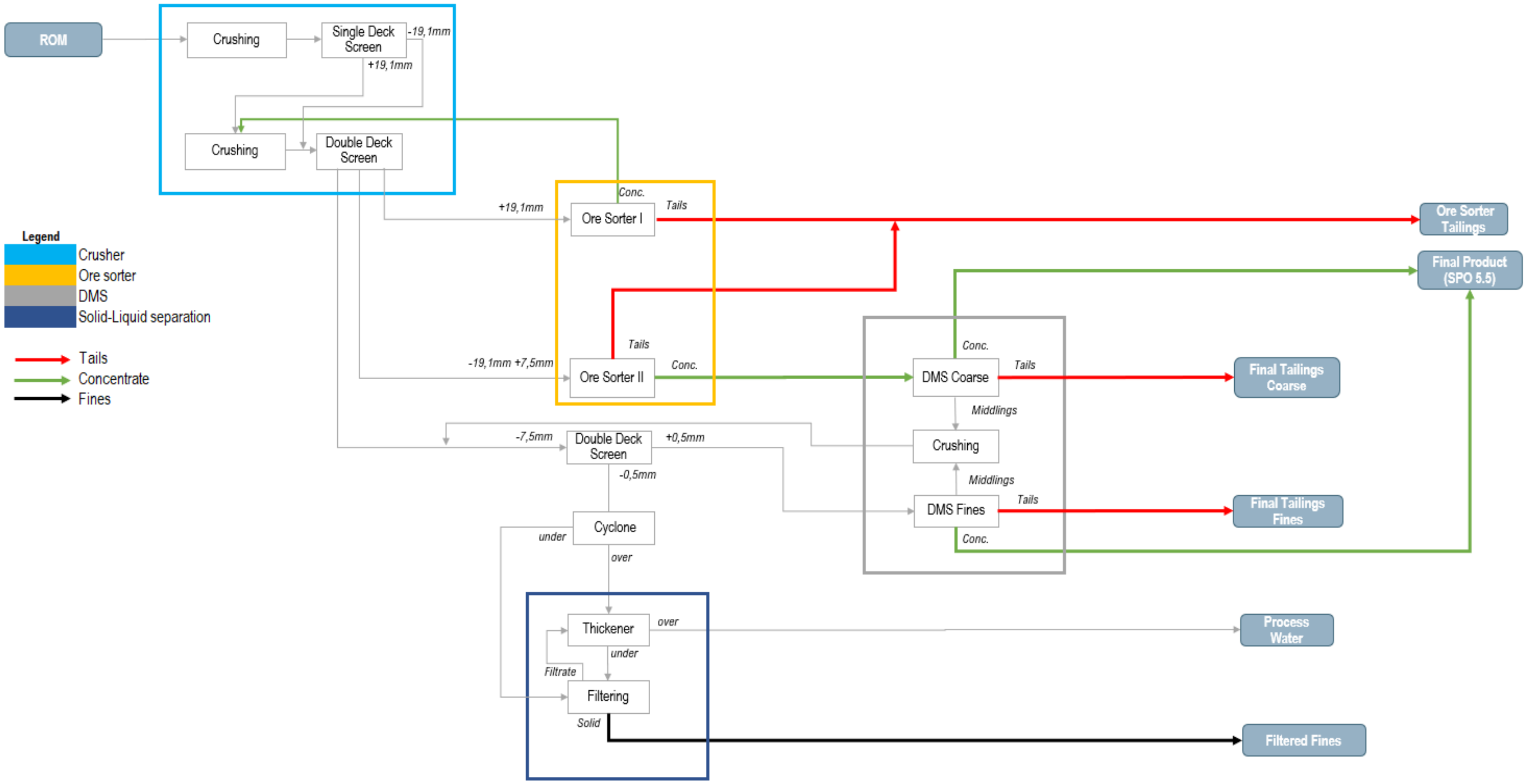


Figure 1-2: Simplified Process Diagram

The fine material (−0.50 mm) will be classified by cyclone when the overflow is dewatered in the thickener, while cyclone underflow is dewatered in a belt filter. The filtered fines will be treated as reject material; however, it will be stockpiled separately for concentration applications to be studied in the future.

Equipment for storing, preparing, and dosing plant consumables are provided to support thickener flocculant and DMS ferrosilicon (FeSi). Crushing, sorting, pre-concentration, thickening, and filtration circuits will have an operating time of 70% of calendar hours. The DMS circuits will have an operating time of 85% of the calendar hours.

1.18 Project Infrastructure

The existing regional infrastructure, with easy highway access, readily available low-carbon power, established road and air transportation, and proximity to ports and logistics hubs, provide a good basis for Project development with minimal off-site CAPEX required.

The on-site infrastructure design features all the requirements necessary for supporting the Project. A full complement of semi-modular office, administration, mess hall, medical, fire, warehousing, and maintenance buildings are provided in the Project CAPEX. The site operating philosophy does not incorporate a camp—employees will be bussed to the site.

The plant will be supported with compressed-air facilities, reagent and consumables storage, and supporting maintenance facilities. The plant construction is a lean design, typical of warm climate operations, using minimal enclosures. Mobile cranes are used in lieu of overhead gantry cranes for routine and shutdown maintenance.

The mine is supported by an explosives magazine, guarded by a security checkpoint. A ventilation system is designed to support the underground operation. Ancillary services are provided, including a mine dispatch and the standard underground mining safety requirements, such as refuge areas. Two portals are at surface to service access to the two underground ramps.

Tailings (DMS rejects and filtered fines) are to be stored in a dry stack, suitable for the very coarse nature of the DMS plant rejects. Since there will be no fine grinding and flotation, a fine-slurry tailings storage facility is not required. Waste stockpiles have been designed in accordance with geotechnical design criteria provided by external consultants.

Fresh or raw water is primarily sourced from the Piauí River, with the Jequitinhonha River an alternative source. Plant process water is reclaimed from thickener and filter operations, and reused as dilution water. Waste dumps and site run-off water is collected via drainage-capture ditches. Potable water and sewage treatment plants are provided and sized to support the on-site workforce. Oil-water separators and effluent treatment are provided to manage mobile equipment wash bays and general maintenance areas.

Site power will be provided by a new 3 km 138 kV transmission line. A new main substation will be built on site to lower the voltage from 138 kV to 13.8 kV. The 13.8 kV will be distributed to the secondary substations in the e-house through overhead distribution networks.

The scope of instrumentation, control, and automation consists of a process control system that enables plant operation. Telecommunications systems will enable the implementation and management of the information technology (IT) services required for the plant and supporting site.

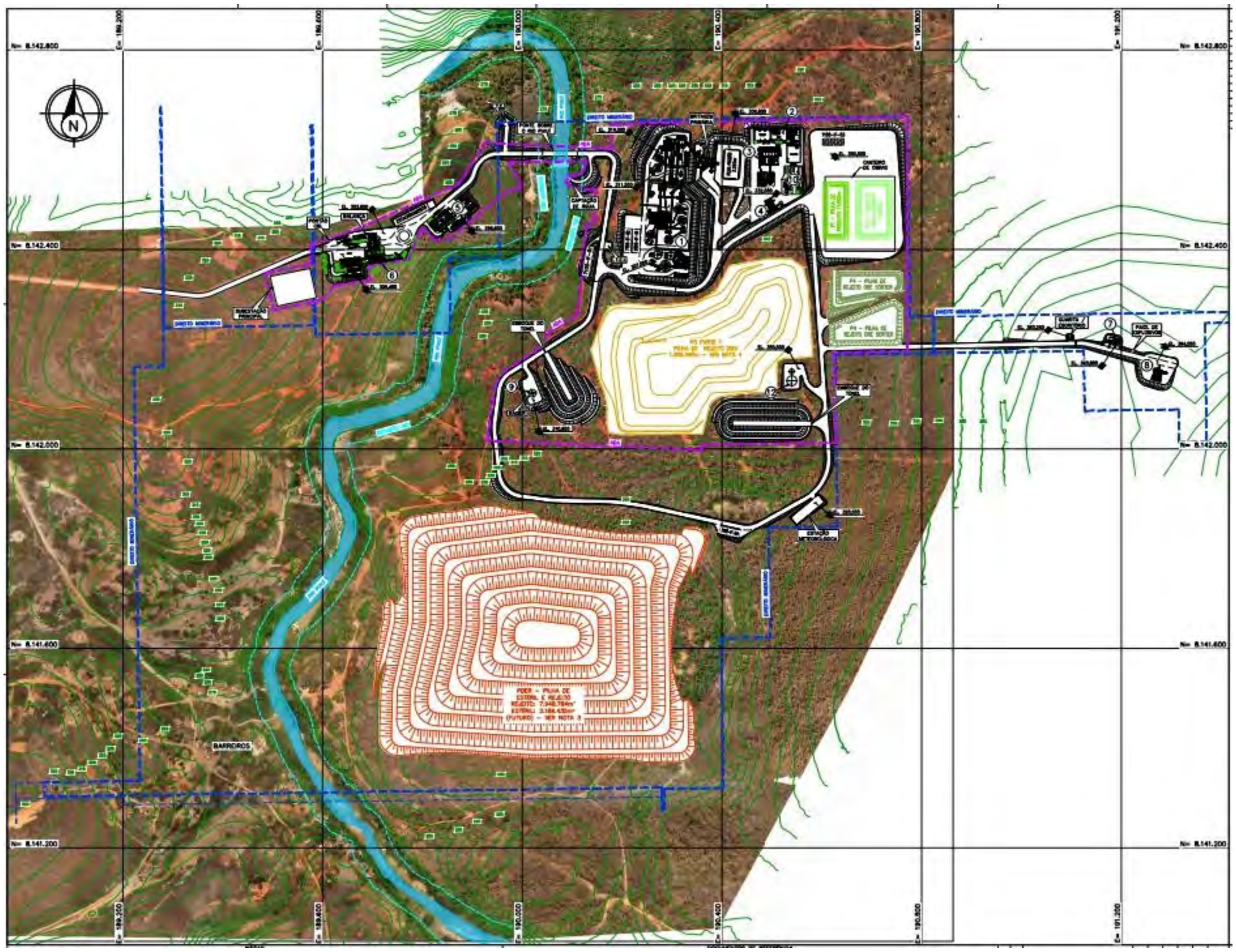


Figure 1-3: Master Plan

Overall, the Bandeira Project infrastructure is meticulously planned to ensure operational efficiency, safety, and environmental responsibility, with a focus on utility systems, administrative support, and waste management strategies.

1.19 Market Studies

Fastmarkets, an international lithium product supply consultancy, was engaged to study the viability of marketing 5.5% Li_2O concentrate and provide a benchmark pricing project to be used in the economic model. Fastmarkets forecasts of lithium and its compounds related to the consumption, supply, and prices of spodumene, carbonate, and lithium hydroxide chemicals (LCE).

Fastmarkets’ macroeconomic outlook, which was updated in April 2024, predicts global economic growth (measured by real GDP, purchase power parity) reaching 2.6% in 2023 before rising to 3.2%

in 2024 and 3.3% in 2025. The expected higher overall global economic growth has the potential to boost consumer demand for batteries, especially for non-EV products such as energy storage systems (ESS) and power tools. This higher demand could pose a positive risk to the demand side.

Fastmarkets forecast demand from battery-electric vehicles (BEV) to increase at a compound annual growth rate (CAGR) of 10% to 1.35 Mt of LCE in 2034 from 498,000 tonnes of LCE in 2024. Demand for lithium-ion batteries from battery-swapping terminals, energy-storage systems, consumer electronics, power tools, and telecoms and data are expected to add an additional 754,000 tonnes of LCE demand by 2034. Lithium-ion batteries are forecast to contribute 97% of total lithium demand by 2030.

Fastmarkets forecasts that hydroxide, carbonate, and spodumene prices will average $18.9/kg, $18.30/kg, and $1,450/t, respectively, between 2024 and 2030.

Fastmarkets still expects ongoing volatility in the global lithium market, driven by restocking and destocking cycles, as well as periods of surplus supply followed by supply disruptions and supply deficits later in the decade. The results of this study are shown in Figure 1-4.

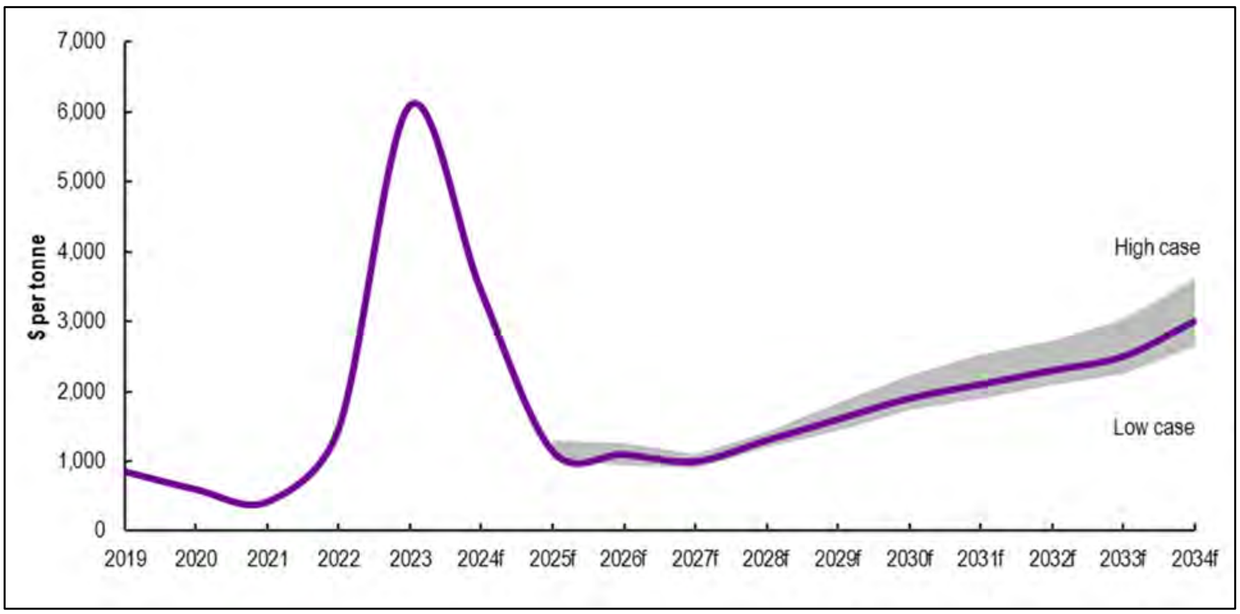


Figure 1-4: Fastmarkets Spodumene 6%Li_2O content, CIF China

1.20 Environmental and Social Impact Studies

MGLIT engaged NeoAgro Ambiental to carry out socio-environmental studies for environmental licensing purposes. The Project includes the development and operation of an underground mine for ore extraction and the construction of a unit for the treatment and concentration of spodumene, a lithium-bearing mineral.

The Concomitant Environmental Licensing process (LAC 2) was adopted and contemplates obtaining the preliminary (LP) and Implementation (LI) licenses at the same time. The documents that are part of the licensing application are the Environmental Control Report (RCA) and the Environmental Control Plan (PCA).

The Directly Affected Area (ADA) of the Bandeira Project is a region in the Atlantic Forest biome, in the Jequitinhonha River Valley in northeast Minas Gerais.

1.20.1 Environmental Licensing

The environmental licensing process in Minas Gerais is carried out in accordance with the normative deliberation of the State Council for Environmental Policy (COPAM) No. 217, signed on December 6, 2017, and published on December 8, 2017. This resolution establishes the criteria for classification, according to size and polluting potential, as well as the locational criteria to be used to define the modalities of environmental licensing of enterprises and activities that use environmental resources in Minas Gerais, and other measures.

The concomitant license process (LAC 2) was filed on November 20, 2023, with the number 2023.07.01.003.0000498, comprising the RCA and the PCA. Grants were also requested for the bridge over the Piauí River under No. 2090.01.0008237/2023-90, and surface water uptake under No. 2090.01.0008240/2023-09.

MGLIT submitted to the environmental agency the Location Statement, in accordance with Article 27 of State Law No. 21,972/2016, which states that the Project does not cause a social impact on Indigenous land, on Quilombola land, on cultural property safeguarded in a municipal environmental protection area, in a conservation unit and its buffer zone, or in any area where there is a need to relocate existing populations.

1.20.2 Authorizations

MGLIT is the current holder of mining right number ANM 832.439/2009, whose permit No. 3785/2014 was published in the Federal Official Gazette on 05/06/2014. The expiration of the research permit was changed from April 28, 2023, to September 30, 2024, by ANM Resolution No. 76/2021, which determined the suspension of material and procedural deadlines due to the state of public calamity resulting from the Covid-19 pandemic. The transfer of the right by full assignment to MGLIT was confirmed by ANM on February 2, 2021.

Within the LAC2 licensing process, a request was made for the granting of water capture in the Piauí River, at a maximum volume of 110 m^3/h, for use in the mine and Project plant. This request is directed to the Institute of Water Management of the State of Minas Gerais (IGAM). The water capture request has already been granted.

1.20.3 Reclamation and Closure

The Conceptual Mine Closure Plan outlines activities aimed at minimizing impacts during the Project's closure phase. Its primary goal is establishing guidelines and corporate criteria for closure activities approved by the ANM and the Minas Gerais Department of Environment and Sustainable Development (SEMAD). These activities ensure technical and financial conditions for mine closure, transitioning to post-closure status and determining future land use. NeoAgro Ambiental's (2023)

Conceptual Mine Closure Plan for the Bandeira Project incorporates final pile configurations with properly sloped sides to ensure the effective execution of the closure strategy. The plan includes a drainage network to control surface water and promote vegetation growth on slope faces. These measures mitigate the visual impact of mining activities and significantly reduce erosive effects.

1.20.4 Community and Government Relations

The Jequitinhonha Valley boasts profound cultural significance for the people of Minas Gerais, renowned for its biodiversity and community dynamics. Moreover, in recent years, the valley has emerged as a significant contributor to the energy transition, with abundant mineral resources such as lithium, cesium, rubidium, tantalum, niobium, rare earth elements, and graphite. This natural wealth holds unique potential to catalyze rapid development within the municipalities, underscoring its pivotal role in regional advancement. The Bandeira Project was designated as a state priority for social and economic development through a memorandum of understanding (MOU) signed on July 17, 2023, by His Excellency Governor Romeu Zema and MGLIT President Mr. Helio Diniz. This agreement grants the Bandeira Project priority status in internal state agency assessments aimed at expediting the licensing process for its implementation.

1.21 Capital and Operating Costs

The CAPEX estimate includes all the direct and indirect costs, along with the appropriate project estimating contingencies for all the facilities required to bring the Project into production, as defined by this feasibility study. The labour rate build-up is based on the statutory laws governing benefits to workers in effect in Brazil at the time of the estimate. Brazilian import tariffs have been applied. The estimate does not include any allowances for scope changes, escalation, and exchange-rate fluctuations.

The CAPEX estimate has the level of accuracy for an AACE Class 3 estimate that is –20% on the low side and +30% on the high side. Contingency is 15% of Project cost before contingency. All costs are in Q2 2024 United States dollars.

Table 1-5: AACE Class 3 Capital Cost Estimate

Area	Cost ($)
Mine	50.5
Plant	102.7
Engineering Services	26.6
General Infrastructure and Others	41.9
Pre-operational	10.8
Contingency (15%)	33.7
Total	266.1

1.21.1 Operational Costs

The operating cost (OPEX) includes the mine, process plant, and general administrative costs (G&A). The LOM overall unit OPEX for the Project is $64.33/t of ore processed (Table 1-6). Royalty payments are not included in OPEX but are included in the Economic Analysis in Section 22. All costs are in Q2 2024 United States dollars ($).

Table 1-6: Operational Costs

Description	ROM ($/t)	SPO ($/t)
Underground Mine	36.70	253.50
Plant and Tailing Handling	24.63	170.01
G&A	3.00	20.70
Total	64.33	444.21

1.22 Economic Analysis

L&M Advisory wrote the economic analysis, and AtkinsRéalis edited it for consistency with the format of the report, but the information and opinions contained herein are L&M Advisory’s. The economic analysis reflects the November 2023 Mineral Resource estimate cut-off and will be updated to November 2024 Mineral Resource estimate at a later date.

L&M Advisory’s work was based on information provided by AtkinsRéalis, and responsible for the mine and processing plant design, production schedule, CAPEX and OPEX for the mine and processing plant, infrastructure, logistics, and the information from the market study and product price forecast for spodumene concentrate (SPO) was provided by Fastmarkets.

The base date of the estimates is Q2 2024, with reference exchange rate 1 USD = 5.07 BRL. No escalation was included in the economic analysis, as the discounted cash-flow model was developed using a real dollar basis. The economic model projections exclude any Project debt financing, but include equipment financing. The Project funding is assumed to be through equity for the purpose of this Technical Report. The economic results are calculated as of the start of the pre-production CAPEX phase at the beginning of Year −2.

Table 1-7 summarizes the key elements of the feasibility study financial analysis for the Project, detailed in Section 22. The Project’s estimated post-tax, unlevered net present value (NPV) is $1,308.8 million using a discount rate of 8.0%. The post-tax, unlevered internal rate of return (IRR) is 40.3%, and the average annual earnings before interest, taxes, depreciation, and amortization (EBITDA) is $304.6 million. The total undiscounted free cash flow generated over the life of the Project is $3,223.4 million, and the payback period after the startup of the operations is 3.4 years (41 months).

Table 1-7: Financial Results Summary

Financial Analysis	Unit	Post-Tax
NPV at 8%	($ M)	1,308.8
Payback[1]	(years)	3.4
IRR	(%)	40.3

Financial Analysis	Unit	Post-Tax
Profitability Ratio	(%)	544.7
EBITDA[2]	($ M)	304.6
Total Cash Flow	($ M)	3,223.4

Notes: [1] Undiscounted, after start-up. [2] Annual average.

Based on the assumptions and parameters used in this Technical Report, the Project is economically viable, given the significantly positive NPV and IRR as compared to the discount rate adopted.

A sensitivity analysis was performed for ±20% variations for SPO concentrate 5.5% Li_2O price, exchange rate, initial CAPEX and OPEX as shown in Figure 1-5 and Table 1-8.

The Project is most sensitive to SPO concentrate 5.5% price followed by exchange rate, initial capital expenditures, and OPEX.

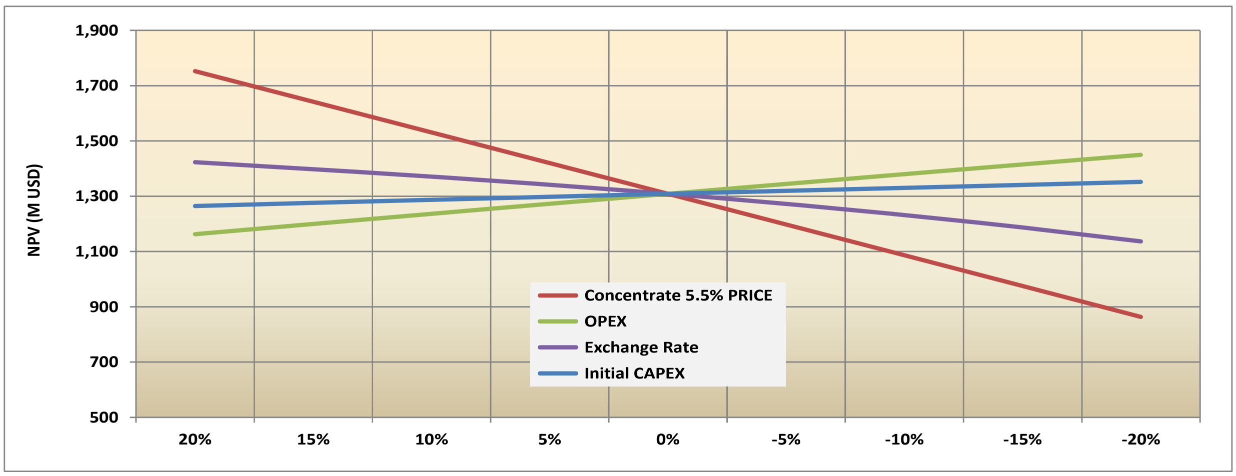


Figure 1-5: Sensitivity for Post-Tax NPV at 8%

Table 1-8: Sensitivity for Post-Tax NPV at 8% ($ M)

Δ (%)	SPO Conc. 5.5% Price	Exchange Rate BRL:USD	Initial CAPEX	OPEX
20	1,752.6	1,422.9	1,265.3	1,163.0
15	1,641.7	1,398.1	1,276.2	1,200.0
10	1,530.8	1,371.1	1,287.0	1,236.5
5	1,419.9	1,341.5	1,297.9	1,272.8
0	1,308.8	1,308.8	1,308.8	1,308.8
−5	1,197.7	1,272.7	1,319.7	1,344.6
−10	1,086.5	1,232.5	1,330.5	1,379.9
−15	975.1	1,187.6	1,341.3	1,415.0
−20	863.7	1,136.8	1,352.1	1,449.9

1.23 Adjacent Properties

The Bandeira deposit is adjacent to the Cachoeira mine, owned by CBL, and the Xuxa mine, Barreiro, Murial, Nezinho do Chicão, and Lavra do Meio deposits, owned by Sigma Lithium Corporation.

1.24 Other Relevant Data and Information

The Araçuaí Pegmatitic District in northeastern Brazil, covering areas in Minas Gerais, is known for its extensive pegmatite occurrences, including those rich in lithium, gemstones, and ceramic minerals. The Bandeira lithium ore deposit is located near the lithium-bearing pegmatites associated with CBL's Cachoeira mine and Sigma Lithium Corporation's Xuxa mine, Barreiro, Murial, Nezinho do Chicão and Lavra do Meio deposits.

1.25 Interpretation and Conclusions

The technical work performed by MGLIT, its consultants, and key experts, has resulted in the following conclusions:

- Mineral Resources were estimated and limited to the areas outlined using CIM Guidelines and the Mining Rights polygon that comprises the Bandeira Property and the Reasonable Prospect for Eventual Economic Extraction—RPE3.
- The Bandeira Project contains 27.27 Mt of 1.34% Li_2O in the Measured and Indicated category, and 18.55 Mt of 1.34% Li_2O in the Inferred category. This Mineral Resource estimate is based on a November 2024 cut-off and supersedes the resource estimates previously published by LTH prior to the effective date of November 20, 2023.
- The Mineral Reserve estimate for the deposit demonstrates 2.30 Mt of 1.17% Li_2O, and 14.90 Mt of 1.15% Li_2O of Proven and Probable reserves on a diluted basis, respectively. This estimate is based on the November 2023 Mineral Resource estimate and requires further work to capture the 2024 resource update presented in this technical report.
- The selected underground mining methods of room-and-pillar and sub-level stoping supports the orientation of the deposit and the ability to produce an average of 1.23 Mt/a of ROM for processing. The geotechnical characteristics of the ore body support these mining methods.
- The selected crushing, ore-sorting, and DMS processing methods are suitable for producing a 5.5% Li_2O spodumene concentrate with no perceived penalty elements at a global recovery of 68.9%. This process is demonstrated by adjacent properties and aligns with the deposit's natural coarse mineralogy.
- The site infrastructure design has all the required components to support the abovementioned operations and respective workforce, and is aligned with typical global mining operations. A primary and backup source of water is readily available.
- The Project CAPEX has been produced at an AACE Class 3 level estimate and encompasses all scope required from start of development in Year −2 through to production. The CAPEX estimate has an appropriate contingency of 15% applied to total Project costs. The CAPEX is estimated at $266 million net of mobile equipment financing. All customary taxes for Brazil and Minas Gerais have been applied.

- The OPEX estimate has been generated using a first principles buildup using inputs from local labour costs, maintenance, power, consumables, and other standard OPEXs. The on-site cost of $444/t is achievable for a low-complexity, coarsely mineralized, spodumene deposit such as the Bandeira Project.
- The Project economics show an NPV of $1.309 million, with a payback of 3.4 years, demonstrating the viability of the Project using an externally generated spodumene concentrate benchmark that accounts for near-term conservative pricing from $917/t in 2026 to $1,742/t in 2029. The low CAPEX to NPV ratio of the Project suggests that the largest Project sensitivity is concentrate pricing. The project economics requires an update to support the November 2024 Mineral Resource and subsequent reserve update.

Lithium Ionic has completed the necessary social and environmental impact studies to build management plans allowing for compliant operation of the Project. The Project area has a low environmental risk, being outside of ecological reserves and areas of environmental sensitivity. MGLIT has actively engaged government agencies and local communities, and has filed the required permit applications to commence construction and commissioning of the Project.

The above statements indicate that the Bandeira Project has completed a sufficient level of technical study to progress to the next phase of Project engineering and development, targeting a near-term operational strategy.

1.26 Recommendations

The following recommendations are suggested for consideration for further Project improvements:

- Optimize the mine plan, Mineral Reserve estimate, and economic model to include the new, 2024 Mineral Resource estimate, and determine the full LOM economics.
- Conduct a dilution study in the mine to determine the optimal block size and confirm the value of diluted content in the model. Analyze operational strategies to support minimizing dilution of ROM from the underground mine.
- Perform additional geotechnical drilling to further strengthen geotechnical assumptions, and study hydrogeological aspects of the deposit.
- Perform metallurgical testwork to find a suitable processing method for generating a 5.5% concentrate from −0.5 mm fines rejected from the processing circuit.
- Optimize the overall Project CAPEX to improve economics. Review planned equipment rental costs against capital leases. Assess plant design and layout opportunities through the consolidation of parallel screening-unit operations, labour-intensive re-handling of middlings, and cut-and-fill optimizations of plant equipment.
- Permit and design the necessary infrastructure to support the Jequitinhonha River water supply as a backup to the Piauí River raw water source.
- Once permits are received, commence engineering and schedule pre-works of a bridge structure over the Piauí River to support site development and construction. With receipt of the LAC permit, follow up with the subsequent submission of the EIA/RIMA to support with permitting of all future site structures.

2.0 INTRODUCTION

This report titled *Bandeira Lithium Project, National Instrument (NI) 43-101 Technical Report Mineral Resource Estimate Update, Araçuaí–Itinga, Minas Gerais, Brazil*, with an effective date of November 20, 2024 (the Technical Report), was prepared for Lithium Ionic with the support of key qualified professionals, as presented in Section 2.2.

This Technical Report supersedes the previous technical report with an effective date of November 13, 2023 (Horta de Cerqueira Viana, B. et al., [2024, July]).

2.1 Terms of Reference

Mineral Resources for the Bandeira Deposit are reported using the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) *CIM Definition Standards for Mineral Resources & Mineral Reserves* (CIM Definition Standards) (CIM, 2014). This Technical Report is based, in whole or in part, on internal reports and references listed in Section 27.

The quality of information, conclusions, and estimates contained here in are consistent with the level of effort based on:

- Information available at the time of preparation
- Data supplied by outside sources
- Assumptions, conditions, and qualifications outlined in this Technical Report.

2.2 Site Visits

In accordance with NI 43-101 guidelines, the following Qualified Persons (QP) from AtkinsRéalis, GE21 Consultoria Mineral (GE21), L&M Assessoria Empresarial S.S. Ltda (L&M Advisory), and Planminas—Projetos e Consultoria em Mineração Ltda (Planminas) visited the Project on several occasions (**Error! Reference source not found.**).

Table 2-1: List of Qualified Person, Professional Designations, and Site Visit Dates

Name of Qualified Person	Designation	Company	Date of Site Visit
Bernardo Horta de Cerqueira Viana	MBA, FAIG	GE21	No site visit
Carlos José Evangelista Silva	M.Sc. AIG	GE21	September 13 and 14, 2023; December 12, 2023; and November 26 and 27, 2024
Ignacy Antoni Lipiec	P.Eng.	AtkinsRéalis	March 13 and 14, 2024
João Augusto Hilário de Souza	B.A.Sc., MBA	L&M Advisory	January 17 to 19, 2024
Porfírio Cabaleiro Rodriguez	B.A.Sc., FAIG	GE21	No site visit
Rubens José de Mendonça	P.Eng., MAusIMM	Planminas	March 13 and 14, 2024

2.3 Araçuaí—Itinga Lithium Province

Bandeira Project is in the Araçuaí Pegmatitic District, northeast of Minas Gerais (Figure 2-1). This important litiniferous district, belonging to the Eastern Pegmatite Province of Brazil, has been known for well over a century for its uninterrupted production of gemstones (e.g., tourmalines, aquamarine, morganite), followed by cassiterite, columbite-tantalite, ceramics, and chemical industries (e.g., muscovite, industrial beryl, potassium feldspar, albite, and lithium minerals). The extraction of lithium minerals in pegmatites began in the 1950s in the Piauí River valley, between the cities of Araçuaí and Itinga. The first lithium minerals extracted were amblygonite and lepidolite, followed by petalite and spodumene from the 1960s. The set of litiniferous pegmatites of the Piauí Valley is part of the Itinga Pegmatite Field, a very special subdivision of the Araçuaí District due to the great abundance of spodumene-rich pegmatites that have been mined by CBL and Sigma Lithium.

Lithium began to arouse great interest in the first decade of this millennium due to its large-scale use in lithium-ion batteries for electric vehicles and solar energy storage. The increase in the supply of lithium concentrates from pegmatite minerals (hard-rock ores) and related chemicals (lithium carbonate and hydroxide) began in Australia in 2008 and continued in Argentina and Chile as a result of the production of lithium brine deposits.

In Brazil, as early as 2011, international companies began to organize themselves in the search for opportunities for mining rights that would contain occurrences of litiniferous pegmatites, focusing on the region that had produced lithium until then. This region is in the northeastern part of the state of Minas Gerais and involves several municipalities, including Araçuaí, Itinga, Coronel Murta, Rubelita, Virgem da Lapa, Salinas. The focus of attention was, therefore, the Araçuaí Pegmatitic District, particularly the Itinga Pegmatitic Field, where spodumene had already been produced at Companhia Brasileira de Litio since 1993 and, previously, at Companhia Arqueana de Minérios e Metais Ltda (now Sigma Lithium). The MGLIT Empreendimentos Ltda (MGLIT) Bandeira orebody is adjacent to these two companies (Figure 2-1).

Figure 2-1: Location of the Bandeira Target in the State of Minas Gerais, Brazil

2.4 Qualified Persons

AtkinsRéalis prepared this technical report with contributions from Lithium Ionic. The QPs who sign the technical sections are shown in Table 2-2.

Table 2-2: Qualified Person Areas of Responsibility

Section	Section Name	Qualified Person	Description of Responsibility	Subsections
1	Executive Summary	All QPs	-	-
2	Introduction	Ignacy Antoni Lipiec	-	-
3	Reliance on Other Experts	Ignacy Antoni Lipiec	-	-
4	Property Description and Location	Carlos José Evangelista Silva	-	-
5	Accessibility, Climate, Local Resources, Infrastructure, and Physiography	Ignacy Antoni Lipiec	-	-
6	History	Carlos José Evangelista Silva	-	-
7	Geology and Mineralization	Carlos José Evangelista Silva	-	-
8	Deposit Types	Carlos José Evangelista Silva	-	-
9	Exploration	Carlos José Evangelista Silva	-	-
10	Drilling	Carlos José Evangelista Silva	-	-
11	Sample Preparation, Analysis and Quality	Carlos José Evangelista Silva	-	-
12	Data Verification	Carlos José Evangelista Silva	-	-
13	Mineral Processing and Metallurgical Testing	Ignacy Antoni Lipiec	-	-
14	Mineral Resource Estimates	Carlos José Evangelista Silva	-	-
15	Mineral Reserves Estimate	Rubens Mendonça	-	-
16	Mining Methods	Rubens Mendonça	-	-
17	Recovery Methods	Ignacy Antoni Lipiec	-	-
18	Project Infrastructure	Ignacy Antoni Lipiec	General infrastructure	All except 18.12 and 18.13
		Porfírio Cabaleiro Rodriguez	Waste rock and tailings disposal	18.14
19	Market Studies and Contracts	Bernardo Horta de Cerqueira Viana	-	-
20	Environmental, Studies, Permitting, and Social or Community Impacts	Bernardo Horta de Cerqueira Viana	-	-
21	Capital and Operating Costs	Ignacy Antoni Lipiec	Plant and infrastructure costs	All except 21.4.2, 21.4.5, 21.4.7, 21.5.7 and 21.5.8
		Rubens Mendonça	Mining costs	21.4 and 21.5 except 21.4.2, 21.4.5, 21.4.7, 21.5.7 and 21.5.8
22	Economy Analysis	João Augusto Hilário	-	-
23	Adjacent Properties	Carlos José Evangelista Silva	-	-
24	Other Relevant Information	Ignacy Antoni Lipiec	-	-
25	Interpretation and Conclusions	All QPs	-	-
26	Recommendations	All QPs	-	-
27	References	N/A	-	-

2.5 Effective Date

This Technical Report's effective date is November 20, 2024.

2.6 Units of Measure and Currency

The units of measurement used in this report conform to the International System of Units (metric system). All currency is United States dollars ($) unless otherwise noted.

3.0 RELIANCE ON OTHER EXPERTS

3.1 Marketing

MGLIT has contracted Fastmarkets to prepare a market analysis for spodumene concentrate and lithium compounds for the next 10 years. This market intelligence document served as the basis for defining the spodumene concentrate price curve for the Bandeira Project and was used in Section 19—Market Studies, and Section 22—Economic Analysis of this Technical Report. The Marketing Report was signed off by Brian Levich, M.A. Fastmarket lithium market expertise.

Qualified Person (QP) João Augusto Hilario de Souza carried out the financial analysis in Section 22, in line with the supply and demand expectations of lithium compounds.

3.2 Environmental Licensing and Studies

NeoAgro Ambiental prepared the Project's environmental licensing, which was reviewed by GE21. Section 20 of this Technical Report describes all components of the environmental licensing and is being used as technical support for the Mineral Resources estimation in Section 14, Mineral Reserves in Section 15, and economic analysis in Section 22.

A report titled *Relatório de Controle Ambiental, Projeto Bandeira, Araçuaí MG, Novembro 2023* (NeoAgro Ambiental, 2023), was filed for the environmental licensing.

3.3 Taxation

The financial analysis QP, L&M Advisory’s (L&M) João Augusto Hilario Souza is responsible for the assumptions adopted for taxes and fees used in this Technical Report. L&M implemented all taxes considered—Financial Compensation for Mineral Exploration (CFEM), Fee for the Control, Monitoring and Inspection of research Mining, Exploration and Utilization of Mining Resources Activities (TFRM), Social Integration Program (PIS), Social Security Financing Contribution (COFINS), Social Contribution on Net Profit (CSLL), and income tax—as well as the investment incentive due to the project for its location in Superintendência do Desenvolvimento do Nordeste (SUDENE) areas. All this information was also used to prepare Section 22.

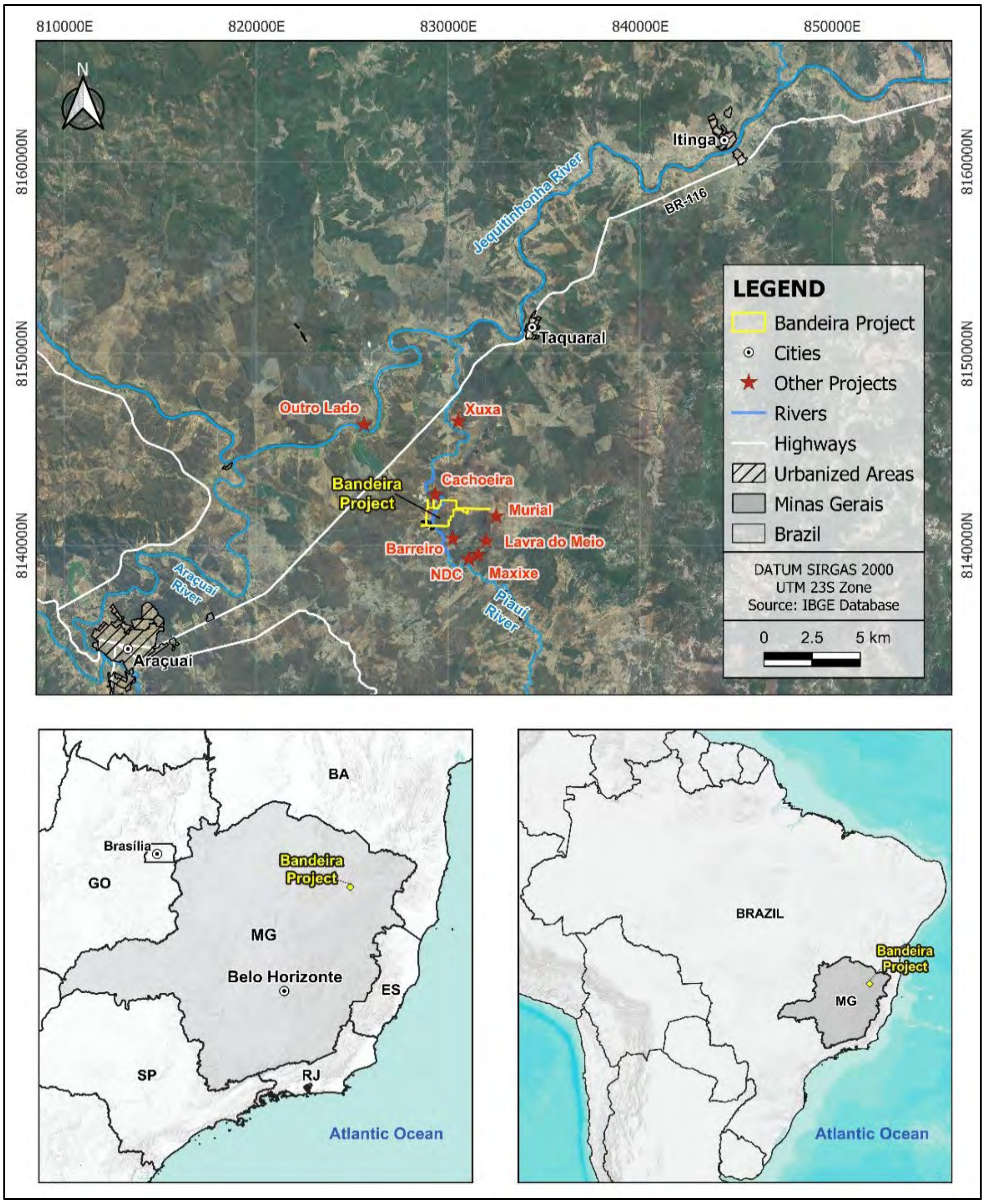
3.4 Mineral Rights

The QPs did not make any assessment of the legal situation of the mining rights of this Project.

William Freire Advogados Associados issued Legal Opinion No. 47/2023—Interested Party: MGLIT Empreendimentos Ltda regarding the mineral right number ANM 832.439/2009, expressing that the mineral rights is active, allowing MGLIT to perform geological research for lithium ore.

4.0 PROPERTY DESCRIPTION AND LOCATION

The Project is in the northeastern region of Minas Gerais State, Brazil, within the Jequitinhonha Valley area, approximately 600 km northeast of Belo Horizonte. It is positioned roughly 75 km south of the town of Salinas (population: approx. 42,000) and about 25 km east of Araçuaí (population: approx. 40,000) (Figure 4-1).



Source: GE21 (2024).

Figure 4-1: Mining Rights of the Bandeira Project

The Bandeira Project is at Latitude 16° 47' S and Longitude 41° 53' W in the SIRGAS 2000 map projection. The SIRGAS 2000 UTM Zone 24S coordinates are 190,117 m E 8,141,940 m N.

4.1 Mineral Rights

The Project consists of three mineral rights currently applicable to mineral exploration research permits covering an area of 174.83 ha (Table 4-1).

Table 4-1: Project Mineral Rights

Claim Number (ANM)	Target Name	Municipality (MG)	Area (ha)
832.439/2009	Bandeira	Araçuaí–Itinga	156.77
831.116/2016	Bandeira Leste	Itinga	15.79
831.117/2016	Bandeira Sul	Araçuaí–Itinga	2.27
Total			174.83

4.2 Brazilian Mineral Exploration and Mine Concession

Under the Brazilian Constitution, all mineral resources on surface or underground are property of the Federal Government. The Brazilian Constitution provides companies with the mining rights to the resources under the mining concessions. Mineral rights come under the jurisdiction of the Federal Government, and mining legislation is enacted at the Federal level. A company applying for mineral rights must be incorporated under Brazilian law, with management and administrative responsibility directly domiciled in Brazil.

Lithium Ionic has ownership and control of MGLIT, its Brazilian subsidiary; MGLIT developed the exploration program, and will implement the mine and concentration plant in Brazil.

4.3 Surface Rights

Lithium Ionic's subsidiary, MGLIT, has a lease agreement with VALITAR Participações Ltda (VALITAR), the properties' landowner. MGLIT is the usufructuary of the properties on which the Bandeira Project will be implemented, thus having the legal rights of possession and enjoyment of these properties, for the purpose of developing its activities in accordance with Brazilian legislation.

4.4 Agreements

Lithium Ionic, through its subsidiary MGLIT, has executed usufruct agreements with VALITAR, securing the access and other corresponding rights to the properties for a minimum of 30 years.

4.5 Royalties

4.5.1 CFEM Royalty

The Brazilian Government is entitled to a compensation royalty (Compensação Financeira pela Exploração de Recursos Minerais [CFEM]), whereby the holder of a mining concession for lithium mineral is legally obligated to pay the Brazilian Government 2.0% of the gross income from sales thereof. The only deductions allowed are taxes levied on commercial sales.

4.5.2 Landowner's Statutory Royalty

According to Brazilian legislation, landowners are entitled to a royalty in connection with the mineral extraction carried out on their respective properties, in an amount equivalent to 50% of the corresponding CFEM Royalty, owed by the holder of the mining concession.

4.5.3 Royalties Agreements

Since the publication of the November 13, 2023, feasibility study published on July 18, 2024, a royalty agreement was reached with Appian Capital Advisory LLP. Funds in the amount of $20 million were secured for a royalty of 2.25% on gross revenue for production on ores originating from the Bandeira Project. This royalty is not reflected in the economics of this Technical Report.

4.6 Environmental Liabilities

All Project activities since the exploration and geological research must comply with federal decree No 99,274/90, which regulates federal law 6,938/81 and establishes the Brazilian Environmental Policy.

The permitting process that encompasses the Preliminary Licensing and Installation was submitted in November 2023.

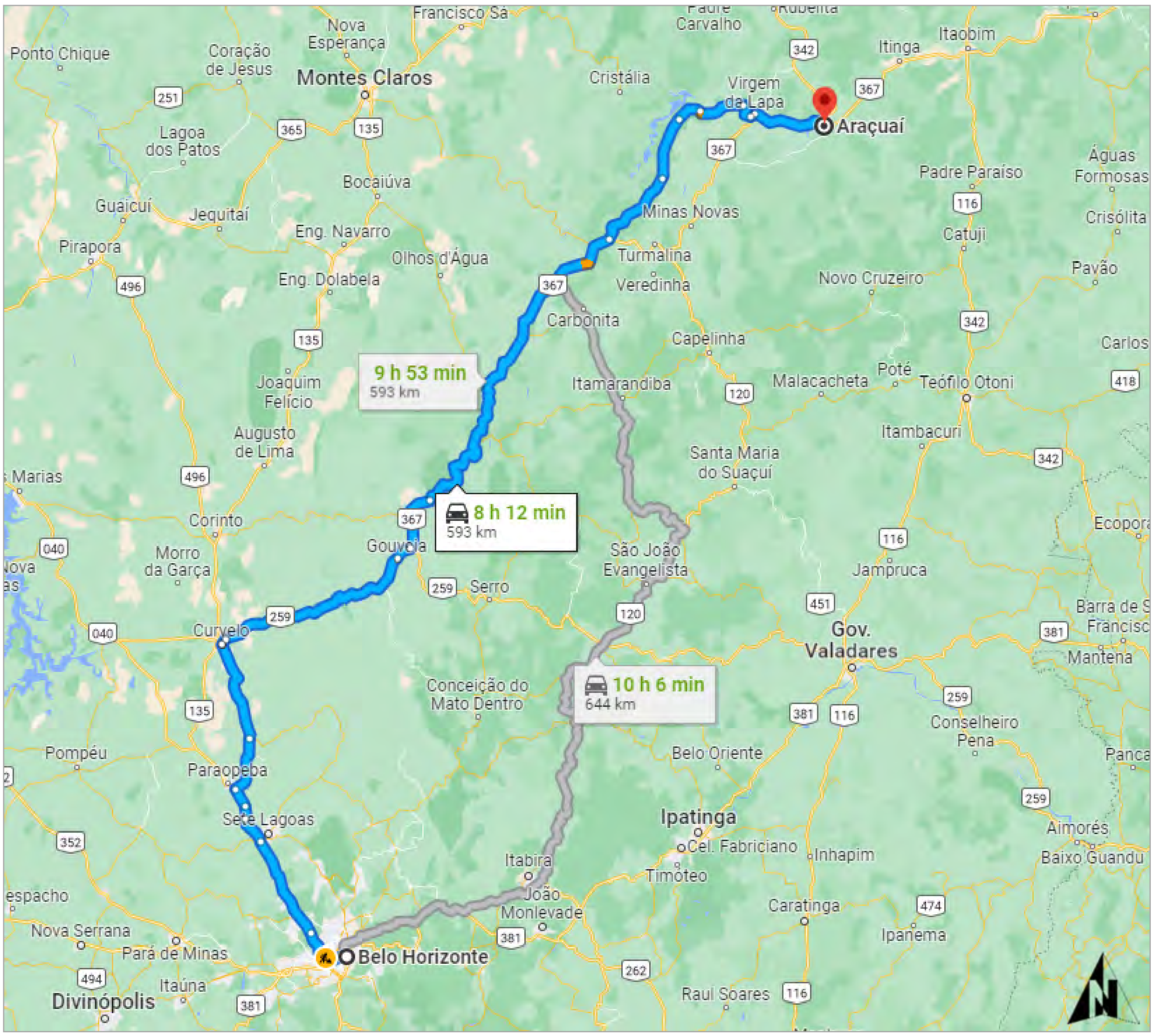
4.7 Qualified Person's Comment

To the extent known, there are no other significant factors and risks that may affect access, title, or the ability to perform work on the Project that not been discussed in this Technical Report.

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

5.1 Accessibility

The Bandeira Project is in northeast Minas Gerais, between the municipalities of Itinga and Araçuaí; approximately 15 km from the city of Araçuaí and 620 km northeast of Belo Horizonte (Figure 5-1).

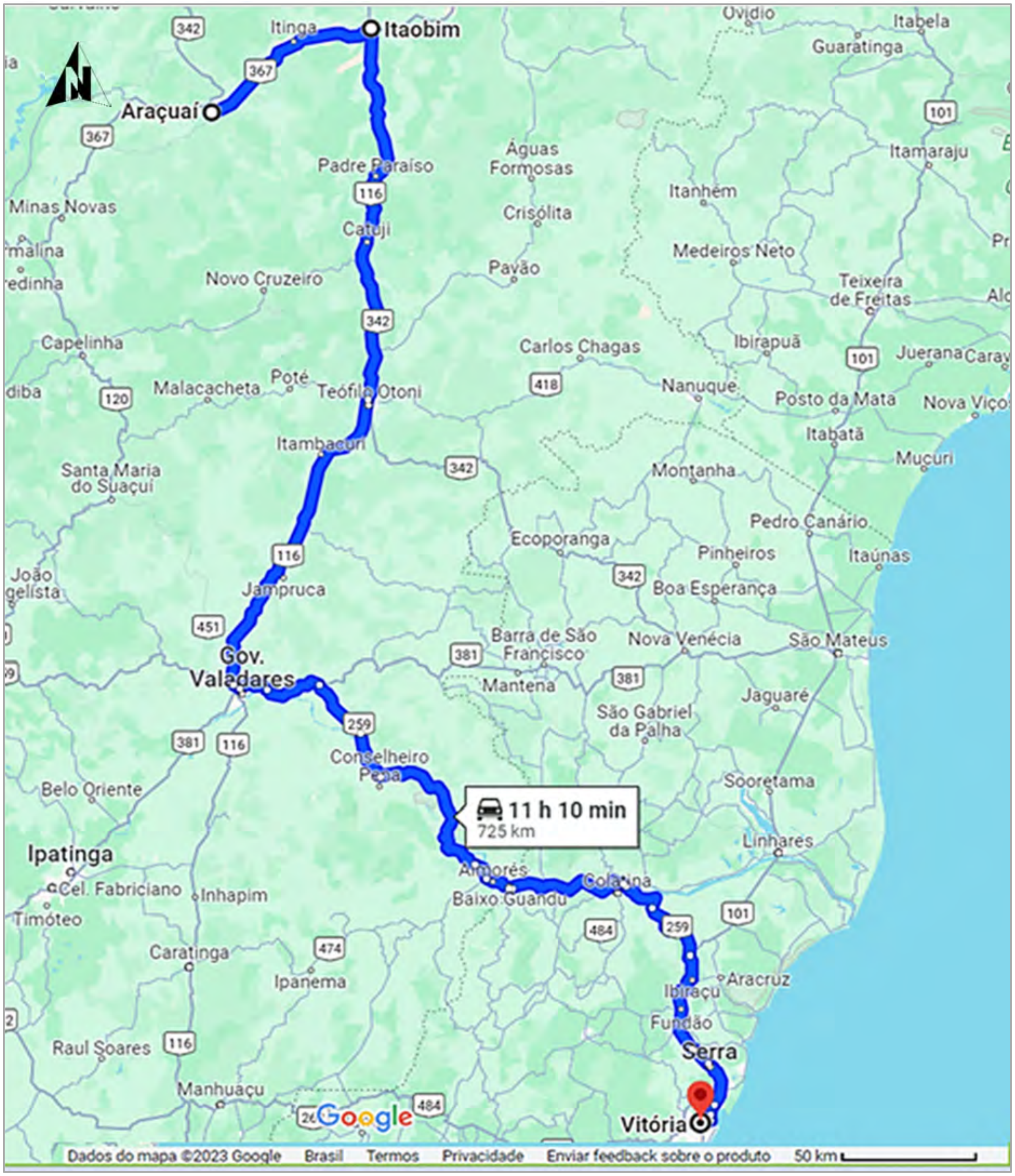


Source: Google Maps (2023).

Figure 5-1: Access from Belo Horizonte to Araçuaí

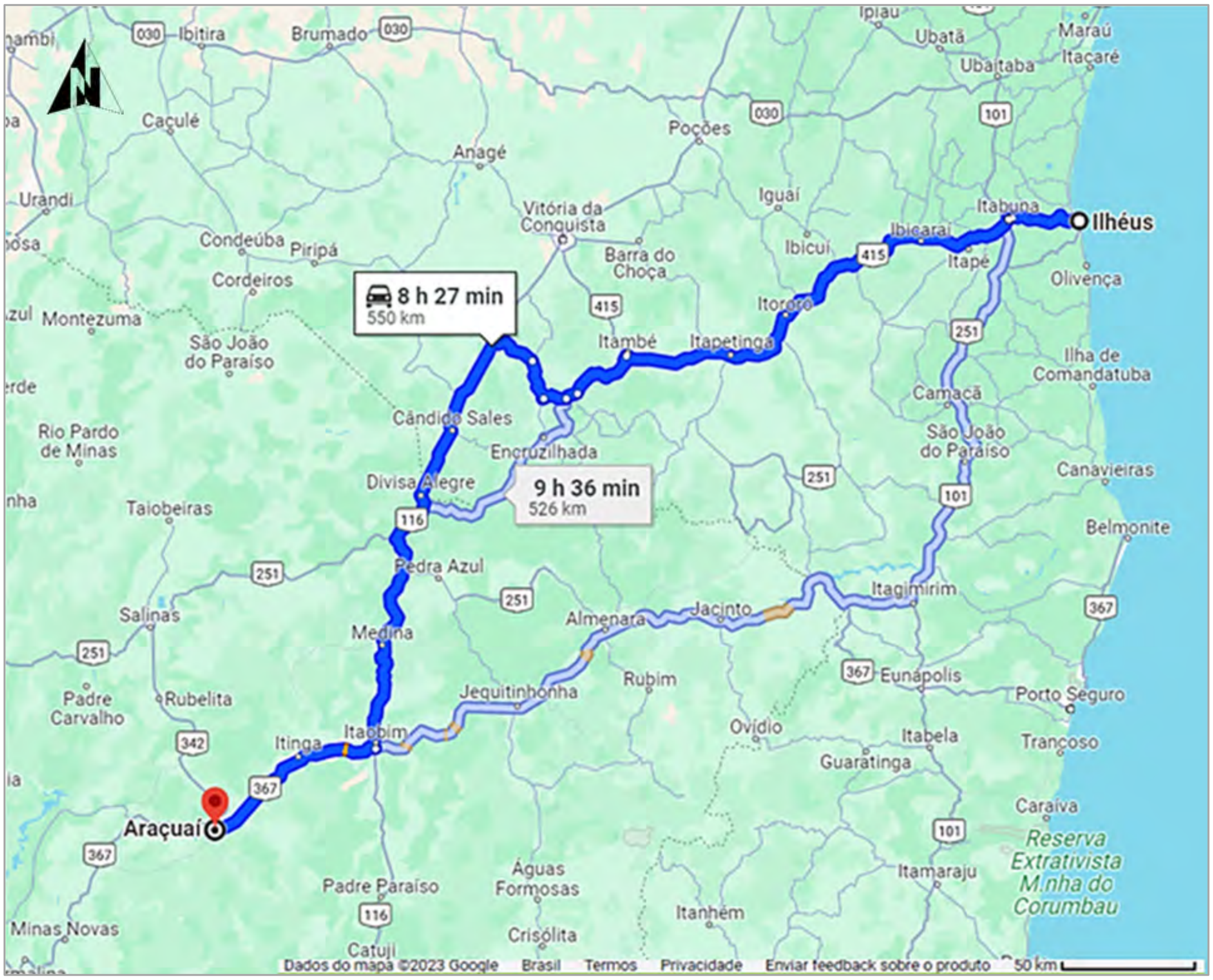
Due to its proximity to the BR-367 national highway, the Project is well-served by a road network. The site is accessible year-round by a good network of highways and airports.

The Project's spodumene production would be exported from the Port of Vitória, in the state of Espírito Santo, 725 km from the Project along federal highways BR-367, BR-116 (or 342), and BR-259. Via federal highways BR-367, BR-116 and BR-415, or BR-367, BR-101 and BR-415, the Port of Ilhéus, which is approximately 550 km from the Project, is another option for exporting the product.



Source: Google Maps (accessed November 22, 2023).

Figure 5-2: Access from Araçuaí to the Port of Vitória



Source: Google Maps (accessed November 22, 2023).

Figure 5-3: Access from Araçuaí to the Port of Ilhéus

5.2 Climate

The region is characterized by a hot, dry, semi-arid climate. The annual average temperature is 24.5°C with an average annual rainfall of 750 mm. The driest period of the year is June, and the wettest period is November. There is no harsh cold season. Exploration and mining activities can take place throughout the year. Detailed weather conditions in Araçuaí are given in Figure 5-4 and Figure 5-5.

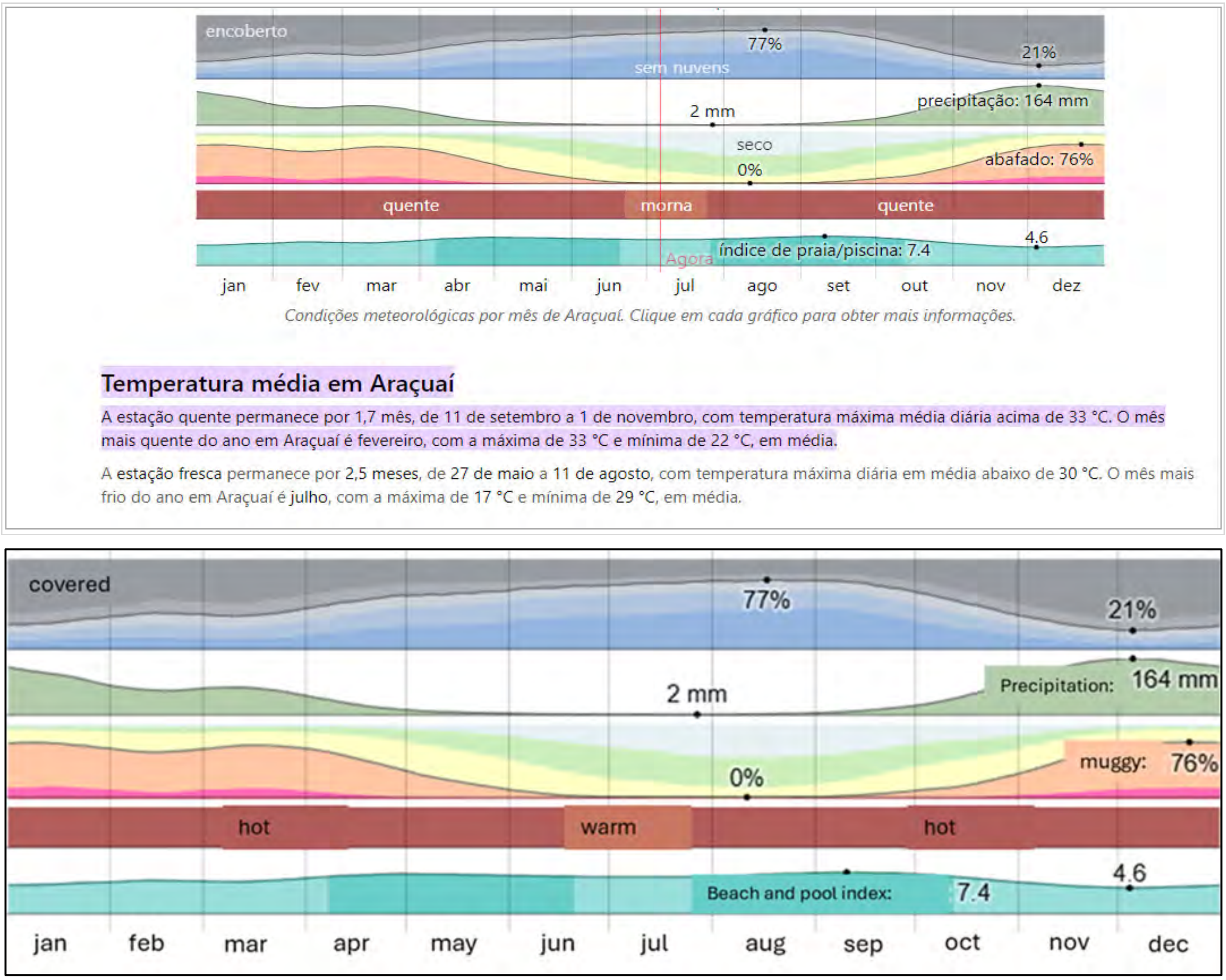
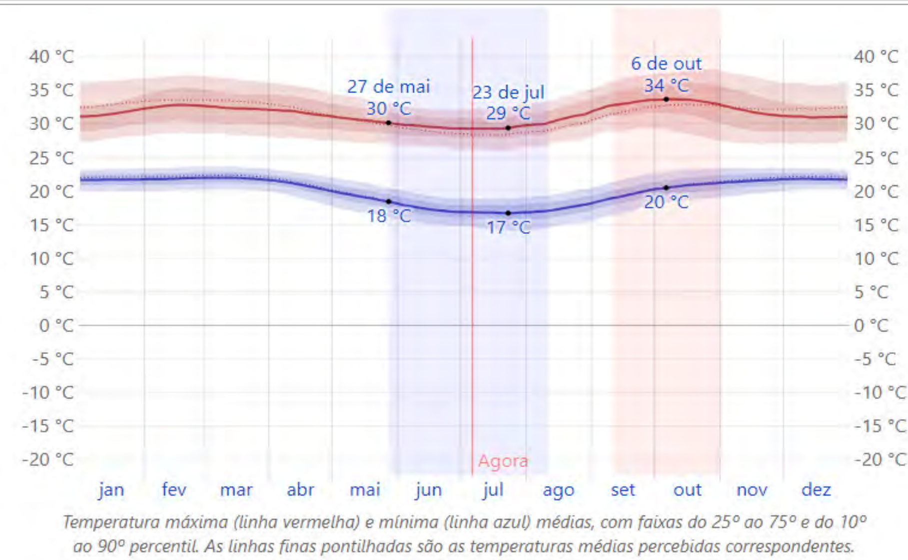
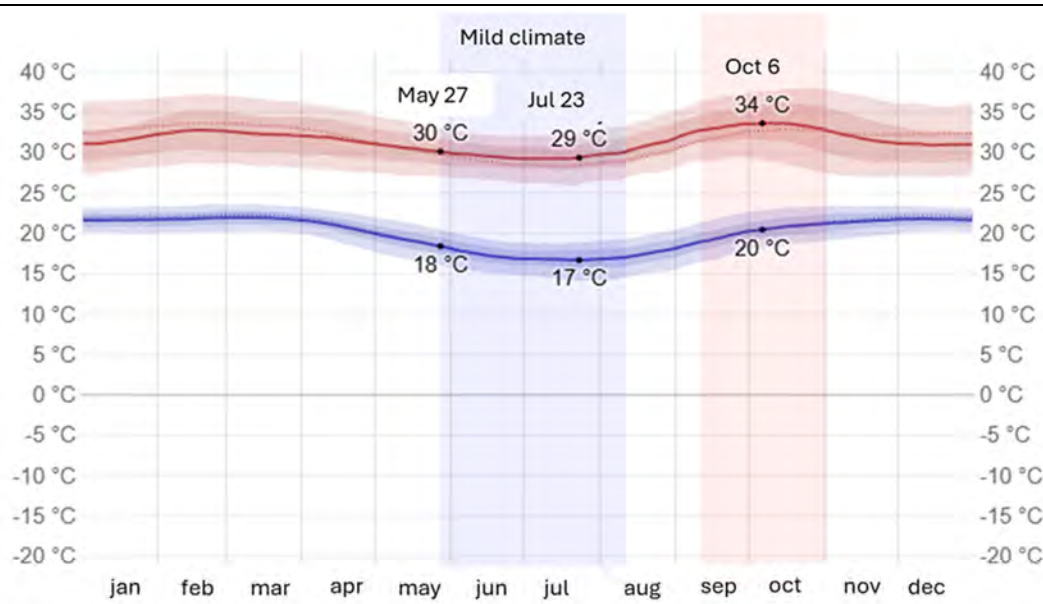


Figure 5-4: Meteorological Conditions in Araçuaí



Média	jan	fev	mar	abr	mai	jun	jul	ago	set	out	nov	dez
Alta	32 °C	33 °C	32 °C	32 °C	30 °C	30 °C	29 °C	31 °C	33 °C	33 °C	32 °C	31 °C
Temp.	26 °C	27 °C	27 °C	26 °C	24 °C	23 °C	22 °C	23 °C	25 °C	27 °C	26 °C	26 °C
Baixa	22 °C	22 °C	22 °C	21 °C	19 °C	17 °C	17 °C	17 °C	19 °C	21 °C	22 °C	22 °C



Average	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec
High	32 °C	33 °C	32 °C	32 °C	30 °C	30 °C	29 °C	31 °C	33 °C	33 °C	32 °C	31 °C
Temp.	26 °C	27 °C	27 °C	26 °C	24 °C	23 °C	22 °C	23 °C	25 °C	27 °C	26 °C	26 °C
Low	22 °C	22 °C	22 °C	21 °C	19 °C	17 °C	17 °C	17 °C	19 °C	21 °C	22 °C	22 °C

Figure 5-5: Maximum and Minimum Temperatures in Araçuaí

5.3 Local Resources and Infrastructure

Itinga and Araçuaí are the large cities nearest to the Bandeira Project, with populations of 14,000 and 40,000 inhabitants, respectively. Araçuaí is served by a small airport and large commercial mobile phone networks.

In 2021, the average monthly wage in Araçuaí was 1.7 times the minimum wage, and the proportion of unemployed persons was 12.5%.

In Araçuaí 38.3% of households have adequate sanitary sewage; 53.6% of urban households face public roads with trees, and 5.3% of urban households are on public roads with culverts, sidewalks, paving, and curbs.

The nearest medium-sized airport with regular commercial flights is Vitória da Conquista (Bahia), about 297 km north of Araçuaí via BR-367 and BR-116. Another medium-sized airport is Montes Claros, 322 km from Araçuaí, accessed via federal highways BR-342 and BR251. The nearest small airport, with regular commercial flights since December 2023, is in Salinas, around 110 km north of Araçuaí via BR-342.

5.4 Physiography

The topography of the Project area comprises low hills, ravines, and wide valleys, whose elevation differences are less than 100 m. The project occupies areas on both banks of the Piauí River, which will provide raw water to meet the demands of the mine, processing, and concentration plants, and mining facilities (Figure 5-6 and Figure 5-7).

Figure 5-6: Aerial View of Bandeira Project Area

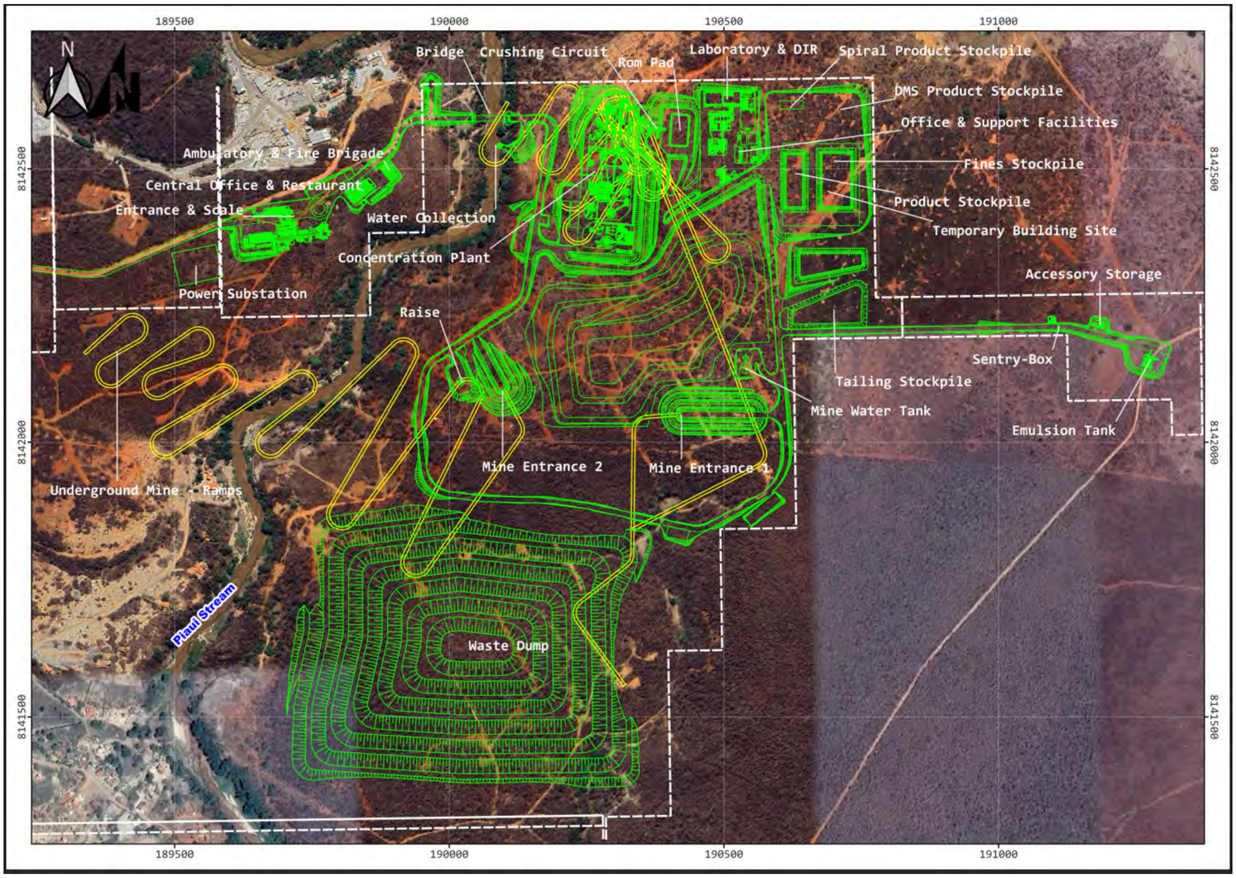


Figure 5-7: Preliminary Master Plan

6.0 HISTORY

6.1 Project History

The Bandeira Project is in a region rich in lithium deposits with other operators present in the area. Prior to 2009, no operation or exploration activity took place in the Bandeira Project area. From 2009 to 2017, Falcon Metais Ltda. (Falcon) performed initial exploration activities; however, any fieldwork was completed during this period. In 2020, MGLIT acquired the mineral rights from Falcon. Since 2022, MGLIT has performed several phases of exploration activities and resource estimate updates has been released in 2023 and 2024.

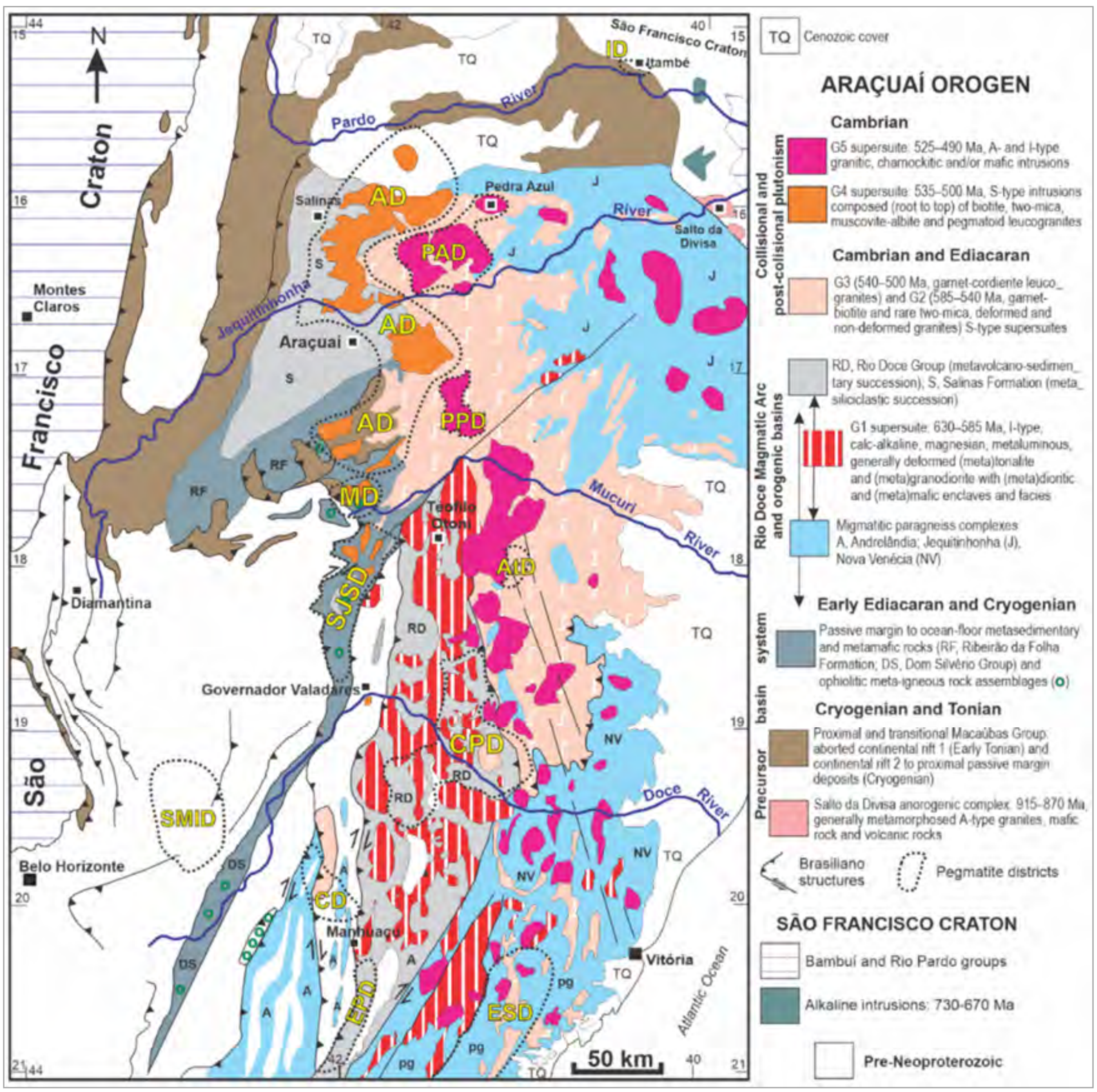
6.2 Production History

This is a greenfield project and there are no production records for this property. There’s no evidence of artisan of small-miners activity in the area. There has not been any commercial production by Lithium Ionic or its subsidiaries from this property.

7.0 GEOLOGY AND MINERALIZATION

7.1 Regional Geology

The Project lies in the Eastern Brazilian Pegmatite Province (EBPP), located in terranes of the Araçuaí Orogen (Figure 7-1 and Figure 7-3). The EBPP, one of the largest pegmatitic populations in the world with c. 150,000 km^2, contains pegmatite districts located in eastern Minas Gerais (c. 90% of the whole province), southeastern Bahia, and Espírito Santo States of Brazil.



Notes: A Simplified geologic map of the Araçuaí Orogen (modified from Pedrosa-Soares et al., 2020), highlighting the granite supersuites and pegmatite districts of the Eastern Brazilian Pegmatite Province (cf. Pedrosa-Soares et al., 2011, 2023): AD, Araçuaí; AtD, Ataléia; CD, Caratinga; CPD, Conselheiro Pena; ESD, Espírito Santo; ID, Itambé; MD, Malacacheta; PAD, Pedra Azul; PPD, Padre Paraíso; SJSD, São José da Safira; SMID, Santa Maria de Itabira. (Figure from Pedrosa-Soares et al., 2023).

Figure 7-1: Simplified Geology of the Araçuaí Orogen

The Eastern Brazilian Pegmatite Province is the most important region in the history of pegmatite studies and the development of lithium deposits in Brazil. Pegmatite gemstones have been officially known in Brazil since the last decades of the 17th century, when the explorer Fernão Dias Paes Leme found green tourmalines, initially mistaken for emeralds, in the region of São José da Safira, a pegmatite district very rich in gem-quality elbaite (Li-bearing tourmaline).

Long after, in the first decades of the 19th century, pioneer naturalists and geologists, such as Eschwege, Spix, Martius, and Saint-Hilaire, described pegmatite gem deposits located in the Jequitinhonha and Doce river valleys. In 1818, Spix and Martius reached the headwaters of the Calhauzinho and Piauí rivers in the Araçuaí region (Figure 7-4), searching for the gemstone's primary sources, particularly chrysoberyl (then called “chrysolite” locally), which was already mined there. They found a “white granite with little mica, but rich in black tourmaline” (i.e., pegmatite).

At that time, spodumene (discovered and named by the Brazilian mineralogist José Bonifácio de Andrada in a volume of the *Journal der Chemie*, 1800) was already called “rotten chrysolite” by pioneer prospectors and gemstone diggers (*garimpeiros* in Brazilian Portuguese) of the Jequitinhonha Valley. In 1866, Charles Hartt described the N45E-trending structure of the mica schists hosting very coarse-grained “granite” veins between Araçuaí and Itinga. In 1882, Costa Sena published the first paper directly referring to spodumene (also called “triphane” at that time) in the Middle Jequitinhonha region, after identifying “andalusite, cymophane (chrysoberyl) and triphane with sharp edges, in sands and gravels from streams of the Piauí river valley” and suggested that the primary deposits would also be located there. In *Compendio dos Mineraes do Brasil*, Luiz Caetano Ferraz (1928) described several spodumene occurrences, among other pegmatite minerals, of the Middle Jequitinhonha Valley.

The importance of pegmatites as economic mineral deposits greatly increased in Brazil from the Second World War, due to the large production of mica, beryl, and quartz to supply the military industry of allied countries, to the end of the Cold War in early 1990s. Just after the Second World War, in 1946, Glaycon de Paiva grouped the largest pegmatitic populations of Brazil into provinces—the first definition of the Eastern Brazilian Pegmatite Province. Since then, more than one thousand pegmatites have been mined there for gemstones, cassiterite, Li and Be ores, Nb-Ta oxides, industrial minerals (K-feldspar, muscovite, albite, quartz), collection and rare minerals, dimension stone, and minerals for esoteric purposes.

Haroldo de Sá's (1977) PhD thesis reported historical milestones in the discoveries and mining of lithium deposits in the Araçuaí-Itinga region:

“The discoveries and production of cassiterite, lepidolite, and amblygonite in pegmatites of the Piauí river valley (e.g., Fumal, Generosa, Jenipapo, and Urubu) by the Estanífera do Brasil and Produco companies dated back to the early 1950s. Although spodumene has been known for a long time by gem diggers (“garimpeiros”), who called it “cambalacho” or “crisólita podre” (i.e., rotten chrysolite in reference to its similarity to chrysoberyl), its commercial production only started at the end of the 1960s at the Cachoeira mine (then owned by Companhia Estanífera do Brasil) to supply the increasing demand of the national market. Petalite, formerly called “escória branca” (white scoria) and very often mistaken for feldspar, was correctly identified at the end of the 1960s and immediately mined for exportation by the Companhia Estanífera do Brasil until 1972, followed by Companhia Arqueana de Minérios e Metais Ltda. Around 1977, this mining company has more than twenty distinct pegmatite bodies producing petalite, spodumene, amblygonite, lepidolite, beryl, cassiterite and columbite-tantalite."

Sá (1977) compiled map, sections, and other data from the archives of the Companhia Arqueana de Minérios e Metais Ltda. and produced the first geochronological data for the local granites and pegmatites (whose similar ages, around 500 Ma, is evidence of a genetic link between them). He also produced the first geochemical data (K, Rb, Cs) for minerals of non-economic value and pegmatites with mineralization of petalite, spodumene, lepidolite and/or pollucite. His spatial interpretation of the distribution and zoning of different Li-rich pegmatites, even with present-day knowledge, remains realistic.

Khalil Afgouni, an outstanding pioneer of lithium mining in Brazil and the owner of Companhia Arqueana de Minérios e Metais Ltda., together with Haroldo de Sá, published a farseeing article titled "Lithium Ore in Brazil" in the prestigious magazine *Energy* in 1978 (vol. 3, pp. 247–253). In the article, they predict that "another new use (for that metal) is in lithium batteries for electric cars and, if this application becomes reality, Brazil will be a big consumer, ranking at the same level as the most developed countries in the world, with the advantage of being one of few countries producing its own raw material." Although this is not yet a full reality, the remarkable increase in lithium ore production in the Jequitinhonha Lithium Valley is a result of the invaluable heritage of Arqueana's discoveries of world-class lithium deposits. CBL (Cachoeira mine) bought the assets in the early 1990s, which Sigma Lithium purchased more recently (Xuxa mine, and other spodumene and petalite deposits such as Barreiro, Maxixe, Murial, and others). That heritage continues to drive new companies to the region, whose exploration efforts have led to the discovery of subsurface spodumene deposits in areas lacking outcrops, such as Lithium Ionic's Bandeira deposit.

Since the early 1980s, the region encompassing the Eastern Brazilian Pegmatite Province (EBPP) has been completely covered by systematic geological mapping (in 1:100,000 scale) and has experienced an outstanding increasing in scientific studies, supported by robust analytical data. That allowed genetic and metallogenetic links between pegmatite populations and the tectono-magmatic events of the regional geological evolution to be established. In fact, the EBPP is the result of the magmatic and tectono-metamorphic events that formed the Araçuaí Orogen from the Early Ediacaran (ca. 630 Ma) to the Late Cambrian (ca. 490 Ma). These events comprise the regional deformation, metamorphism and partial melting of sedimentary and volcanic successions deposited in the Tonian-Cryogenian precursor (rift to passive margin) basin system and the Ediacaran orogenic (arc-related) basins (Figure 7-2), as well as of the continental basement. These melting events resulted in the production of huge volumes of orogenic granitic rocks and thousands of pegmatites grouped into five supersuites (G1 to G5) (Figure 7-1, Table 7-1).

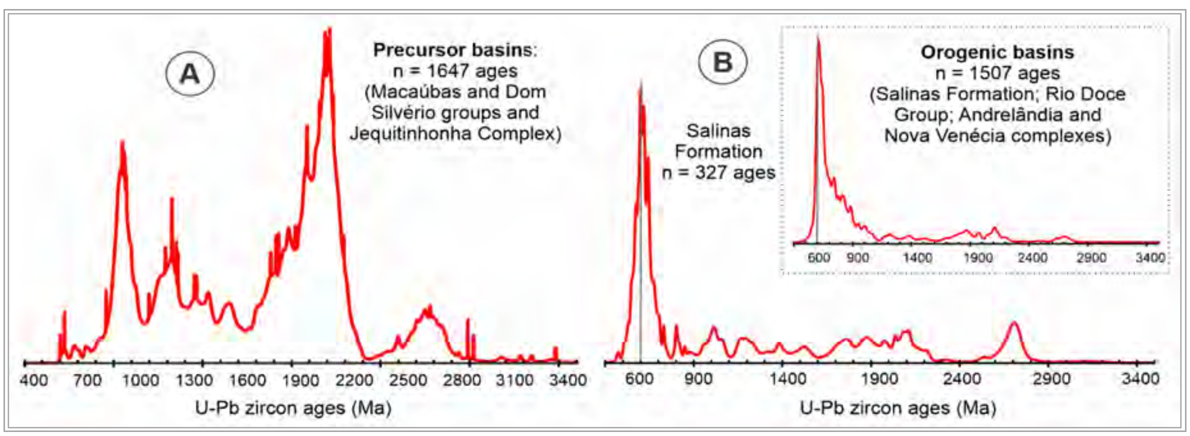
The sedimentary and volcano-sedimentary successions involved in the tectono-metamorphic-anatectic processes that generated granites and pegmatites show two contrasting distributions of U-Pb ages for detrital grains of zircon (Figure 7-2). One is a classic multimodal age spectrum of a basin system evolved from continental rift to passive margin, represented by the Macaúbas Group and Jequitinhonha Complex. The other age distribution shows a unimodal spectrum typical of orogenic basins largely filled by material from a rather dominant zircon source (e.g., an active magmatic arc), representing the Salinas Formation and Rio Doce Group that host most Li-bearing pegmatites in the EBPP (Figure 7-1). The Salinas Formation, comprising quartz-mica schist (metapelite) with lenses of calc-silicate rock (metamarl), metawacke (metasandstone) and meta conglomerate, is the main host unit of Li-rich pegmatites in the whole EBPP, including the spodumene-rich pegmatites of the Bandeira deposit of MGLIT.

Tectono-metamorphic events and the G1 to G5 granitic supersuites of the Araçuaí Orogen play distinct roles in relation to pegmatite abundance, distribution, genesis, and metallogenetic specialization, imposing important prospecting constraints with regards to metallic potential of distinct pegmatite populations along the EBPP (Figure 7-2).

The G4 is the most important granitic supersuite related to Li-rich pegmatites, followed by the G2 supersuite, while the G5 and G1 supersuites are related to Be-rich pegmatites generally free of, or poor in Li-minerals. Tourmaline-bearing pegmatites are widespread in the EBPP, except in some clusters of Be-rich and Li-rich pegmatites. The G4 intrusions and batholiths show the classical distribution of granitic facies, from pluton root to top, found in other Li-rich pegmatite districts around the world, comprising biotite leucogranite, two-mica leucogranite, muscovite leucogranite, albite leucogranite and pegmatoid granite. Apatite, beryl, tourmaline, and garnet occur in the pegmatoid granites, and muscovite-albite leucogranites. The Salinas Formation is also the main host unit of G4 intrusions associated with Li-rich pegmatites (Figure 7-1).

7.1.1 Pegmatites

Granitic pegmatites represent silica-saturated magmas variably rich in H_2O- and F-bearing fluids, as well as in other hyperfusible (fluxing) components (e.g., Li, Na), crystallized in rather closed chemical systems (Cerný, 1991; London, 2008). The EBPP comprises the two known genetic types of pegmatites, both formed during the evolution of the Araçuaí Orogen: i) the anatectic pegmatites generated directly from the partial melting of country rocks; and ii) the residual pegmatites, representing late silicate melts released by fractional crystallization of parental granites. Genetic affiliation and other criteria allow pegmatite districts to be distinguished in the EBPP (Figure 7-2; Table 7-1).



Source: Figure adapted from Pedrosa-Soares et al., 2023.

Notes: (A) precursor basins (e.g., Macaúbas Group and Jequitinhonha Complex), and (B) orogenic basins (e.g., Salinas Formation, Rio Doce Group) of the Araçuaí Orogen within the Eastern Brazilian Pegmatite Province.

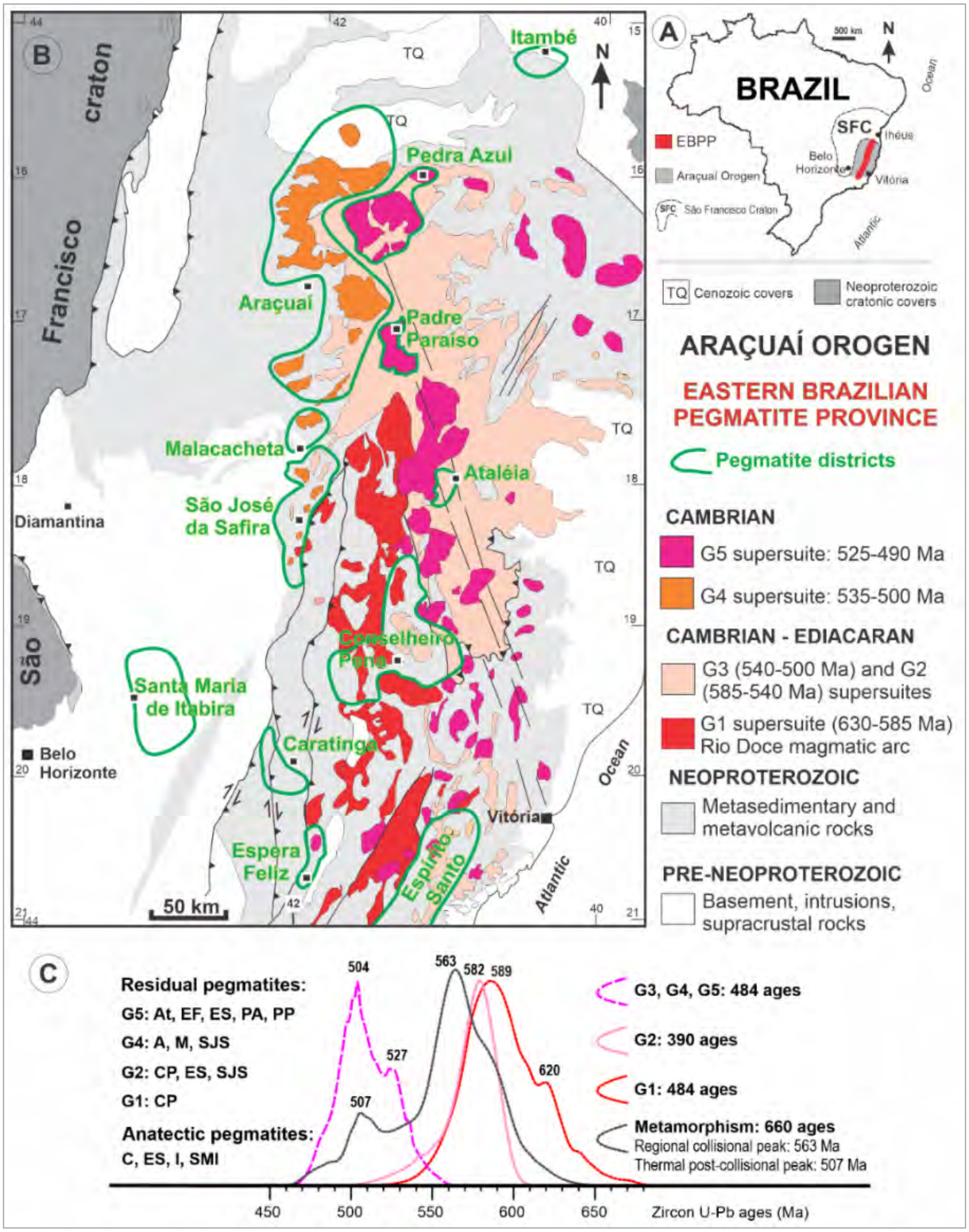
Figure 7-2: Distributions of U-Pb Ages for Detrital Zircon Grains from Metamorphosed Sedimentary and Volcanic Rocks

Table 7-1: Main Features of the Orogenic Igneous Supersuites of the Araçuaí Orogen

Supersuites	G1	G2	G3	G4	G5
Ages (Ma)	630–585	585–540	540–500	535–500	525–490
Lithotypes	Mostly tonalite and granodiorite, minor diorite to gabbronorite, with biotite, amphibole and/or pyroxenes; poor in pegmatites	Mostly biotite-garnet syenogranite to alkali feldspar granite, garnet-rich monzogranite to tonalite, and garnet-two-mica granite, locally with sillimanite; associated with external rare element pegmatites	Alkali feldspar granite to syenogranite with cordierite and/or garnet and/or sillimanite, free of or poor in biotite; poor in pegmatites	From pluton root to top: biotite granite, two-mica leucogranite, muscovite and/or albite and/or schorlite granite, pegmatoid granite; associated with external rare element pegmatites	Alkali feldspar granite to granodiorite, orthopyroxene-bearing charnockitic rocks, basic (norite) to ultrabasic rocks, and beryl-topaz pegmatites
Field relations	Batholiths and stocks, generally rich in dioritic to mafic enclaves and facies, showing solid-state deformation and migmatization, local well-preserved igneous fabrics, associated with the arc-related metavolcano-sedimentary Rio Doce Group	Batholiths, stocks and stratoid bodies, showing solid-state deformation, metamorphism and migmatization, with common restites and xenoliths of metasedimentary rocks, and localized well-preserved igneous fabrics	Mostly autochthonous, non-deformed patches, veins, and lodes of G3 leucosome, and minor stocks, free of the regional foliation, hosted by migmatites with G2 paleosome	Balloon- to stratoid-shaped intrusions, post-kinematic in relation to the regional ductile foliation, locally imposing late deformation on the regional structural trend (circumscribed intrusions)	Balloon-shaped plutons and multiple intrusions, locally rich in mafic and/or microgranular enclaves with magma mixing features, and norite-rich bodies, post-kinematic in relation to the regional ductile foliation
Geochemical signatures	Metaluminous to slightly peraluminous, magnesian, calcic to alkali-calcic, medium- to high-K, expanded calc-alkaline series	Strongly to weakly peraluminous, calc-alkalic to sub-alkalic (K > Na)	Peraluminous, sub-alkalic (K > Na)	Peraluminous, sub-alkalic (K > Na) to alkalic (Na > K)	Metaluminous to slightly peraluminous, ferroan, high-K calc-alkalic, minor tholeiite
Petrogenetic type	Metaluminous I-type, locally peraluminous I-type	Peraluminous S-type, locally peraluminous I-type	S-type	S-type	A-type and I-type
Tectonic stage	Pre-collisional to early collisional magmatic arc	Late pre-collisional to late collisional	Late collisional to post-collisional	Post-collisional	Post-collisional

Source: Simplified by Pedrosa-Soares et al. 2023.

The anatectic pegmatites are coarse-grained quartz-feldspathic bodies (i.e., granitic leucosomes) hosted by migmatitic gneisses and micaschists, mostly formed in the collisional tectono-metamorphic event (585–540 Ma) and in the post-collisional thermal event (540–490 Ma). Therefore, their spatial distribution, and genetic and metallogenetic features are directly related to the melted country rocks. Conversely, the residual pegmatites, especially those enriched in rare elements, have restricted spatial distributions and genetic links directly related to the distinct granite types from which they ultimately inherited their geochemical characteristics and metallogenetic specializations (Figure 7-3; Table 7-2). Therefore, residual pegmatites released from peraluminous, subalkalic-to-alkalic, hydrous, S-type, two-mica leucogranites formed from the partial melting of metasedimentary rocks might have a rather distinct metallogenetic specialization (e.g., richer in Li, Cs, Ta, Sn, and P) in relation to residual pegmatites (e.g., richer in Be, F, and Fe) from metaluminous, high-K calc-alkalic, ferroan, relatively anhydrous, A-type, amphibole-biotite granites formed from the partial melting of mainly igneous rocks. The first case (S-type granites) refers to Li-bearing pegmatites associated with the G4 and G2 supersuites, while the second (A-type granites) stands for the Be-bearing (but Li-free) pegmatites comprised by the G5 supersuite (Figure 7-3; Table 7-2).



Source: From Pedrosa-Soares et al., 2023.

Notes: A) Location of Eastern Brazilian Pegmatite Province (EBPP).
B) Simplified geological map highlighting the granite supersuites (G1 to G5) and EBPP pegmatite districts: A, Araçuaí; At, Ataléia; C, Caratinga; CP, Conselheiro Pena; EF, Espera Feliz; ES, Espírito Santo; I, Itambé; M, Malacacheta; PA, Pedra Azul; PP, Padre Paraíso; SMI, Santa Maria de Itabira; SJS, São José da Safira.
C) Distribution of zircon U-Pb ages from orogenic granite supersuites (G1 to G5), regional metamorphism and post-collisional thermal events, correlated to pegmatite districts.

Figure 7-3: Simplified Geologic Map of Araçuaí Orogen

Table 7-2: Features of the Main Pegmatite Districts of the Eastern Brazilian Pegmatite Province

District Names and Ages (Ma)	Historical and Present-Day Mineral Production, and Rare Minerals	Genetic Affiliation; Class, Subclass, Type, Subtype, and Family[1]	Parent and Host Rocks
Itambé 508 Ma	K-feldspar, quartz crystals, mica, beryl, columbite, monazite	anatectic; muscovite-rare element, REE, allanite-monazite, NYF	biotite-hornblende gneisses, sillimanite-feldspar-mica schists
Pedra Azul 501 Ma	Quartz, beryl (aquamarine), topaz	residual; REE, beryl-topaz, NYF	A-type G5 granites
Padre Paraíso 519 Ma	Quartz, beryl (aquamarine), topaz, quartz crystals, goshenite, chrysoberyl	residual; REE, beryl-topaz, NYF	A- and I-types G5 granites and charnockites
Araçuaí 535–500 Ma	Greenish to pinkish spodumene, petalite, lepidolite, Li-phosphates, cookeite, cassiterite, columbite-tantalite, industrial minerals (perthitic K-feldspar, albite, muscovite), tourmalines (elbaite, schorlite), beryl ore and gems (aquamarine, morganite), pollucite, quartz crystals, cleavelandite, herderite and other rare phosphates, topaz, bismuthinite	residual; mostly rare element and minor muscovite-rare element, Li, beryl, complex (spodumene, petalite, lepidolite, elbaite, amblygonite), albite-spodumene (SRP), albite, LCT	S-type G4 leucogranites; low-P/high-T (andalusite, cordierite, sillimanite) to medium-PT (garnet, staurolite, kyanite, sillimanite) mica schists to paragneisses, metasandstones, calc-silicate rocks, meta-ultramafic rocks
Ataléia 502 Ma	Quartz crystals, beryl (aquamarine), topaz, chrysoberyl	residual; REE, beryl-topaz, NYF	A- and I-types G5 granites and charnockites
São José da Safira 545–490 Ma	Tourmalines (elbaite, schorlite), industrial minerals (perthitic K-feldspar, albite, muscovite), beryl ore and gems (aquamarine, heliodor, morganite), lepidolite, Li-phosphates, spodumene, garnet, cleavelandite, columbite-tantalite, cassiterite, bertrandite, microlite, zircon, rare phosphates	residual; muscovite-rare element and rare element, Li, beryl, complex (elbaite, lepidolite, Li-phosphates, spodumene), LCT	S-type G4 and G2 leucogranites; medium-PT (garnet, staurolite, kyanite, sillimanite) mica schists to paragneisses, metasandstones, calc-silicate rocks, meta-ultramafic rocks
District names and ages (Ma)	Historical and present-day mineral production, and rare minerals	Genetic affiliation; class, subclass, type, subtype, and family (*)	Parent and host rocks
Conselheiro Pena 570–545 Ma	Industrial minerals (perthitic K-feldspar, albite, muscovite), tourmalines (elbaite, schorlite), beryl ore and gem, spodumene (kunzite), lepidolite, Li-phosphates, quartz crystals, cleavelandite, columbite-tantalite, cassiterite, rare phosphates (arrojadite, barbosalite, brasilianite, childrenite, correianevesite, eosphorite, roscherite, vivianite, etc.)	residual; muscovite-rare element and rare element; Li, beryl, complex (elbaite, Li-phosphates, lepidolite, spodumene), LCT	S-type G2 (and I-type G1?) granites; medium-PT to intermediate low-P (garnet, staurolite, cordierite, kyanite, sillimanite), mica schists to paragneisses, metasandstones, calc-silicate rocks, meta-ultramafic rocks
Malacacheta 535–500 Ma	Muscovite, beryl, chrysoberyl; alexandrite, sapphire	residual; muscovite-rare element, beryl, LCT; and anatectic to hydrothermal processes	S-type G4 leucogranites; mica schists, meta-ultramafic rocks, migmatites
Santa Maria de Itabira, 545–500 Ma	Emerald, alexandrite, aquamarine, amazonite	quartz-feldspathic hydrothermal deposits, and pegmatites	ultramafic schists, banded iron formations, migmatites
Caratinga, 570 Ma	Kaolin, corundum (sapphire, ruby), beryl	anatectic; abyssal, ceramic	migmatitic paragneisses
Espera Feliz, 500	Quartz crystals, beryl (aquamarine), topaz	residual; REE, beryl-topaz; NYF	G5 granites
Espírito Santo 570–500 Ma	Kaolin, quartz, beryl (aquamarine), topaz, tourmalines (and spodumene?)	anatectic; ceramic; and residual; REE, beryl-topaz, NYF (and LCT?)	migmatitic paragneisses, G5 (and G2?) granites

Source: Pedrosa-Soares et al., 2023, updated after Pedrosa-Soares et al., 2011.

Notes: [1] Cerný et al. (1991, 2012).
LCT = lithium-cesium-tantalum; NYF = niobium-yttrium-fluorine pegmatites.

The EBPP is subdivided into twelve pegmatite districts based on the mineral production; genetic and metallogenetic affiliation and classification; parental granite type; host rocks and metamorphic regime; and crystallization ages of a relatively large and clustered pegmatite population (Figure 7-3; Table 7-2). Most are districts of residual pegmatites of the rare element class, distinguished by their affinities with the lithium-cesium-tantalum (LCT) or niobium-yttrium-fluorine (NYF) geochemical-metallogenetic families that, in turn, are related to distinct types of parental granites. Beryl-topaz (NYF) pegmatites cluster in districts almost completely circumscribed or very close to A-type and I-type G5 intrusions, encompassing granitic and igneous charnockitic (orthopyroxene-bearing) rocks with features of magma mingling-mixing involving mafic melts.

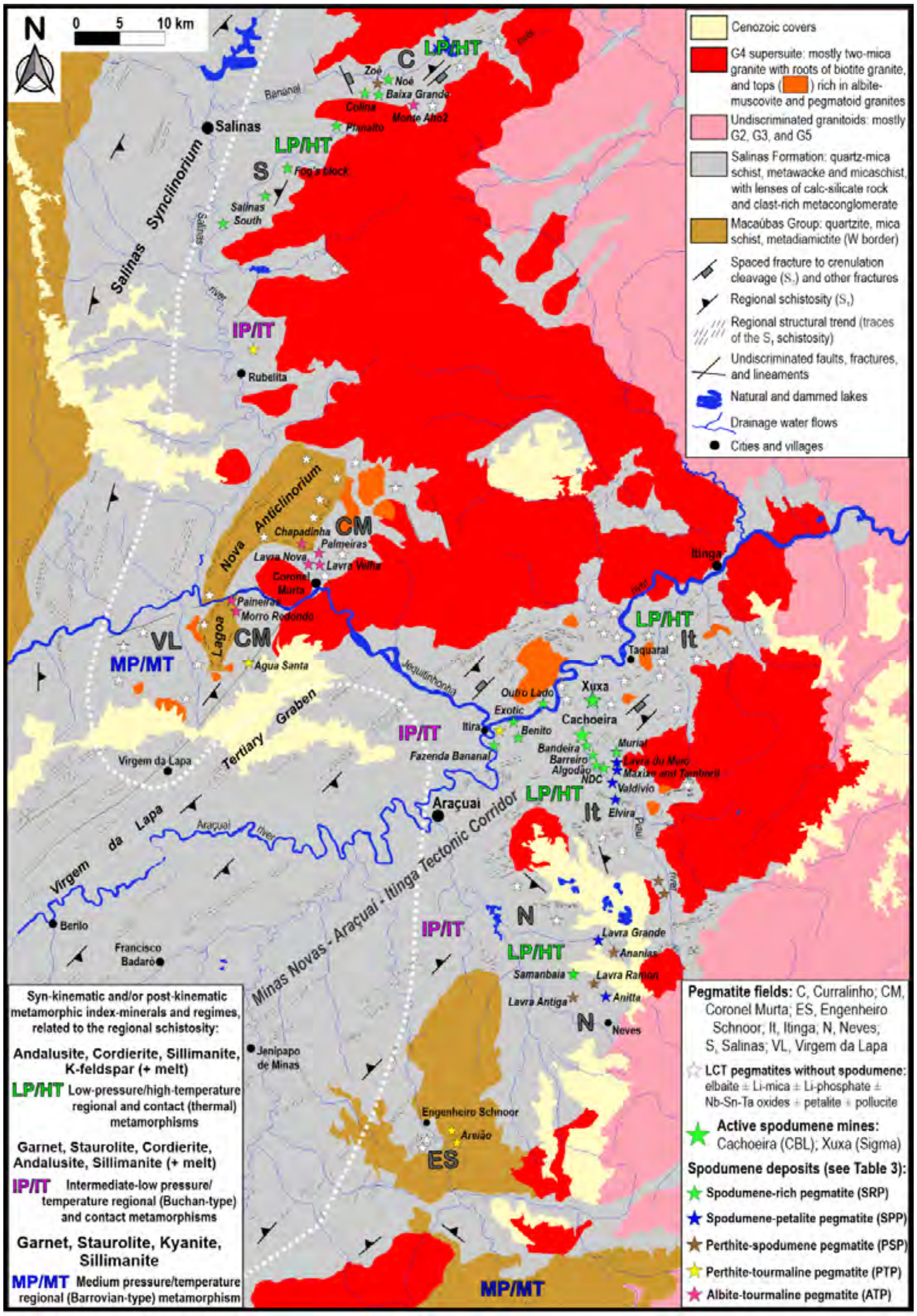
Contrastingly, complex LCT pegmatites and albite-spodumene-rich pegmatites (SRP) are found in the external aureoles of S-type intrusions mostly composed of two-mica leucogranites with pegmatoid cupolas, generally hosted by metasedimentary rocks of the greenschist to amphibolite facies. Among the EBPP Li-bearing districts, the Araçuaí Pegmatite District stands out by having the largest historical and current production of lithium ore and the only world-class spodumene deposits of Brazil. Those deposits include the CBL, Sigma, and other companies' newly discovered deposits, such as the Bandeira and other spodumene-rich deposits of Lithium Ionic Corporation.

The Araçuaí Pegmatite District includes several LCT pegmatite fields distinguished by their mineral production, pegmatite types and subtypes, and pressure-temperature (P-T) conditions of both the regional and contact metamorphisms (Figure 7-4). Besides complex LCT pegmatites, spodumene-rich pegmatites (SRP) are known in the Curralinho, Itinga, Neves-Tesouras and Salinas pegmatite fields. However, the Itinga Pegmatite Field remains the most important for spodumene production and prospecting, owing to the outstanding abundance of non-zoned to poorly zoned SRP ranging from a few to dozens of metres thick, hundreds to a few thousand metres in length along strike, and dozens to hundreds of metres in downdip width. Many spodumene orebodies mined by Arqueana, CBL and Sigma, as well as those discovered by Lithium Ionic at Bandeira and other targets, belong to the SRP (or albite-spodumene) type.

7.2 Structural Geology

In the Araçuaí Pegmatite District (Figure 7-4), the present-day structural framework was established after four deformation events (D1, D2, DG, and DNt). Two of them (D1, D2) are directly related to the regional tectono-metamorphic evolution of the Araçuaí Orogen in the Ediacaran-Cambrian. The third deformation event (DG) was caused by the widespread and voluminous intrusions of Cambrian G4 granites that caused thermal metamorphism and significant structural disturbance on the regional fabrics along areas relatively close to granitic stocks and batholiths (Pedrosa-Soares et al. 1987, 1993, 2011; Alkmim et al., 2006; Santos et al., 2009; Peixoto et al., 2017). Much later, the last deformation event (DNt) resulted from neotectonics reactivation in the Late Tertiary (Saadi & Pedrosa-Soares, 1989).

The Ediacaran-Cambrian deformation events (D1, D2, and DG) formed the structural framework that passively hosts the rare element pegmatites in the Araçuaí District (Figure 7-4). The much younger neotectonic deformation (DNt) reworked prior structures in upper crustal levels in the Late Tertiary (Miocene), forming normal faults and graben basins (e.g., the Virgem da Lapa Graben, Figure 7-4) filled by the fluvial to lacustrine sandstone-mudstone piles of the São Domingos Formation that reach more than 100 m thick (Saadi & Pedrosa-Soares, 1989; Pedrosa-Soares, 1997). Locally, neotectonic faults may cut and displace blocks with pegmatite deposits.



Notes: Highlighting lithium-bearing pegmatite fields (see inbox), major tectonic domains (names in italics on map), metamorphic regimes according to relative pressure (P) and temperature (T) conditions (LP/HT, low-P/high-T; IP/IT, intermediate-low P and T; and MP/MT, medium P and T), spodumene active mines (Cachoeira, Xuxa) and main spodumene deposits: Bandeira, Baixa Grande and Outro Lado (Lithium Ionic), Barreiro (Sigma), and Colina (Latin Resources). Map from Pedrosa-Soares et al. (2023).

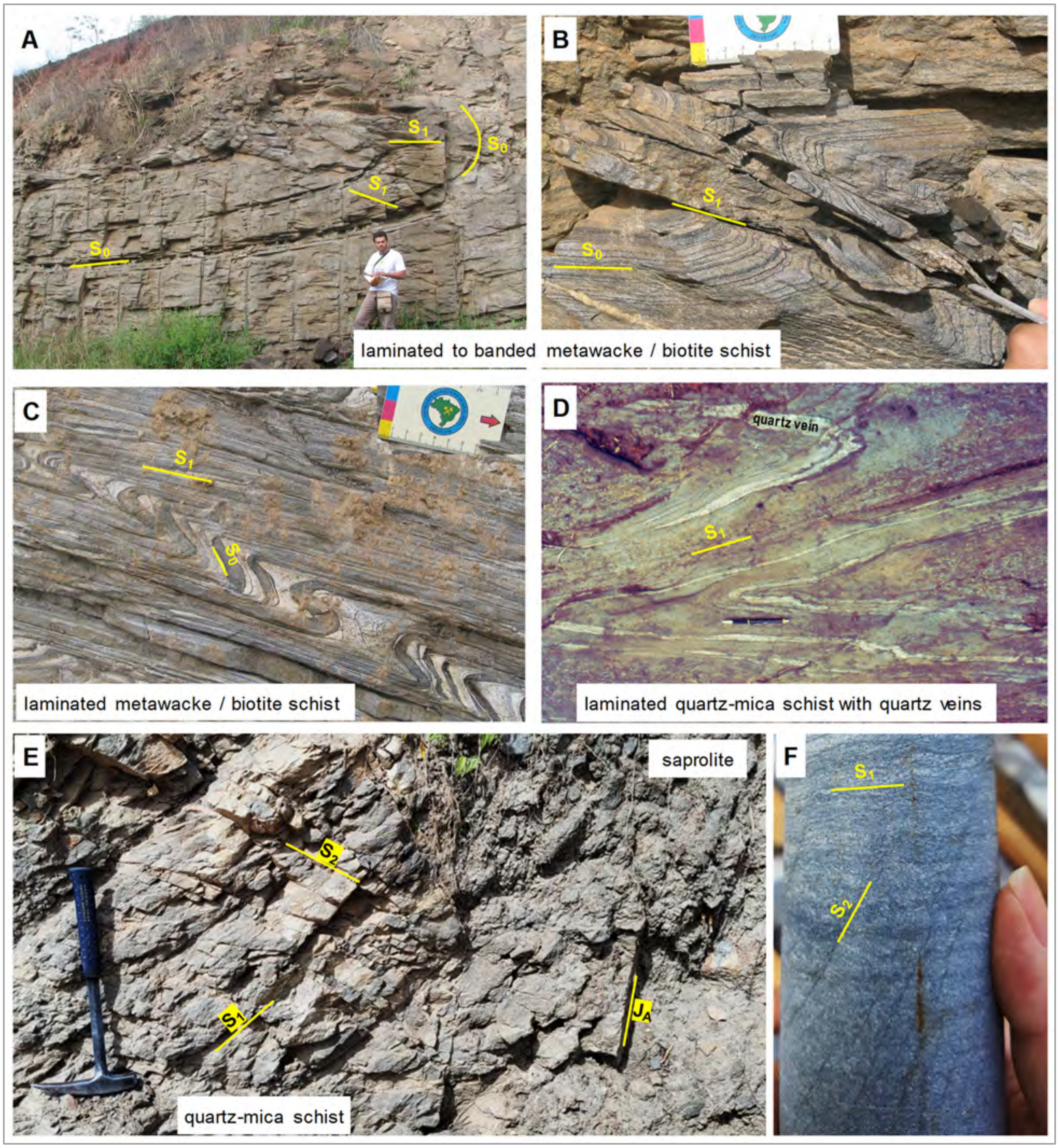
Figure 7-4: Geology of the Araçuaí Pegmatite District

The D1 deformation results from regional tectono-metamorphic processes imposed by compressive stresses during the collisional stage (580–540 Ma) of the Araçuaí Orogen. Megascopic to macroscopic D1 structures are asymmetric tight folds with long limbs and short hinges, parasitic folds, and ductile shear zones related to thrust ramps and oblique to transcurrent strike-slip domains. The macroscopic to microscopic D1 structures include the main regional planar structure that evolved from a cleavage to the S1 schistosity (Figure 7-5) that contains the L1 mineral/stretching lineation. S1 is generally (sub)parallel to the layering (S0) along D1 fold limbs, becoming an axial-plane surface in fold hinges (Figure 7-5). Anastomosed and S-C foliations characterize higher strain shear zones syn-kinematic to S1. Although it generally is a very penetrative structure, the S1 foliation also provides host surfaces for pegmatites.

Distinct metamorphic regimes related to the D1 deformation of schists and gneisses rich in micas have been recognized in the region encompassing the Araçuaí Pegmatite District (Pedrosa-Soares et al., 1984, 1993, 1996; Costa et al., 1984; Costa, 1989; Santos et al., 2009; Peixoto et al., 2017). In the western and southwestern sectors of the region (Figure 7-4), the S1 schistosity shows syn-kinematic (syn-S1) assemblages with Fe-rich garnet almandine), staurolite, kyanite and/or sillimanite. Such index-minerals series are typical of a medium pressure and medium temperature (MP/MT) metamorphic regime (Figure 7-4). This, together with quantitative geothermobarometric data, characterize the M1 metamorphic event as a syn-collisional (syn-D1) Barrovian-type (MP/MT) metamorphism dating between 575–550 Ma. P and T increase from about 3.5 kbar at 450°C in the garnet zone at the southwest of Francisco Badaró, passing northeastwards through the staurolite, kyanite and sillimanite zones, and reaching up to 8.5 kbar at 650°C at the southeast of Coronel Murta (Figure 7-4).

In the northeastern and northern sectors of the region, the S1 schistosity shows syn-kinematic (syn-S1) assemblages with biotite, Mn-rich garnet (spessartine), andalusite, cordierite and/or sillimanite. Such index-minerals series are typical of a low pressure and high temperature (LP/HT) metamorphic regime (Figure 7-4). From the northeastern andalusite zone to the southwest of Itinga, quartz-feldspathic leucosomes with aplitic to pegmatitic textures formed from the breakdown of muscovite along the S1 foliation of cordierite-quartz-mica schists. Northeastwards, through the andalusite-cordierite, cordierite-sillimanite, sillimanite, and K-feldspar zones, increasing metamorphism and partial melting of quartz-mica schists formed migmatitic paragneisses in the eastern tip of the Itinga Pegmatite Field (Figure 7-4).

Regionally, the metamorphic event (M2) records a low-P/high-T metamorphism with pressures from 2 to 5.5 kbar under temperatures from 400°C to 700°C, at around 540–530 Ma. The M2 metamorphism reached partial melting conditions on quartz-mica schists of the Salinas Formation with increasing anatexis rates that formed leucosome-rich migmatites (diatexites) in the easternmost sector of the Araçuaí Pegmatite District. This implies that, in deeper crustal levels, the widespread anatexis on the Salinas Formation could have produced large volumes of S-type granitic magmas in the late collisional to post-collisional stages of the Araçuaí Orogen. Indeed, the time interval of the M2 metamorphism (540–530 Ma) fits well with the oldest ages of G4 granites (535–525 Ma). This, together with the fact that the M2 metamorphism culminated in partial melting of quartz-mica schists and paragneisses in the easternmost Araçuaí Pegmatite District, indicate that the S-type G4 magmas were formed from the anatexis of thick metasedimentary packages in deep levels of the Salinas Formation.



Notes: (A and B) Large tight fold (A) with a hinge (B) showing the sedimentary layering (S0) cut by the low-angle dip to flat axial-plane S1 cleavage. C) Tight folds with limbs transposed by S1 foliation. D) Hinges of tight folds with metamorphic quartz veins in quartz-mica schist. E) Spaced cleavage S2 cutting the schistosity S1, and sub-vertical joints (JA) cutting across both S1 and S2 in the Bandeira area. F) S2 spaced foliation marked by recrystallized mica, cutting the S1 schistosity in a drill core sample from the Bandeira deposit.

Figure 7-5: Outcrops and a Drill Core Showing Structures of the Deformation Events D1 and D2 on the Salinas Formation in the Araçuaí Pegmatite District

Along the boundary between the M1 and M2 metamorphic domains (Figure 7-4), the syn-S1 mineral assemblages include almandine and/or staurolite and andalusite and/or cordierite, characterizing an intermediate-low pressure (Buchan-type) metamorphic regime (IP/IT, Figure 7-4) transitional between the M1 Barrovian-type (MP/HT) and the M2 low-P/high-T (LP/HT) metamorphic regimes found in the Araçuaí Pegmatite Districts. Bearing in mind the relations between distinct pegmatite populations, their metallogenetic specializations and metamorphic regimes (Cerný, 1991; Cerný et al., 2012), such metamorphic characterization is of great importance for prospecting different rare element pegmatites, as Li-rich pegmatites are typically found in terranes with relatively low-P/high-T metamorphism.

The D2 deformation developed from the late collisional to the post-collisional stages of the Araçuaí Orogen, when increasing decompression conditions, imposed by the orogen gravitational collapse, gradually replaced the tangential D1 compressive stresses. In the Araçuaí Pegmatite District, the D2 deformation comprises mostly brittle structures, such as the S2 spaced cleavage, joint families, and normal faults, as well as large open folds (flexures). The spacing between surfaces of the S2 cleavage ranges from less than 1 cm to decimetres (Figure 7-5. Locally, S2 may be very well developed in micaschists, becoming a tight crenulation cleavage to schistosity. The S2 spaced cleavage and other brittle structures, as being more open surfaces than the S1 schistosity, provided host surfaces for Li-rich pegmatites, generally the thicker ones, in the Itinga Pegmatite Field.

The latest Cambrian deformation event (DG) was caused by the intrusion of large volumes of S-type magmas that formed the G4 granites and cut across and disturbed the regional framework imprinted by the D1 and D2 deformations. The DG event deformed the regional structural trend of the host rocks around granitic plutons, forming radial fractures irradiating from the granitic plutons, and imprinting ring-shaped fracture systems that reworked regional structures around the intrusions. All these DG structures can host late orogenic rare element pegmatites.

During emplacement and cooling, the G4 plutons caused contact metamorphism on their country rocks and released residual silicate melts that formed pegmatites that either crystallized within the parental granite or migrated outwards and were hosted by D1, D2 and DG structures of the Salinas Formation and other metasedimentary units. While barren and beryl-bearing pegmatites are found both within parental G4 granites and country rocks, the Li-bearing pegmatites have been found only in places rather far from (>1 km) granite massifs, emplaced in the Salinas Formation and other metasedimentary units. The G4 batholith emplaced along the whole eastern boundary of the Araçuaí Pegmatite District is formed by multiple coalescent plutons and defines an eastern limit for the occurrence of Li-bearing pegmatites.

Regionally, the deformational events formed large structures with distinct implications for the occurrence and structural control of pegmatites in the Araçuaí District, such as the Salinas Synclinorium, the Lagoa Nova Anticline, and the Minas Novas–Araçuaí–Itinga Corridor (Figure 7-4). The axial zone of the Salinas Synclinorium shows the best-preserved section of the Salinas Formation, comprising non-deformed to weakly deformed metawacke, metapelite and metaconglomerate, metamorphosed in the biotite and garnet zones of the low greenschist facies. This low-grade metasedimentary section reaches up to 2 km thick, with no evidence of pegmatite along the synclinorium keel. However, a Li-rich pegmatite cluster, including SRP bodies, was recently found to the east of the Salinas Synclinorium, along the andalusite-cordierite-bearing, low-pressure/high-temperature metamorphic zone of the Curralinho Pegmatite Field (Figure 7-4). In the case of the Lagoa Nova Anticline, although there are LCT pegmatites emplaced along its structural surfaces, no

SRP was yet found there, probably due to the rather unfavorable pressure-temperature conditions of the regional and contact metamorphisms (between the medium PT [MP/MT] and intermediate PT [IP/IT] regimes). The Minas Novas–Araçuaí–Itinga Corridor, in turn, plays a special role in the understanding of the structural control and the most favourable pressure-temperature conditions for the SRP occurrence in the Araçuaí Pegmatite District. That corridor has been characterized as a flower-shaped transpressive (during D1) to transtensive (during D2) structure (Pedrosa-Soares et al., 1993, 1996; Alkmim et al., 2006) with the S1 foliation dipping to SE in the NW flank, and to NW in the SE flank (Figure 7-4). In the Itinga Pegmatite Field, the S1 schistosity and S2 spaced cleavage show NE-trending strikes, with the S1 schistosity dipping to NW and the S2 cleavage dipping to SE (if they have not been disturbed by later deformations, i.e., DG and DNt). The S1 foliation, as well as the S2 spaced cleavage and other brittle surfaces (i.e., the flat-lying and subvertical joints) host many Li-rich pegmatites, with the thicker SRP bodies generally emplaced in more open surfaces of brittle structures.

The regional metamorphism associated with the S1 schistosity gradually increases from southwest to northeast along the corridor, reaching c. 3.5 kbar at c. 550ºC at the andalusite-cordierite zone in the Piauí river valley, where the contact metamorphism was imposed by G4 granitic intrusions, also under relatively low-pressure conditions. All those tectono-metamorphic and magmatic features favourable to SRP occurrence characterize the Itinga Pegmatite Field, where several of the most important spodumene deposits already found in Brazil are located, such as those of the CBL and Sigma, and the SRP deposits of MGLIT.

7.3 Prospective-Exploration Model

There are several different types of spodumene pegmatites in the Araçuaí District (Figure 7-4). The spodumene-rich deposits can reach tens of millions of tons of lithium ore, while the complex zoned spodumene-bearing pegmatites hardly reach some thousands of tons of spodumene ore (Pedrosa-Soares et al., 2023). Therefore, if the aim is to find spodumene-rich deposits, it is of overwhelming importance to conceive a specific prospective-exploration model based on mines and surface exposures of spodumene-rich pegmatites.

The Bandeira spodumene deposit is located immediately to the southeast of the CBL's Cachoeira mine (Figure 7-6). This mine has played a major role in the understanding of the mineralogical, petrographic, geochemical, and structural features of spodumene-rich pegmatites (SRP) in the Araçuaí Pegmatite District (Sá, 1977; Afgouni and Sá, 1978; Correia-Neves et al., 1986; Afgouni and Marques, 1997; Pedrosa-Soares et al., 2009, 2011, 2023; Romeiro, 1998; Quéméneur and Lagache, 1999; Romeiro and Pedrosa-Soares, 2005; Dias, 2015; Chaves et al., 2018; Luiz, 2023). The Cachoeira pegmatite swarm has been mined since the 1970s by the Arqueana Company (Figure 7-7), followed by CBL's production of spodumene ore at an industrial scale since 1993 (Figure 7-8). This mine, therefore, provided solid information for the prospective model that was successfully applied to the exploration of the Bandeira deposit (Figure 7-6).

The typical SRP orebodies of the Cachoeira Pegmatite Group are non-zoned but rather inequigranular pegmatites composed of spodumene (on average 23 vol%), perthitic microcline, albite, quartz, and muscovite, generally totalling more than 95% of the whole orebody volume. Montebrasite, beryl, cassiterite, columbite-tantalite, cookeite, zabuyelite and petalite are scarce accessory minerals. The

Cachoeira SRP cluster forms a pegmatite swarm characterized by a staggered (en-échelon) spatial distribution of parallel to subparallel, locally branched orebodies showing lateral and vertical offsets among them (Figure 7-8 and Figure 7-9). They are roughly tabular bodies with lens-shaped terminations, ranging from decimetres up to 30 m thick orthogonal to dip, from a few metres to many hundreds of metres in length along strike, and up to many hundreds of metres downdip. The Cachoeira pegmatites were emplaced in the Salinas Formation that consists of banded cordierite-quartz-mica schist with intercalations of calcsilicate rock, recording P-T conditions suitable for SRP occurrence. In the Salinas Formation, the main host surfaces for pegmatites are the regional foliation (schistosity) S1 and the S2 spaced cleavage, although late joint surfaces can also host SRP bodies (Figure 7-7, Figure 7-8, and Figure 7-9).

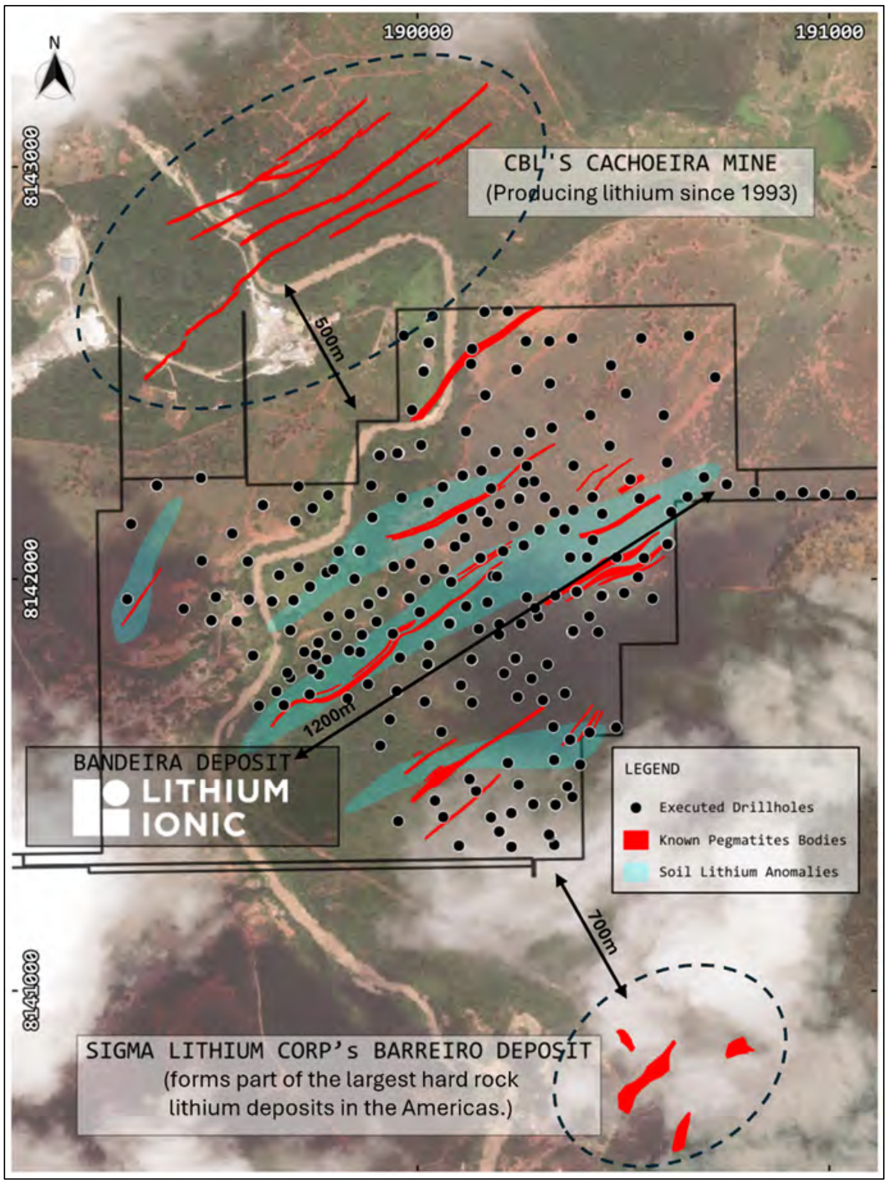
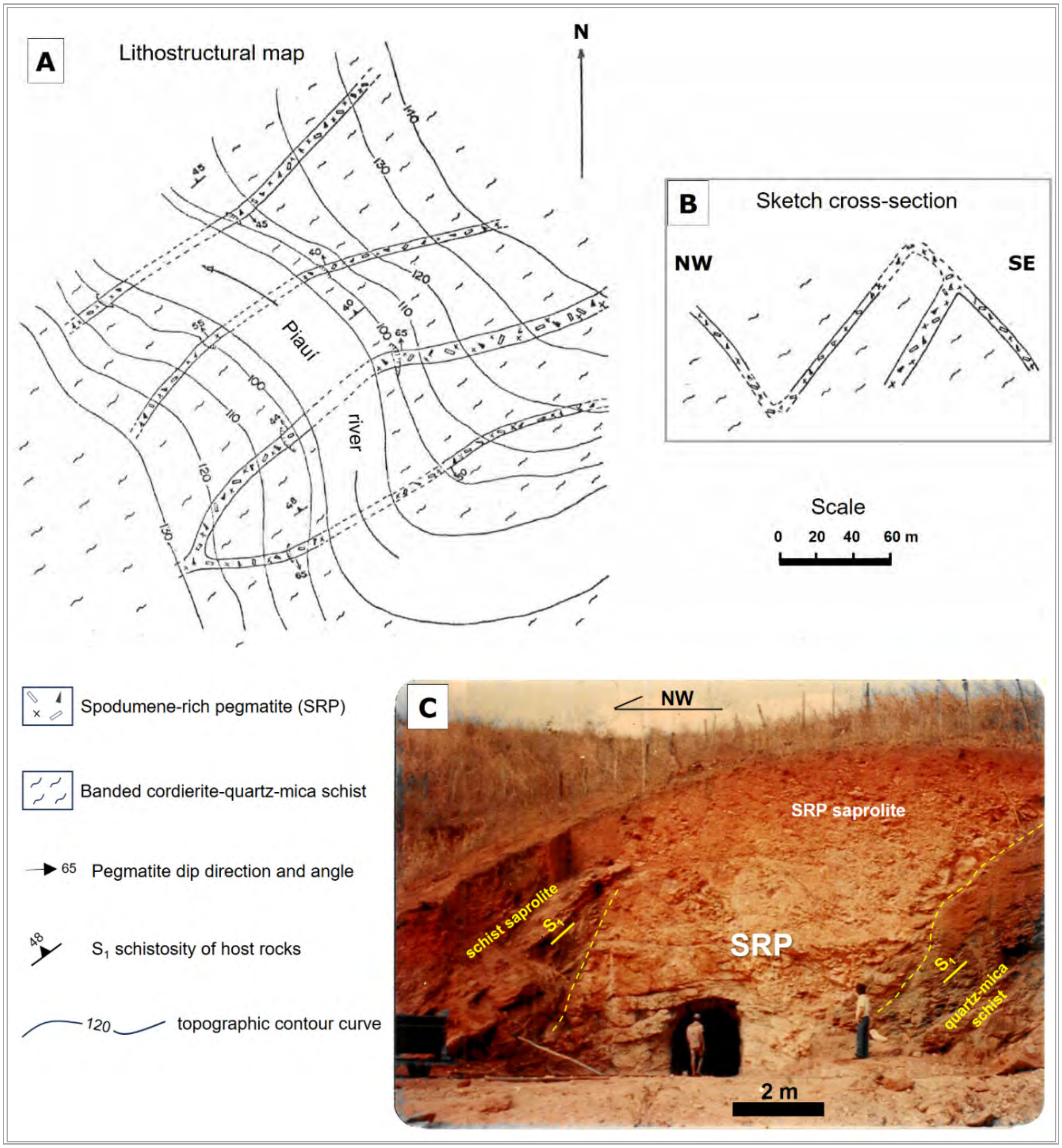


Figure 7-6: Location of the Bandeira Deposit in Relation to the CBL's Cachoeira Mine and the Sigma's Barreiro Deposit

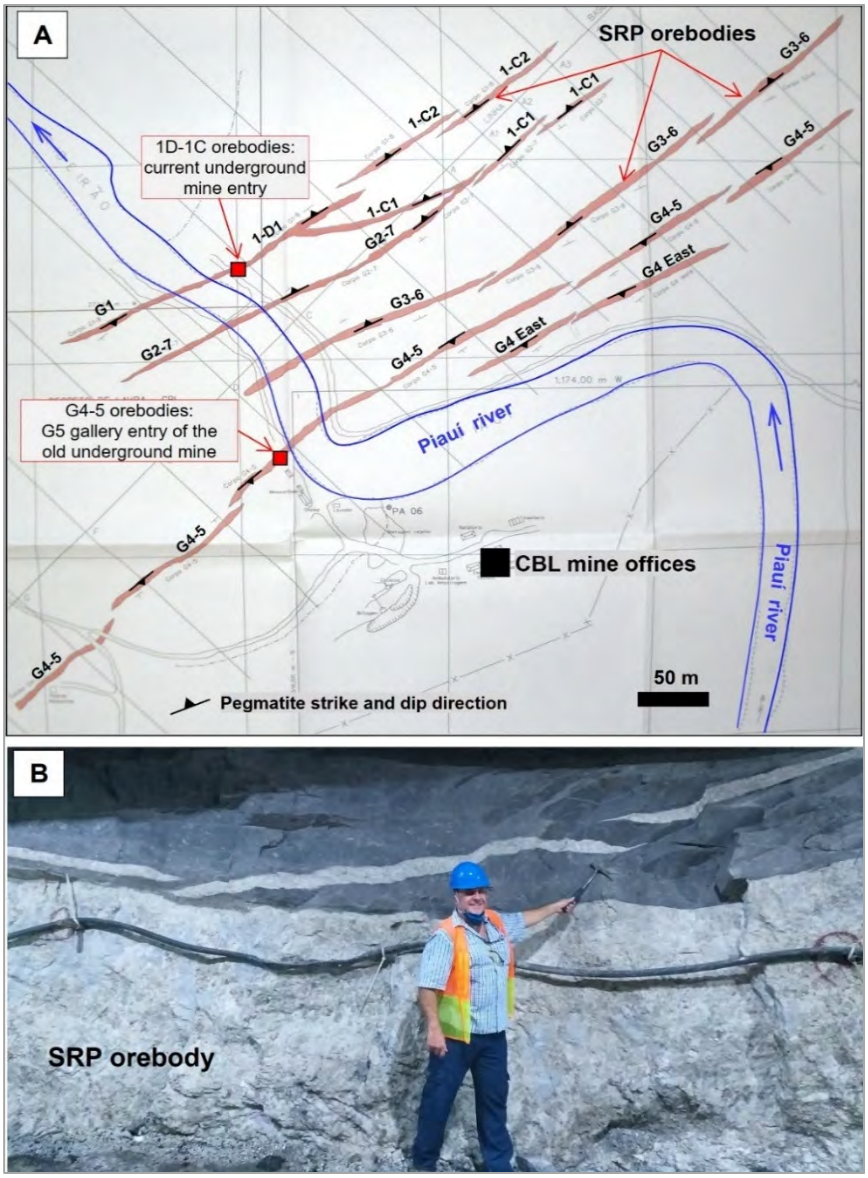


Source: Map, cross-section, and photo adapted from Sá, 1977.

Notes: A (map) and B (section) showing four NE-trending, parallel to sub-parallel, branched, tabular-shaped, spodumene-rich pegmatites (SRP) both concordant with the NW-dipping S1 schistosity of host rocks and discordant with S1, (i.e., emplaced in the SE-dipping S2 spaced cleavage). B (photo) shows a concordant, c. 7 m thick SRP hosted by cordierite-quartz-mica schist, with both rocks increasingly weathered (saprolites to soils) towards the topographic surface.

Figure 7-7: The Cachoeira Mine in the mid-1970s

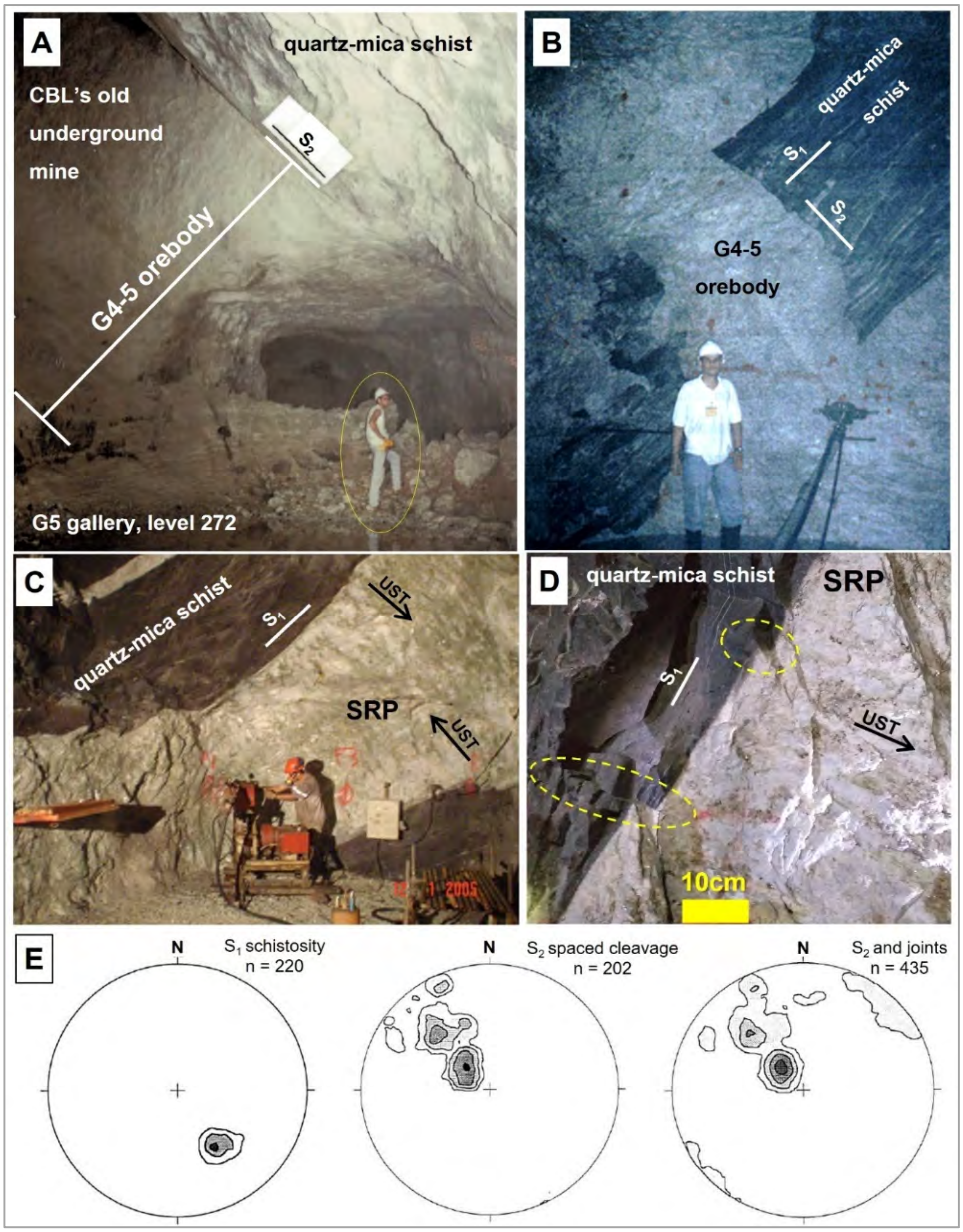
The tectonic structure of the Salinas Formation behaved passively during the intrusion of Li-rich magmas that crystallized as spodumene-rich pegmatites, which in turn do not record any evidence of ductile or brittle deformations (Figure 7-8 and Figure 7-9), except for small faults that locally cut pegmatite contacts and may be related to the latest D2 or DG deformations (Figure 7-9; see also Section 7.2).



Source: Photo by A.C. Pedrosa Soares, August 2022.

Notes: A) Map of the CBL's Cachoeira pegmatite swarm (adapted and updated from Romeiro, 1998), showing the staggered (en- echelon) spatial pattern of parallel to subparallel, locally branched, NE-trending orebodies of spodumene-rich pegmatites (SRP, in light brown) with indications of mapped strike and dip directions of the pegmatite bodies. SRP concordant bodies, emplaced along the S1 schistosity, dip to NW. SRP discordant bodies, hosted by the S2 spaced cleavage, dip to SE.
B) A fractal example of the en-échelon distribution pattern of SRP bodies shown by three smaller veins (above the main SRP orebody) in CBL's Cachoeira mine).

Figure 7-8: Cachoeira Pegmatite Swarm in CBL's Mine Area

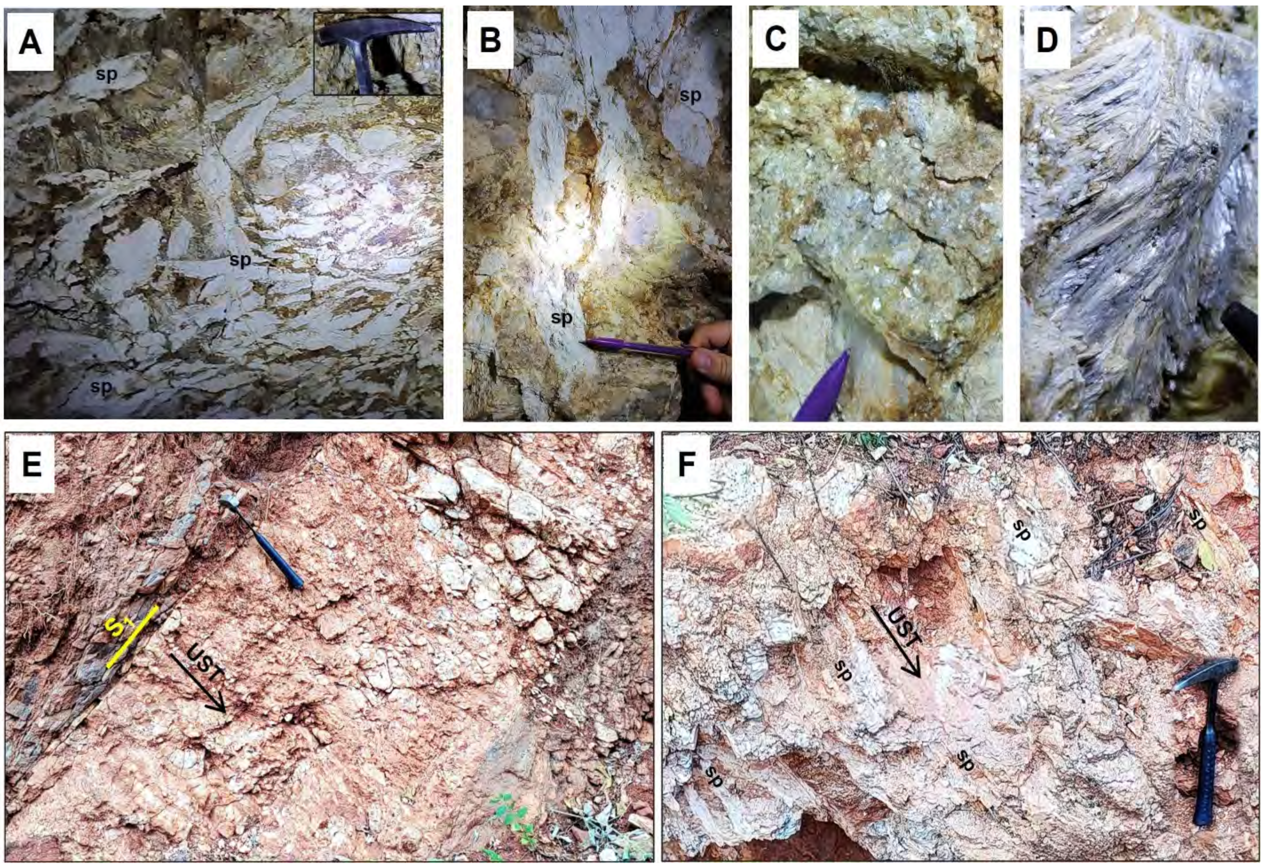


Notes: A) The G4-5 SRP in the G5 gallery, level 272, showing a discordant orebody (c. 7 m thick) hosted by the S2 spaced cleavage (photo from Romeiro, 1998). B) A closing edge of the main G4-5 orebody, showing SRP branches cutting across the host quartz-mica schist (photo from Romeiro, 1998). C) Mining front showing a concordant SRP orebody (1D/1C gallery) ranging from c. 3 m to more than 4 m thick, hosted by the S1 foliation dipping to NW, with unidirectional solidification texture (UST, black arrows) outlined by orientated greenish spodumene crystals orthogonal to the contacts (photo from Romeiro and Pedrosa-Soares, 2005). D) Sharp lithological contact, concordant with S1, between SRP and the host schist, showing small offsets along short brittle surfaces (yellow ellipses) and unidirectional solidification texture (UST, black arrow) outlined by oriented spodumene and feldspar (photo by Pedrosa-Soares, August 2022). E) Stereograms (Schmidt projection, lower hemisphere) for the SRP host structures in the Cachoeira underground mine and surface outcrops showing that both S1 and S2 are Ne-trending but dip to opposite directions: S1 to NW and S2 to SE (stereograms adapted from Romeiro, 1998).

Figure 7-9: Spodumene-Rich Pegmatites (SRP) in the CBL's Underground Mine

7.4 Bandeira's Mineralization Model

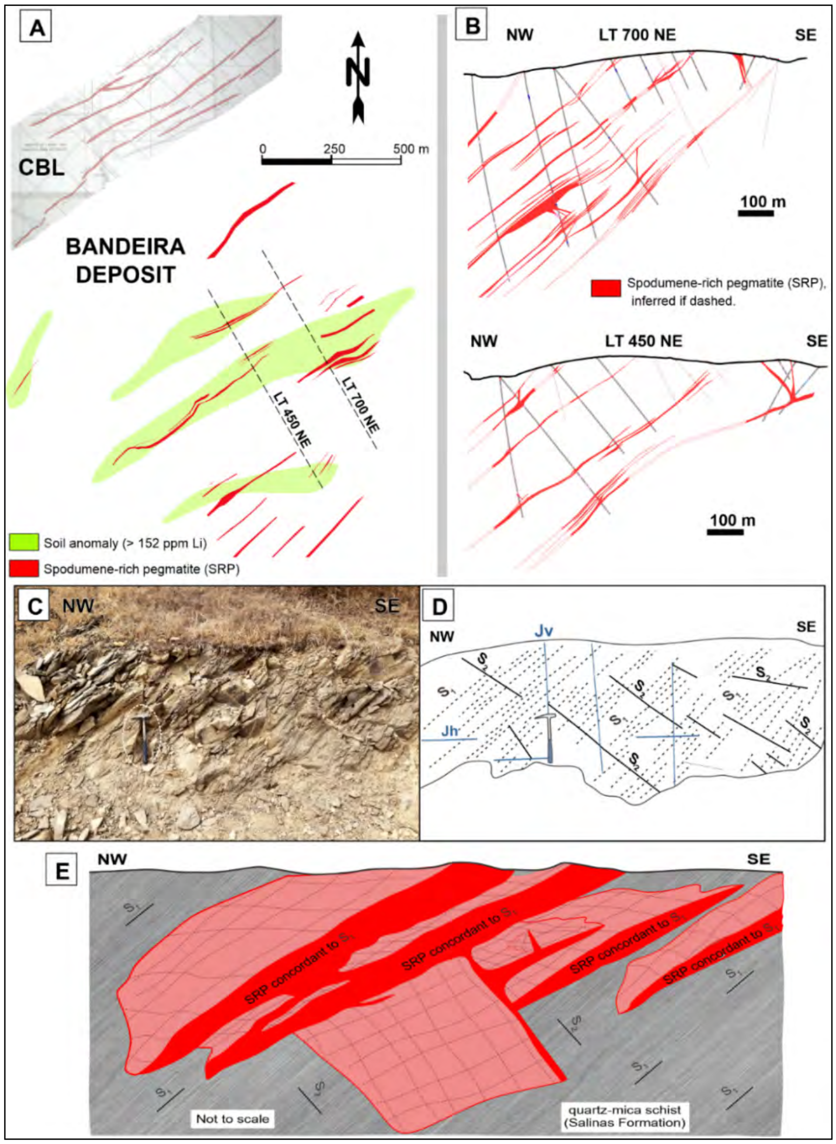
A soil geochemistry campaign revealed Li anomalies roughly parallel to the Cachoeira pegmatite swarm. This, together with lithological and structural data from outcrops, old diggings, and new exploration trenches (Figure 7-10) provided the basis for a very successful drilling campaign that discovered a new swarm of spodumene-rich pegmatites (SRP) extending from near-surface up to 500 m deep (Figure 7-11).



Notes: Exposures of partially weathered pegmatites very rich in pseudomorphs of spodumene (sp) replaced by white clay (A and B), with local mica-rich metasomatic bodies, small miarolitic cavities and rare lepidolite books (D) at the pegmatite top. A new trench (E) revealed another rather weathered pegmatitic body concordant with the S1 foliation of the host quartz-mica schist, showing pseudomorphs of tabular-shaped spodumene (sp) replaced by white clay (F), depicting unidirectional solidification texture (UST) orthogonal to the pegmatite/schist contact.

Figure 7-10: Old Digging for Gems (A to D) and An Exploration Trench (E and F)

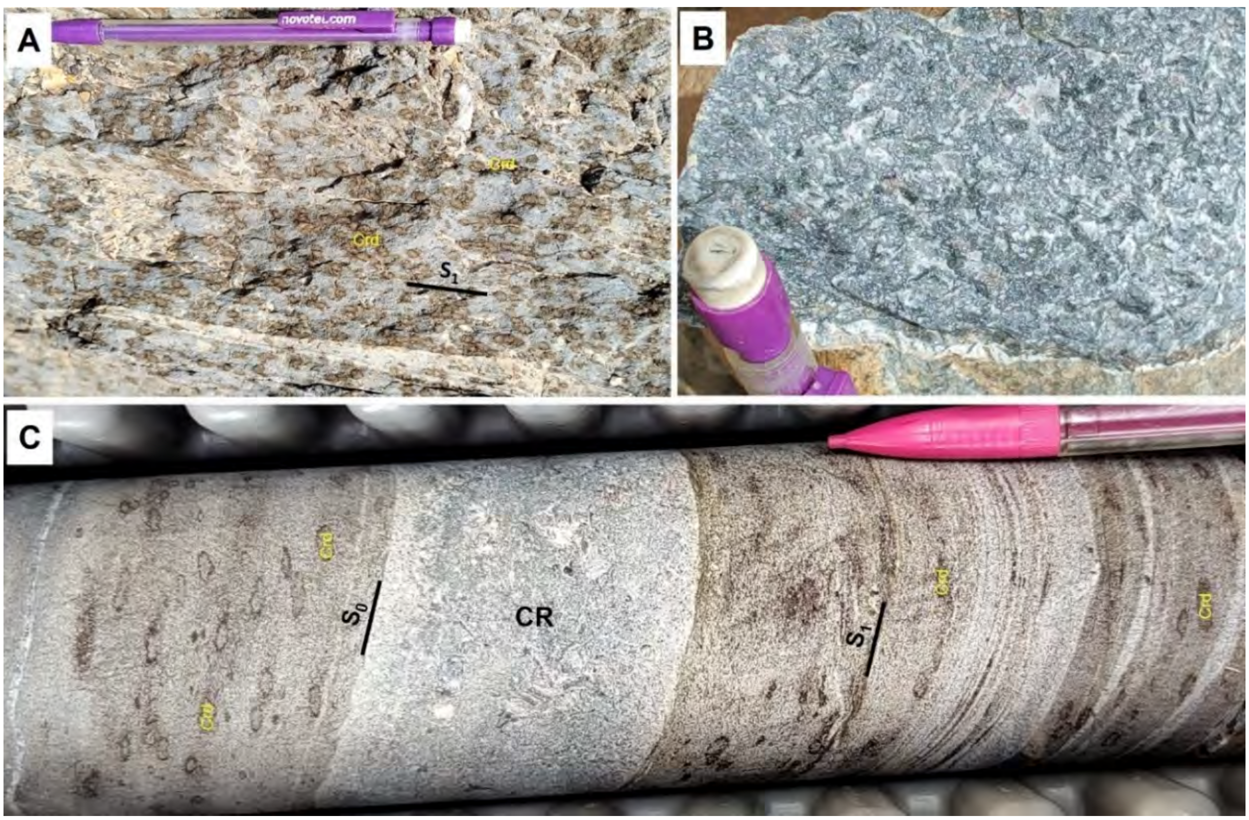
Following the regional NE–SW structural trend, the Bandeira deposit comprises SRP swarms of NE-striking orebodies mostly hosted by and concordant with the NW-dipping schistosity (S1), but also some discordant SRP emplaced along the SE-dipping fracture system (S2 spaced cleavage), as well as a few SRP bodies hosted by late flat-lying joints (Figure 7-11). The Bandeira pegmatites are tabular bodies with convex lens-shaped terminations, arranged in tight and staggered (en-echellon) swarms, locally with branched connections linking ore bodies. Single SRP bodies normally reach hundreds of metres in length along the strike, ranging in thickness from a few decametres to decimetres, with the discordant SRP bodies tending to be thicker than the concordant ones. With known downdip-width up to 800 m, several Bandeira SRP bodies remain open in depth. The exploration drilling work revealed two main SRP swarms in the Bandeira deposit: i) the northern swarm, with thicker, longer, and wider SRP bodies concordant to the S1 foliation of host rocks; and ii) the southern swarm, with somewhat smaller SRP bodies (Figure 7-11).



Notes: A) Simplified map of the Bandeira deposit showing Li anomalies and spodumene-rich pegmatites projected to surface, and the adjacent CBL's pegmatites. B) Simplified cross-sections showing the SRP swarm discovered in depth by Lithium Ionic after exploration work. C and D) Outcrop and structural sketch illustrating the tectonic surfaces of the country rocks (Salinas Formation) that host pegmatites in the Bandeira deposit: S1, regional ductile foliation (schistosity); S2, post-S1 spaced cleavage; Jh, late horizontal joints; and Jv, late vertical joints. E) Cartoon illustrating a model for the spatial distribution and lateral relations of SRP orebodies in the Bandeira deposit. (Map and sections for A and B from Lithium Ionic reports, and CBL map from Romeiro, 1998. C, D, and E by Geologist Anderson Victoria).

Figure 7-11: Simplified Map Showing the Distributions of Li

The host rocks of SRP orebodies in the Bandeira deposit are banded to laminated cordierite-quartz-mica schists, locally containing disseminated sulfide and/or graphite-rich bands, with intercalations of massive calcsilicate rocks (Figure 7-12 and Figure 7-13). Most cordierite forms ellipsoidal (egg-shaped) stretched poikiloblasts syn-kinematic to the regional S1 schistosity (Figure 7-12). The banded to laminated quartz-mica schists represent metamorphosed sand-mud sediments, and the calcsilicate rocks are metamorphosed Ca-rich carbonate-mud sediments (marls). They show sharp contacts with the SRP orebodies that generally are concordant to the regional S1 foliation (often parallel to the compositional layering S0) but are also hosted by the S2 cleavage or foliation (Figure 7-13). The host schists may be enriched in decussate muscovite and/or biotite, black to green tourmaline, and recrystallized cordierite along narrow (cm to dm) fringes of contact metamorphism imposed by pegmatites (Figure 7-14). Although the host schists may be anomalous in lithium content close to pegmatites, they show no Li-ore mineral.



Notes: Partially weathered cordierite-quartz-mica schist rich in poikiloblasts (dark spots) of egg-shaped (ellipsoidal) cordierite (Crd) crowded of biotite and/or quartz inclusions and coronated by biotite. B) Calcsilicate rock with porphyroblasts of amphibole (dark green) and grossular garnet (light pink) within a massive matrix (greenish gray) mostly composed of quartz and plagioclase. C) Drill core segment showing the banded to laminated cordierite-quartz-mica schist with ellipsoidal cordierite (Crd; light spots coronated by biotite), light-coloured quartz-rich laminae, and intercalation of calcsilicate rock (CR).

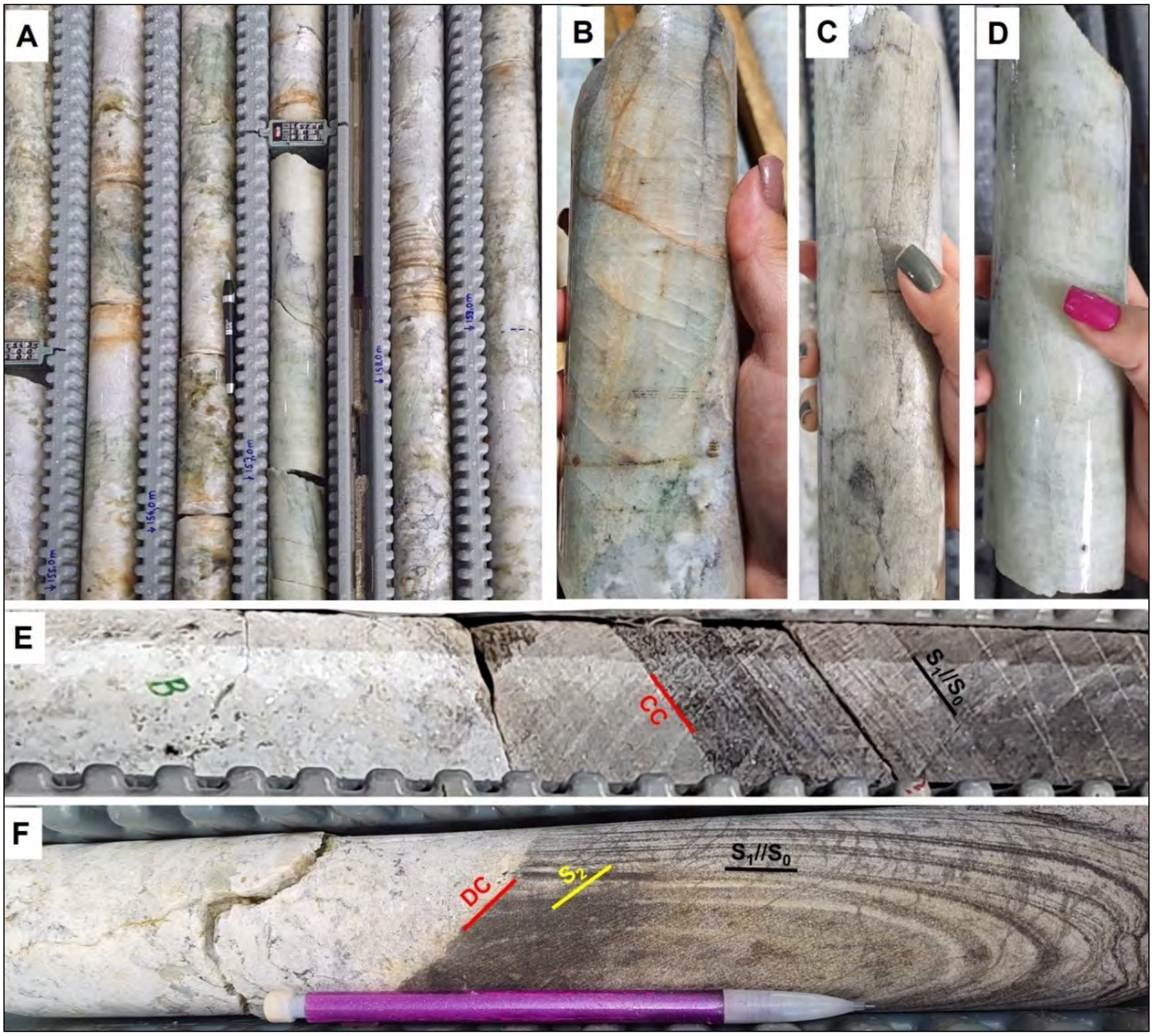
Figure 7-12: Host Rocks of Spodumene-Rich Orebodies in the Bandeira Deposit

The Bandeira spodumene orebodies show a rather simple mineralogical assemblage (Figure 7-13 and Figure 7-14), consisting of medium- to very coarse-grained spodumene phenocrysts, reaching up to 35 vol% on average, within a fine- to medium-grained matrix mostly composed of albite, perthitic K-feldspar (microcline), quartz, muscovite, and petalite, summing up to 95 vol% of the total matrix.

The scarce accessory minerals (mainly montebrasite, and Nb-Sn-Ta oxides) and secondary minerals (cookeite, sericite, zabuyelita, Fe-Mn oxides, clay minerals) generally comprise less than 5 vol%. In drill cores, the spodumene crystals are mostly free of hydrothermal and weathering alterations and very poor in mineral inclusions (Figure 7-13 and Figure 7-14). Conversely, surface outcrops, shallow diggings and exploration trenches cutting SRP bodies generally show weathered spodumene (Figure 7-10), forming pseudomorphs composed of white clay (kaolinite and montmorillonite). Rare spodumene-quartz intergrowth (SQUI) may be found associated with spodumene crystals (Figure 7-14). Petalite has been found in SRP's drill cores and thin sections, mostly occurring in the matrix as very fine- to fine-grained (sub-millimetric to 1 cm) crystals (Figure 7-14) and, more rarely, as coarser crystals locally found in rather restricted intervals.

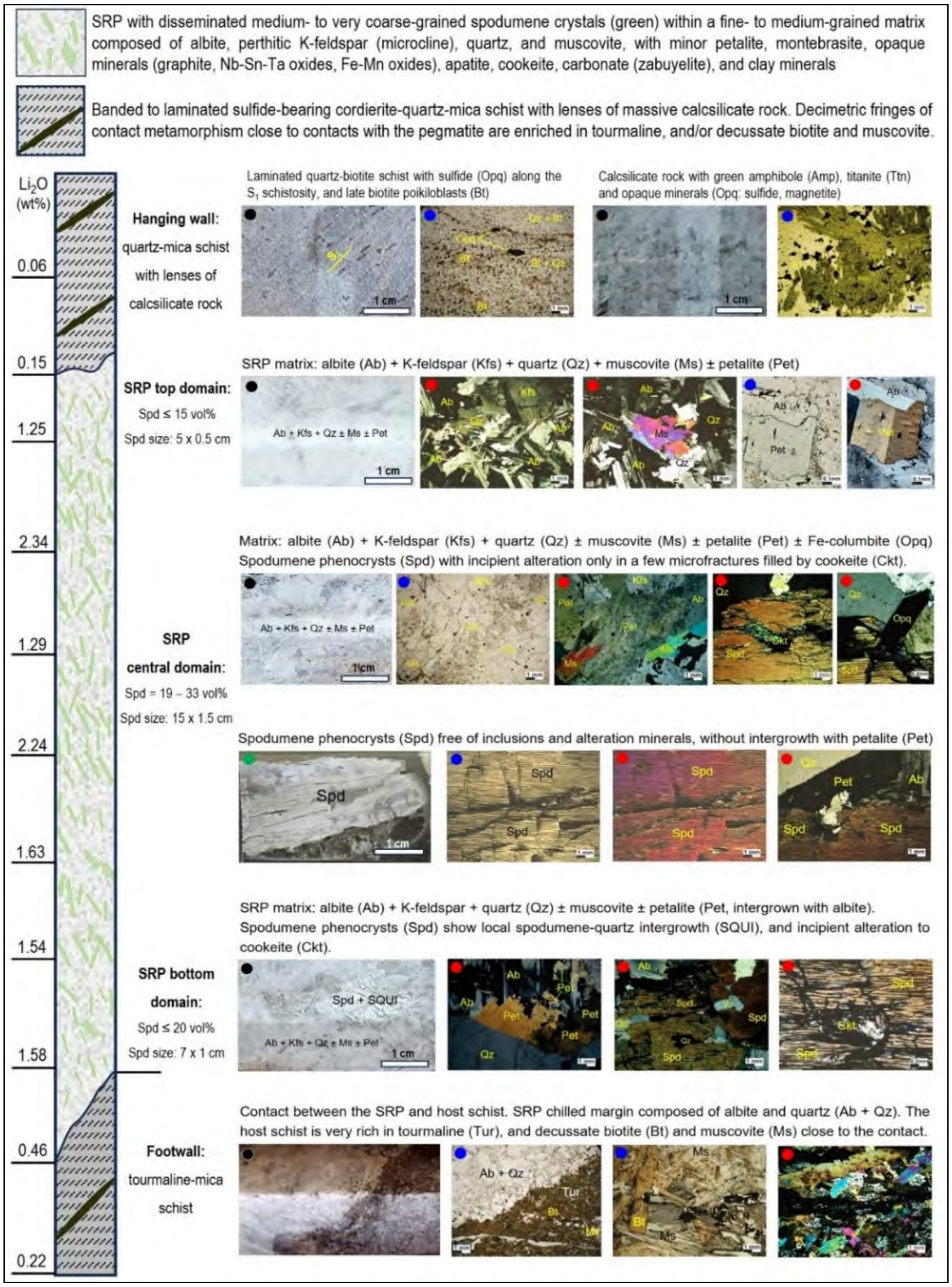
The thicker SRP bodies may show a lithium-barren and thin marginal zone rich in albite, generally rather discontinuous, followed inwards by a thick internal zone rich in disseminated spodumene (although spodumene may also be more concentrated in some domains than others along the internal zone). Owing to the upward migration of H_20-rich fluids, flat-lying SRP sections close to the hanging-wall contact, as well as the top termination ("head") of high-angle dip bodies, may show metasomatic units with miarolitic cavities that partially replaced the primary mineral assemblage. Many SRP bodies lack the external lithium-barren zone, showing disseminated spodumene along virtually the whole orebody (Figure 7-13 and Figure 7-14). Unidirectional solidification textures outlined by tabular to telescope-shaped spodumene crystals are common in Bandeira's SRP orebodies. Thin albite-rich pegmatites, barren to poor in lithium, are also found in the Bandeira pegmatite swarms.

In summary, the mineralization model for the Bandeira deposit consists of a dense swarm of unzoned spodumene-rich pegmatite dikes and sparse albite-rich/spodumene-barren pegmatite dikes. The Bandeira SRP dykes show a simple mineralogy, with spodumene, albite, perthitic microcline (perthitic K-feldspar), and quartz totaling up to 95 vol%, and rather scarce accessory minerals (Al-Li mica, Li-phosphates, petalite, zabuyelite, and others). These spodumene-rich pegmatites can generally be correlated with undeformed and unzoned albite-spodumene pegmatites (cf. Cerný 1991, Cerný et al., 2012).



Notes: A) Segment of a non-zoned SRP body with medium- to coarse-grained greenish spodumene disseminated in the quartz-albite-microcline-muscovite matrix; black minerals in spots and fracture fillings are Nb-Sn-Ta oxides and graphite. B to D) Features of tabular, greenish to white spodumene crystals free of or poor in inclusions. E) Concordant contact (CC) between albite-rich pegmatite border and laminated quartz-mica schist; the host surface is the regional schistosity S1 parallel to the compositional (sedimentary) layering S0. F) Discordant contact (DC) between albite-rich pegmatite border and laminated cordierite-quartz- mica schist.

Figure 7-13: Drill Core Samples from Spodumene-Rich Orebodies and their Host Rocks in the Bandeira Deposit



Source: From Pedrosa-Soares et al. (2023).

Notes: Based on intercept with 6,75 m thick and 1.99 wt% Li_2O Pegmatitic textures based on average grain size (cm): fine <2.5; medium = 2.5–10; coarse = 10–30; and very coarse >30. Spd size (e.g., 15 x 1.5 cm) based on the average length and thickness of spodumene crystals. Photo types indicated by dots: black, photo from unpolished sample; blue, photomicrography under parallel polarizers light; green, photo from polished thin section; red: photomicrography under crossed polarizers light. Drill core and thin sections described by Geologists Fabiana Guimarães and Laura Wisniowscki, respectively.

Figure 7-14: Characterization Illustrated Summary for a Typical Spodumene-Rich Pegmatite (SRP) of the Bandeira Deposit

8.0 DEPOSIT TYPES

According to the most accepted petrologic-metallogenetic classification of pegmatites (Cerný, 1991; Cerný & Ercit, 2005; Cerný et al., 2012), all the spodumene-rich pegmatites found within the Bandeira deposit, as well as in the whole Cachoeira Pegmatite Group, belong to the rare element class, lithium subclass, and albite-spodumene type (Figure 7-7 to Figure 7-14).

Although generally included in the lithium–cesium–tantalum (LCT) family, the non-zoned to poorly zoned SRPs found in the Bandeira deposit, as well as all the ore bodies mined in CBL's Cachoeira Mine since the 1990s (Figure 7-7 to Figure 7-14), the Xuxa and other spodumene-rich deposits of Sigma Lithium (Delboni et al., 2023; Sá, 1977), and the Outro Lado deposit of Lithium Ionic, are rather poor both in tantalum and cesium when compared with the complex zoned LCT pegmatites (e.g., Generosa, Jenipapo, Murundu, Urubu—local pegmatites names for traditional artisanal mines found in the Itinga Pegmatite Field (cf. Dias, 2015; Quéméneur & Lagache, 1999; Romeiro, 1998; Sá, 1977) and elsewhere (e.g., Cerný 1991; Cerný et al., 2012; London, 2008).

The SRP deposits consist of non-zoned to poorly zoned spodumene-rich pegmatites with spodumene reaching up to 35 vol% on average, and the total modal content of spodumene, albite, K-feldspar, quartz, and white mica (muscovite and/or lithium-rich mica) summing up more than 90 vol% of the whole body. Therefore, SRP bodies are very poor in accessory minerals, which are generally represented by lithium-micas, lithium-phosphates, niobium–tin–tantalum oxides, cookeite, carbonate, and graphite. They are also poor in secondary (metasomatic) units due to their rather fluid-poor (anhydrous) nature (Figure 7-9, Figure 7-13, and Figure 7-14). As a corollary, the scarcity of rare elements, except for lithium, imposes constraints on the geochemical prospecting methods to be applied in searching for spodumene-rich deposits. Conversely, the high lithium content (1.4 wt% Li_2O on average) in SRP-type magmas promotes a significant decrease in the crystallization temperature and viscosity of the silicate melt, leading to the high mobility that allows such lithium-rich magmas to crystallize as very large, but relatively narrow, SRP bodies, with hundreds to thousands of metres long and wide, but only decimetres to a few decametres thick.

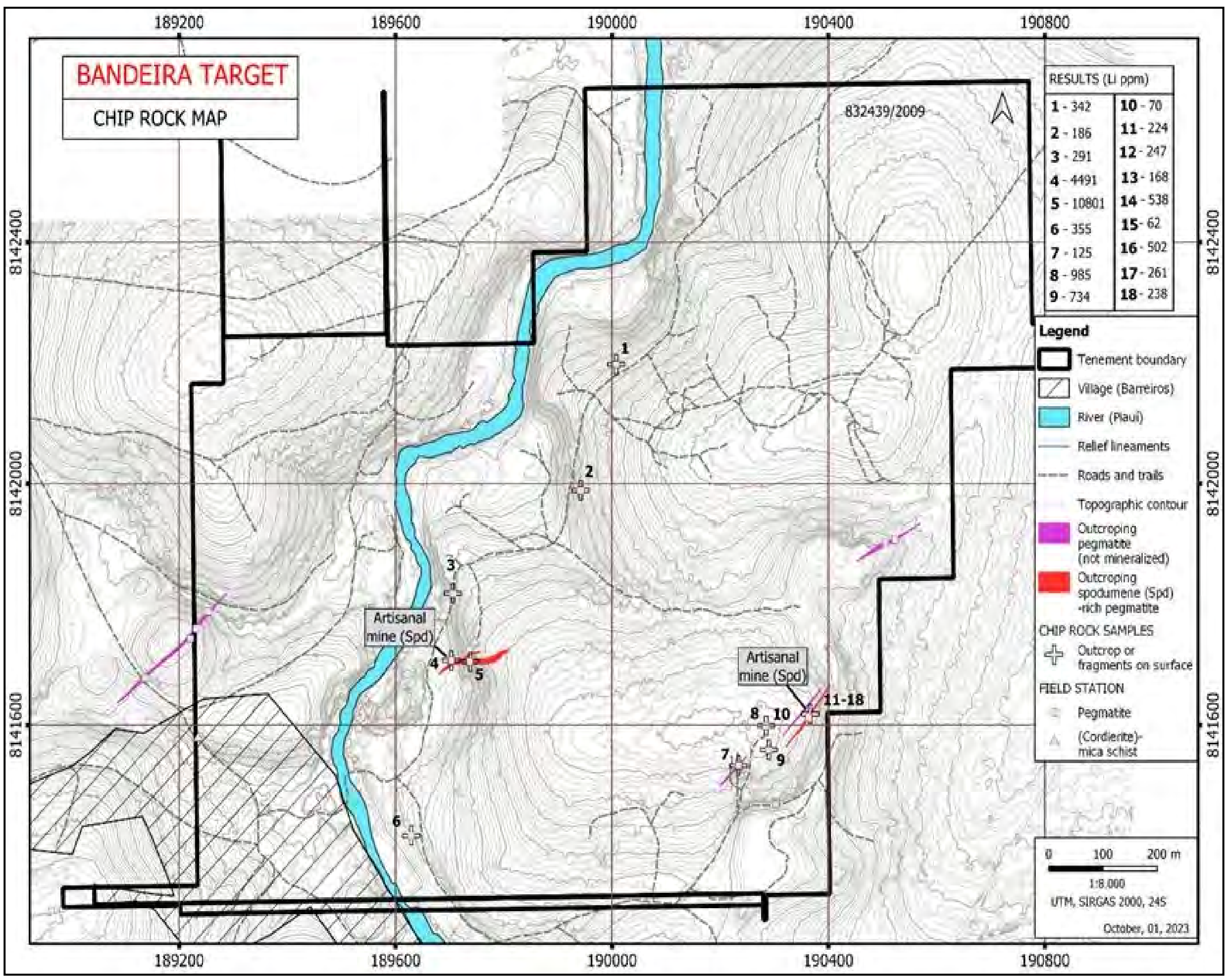
Therefore, for prospection and exploration work related to spodumene-rich deposits, it is very important to distinguish between the non-zoned and poorly zoned SRPs (i.e., pegmatites of the albite-spodumene type) and the complex zoned LCT pegmatites.

9.0 EXPLORATION

Significant fieldwork has been carried out in the Bandeira deposit, employing a comprehensive approach that included rock chip sampling, soil sampling, a trench program, structural analysis, and a drilling program (see Section 10). These activities were instrumental in deepening our understanding of the local geology and identifying potential SRPs, a crucial step in the exploration process.

9.1 Chip Rock Sampling

Despite the extensive residual soil cover, field mapping led to the recognition of pegmatites in artisanal mines (garimpos), in situ outcrops, or as fragments dispersed on the surface. Spodumene crystals were identified only in pegmatites founded in artisanal mines and surrounding areas. Figure 9-1 shows the location of each collected sample and its lithium content (ppm), and the location of outcropping pegmatites, mineralized in spodumene or not.



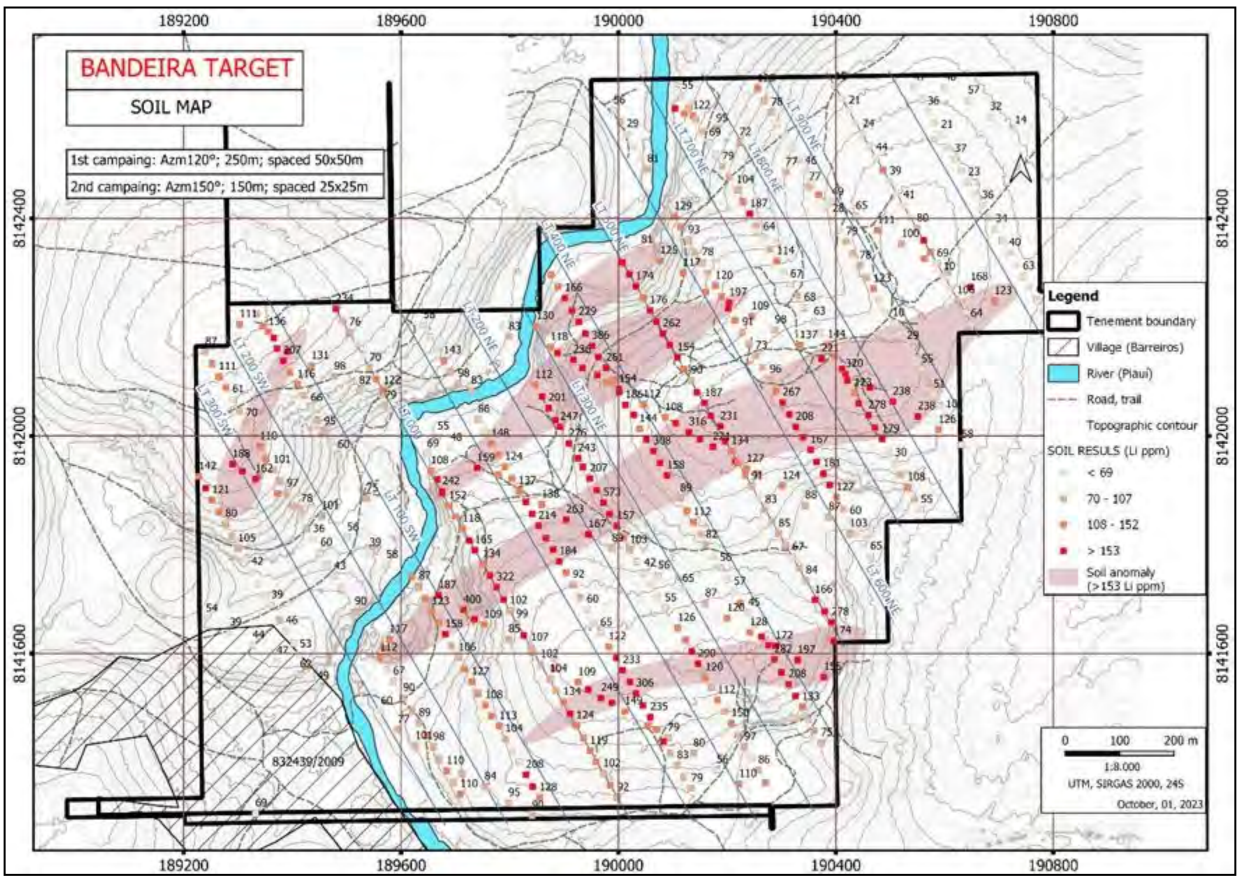
Note: Location of Each Sample and its Lithium Yield (ppm), and the Areas where Pegmatites are Exposed on the Surface.

Figure 9-1: Bandeira Deposit—Chip Rock Sample

9.2 Soil Sampling Program

The soil sampling program in the Bandeira area was conducted in two campaigns. In the first, sample transects were on azimuth 120° and spaced at 250 m apart. Samples were collected every 50 m along each transect. In the second campaign, the transects were oriented to azimuth 150°, spaced 150 m apart, with samples collected every 25 m along the transects.

In all, 537 samples were collected in the Bandeira area, and the lithium content in the soil varied from 10 ppm to 573 ppm. Calculations based on the results distribution indicated a subdivision of the lithium content as low grade (<69 Li ppm); low to moderate grade (70–107 Li ppm); moderate to high grade (108–152 Li ppm); and high grade (>153 Li ppm). Based on the distribution of the results, it was possible to identify at least five high-grade anomalous zones that represent more favourable spots to prospect SRPs (Figure 9-2). These anomalous regions are strongly oriented in a northeast–southwest direction, which is the same strike as the regional foliation and the mapped pegmatites in the Bandeira area and adjacent region.



Note: Northeast–Southwest Trend Coincides with the Direction of the SRPs.

Figure 9-2: Bandeira Deposit—Soil Geochemical

9.3 Trenching Program

After the soil geochemistry survey, a trenching program was devised to investigate the anomalous lithium-content areas. A total of 42 trenches was executed, totalling 2,293 m of trench (Table 9-1). The trenches were preferentially positioned above the soil anomalies, and the majority intercepted pegmatite (Figure 9-3). Due to the degree of weathering, the exposed pegmatites in some trenches are very decomposed, exhibiting a characteristic whitish colour, a significant contrast with the horst schist (see an example of trench ITTRE-22-006 in Figure 9-4 A and B). The decomposed pegmatites are friable, and it was possible to diagnose only quartz, kaolin, and flake muscovite. However, in other trenches it was possible to observe more preserved pegmatites, with visible spodumene centimetric crystals (see trench example ITTRE-22-001 in Figure 9-4 C and D). Independent of the conservation state, as part of the procedure, every pegmatite higher than 30 cm of thickness were mapped in the trench was sampled to verify the lithium content (see channel sampling line on the pegmatite excavated in trench ITTRE-22-001 shown in the scheme of Figure 9-4 E).

Table 9-1: Summary of Trenches Executed in the Bandeira Deposit (Coordinates UTM X, Y, Z in metres, Datum Sirgas 2000 Zone 24 S)

Trench	X	Y	Z	Length (m)	Azimuth (°)	Dip (°)
ITTRE-22-001	189772	8141686	301	43	308	0
ITTRE-22-002	190395	8141705	304	67	155	0
ITTRE-22-003	190156	8142046	336	36	150	0
ITTRE-22-003B	190158	8142055	336	11	150	0
ITTRE-22-004	189960	8141898	298	64	155	0
ITTRE-22-005	190401	8142141	343	47	150	0
ITTRE-22-006	190451	8142056	342	54	150	0
ITTRE-22-007	190292	8142082	340	50	150	0
ITTRE-22-008	190055	8141994	324	80	150	0
ITTRE-22-009	189936	8142184	299	74	150	0
ITTRE-22-010	189888	8142019	279	95	150	0
ITTRE-22-011	190001	8141581	323	140	150	0
ITTRE-22-012	190077	8142201	312	51	150	0
ITTRE-22-014	190304	8141550	323	53	150	0
ITTRE-22-015	190475	8141898	308	8	150	0
ITTRE-22-016	190085	8141692	318	66	150	0
ITTRE-22-017	190319	8142037	339	109	150	0
ITTRE-22-018	190189	8141817	316	102	150	0
ITTRE-22-020	190538	8142145	341	51	150	0
ITTRE-23-021	189815	8141416	303	98	155	0
ITTRE-23-014A	190244	8141657	323	53	150	0
ITTRE-23-023	189341	8141921	315	70	150	0
ITTRE-23-013	189710	8141979	279	78	150	0
ITTRE-23-019	190173	8141685	322	100	150	0
ITTRE-23-024	189979	8142318	276	65	330	0

Trench	X	Y	Z	Length (m)	Azimuth (°)	Dip (°)
ITTRE-23-025	190214	8142105	336	115	150	0
ITTRE-23-022	189358	8142195	335	97	150	0
ITTRE-23-028	190619	8142362	341	170	147	0
ITTRE-23-030	190483	8142200	338	85	150	0
ITTRE-23-031	190454	8142178	340	70	150	0
ITTRE-24-027	190297	8142651	304	55	135	0
ITTRE-23-026	190576	8142091	337	80	140	0
ITTRE-23-029	190598	8142251	340	0	150	0
ITTRE-24-032	190562	8142012	332	88	160	0
ITTRE-24-033	190736	8142360	330	70	150	0
ITTRE-24-034	190499	8142105	345	83	150	0
ITTRE-24-035	190394	8142020	336	65	145	0
ITTRE-24-036	190848	8142268	340	72	150	0
ITTRE-24-037	190548	8142029	335	35	190	0
ITTRE-24-038	190504	8142020	338	46	150	0
ITTRE-24-039	190423	8142048	341	59	150	0
ITTRE-24-040	190189	8142021	337	0	150	0
ITTRE-24-041	189958	8141456	313	0	330	0
ITTRE-24-042	190160	8142008	335	70	150	0

In addition to confirming the presence of pegmatites and studying their mineral composition, the trenches played an important role in determining the strike and dip of the orebodies. This provided a higher level of confidence when planning the borehole locations for the drilling campaign.

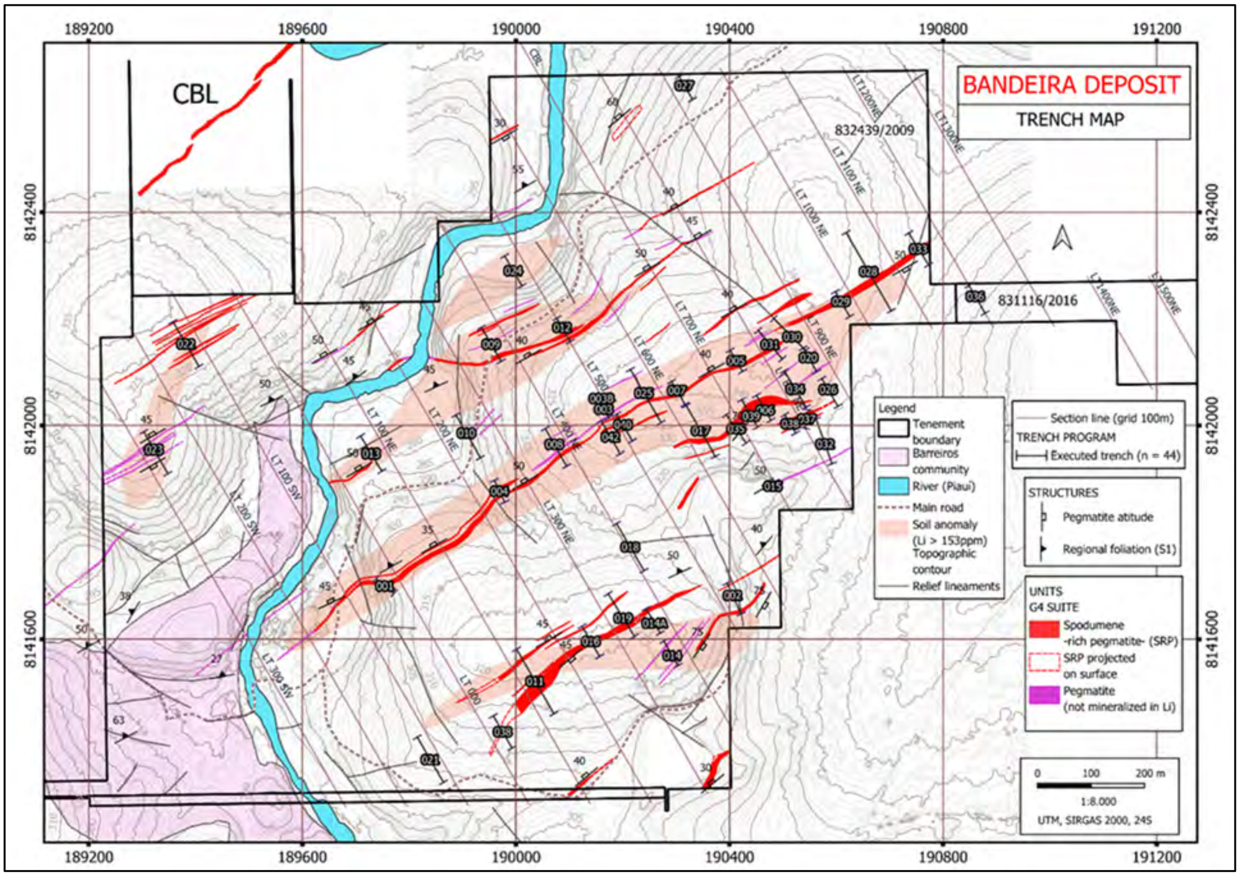
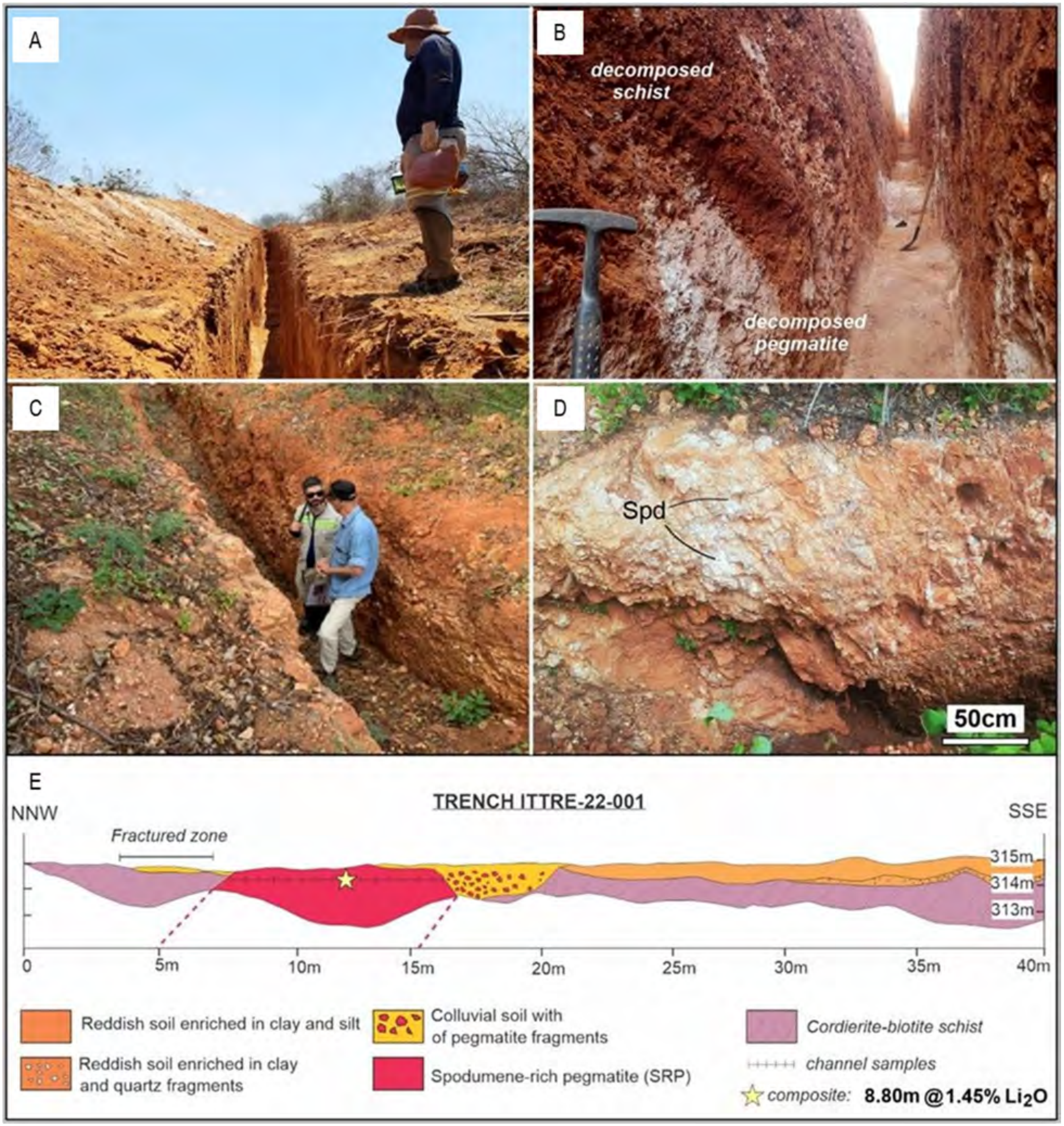


Figure 9-3: Bandeira Deposit Trench Sample Map—22 Trenches Sited Preferentially in Soil Anomalies, Most of Which Intercepted Pegmatites

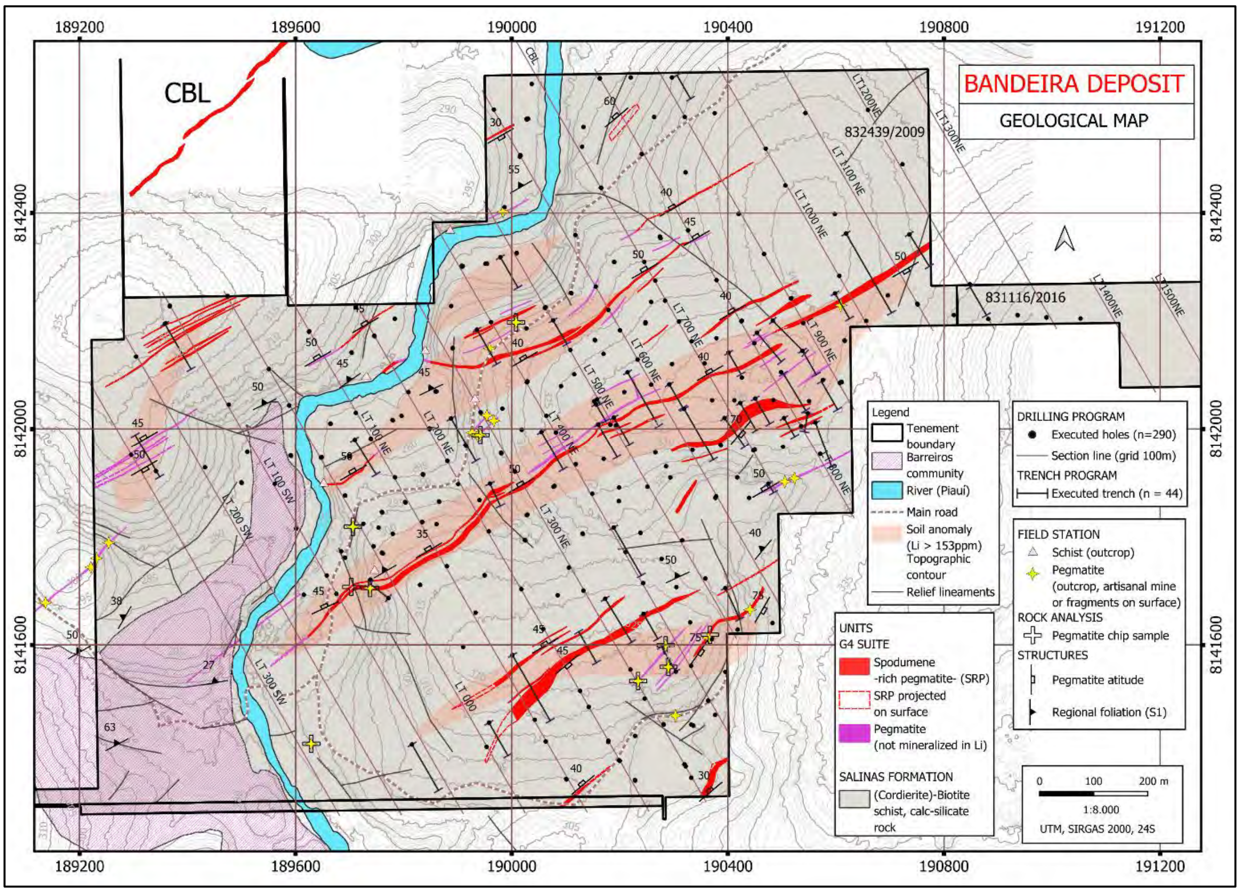


Notes: A and B) Trench ITTRE-22-006 and Detail of the Highly Decomposed Excavated Whitish Pegmatite Contrasting with the Host Reddish Decomposed Schist; C and D) General View of Trench ITTRE-22-001 and Detail of the Spodumene Crystals in the Excavated Pegmatite; E) Cross-Section of Trench ITTRE-22-001 Emphasizing the Mapped Units in the Trench and the Channel Samples Collected on the Spodumene-Rich Pegmatite.

Figure 9-4: Bandeira Project Sample Trenches

9.4 Structural Analysis

Although lacking outcrops, the few exposures of mica schists from the Salinas Formation are very relevant and helpful to understanding the structures in the Bandeira deposit. Ductile and brittle structures are recognized. The ductile structures were produced during the progressive metamorphism related to the syn-collisional phase of the Araçuaí orogen. In contrast, the brittle structures are younger and are interpreted as related to the gravitational collapse of the orogen during the post-collisional phase. The structural map of the Bandeira target (Figure 9-5) shows the distribution of the structures and the projection of the non-exposed pegmatites. In that case, the attitude of each body was measured considering the interpreted geological model.



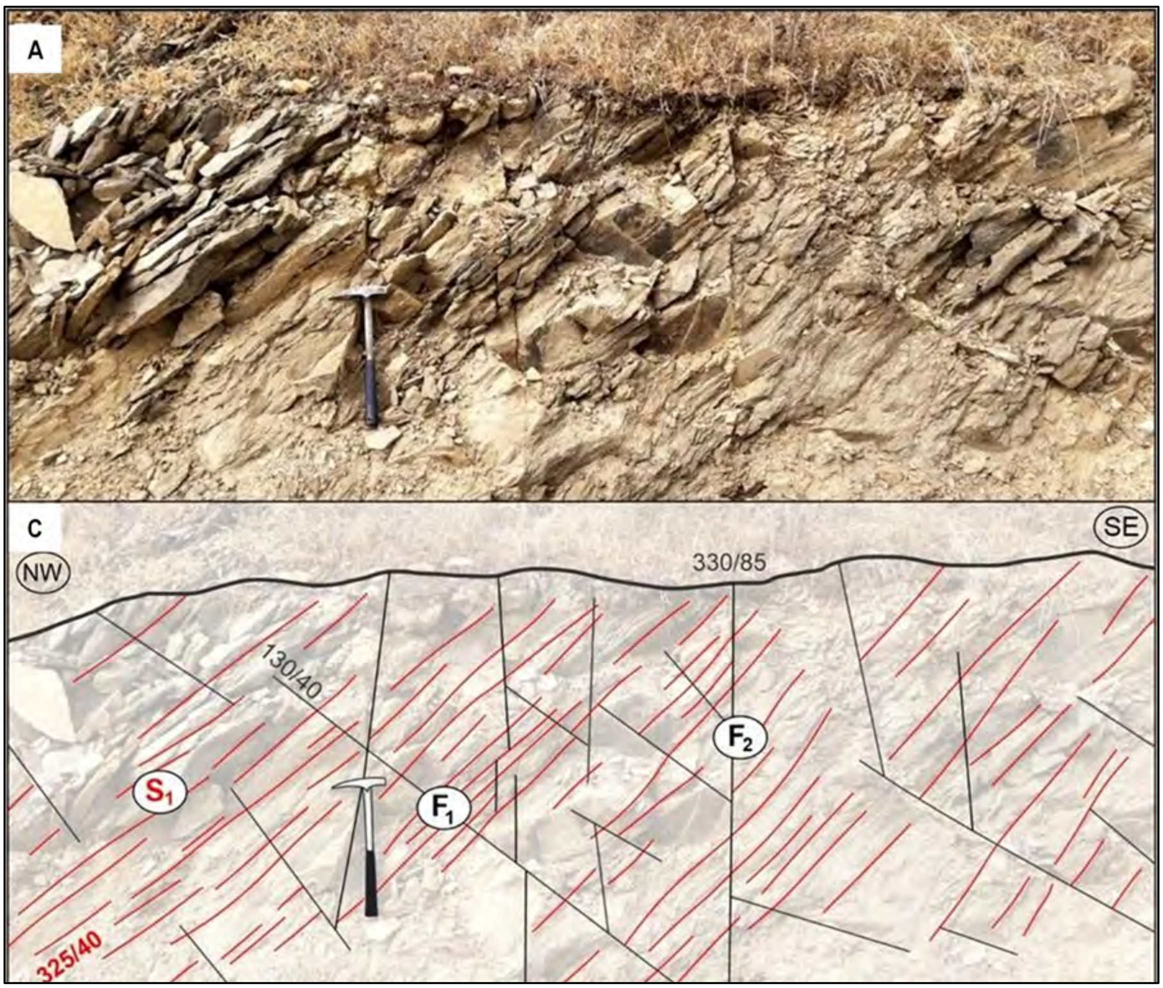
Note: The pegmatite veins are projections of the known intrusions based on the intercepts in drill holes. The attitude of each vein is based on the modelled veins.

Figure 9-5: Bandeira Target Structural Map Emphasizing the Distribution of Mapped Structures

The dominant ductile structural feature is the pervasive regional schistosity (S_1), which exhibits a consistent orientation in both strike and dip across the entire area (modal: N50E/45NW). The stretched lineation (Lx) complements the ductile structural framework, often manifested as elongated micas or ellipsoidal cordierite porphyroblasts crystalized along S_1. This lineation is down-dip and indicates tectonic transport along the northwest–southeast direction.

The brittle structures are represented by a series of fractures, occasionally joints, that intersect the S_1 schistosity and seem part of a conjugate system (Figure 9-6). Each structure was denoted as either F_1 (fractures with a moderate dip to the southeast) or F_2 (sub-vertical fractures), and their presence and prevalence may vary depending on the outcrop. The F_1 structure seems more pervasive in the entire region, which also allows the interpretation of these structures as related to the development of a cleavage fracture system (secondary foliation S_2). All these planar structures in the Bandeira area (S_1, F_1, and F_2) consistently display a standard orientation along the northeast–southwest strike, with variations only in their dip angles.

Understanding the structural patterns in the host rocks is crucial for prospecting pegmatites, since these structures serve as the surfaces that guide the migration of the silicate magmatic residues. Consequently, they profoundly influence the shape and continuity of the pegmatite bodies enriched in spodumene in the Bandeira area.



Notes: A) Fractured Biotite-Schist in the Bandeira Area (UTM: E-189,232, N-8,141,577)
B) Scheme Emphasizing the Interpreted Structures in the Same Outcrop (a): Regional Ductile foliation (schistosity S_1) and Spaced Brittle Structures Possibly Related to Conjugated System (F_1, with Moderate Dip to Southeast, and F_2, Subvertical

Figure 9-6: Fractured Biotite-Schist in the Bandeira Area and Scheme Emphasizing the Interpreted Structures in the Same Outcrop

9.5 Geophysical Surveys

A small-scale induced polarization (IP) geophysical survey was conducted in 2022.

Induced polarization (IP) and resistivity (RES) are commonly used to delineate the resistive or conductive portions of pegmatites subsurface. The inverted data are not always helpful or productive in the very early stages of exploration; however, in Lithium Ionic's case, there were sufficient outcrops to measure some attitude data, so the general trend of the pegmatites could be extrapolated using the subsurface IP anomalies. Energy-induced data were acquired through the dipole–dipole arrangement in two distinct areas: Bandeira involved six lines totalling 5,150 min March and April 2022.

The principle for IP prospecting is based on the injection of current through several electrodes into the ground. Data acquired depend on the resistivity values at each point, terrain geometry, and the electrodes' geometric arrangement (array). For an uninterrupted current flow, the IP depends on the terrain's impedance and the current frequency. The IP can be measured in the time and frequency domains. Once processed, the raw data can be viewed in two dimensions (2-D) or, if available, in a 3-D environment. Resistivity and induced polarization data were acquired in Bandeira with the dipole–dipole arrangement (AB = MN = 25 m). Figure 9-7 shows the location of the lines and measuring stations of the chargeability and resistivity data. Some pseudo-sections of apparent chargeability and apparent resistivity 2-D models of the processed data are shown in Figure 9-7.

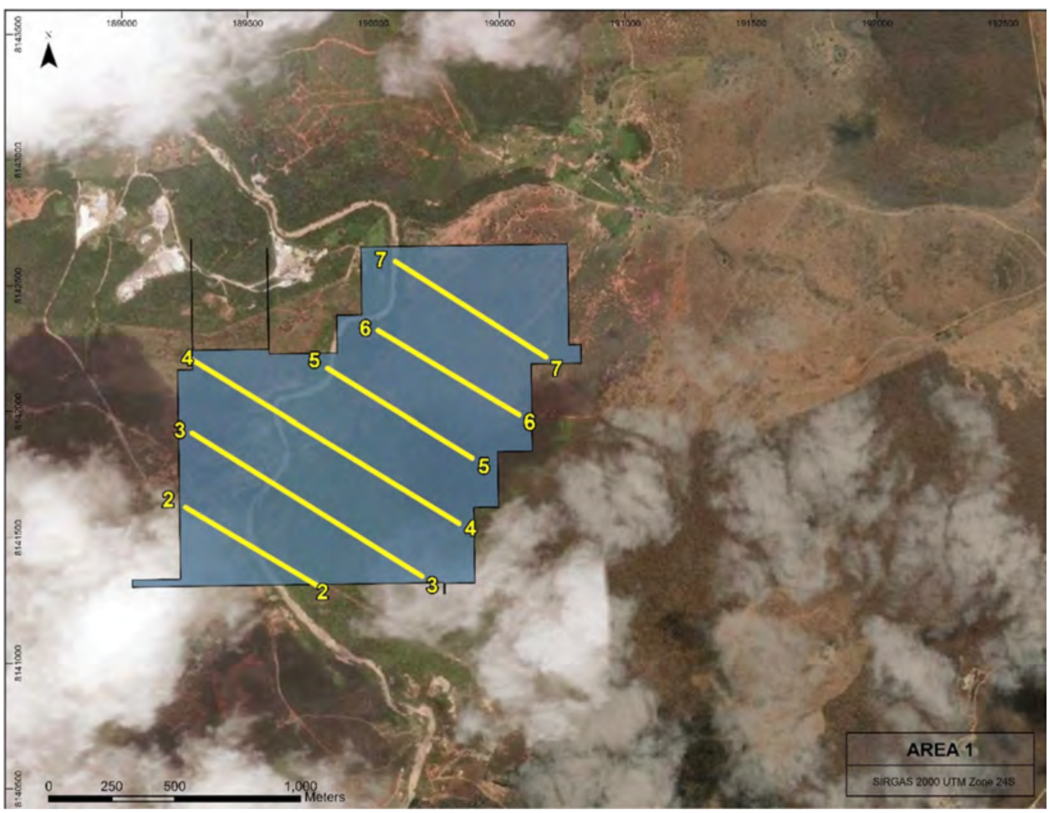
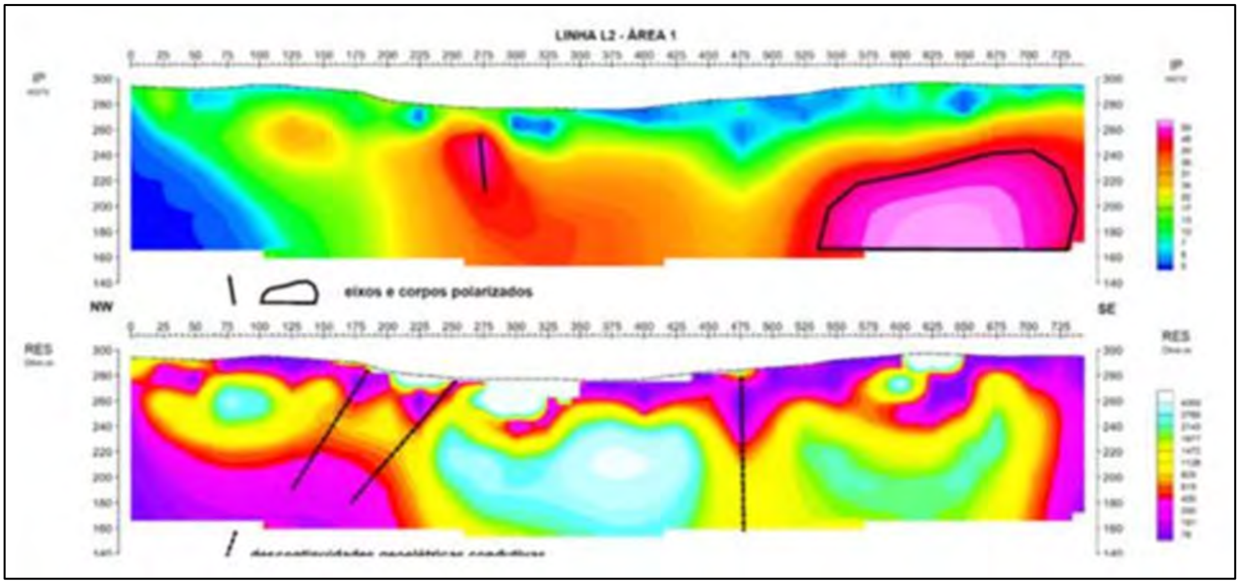


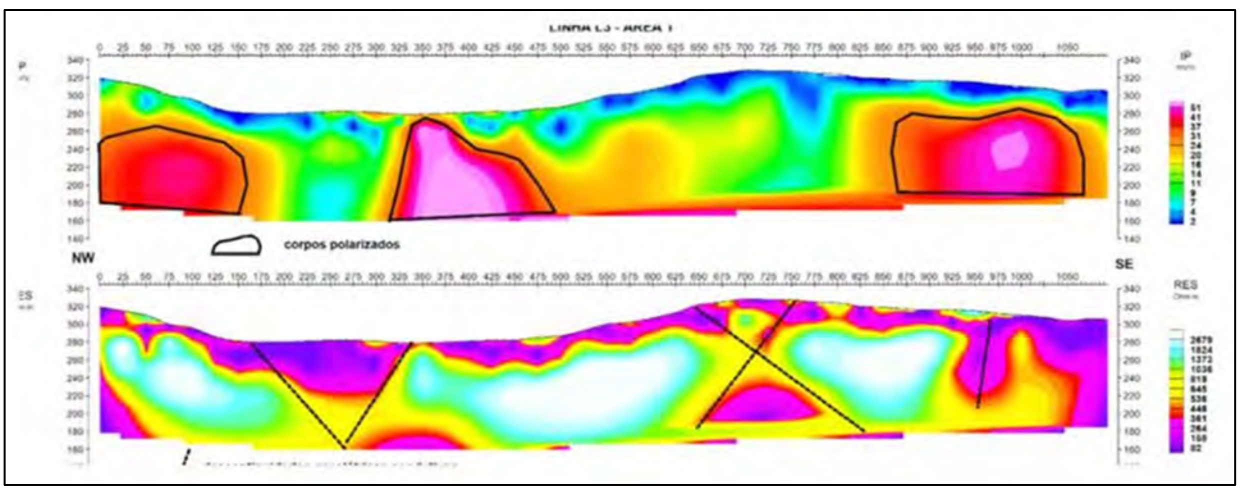
Figure 9-7: Location of the Lines and Measuring Stations of the Chargeability and Resistivity Data for Bandeira (Area 1)

The top panels of Figure 9-8 to Figure 9-10 show some examples of the actual chargeability sections and the lower panels the real resistivity sections of some of the lines, are shown below.



Source: Stevanato (2022).

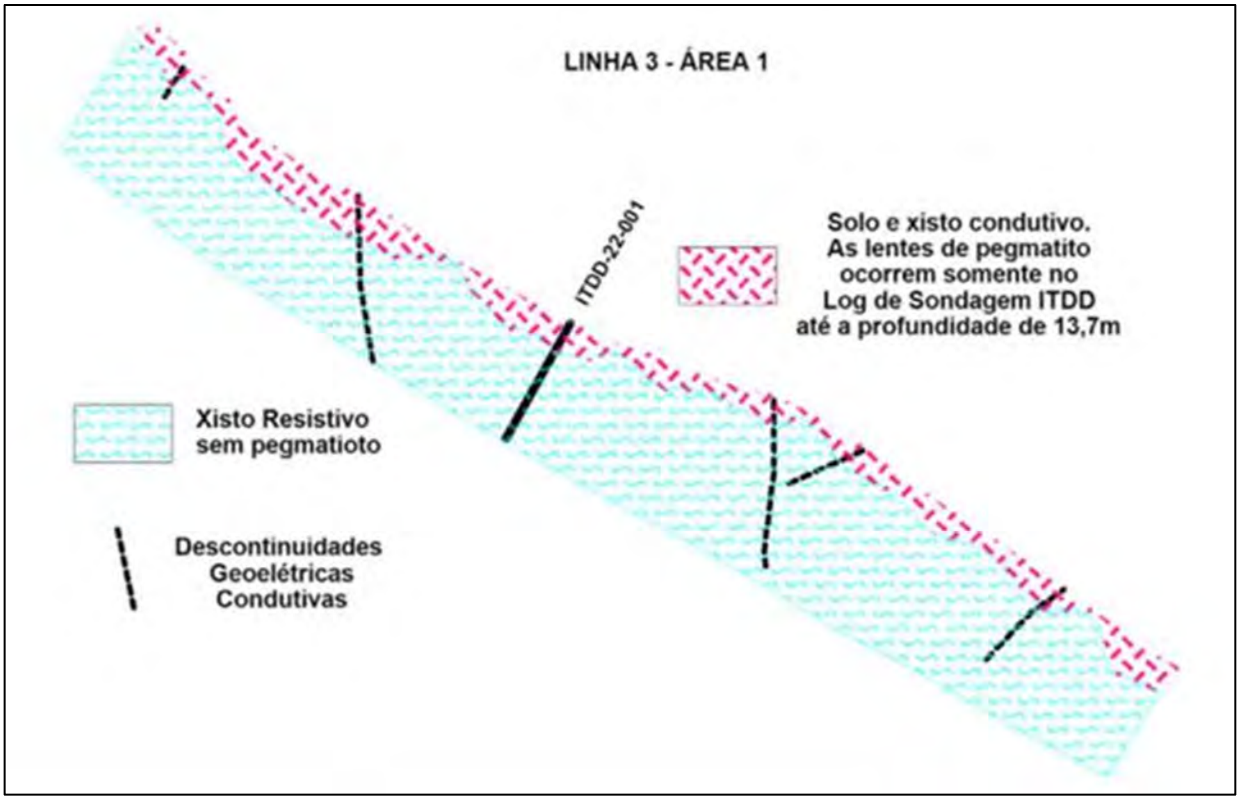
Figure 9-8: Depth Model of the Chargeability (Top Panel) and the Actual Resistivity (Bottom Panel) of Line 2 of Bandeira



Source: Stevanato (2022).

Figure 9-9: Depth Model of the Actual Chargeability (Top Panel) and the Actual Resistivity (Bottom Panel) of Line 3 of Bandeira

The geophysical-geological model was designed from the resistivity data of Line 3 of Bandeira. This model was parameterized from the log data of the ITDD-22-001 rotary drilling and is composed of a unit of shales throughout the length measured by geophysics. Superimposed on this geological homogeneous unit is another consisting of soil and conductive shale that, in the probing carried out, intercepted the pegmatite lenses to a depth of 13.7 m. Other interpretations suggest the presence of conductive geoelectric discontinuities that probably correspond to fault or fracture systems.



Source: Stevanato (2022).

Figure 9-10: Conceptual Geological Model from Geophysics Data

Lithium Ionic geoscientists reviewed the inverted data to determine some baseline information to choose a general attitude of the pegmatitic dikes and, if possible, to assist in designing some drill-hole targets.

10.0 DRILLING

10.1 MGLIT Drilling Campaigns

As of November 20, 2024 Lithium Ionic has successfully executed 297 diamond drill holes within the Bandeira Deposit, as detailed in Table 10-1 to Table 10-3 and Figure 10-1.

All diamond drilling activities conducted within the Bandeira Property until November 20, 2024, were incorporated into the Mineral Resource estimation process, ensuring compliance with best practices and standards.

Table 10-1: Bandeira Diamond Drill-Hole Summary

Year	Drill Hole Count	Total Length (m)
2022	49	5,570
2023	207	46,642
2024	41	8,089
Total	297	60,301

10.2 Drill Type

All drilling operations were conducted using HQ (63.5 mm diameter) and NQ (47.6 mm diameter) core sizes. This approach was chosen to ensure the retrieval of pristine and representative core samples, which are essential for accurate geological logging, adequate sample support, and to secure a material supply for future metallurgical testing purposes.

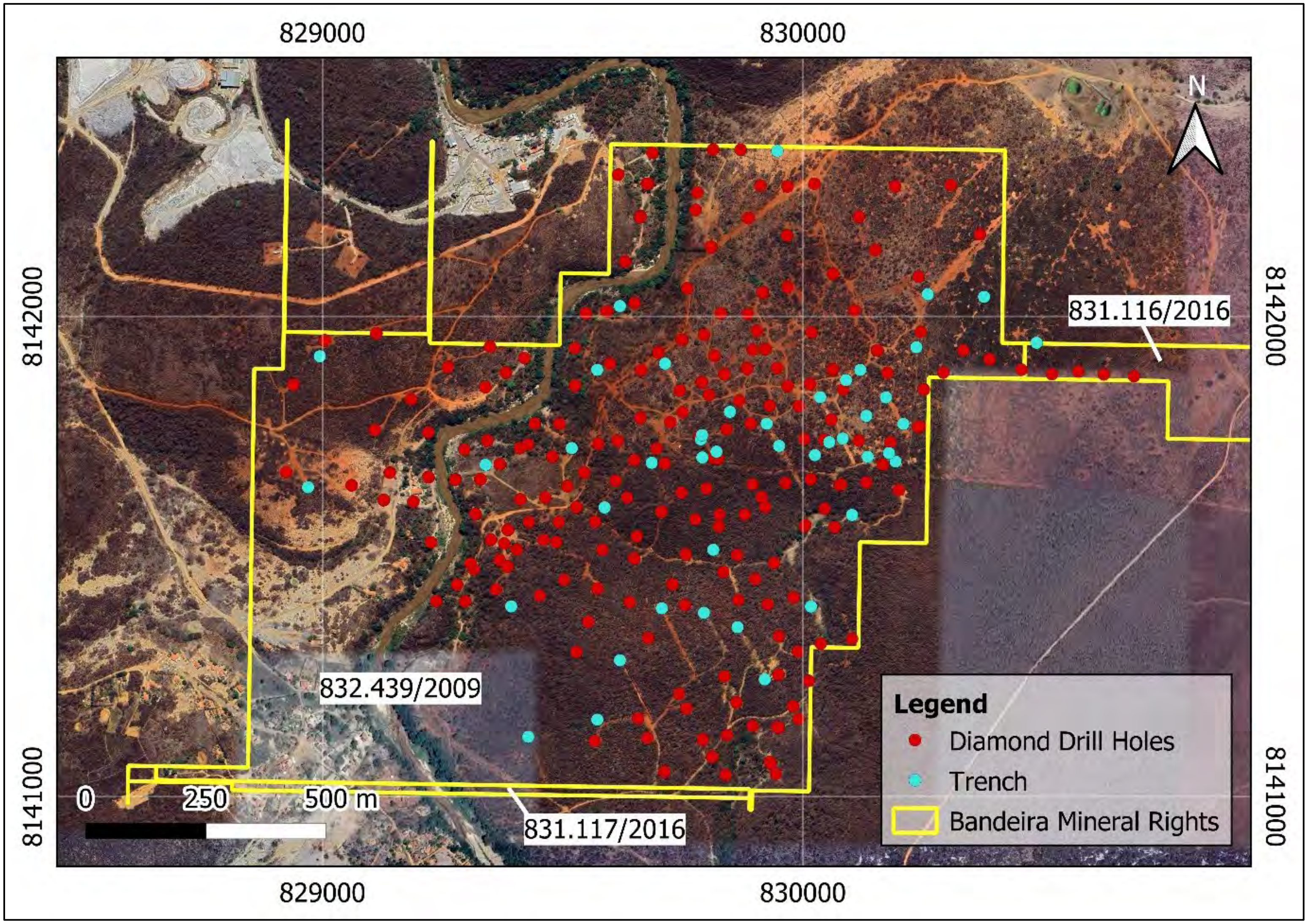
10.3 MGLIT Drilling Campaigns

The following Brazilian-based companies undertook the 2022–2024 drill program at Bandeira:

- Servdrill Perfuração e Sondagens Ltda (http://servdrill.com.br).
- Servitec Foraco Sondagem AS (https://www.foraco.com.br/).
- GEOSOL Ltda. (https://www.geosol.com.br).

10.4 Drill-Collar Monuments

All drill-collar monuments were surveyed using a differential GPS, and the driller placed the monuments once the hole had been completed.



Source: GE21 (2024).

Figure 10-1: Drill Holes and Trenches

10.5 Drill-Hole Surveying

Drill holes were drilled with a plunge between 50° and 90°. Core holes are generally oriented at azimuth 330° and 150°, perpendicular to the pegmatite intrusion orientation.

Lithium Ionic used REFLEX GYRO SPRINT IQ EQ0394 to obtain all downhole survey data.

According to the REFLEX GYRO SPRINT IQ website, the tool can maintain high survey accuracy. The device is connected to a cloud-based data hub with a secure chain of custody and a QA/QC application with real-time access to drilling survey data. Data transfer from field to office ensures minimum clerical errors related to processing and interpretation.

Lithium Ionic rented the REFLEX GYRO SPRINT IQ downhole Reflex tool and completed all hole surveys in real time. MGLIT staff had quick access to results through the cloud-based data hub. The design of the high-speed survey allowed Lithium Ionic field staff (including geologists and driller Continuous survey data from the tool's north-seeking sensors, which assisted with obtaining GPS locations.

The QPs have no way to verify the accuracy of the survey method; hence, the authors will rely on the statements and information that Lithium Ionic provided.

10.6 Core Orientation

Lithium Ionic began implementing REFLEX ACT III to establish core orientation for drill holes within the Bandeira Project after July 2023. As of the effective date, November 20, 2024, core orientation has been determined for four drill holes. Lithium Ionic has consistently integrated core orientation into its drilling program and will now prioritize its application in strategically significant sections of the geological model moving forward.

The Reflex core orientation system is based on recovering the core barrel orientation after a run. The Reflex orientation tool begins the orientation process by inserting the device in the core barrel using a specially made "shoe." The tool records core-barrel orientation each minute during a core run. The Reflex sleeve that attaches to the upper drill rod measures the direction of the top-of-hole using built-in accelerometers. Upon completion of a run, the drill string is left undisturbed while the communication tool on the surface counts down the time to the next reading; after this, the barrel can be withdrawn. On the surface, the tool is inserted into the end of the barrel, and the barrel is rotated until it indicates that the barrel is in the same up–down position as it was in the hole. The core, barrel, and shoe are then marked using a level to confirm vertical upward position. After the line is split, the top of the core marks is transferred along the length of the recovered core.

The QPs could not verify the orientation method's accuracy and instead relied on the statements and information that MGLIT provided.

10.7 Drill Core Chain of Custody

The drill cores are stored in plastic or wooden boxes. The drilling companies always transport the core directly from the drilling site to the Lithium Ionic core sheds in Araçuaí. Lithium Ionic's staff receives all core boxes delivered.

10.8 Core-Logging Procedures

Lithium Ionic adheres to a core-logging methodology carried out by geologists and technicians.

The following procedures are conducted:

- Preparing drilling site
- Locating drill collars
- Field-verifying and validating metreage and quality of drill cores
- Core survey drilling
- Photographing the core box
- Logging detailed petrographic and geological structural of core
- Geotechnical logging (RQD, weathering types)
- Sample geochemistry logging programming and QA/QC procedures
- Determining drill-core density for each programmed sample
- Preparing core samples for geochemistry analysis
- Sending samples to the laboratory according to logistics protocols.

Each procedure has its respective spreadsheet and is stored in digital form within Lithium Ionic's customized database.

Table 10-2: Bandeira Project Drill Holes

HOLE-ID	Location-X	Location-Y	Location-Z	Max. depth	Method	Year
ITDD-22-001	189 738	8 141 720	296	101	DDH	2022
ITDD-22-002	189 760	8 141 770	302	96	DDH	2022
ITDD-22-003	190 330	8 141 641	323	60	DDH	2022
ITDD-22-004	190 153	8 142 051	336	76	DDH	2022
ITDD-22-004B	190 153	8 142 051	336	40	DDH	2022
ITDD-22-005	190 183	8 142 008	336	68	DDH	2022
ITDD-22-006	190 116	8 142 101	331	125	DDH	2022
ITDD-22-007	189 861	8 141 823	302	71	DDH	2022
ITDD-22-008	189 744	8 141 782	299	75	DDH	2022
ITDD-22-009	190 426	8 142 095	345	110	DDH	2022
ITDD-22-010	190 379	8 142 168	341	4	DDH	2022
ITDD-22-011	189 803	8 141 864	292	100	DDH	2022
ITDD-22-012	189 901	8 141 897	288	100	DDH	2022
ITDD-22-013	189 881	8 141 940	284	100	DDH	2022
ITDD-22-014	189 784	8 141 910	285	103	DDH	2022
ITDD-22-015	189 675	8 141 694	275	51	DDH	2022
ITDD-22-016	189 980	8 141 955	308	103	DDH	2022
ITDD-22-017	189 725	8 141 824	293	100	DDH	2022
ITDD-22-018	190 064	8 142 024	326	154	DDH	2022
ITDD-22-019	189 658	8 141 728	276	102	DDH	2022
ITDD-22-020	190 082	8 141 993	327	91	DDH	2022
ITDD-22-021	190 258	8 142 082	339	131	DDH	2022
ITDD-22-022	190 006	8 141 920	311	100	DDH	2022
ITDD-22-023	190 063	8 142 225	304	149	DDH	2022
ITDD-22-024	190 156	8 142 264	313	180	DDH	2022
ITDD-22-025	190 233	8 142 129	335	130	DDH	2022
ITDD-22-026	190 357	8 142 121	342	121	DDH	2022
ITDD-22-027	190 449	8 142 159	342	109	DDH	2022
ITDD-22-028	190 333	8 142 162	339	112	DDH	2022
ITDD-22-029	189 962	8 142 198	299	171	DDH	2022
ITDD-22-030	190 426	8 142 200	337	110	DDH	2022
ITDD-22-031	190 540	8 142 196	339	130	DDH	2022
ITDD-22-032	190 245	8 142 309	320	163	DDH	2022
ITDD-22-033	190 516	8 142 242	339	100	DDH	2022

HOLE-ID	Location-X	Location-Y	Location-Z	Max. depth	Method	Year
ITDD-22-033A	190 517	8 142 242	339	22	DDH	2022
ITDD-22-034	190 043	8 141 461	311	121	DDH	2022
ITDD-22-035	190 326	8 142 368	320	205	DDH	2022
ITDD-22-036	190 127	8 141 515	317	121	DDH	2022
ITDD-22-037	189 954	8 141 411	305	122	DDH	2022
ITDD-22-038	190 379	8 142 276	327	150	DDH	2022
ITDD-22-039	190 284	8 142 238	331	150	DDH	2022
ITDD-22-040	190 063	8 141 421	306	151	DDH	2022
ITDD-22-041	190 467	8 142 324	338	151	DDH	2022
ITDD-22-042	190 606	8 142 283	341	110	DDH	2022
ITDD-22-043	190 143	8 141 485	314	151	DDH	2022
ITDD-22-044	190 420	8 142 398	334	202	DDH	2022
ITDD-22-045	190 536	8 142 005	333	101	DDH	2022
ITDD-22-046	190 179	8 141 423	305	120	DDH	2022
ITDD-22-047	190 507	8 142 451	340	157	DDH	2022
ITDD-22-048	190 448	8 141 960	326	100	DDH	2023
ITDD-22-050	190 200	8 142 183	327	151	DDH	2023
ITDD-22-049	190 179	8 141 421	305	109	DDH	2023
ITDD-23-051	190 101	8 141 351	298	91	DDH	2023
ITDD-23-052	190 166	8 142 446	294	481	DDH	2023
ITDD-23-053	190 109	8 142 146	325	141	DDH	2023
ITDD-23-054	189 739	8 141 981	275	145	DDH	2023
ITDD-23-055	190 101	8 141 352	298	130	DDH	2023
ITDD-23-056	190 228	8 141 350	299	76	DDH	2023
ITDD-23-058	189 739	8 141 982	275	156	DDH	2023
ITDD-23-059	190 229	8 141 349	299	57	DDH	2023
ITDD-23-060	190 165	8 142 447	292	490	DDH	2023
ITDD-23-061	190 281	8 141 453	297	105	DDH	2023
ITDD-23-062	190 163	8 142 649	278	433	DDH	2023
ITDD-23-063	190 281	8 141 452	297	121	DDH	2023
ITDD-23-065	190 130	8 142 523	283	505	DDH	2023
ITDD-23-066	190 332	8 141 354	297	151	DDH	2023
ITDD-23-067	190 364	8 141 497	301	130	DDH	2023
ITDD-23-068	189 692	8 141 876	287	136	DDH	2023

HOLE-ID	Location-X	Location-Y	Location-Z	Max. depth	Method	Year
ITDD-23-069	190 364	8 141 496	302	220	DDH	2023
ITDD-23-070	190 163	8 142 649	280	423	DDH	2023
ITDD-23-071	190 332	8 141 561	320	153	DDH	2023
ITDD-23-072	189 691	8 141 876	287	140	DDH	2023
ITDD-23-073	190 016	8 142 507	275	480	DDH	2023
ITDD-23-074	189 848	8 142 000	276	121	DDH	2023
ITDD-23-075	190 395	8 141 550	303	169	DDH	2023
ITDD-23-076	190 009	8 142 325	276	260	DDH	2023
ITDD-23-077	190 220	8 141 554	322	100	DDH	2023
ITDD-23-078	189 625	8 142 181	306	362	DDH	2023
ITDD-23-079	190 483	8 141 640	320	171	DDH	2023
ITDD-23-080	190 241	8 142 509	305	310	DDH	2023
ITDD-23-081	190 418	8 141 628	304	172	DDH	2023
ITDD-23-082	190 009	8 142 326	275	298	DDH	2023
ITDD-23-083	190 017	8 142 506	275	420	DDH	2023
ITDD-23-084	189 625	8 142 181	306	305	DDH	2023
ITDD-23-085	190 246	8 141 501	315	115	DDH	2023
ITDD-23-086	190 241	8 142 509	305	341	DDH	2023
ITDD-23-087	190 322	8 141 375	296	90	DDH	2023
ITDD-23-088	190 118	8 142 359	300	304	DDH	2023
ITDD-23-089	190 371	8 141 611	317	184	DDH	2023
ITDD-23-090	190 037	8 142 639	276	589	DDH	2023
ITDD-23-091	189 367	8 142 228	335	544	DDH	2023
ITDD-23-092	189 847	8 142 001	277	130	DDH	2023
ITDD-23-093	190 200	8 141 385	302	75	DDH	2023
ITDD-23-094	189 943	8 142 030	300	109	DDH	2023
ITDD-23-095	189 746	8 142 172	277	250	DDH	2023
ITDD-23-096	189 942	8 142 031	300	118	DDH	2023
ITDD-23-097	189 780	8 141 805	299	49	DDH	2023
ITDD-23-098	189 760	8 141 845	294	350	DDH	2023
ITDD-23-099	189 836	8 141 914	284	79	DDH	2023
ITDD-23-100	189 691	8 141 761	278	50	DDH	2023
ITDD-23-101	189 835	8 141 915	284	100	DDH	2023
ITDD-23-102	189 745	8 142 173	277	262	DDH	2023

Source: GE21 (2024).

Table 10-3: Bandeira Project Drill Collars

HOLE-ID	Location-X	Location-Y	Location-Z	Max. depth	Method	Year
ITDD-23-103	189 511	8 141 957	273	221	DDH	2023
ITDD-23-104	189 684	8 141 773	278	67	DDH	2023
ITDD-23-105	189 907	8 142 302	277	421	DDH	2023
ITDD-23-106	189 700	8 141 948	279	142	DDH	2023
ITDD-23-107	189 588	8 142 044	273	241	DDH	2023
ITDD-23-108	189 760	8 141 846	294	95	DDH	2023
ITDD-23-109	189 780	8 142 016	275	316	DDH	2023
ITDD-23-110	189 915	8 141 968	288	72	DDH	2023
ITDD-23-111	189 834	8 141 827	299	41	DDH	2023
ITDD-23-113	189 601	8 141 814	273	109	DDH	2023
ITDD-23-114	189 916	8 141 968	288	92	DDH	2023
ITDD-23-115	189 866	8 141 864	294	48	DDH	2023
ITDD-23-116	189 859	8 142 069	276	139	DDH	2023
ITDD-23-117	189 891	8 142 149	297	220	DDH	2023
ITDD-23-118	189 592	8 141 949	273	184	DDH	2023
ITDD-23-120	189 859	8 142 070	277	280	DDH	2023
ITDD-23-112	189 699	8 141 949	279	320	DDH	2023
ITDD-23-119	189 779	8 142 016	275	139	DDH	2023
ITDD-23-121	189 891	8 142 150	297	362	DDH	2023
ITDD-23-122	189 591	8 141 950	273	340	DDH	2023
ITDD-23-123	189 712	8 142 030	275	351	DDH	2023
ITDD-23-124	190 154	8 142 164	327	130	DDH	2023
ITDD-23-125	189 648	8 141 947	273	330	DDH	2023
ITDD-23-126	190 154	8 142 165	327	170	DDH	2023
ITDD-23-127	190 029	8 142 087	320	151	DDH	2023
ITDD-23-128	189 591	8 141 950	273	206	DDH	2023
ITDD-23-129	189 665	8 142 009	274	199	DDH	2023
ITDD-23-130	190 154	8 142 164	327	300	DDH	2023
ITDD-23-131	190 029	8 142 088	320	301	DDH	2023
ITDD-23-132	189 664	8 142 010	274	210	DDH	2023
ITDD-23-133	189 561	8 141 898	277	184	DDH	2023
ITDD-23-134	189 648	8 141 947	273	165	DDH	2023
ITDD-23-135	190 179	8 142 220	321	250	DDH	2023
ITDD-23-136	190 248	8 142 197	331	334	DDH	2023

HOLE-ID	Location-X	Location-Y	Location-Z	Max. depth	Method	Year
ITDD-23-137	189 664	8 142 010	274	401	DDH	2023
ITDD-23-138	189 476	8 142 045	298	330	DDH	2023
ITDD-23-140	190 208	8 142 068	338	80	DDH	2023
ITDD-23-141	190 297	8 142 120	339	61	DDH	2023
ITDD-23-142	190 111	8 142 251	306	200	DDH	2023
ITDD-23-144	190 247	8 142 198	331	120	DDH	2023
ITDD-23-139	189 550	8 142 111	304	367	DDH	2023
ITDD-23-143	190 190	8 142 309	316	439	DDH	2023
ITDD-23-145	189 625	8 142 180	306	330	DDH	2023
ITDD-23-146	189 809	8 142 068	274	295	DDH	2023
ITDD-23-147	190 110	8 142 251	306	510	DDH	2023
ITDD-23-148	190 310	8 142 199	335	350	DDH	2023
ITDD-23-149	189 367	8 142 227	335	469	DDH	2023
ITDD-23-150	189 861	8 142 069	276	349	DDH	2023
ITDD-23-151	189 474	8 142 246	327	442	DDH	2023
ITDD-23-152	190 190	8 142 309	316	315	DDH	2023
ITDD-23-153	189 295	8 141 951	322	450	DDH	2023
ITDD-23-154	190 266	8 142 274	325	550	DDH	2023
ITDD-23-155	190 110	8 142 252	305	241	DDH	2023
ITDD-23-156	190 189	8 142 309	316	341	DDH	2023
ITDD-23-157	189 888	8 142 227	285	380	DDH	2023
ITDD-23-158	189 474	8 142 246	327	481	DDH	2023
ITDD-23-160	190 091	8 142 079	329	259	DDH	2023
ITDD-23-161	190 276	8 142 353	312	420	DDH	2023
ITDD-23-162	189 367	8 142 228	335	487	DDH	2023
ITDD-23-163	190 031	8 142 574	277	534	DDH	2023
ITDD-23-164	189 954	8 142 306	275	480	DDH	2023
ITDD-23-165	189 910	8 142 302	276	367	DDH	2023
ITDD-23-166	190 132	8 141 805	310	121	DDH	2023
ITDD-23-167	189 703	8 142 142	284	412	DDH	2023
ITDD-23-168	190 131	8 141 806	310	146	DDH	2023
ITDD-23-169	190 322	8 142 475	321	445	DDH	2023
ITDD-23-170	189 950	8 141 728	314	141	DDH	2023
ITDD-23-171	190 019	8 141 998	317	249	DDH	2023

HOLE-ID	Location-X	Location-Y	Location-Z	Max. depth	Method	Year
ITDD-23-172	190 274	8 142 355	312	392	DDH	2023
ITDD-23-173	189 950	8 141 729	314	150	DDH	2023
ITDD-23-174	189 704	8 142 141	284	370	DDH	2023
ITDD-23-175	190 028	8 142 573	275	550	DDH	2023
ITDD-23-176	190 018	8 141 999	318	255	DDH	2023
ITDD-23-177	189 954	8 142 306	276	391	DDH	2023
ITDD-23-178	189 500	8 141 899	273	211	DDH	2023
ITDD-23-179	189 432	8 141 928	294	250	DDH	2023
ITDD-23-180	189 987	8 142 411	276	509	DDH	2023
ITDD-23-181	189 588	8 142 043	273	250	DDH	2023
ITDD-23-182	190 322	8 142 475	322	381	DDH	2023
ITDD-23-183	189 500	8 141 899	273	201	DDH	2023
ITDD-22-002T	189 761	8 141 769	302	45	DDH	2023
ITDD-23-184	190 274	8 142 356	313	421	DDH	2023
ITDD-23-185	190 027	8 142 574	276	592	DDH	2023
ITDD-23-186	189 305	8 142 134	331	421	DDH	2023
ITDD-23-187	189 500	8 141 900	273	220	DDH	2023
ITDD-23-189	189 615	8 141 692	277	120	DDH	2023
ITDD-23-191	189 753	8 141 816	296	80	DDH	2023
ITDD-23-087T	190 320	8 141 379	296	76	DDH	2023
ITDD-23-093T	190 199	8 141 386	302	60	DDH	2023
ITDD-23-188	189 967	8 142 591	276	664	DDH	2023
ITDD-23-192	189 783	8 142 204	276	381	DDH	2023
ITDD-23-193	190 571	8 141 953	323	150	DDH	2023
ITDD-23-194	190 025	8 141 793	302	150	DDH	2023
ITDD-23-195	189 983	8 142 037	312	106	DDH	2023
ITDD-23-196	190 024	8 141 794	302	151	DDH	2023
ITDD-23-197	190 258	8 142 235	330	110	DDH	2023
ITDD-23-198	190 447	8 141 960	326	120	DDH	2023
ITDD-23-200	189 910	8 141 596	322	100	DDH	2023
ITDD-23-201	190 550	8 142 051	337	50	DDH	2023
ITDD-23-134T	189 647	8 141 946	273	39	DDH	2023
ITDD-23-202	190 028	8 142 086	320	281	DDH	2023
ITDD-23-203	190 199	8 141 891	324	151	DDH	2023

Source: GE21 (2024).

Table 10-4: Bandeira Project Drill Collars

HOLE-ID	Location-X	Location-Y	Location-Z	Max. depth	Method	Year
ITDD-23-204	190 029	8 141 840	303	40	DDH	2023
ITDD-23-205	190 484	8 142 053	342	150	DDH	2023
ITDD-23-206	190 412	8 142 053	341	50	DDH	2023
ITDD-23-207	190 119	8 141 934	326	50	DDH	2023
ITDD-23-208	190 371	8 142 053	340	50	DDH	2023
ITDD-23-209	190 228	8 141 432	301	75	DDH	2023
ITDD-23-199	189 711	8 142 225	293	451	DDH	2023
ITDD-23-211	190 082	8 141 993	327	233	DDH	2023
ITDD-23-212	190 149	8 141 879	322	150	DDH	2023
ITDD-23-213	190 336	8 141 450	300	131	DDH	2023
ITDD-23-218	190 332	8 141 452	299	93	DDH	2023
ITDD-23-214	190 079	8 141 894	317	45	DDH	2023
ITDD-23-215	189 981	8 141 954	307	233	DDH	2023
ITDD-23-216	189 881	8 141 940	284	228	DDH	2023
ITDD-23-217	190 238	8 141 807	315	91	DDH	2023
ITDD-23-219	189 914	8 141 970	288	220	DDH	2023
ITDD-23-220	190 106	8 141 742	314	99	DDH	2023
ITDD-23-222	189 803	8 141 863	292	224	DDH	2023
ITDD-23-223	190 018	8 141 703	315	118	DDH	2023
ITDD-22-023T	190 061	8 142 224	304	49	DDH	2023
ITDD-22-048T	190 450	8 141 961	326	84	DDH	2023
ITDD-23-221	190 336	8 141 451	300	221	DDH	2023
ITDD-23-224	189 835	8 141 827	299	193	DDH	2023
ITDD-23-225	189 933	8 141 659	320	107	DDH	2023
ITDD-23-226	189 865	8 141 865	294	199	DDH	2023
ITDD-23-227	189 940	8 141 867	291	214	DDH	2023
ITDD-23-228	190 377	8 141 470	301	153	DDH	2023
ITDD-23-229	189 830	8 141 711	312	147	DDH	2023
ITDD-23-230	190 077	8 141 892	317	187	DDH	2023
ITDD-22-030T	190 425	8 142 199	337	61	DDH	2023
ITDD-23-083T	190 015	8 142 504	276	74	DDH	2023
ITDD-23-210	190 170	8 141 944	330	608	DDH	2023
ITDD-23-231	189 880	8 141 745	312	157	DDH	2023
ITDD-23-232	190 028	8 141 840	303	166	DDH	2023
ITDD-23-233	189 958	8 141 810	303	171	DDH	2023
ITDD-23-234	190 243	8 141 714	319	199	DDH	2023
ITDD-23-235	190 277	8 141 759	314	233	DDH	2023
ITDD-23-236	190 316	8 141 793	309	231	DDH	2023
ITDD-23-159	190 027	8 142 186	309	489	DDH	2023
ITDD-23-237	190 376	8 142 585	324	100	DDH	2023
ITDD-23-238	190 470	8 142 519	334	100	DDH	2023
ITDD-23-239	190 544	8 142 585	332	100	DDH	2023
ITDD-23-240	190 659	8 142 591	328	100	DDH	2023
ITDD-23-241	190 723	8 142 490	328	100	DDH	2023
ITDD-23-242	190 598	8 142 398	342	100	DDH	2023
ITDD-23-243	190 696	8 142 247	333	101	DDH	2023
ITDD-23-244	190 320	8 142 578	316	100	DDH	2023
ITDD-23-245	190 264	8 142 578	304	100	DDH	2023
ITDD-23-246	190 616	8 142 164	335	70	DDH	2023
ITDD-23-247	190 617	8 142 163	335	111	DDH	2023
ITDD-23-248	190 751	8 142 232	333	88	DDH	2023
ITDD-23-249	190 752	8 142 230	333	150	DDH	2023
ITDD-24-250	190 656	8 142 200	334	70	DDH	2024
ITDD-24-251	190 818	8 142 211	340	217	DDH	2024
ITDD-24-252	190 610	8 142 087	333	121	DDH	2024
ITDD-24-253	190 611	8 142 086	333	200	DDH	2024
ITDD-24-254	190 133	8 142 559	283	200	DDH	2024
ITDD-24-255	190 220	8 142 651	288	182	DDH	2024
ITDD-24-256	190 882	8 142 204	347	261	DDH	2024
ITDD-24-257	190 937	8 142 211	353	218	DDH	2024
ITDD-24-258	189 908	8 142 300	277	170	DDH	2024
ITDD-24-259	190 936	8 142 211	353	200	DDH	2024
ITDD-24-260	190 990	8 142 207	358	206	DDH	2024
ITDD-24-261	189 796	8 142 024	275	200	DDH	2024
ITDD-24-262	190 990	8 142 206	358	278	DDH	2024
ITDD-24-263	191 053	8 142 204	362	350	DDH	2024
ITDD-24-264	190 607	8 142 085	333	141	DDH	2024
ITDD-24-265	190 058	8 141 629	322	80	DDH	2024
ITDD-24-266	190 502	8 141 966	329	245	DDH	2024
ITDD-24-267	190 133	8 141 700	319	68	DDH	2024
ITDD-24-268	190 211	8 141 771	312	260	DDH	2024
ITDD-24-269	190 247	8 142 195	331	191	DDH	2024
ITDD-24-270	190 238	8 141 807	315	182	DDH	2024
ITDD-24-271	190 305	8 141 707	317	218	DDH	2024
ITDD-24-272	190 170	8 142 139	331	226	DDH	2024
ITDD-24-273	190 358	8 141 723	309	260	DDH	2024
ITDD-24-274	190 193	8 142 007	336	210	DDH	2024
ITDD-24-275	190 294	8 141 909	319	250	DDH	2024
ITDD-24-276	190 386	8 141 970	328	211	DDH	2024
ITDD-24-277	190 335	8 141 961	327	240	DDH	2024
ITDD-24-278	190 387	8 141 970	328	150	DDH	2024
ITDD-24-279	190 417	8 141 910	307	151	DDH	2024
ITDD-24-280	189 951	8 142 306	276	250	DDH	2024
ITDD-24-281	190 439	8 141 872	306	150	DDH	2024
ITDD-24-282	190 286	8 141 930	323	303	DDH	2024
ITDD-24-283	190 377	8 141 872	306	243	DDH	2024
ITDD-24-284	190 266	8 141 956	329	90	DDH	2024
ITDD-24-286	190 387	8 141 969	328	185	DDH	2024
ITDD-23-057	192 600	8 142 101	363	300	DDH	2024
ITDD-23-064	192 600	8 141 900	379	301	DDH	2024
ITDD-23-190	192 596	8 142 203	353	300	DDH	2024
ITDD-24-285	190 377	8 141 871	305	281	DDH	2024
ITDD-24-287	190 387	8 141 970	328	150	DDH	2024
ITDD-24-288	190 198	8 141 866	322	60	DDH	2024
ITDD-24-289	190 251	8 141 892	323	163	DDH	2024
ITDD-24-290	190 378	8 141 874	306	260	DDH	2024

Source: GE21 (2024).

10.9 Ore Drilling Intercepts

Drill spacing typically ranged from 50 to 150 m, with narrower spacing observed in the central portion of the drill-hole array and wider spacing towards the margins. The ore intercepts vary in thickness, ranging from approximately 85% of the true width to nearly the true width of the mineralization.

The average pegmatite intersection ranges from 0.3 to 40 m, with an average true thickness of about 5 m. In total, 760 mineralized DDH intercepts were used for modelling the 34 mineralized solids within the Bandeira Project. Each solid was assigned a numerical code in the tag column.

Table 10-5 to Table 10-7 list the mineralized intervals from Bandeira Project drill holes that were incorporated into the 3-D modelling of the mineralized solids (Figure 10-2 and Figure 10-3).

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Table 10-5: Mineralized Intercepts by Bandeira Drill Holes

holeid	from	to	Li2O_pct	Grade_shell
ITDD-22-001	8.50	13.70	1.53	1
ITDD-22-002	33.08	38.74	1.94	1
ITDD-22-004B	37.45	38.13	0.44	1
ITDD-22-006	54.90	57.60	2.23	1
ITDD-22-007	18.20	18.75	0.50	01A-SW
ITDD-22-007	21.62	27.58	1.33	1
ITDD-22-008	45.45	46.80	0.23	1
ITDD-22-011	53.14	59.89	1.99	1
ITDD-22-012	33.70	34.45	0.74	01A-SW
ITDD-22-012	36.23	42.03	1.69	1
ITDD-22-013	53.18	57.08	1.56	01A-SW
ITDD-22-013	62.90	65.66	1.66	1
ITDD-22-014	77.10	82.80	1.14	1
ITDD-22-015	6.16	8.74	1.04	1
ITDD-22-015	10.97	11.70	0.66	01B-SW
ITDD-22-016	39.50	45.35	1.27	1
ITDD-22-017	62.21	67.15	1.06	1
ITDD-22-018	44.96	45.96	0.52	1
ITDD-22-019	29.83	33.57	1.97	1
ITDD-22-020	17.65	19.65	0.09	1
ITDD-22-021	23.50	24.19	0.74	1
ITDD-22-021	31.90	37.33	0.76	04-NE
ITDD-22-022	14.31	18.31	0.55	1
ITDD-22-023	33.50	34.26	0.96	02-NE
ITDD-22-023	38.53	43.59	2.13	02A-NE
ITDD-22-023	114.34	115.90	1.01	1
ITDD-22-024	28.14	33.86	1.71	02-NE
ITDD-22-024	36.35	37.35	1.07	02A-NE
ITDD-22-024	117.39	118.76	0.07	1
ITDD-22-024	156.72	161.72	1.22	04-NE
ITDD-22-025	56.47	58.08	0.37	1
ITDD-22-025	67.62	71.31	2.22	04-NE
ITDD-22-027	22.78	29.09	0.43	04-NE
ITDD-22-028	34.30	35.35	2.17	04B-NE

holeid	from	to	Li2O_pct	Grade_shell
ITDD-22-028	38.64	40.25	1.95	1
ITDD-22-028	51.39	53.39	0.67	04-NE
ITDD-22-029	41.46	42.25	1.56	02-NE
ITDD-22-029	44.28	46.93	1.29	02A-NE
ITDD-22-029	145.91	149.08	1.21	1
ITDD-22-030	46.60	53.30	1.49	04-NE
ITDD-22-032	13.18	14.33	0.29	02-NE
ITDD-22-032	18.35	19.95	1.95	02A-NE
ITDD-22-032	130.30	135.34	0.64	1
ITDD-22-032	137.40	139.20	1.58	04-NE
ITDD-22-033A	6.05	10.05	0.41	04B-NE
ITDD-22-034	17.42	18.42	1.17	SE-A
ITDD-22-035	103.27	105.17	1.04	04A-NE
ITDD-22-035	111.93	113.21	1.43	04B-NE
ITDD-22-035	128.48	129.24	0.56	1
ITDD-22-035	171.62	176.50	1.28	04-NE
ITDD-22-035	179.30	181.02	0.56	04C-NE
ITDD-22-036	39.10	45.10	0.90	SE-A
ITDD-22-038	43.26	44.66	2.43	04A-NE
ITDD-22-038	55.73	56.81	0.39	04B-NE
ITDD-22-038	67.32	71.32	1.04	1
ITDD-22-038	98.13	104.85	1.24	04-NE
ITDD-22-039	86.24	91.95	2.13	1
ITDD-22-039	94.19	95.86	1.71	04-NE
ITDD-22-040	55.90	56.90	1.36	SE-A
ITDD-22-041	37.16	37.97	0.60	04A-NE
ITDD-22-043	38.05	42.41	1.43	SE-A
ITDD-22-044	157.06	158.03	0.32	1
ITDD-22-045	21.65	24.65	0.34	10-NE
ITDD-22-045	34.94	39.78	0.36	09-NE
ITDD-22-045	40.57	44.88	1.17	09-NE
ITDD-22-046	63.00	68.00	1.17	SE-A
ITDD-22-048	57.50	60.11	0.70	10-NE
ITDD-22-048	69.39	74.20	1.08	09-NE

holeid	from	to	Li2O_pct	Grade_shell
ITTRE-22-004	12.80	15.80	0.46	01A-SW
ITTRE-22-009	60.00	63.00	0.08	02-NE
ITTRE-22-012	33.20	37.20	0.28	02-NE
ITTRE-22-012	42.06	45.06	0.35	02A-NE
ITDD-22-050	96.60	99.31	0.81	04-NE
ITDD-22-049	64.87	67.87	0.86	SE-A
ITDD-23-051	56.98	59.68	0.64	SE-A
ITDD-23-052	99.96	100.73	0.87	02-NE
ITDD-23-052	108.25	111.94	0.63	02A-NE
ITDD-23-052	205.44	209.44	1.79	1
ITDD-23-052	223.63	225.63	2.33	04-NE
ITDD-23-052	255.36	257.46	0.89	04C-NE
ITDD-23-052	279.04	280.00	0.74	05A-NE
ITDD-23-052	308.20	312.46	0.93	05-NE
ITDD-23-052	327.28	328.28	0.92	05B-NE
ITDD-23-052	381.30	386.00	1.11	06-NE
ITDD-23-052	392.20	398.52	1.37	06A-NE
ITDD-23-052	415.48	416.48	2.07	06B-NE
ITDD-23-052	433.13	440.30	1.52	07-NE
ITDD-23-053	74.65	77.19	1.95	1
ITDD-23-054	118.00	123.00	1.66	1
ITDD-23-055	36.97	38.95	0.42	SE-A
ITDD-23-056	37.75	49.02	0.88	SE-A
ITDD-23-058	122.55	128.55	1.96	1
ITDD-23-059	28.72	32.96	1.32	SE-A
ITDD-23-060	111.44	112.13	2.00	02-NE
ITDD-23-060	170.03	174.36	0.73	02B-NE
ITDD-23-060	225.23	229.50	2.03	1
ITDD-23-060	252.75	254.57	0.04	04-NE
ITDD-23-060	283.30	284.48	2.16	04C-NE
ITDD-23-060	315.98	317.93	1.22	05A-NE
ITDD-23-060	318.40	321.20	0.72	05A-NE
ITDD-23-060	332.62	334.00	2.04	05-NE
ITDD-23-060	399.67	402.45	1.79	06-NE

holeid	from	to	Li2O_pct	Grade_shell
ITDD-23-060	405.94	408.44	0.81	06A-NE
ITDD-23-060	444.29	449.43	1.44	07-NE
ITDD-23-061	61.50	80.19	1.32	SE-A
ITDD-23-062	104.43	124.43	1.62	03-NE
ITDD-23-062	167.88	168.86	0.74	02D-NE
ITDD-23-062	349.56	353.47	1.05	04-NE
ITDD-23-062	384.50	388.68	1.01	04C-NE
ITDD-23-063	41.67	55.24	1.73	SE-A
ITDD-23-065	159.62	164.60	1.12	02-NE
ITDD-23-065	203.93	208.16	1.53	02B-NE
ITDD-23-065	216.53	217.63	1.30	02E-NE
ITDD-23-065	271.20	277.29	2.53	1
ITDD-23-065	321.22	324.22	1.25	04-NE
ITDD-23-065	336.67	339.41	1.32	04C-NE
ITDD-23-065	354.23	378.23	1.32	05A-NE
ITDD-23-065	390.10	397.82	1.88	05-NE
ITDD-23-065	400.74	403.08	1.30	05B-NE
ITDD-23-065	431.25	434.45	0.67	06-NE
ITDD-23-065	441.88	445.37	2.04	06A-NE
ITDD-23-065	456.28	465.95	0.61	07-NE
ITDD-23-065	484.11	485.10	1.12	08-NE
ITDD-23-066	28.16	37.16	0.73	SE-A
ITDD-23-067	86.96	103.96	1.21	SE-A
ITDD-23-068	92.23	93.97	1.03	1
ITDD-23-068	112.79	114.45	0.38	01B-SW
ITDD-23-069	58.55	75.48	1.29	SE-A
ITDD-23-070	78.30	97.30	0.90	03-NE
ITDD-23-070	152.73	156.40	1.83	02D-NE
ITDD-23-070	332.74	336.36	2.15	04-NE
ITDD-23-070	339.94	343.42	1.09	04C-NE
ITDD-23-071	86.49	90.49	0.90	SE-A
ITDD-23-072	99.14	100.94	1.37	1
ITDD-23-072	113.69	117.69	1.38	01B-SW
ITDD-23-073	77.82	83.66	1.99	03-NE

holeid	from	to	Li2O_pct	Grade_shell
ITDD-23-073	206.62	213.30	1.99	02-NE
ITDD-23-073	242.54	247.63	0.77	02B-NE
ITDD-23-073	298.08	299.08	1.06	1
ITDD-23-073	352.92	360.92	1.66	04-NE
ITDD-23-073	408.21	411.86	1.83	05A-NE
ITDD-23-073	412.04	426.35	1.11	05A-NE
ITDD-23-073	443.07	447.07	2.10	05-NE
ITDD-23-074	85.77	89.96	1.45	01A-SW
ITDD-23-074	95.31	95.91	1.98	1
ITDD-23-074	96.84	100.25	1.98	1
ITDD-23-075	109.00	113.03	1.22	SE-A
ITDD-23-075	113.57	119.43	0.74	SE-A
ITDD-23-075	130.10	141.90	1.00	08-NE
ITDD-23-076	82.64	84.05	2.03	02-NE
ITDD-23-076	85.55	86.84	2.24	02A-NE
ITDD-23-076	165.53	168.98	1.39	1
ITDD-23-078	313.14	317.90	0.89	01A-SW
ITDD-23-078	321.95	337.78	1.42	1
ITDD-23-080	63.52	65.52	0.22	02D-NE
ITDD-23-080	255.45	261.66	1.49	04-NE
ITDD-23-080	274.70	275.70	0.92	04C-NE
ITDD-23-081	120.07	129.07	1.49	08-NE
ITDD-23-081	144.40	149.12	1.50	08A-NE
ITDD-23-082	50.63	56.40	2.17	02C-NE
ITDD-23-082	99.92	102.23	1.04	02-NE
ITDD-23-082	196.20	201.00	1.48	1
ITDD-23-083	59.09	66.12	1.37	03-NE
ITDD-23-083	171.31	177.15	1.90	02-NE
ITDD-23-083	225.68	226.38	0.71	02B-NE
ITDD-23-083	230.83	231.48	1.09	02E-NE
ITDD-23-083	310.73	314.78	1.11	04-NE
ITDD-23-083	371.44	379.76	2.03	05-NE
ITDD-23-084	273.30	274.06	0.92	01A-SW
ITDD-23-084	275.42	284.87	1.31	1

Source: GE21 (2024).

Table 10-6: Mineralized Intercepts by Bandeira Drill Holes

holeid	from	to	Li2O_pct	Grade_shell
ITDD-23-085	73.40	74.47	0.67	SE-A
ITDD-23-086	69.92	72.11	1.48	02D-NE
ITDD-23-086	272.46	283.27	1.04	04-NE
ITDD-23-086	293.70	299.86	1.33	04C-NE
ITDD-23-087	53.24	69.96	1.19	SE-A
ITDD-23-088	83.32	86.32	0.96	02-NE
ITDD-23-088	199.94	210.19	1.28	04-NE
ITDD-23-088	272.46	274.62	2.21	05-NE
ITDD-23-088	287.18	287.96	0.74	05C-NE
ITDD-23-088	294.83	295.63	0.48	05B-NE
ITDD-23-089	63.26	72.02	1.37	SE-A
ITDD-23-089	155.53	161.53	1.22	08-NE
ITDD-23-090	161.74	169.95	1.03	03-NE
ITDD-23-090	253.07	263.50	0.98	02-NE
ITDD-23-090	386.98	389.98	1.62	1
ITDD-23-090	442.90	445.66	1.79	04-NE
ITDD-23-090	465.61	471.85	1.57	04C-NE
ITDD-23-090	564.45	567.45	1.56	06-NE
ITDD-23-090	580.60	581.60	0.57	07-NE
ITDD-23-091	62.26	63.07	0.95	01E-SW
ITDD-23-091	426.02	427.97	0.89	01D-SW
ITDD-23-091	479.83	489.24	1.04	1
ITDD-23-092	92.81	95.83	1.57	01A-SW
ITDD-23-092	103.81	109.42	1.23	1
ITDD-23-093	43.65	51.65	1.47	SE-A
ITDD-23-094	80.58	88.26	1.63	1
ITDD-23-095	46.35	48.48	0.70	02C-NE
ITDD-23-095	202.91	206.91	0.63	01A-SW
ITDD-23-095	216.19	223.07	1.38	1
ITDD-23-096	88.95	97.18	1.62	1
ITDD-23-097	38.70	44.12	1.48	1
ITDD-23-098	62.59	67.59	1.64	1
ITDD-23-098	194.04	196.69	1.02	05-NE
ITDD-23-099	63.04	65.04	1.91	01A-SW

holeid	from	to	Li2O_pct	Grade_shell
ITDD-23-099	67.96	72.49	1.10	1
ITDD-23-100	27.85	28.85	0.35	1
ITDD-23-100	32.49	33.49	0.56	01B-SW
ITDD-23-101	76.74	81.74	1.55	1
ITDD-23-102	52.60	56.09	1.16	02C-NE
ITDD-23-102	202.45	204.35	0.99	01A-SW
ITDD-23-102	226.35	233.36	1.55	1
ITDD-23-103	197.00	200.00	1.33	1
ITDD-23-104	55.89	57.89	0.93	1
ITDD-23-104	58.89	59.89	1.45	01B-SW
ITDD-23-105	97.01	99.52	1.47	02C-NE
ITDD-23-105	110.73	116.40	1.49	02-NE
ITDD-23-105	214.09	215.79	0.96	01A-SW
ITDD-23-105	220.44	229.59	1.32	1
ITDD-23-105	370.38	375.38	1.24	05-NE
ITDD-23-106	133.08	135.23	0.95	01B-SW
ITDD-23-107	194.96	195.83	0.66	01A-SW
ITDD-23-107	197.74	199.94	1.37	1
ITDD-23-107	209.54	213.54	1.81	01B-SW
ITDD-23-108	75.26	81.81	1.46	1
ITDD-23-108	86.52	88.52	1.73	01B-SW
ITDD-23-109	120.09	127.08	1.28	1
ITDD-23-109	247.87	255.66	1.69	05-NE
ITDD-23-110	55.33	56.10	1.35	01A-SW
ITDD-23-110	58.58	62.84	2.15	1
ITDD-23-111	27.80	34.40	1.51	1
ITDD-23-113	97.33	99.89	1.75	1
ITDD-23-114	66.26	67.26	0.49	01A-SW
ITDD-23-114	72.40	77.06	0.97	1
ITDD-23-114	77.15	78.15	1.32	1
ITDD-23-115	34.08	41.00	1.26	1
ITDD-23-116	112.82	117.36	2.18	01A-SW
ITDD-23-116	132.12	134.17	0.91	1
ITDD-23-117	30.22	33.22	0.33	02-NE

holeid	from	to	Li2O_pct	Grade_shell
ITDD-23-117	35.00	37.69	0.33	02A-NE
ITDD-23-117	143.90	145.00	2.81	01A-SW
ITDD-23-117	166.63	169.18	0.74	1
ITDD-23-118	155.35	156.56	1.76	01A-SW
ITDD-23-118	160.13	164.07	0.93	1
ITDD-23-120	109.66	115.92	1.24	01A-SW
ITDD-23-120	126.06	127.18	0.52	1
ITDD-23-120	253.93	259.63	1.86	05-NE
ITDD-23-112	124.79	131.18	1.74	1
ITDD-23-112	142.43	144.36	1.20	01B-SW
ITDD-23-119	118.90	119.42	0.31	01A-SW
ITDD-23-119	124.13	130.85	1.57	1
ITDD-23-121	34.85	40.85	0.57	02-NE
ITDD-23-121	44.12	46.12	0.33	02A-NE
ITDD-23-121	163.40	169.82	1.92	01A-SW
ITDD-23-121	182.04	183.59	2.59	1
ITDD-23-121	331.55	337.47	1.83	05-NE
ITDD-23-122	157.52	158.16	0.73	01A-SW
ITDD-23-122	164.11	168.11	1.49	1
ITDD-23-123	151.75	159.40	2.39	1
ITDD-23-123	285.88	286.88	1.40	05-NE
ITDD-23-124	80.04	81.04	0.99	1
ITDD-23-125	133.72	134.77	0.60	1
ITDD-23-125	144.94	147.97	1.43	01B-SW
ITDD-23-126	105.80	108.37	1.02	1
ITDD-23-127	81.91	82.66	1.11	1
ITDD-23-128	178.46	183.31	2.24	1
ITDD-23-129	153.61	155.00	0.83	01A-SW
ITDD-23-129	157.10	160.35	1.97	1
ITDD-23-130	88.49	91.08	1.15	1
ITDD-23-130	201.33	203.33	0.60	05-NE
ITDD-23-130	240.32	242.41	1.46	05B-NE
ITDD-23-131	99.48	101.48	1.98	1
ITDD-23-131	272.94	278.00	0.96	05-NE
ITDD-23-132	69.51	72.73	1.66	01C-SW

holeid	from	to	Li2O_pct	Grade_shell
ITDD-23-132	166.14	169.88	1.36	01A-SW
ITDD-23-132	172.68	178.59	1.59	1
ITDD-23-133	150.20	154.79	1.20	1
ITDD-23-134	32.45	34.95	2.43	01C-SW
ITDD-23-134	135.63	137.16	0.50	01A-SW
ITDD-23-134	138.85	141.96	2.24	1
ITDD-23-135	111.38	112.27	0.13	1
ITDD-23-135	134.02	138.59	1.25	04-NE
ITDD-23-135	205.63	206.63	0.54	05-NE
ITDD-23-135	247.22	248.46	0.31	05B-NE
ITDD-23-136	75.02	75.76	0.43	1
ITDD-23-136	85.97	89.97	1.73	04-NE
ITDD-23-136	283.33	286.25	0.21	06-NE
ITDD-23-136	318.38	319.63	0.32	07-NE
ITDD-23-137	81.68	85.18	1.48	01C-SW
ITDD-23-137	182.18	187.28	0.98	01A-SW
ITDD-23-137	189.80	196.65	1.44	1
ITDD-23-137	207.90	208.90	1.53	01B-SW
ITDD-23-138	289.52	296.62	1.01	1
ITDD-23-140	27.30	30.62	0.84	1
ITDD-23-141	39.98	44.45	1.32	1
ITDD-23-141	47.25	51.61	0.63	04-NE
ITDD-23-142	36.36	40.36	1.37	02-NE
ITDD-23-142	40.36	41.36	1.50	02A-NE
ITDD-23-142	126.70	128.70	2.05	1
ITDD-23-144	94.46	99.42	1.85	04-NE
ITDD-23-139	304.00	315.16	1.63	1
ITDD-23-143	48.05	49.46	1.18	02-NE
ITDD-23-143	49.87	52.40	2.21	02A-NE
ITDD-23-143	156.45	158.76	0.71	1
ITDD-23-143	164.12	169.75	1.09	04-NE
ITDD-23-143	187.65	191.02	0.58	04C-NE
ITDD-23-143	231.53	233.40	0.64	05-NE
ITDD-23-143	251.16	251.77	0.94	05C-NE
ITDD-23-143	341.86	344.37	1.52	06-NE

holeid	from	to	Li2O_pct	Grade_shell
ITDD-23-143	347.82	349.48	0.73	06A-NE
ITDD-23-143	359.64	361.75	0.42	06B-NE
ITDD-23-143	383.35	388.72	1.72	07-NE
ITDD-23-143	398.90	400.75	2.40	07A-NE
ITDD-23-145	290.15	302.05	1.39	1
ITDD-23-146	132.78	134.82	0.34	01A-SW
ITDD-23-146	142.88	147.88	1.29	1
ITDD-23-146	267.31	276.18	1.57	05-NE
ITDD-23-147	41.30	44.43	1.96	02-NE
ITDD-23-147	45.04	47.62	1.35	02A-NE
ITDD-23-147	138.02	140.27	1.11	1
ITDD-23-147	268.30	271.03	1.63	05-NE
ITDD-23-147	285.15	287.81	1.57	05C-NE
ITDD-23-147	307.66	310.36	2.16	05B-NE
ITDD-23-147	391.75	401.23	0.65	07-NE
ITDD-23-147	404.20	409.13	0.77	07A-NE
ITDD-23-147	430.72	436.67	2.01	08-NE
ITDD-23-147	448.24	449.52	1.54	08C-NE
ITDD-23-147	479.02	486.52	1.20	08A-NE
ITDD-23-148	60.55	61.40	1.07	04B-NE
ITDD-23-148	62.30	64.65	0.50	1
ITDD-23-148	73.61	77.87	1.17	04-NE
ITDD-23-148	257.50	260.54	3.18	06-NE
ITDD-23-148	262.83	266.60	1.39	06A-NE
ITDD-23-148	317.40	320.17	2.11	07-NE
ITDD-23-148	326.16	328.99	1.44	07A-NE
ITDD-23-149	46.51	48.45	1.52	01E-SW
ITDD-23-149	434.80	440.56	1.66	1
ITDD-23-150	123.60	129.60	1.74	01A-SW
ITDD-23-150	142.44	146.34	2.15	1
ITDD-23-150	293.11	301.75	1.45	05-NE
ITDD-23-151	8.66	10.35	0.68	01E-SW
ITDD-23-151	348.98	351.05	1.17	01D-SW
ITDD-23-151	411.87	421.66	1.84	1
ITDD-23-152	53.19	55.35	0.44	02-NE

Source: GE21 (2024).

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Table 10-7: Mineralized Intercepts by Bandeira Drill Holes

holeid	from	to	Li2O_pct	Grade_shell
ITDD-23-085	73.40	74.47	0.67	SE-A
ITDD-23-086	69.92	72.11	1.48	02D-NE
ITDD-23-086	272.46	283.27	1.04	04-NE
ITDD-23-086	293.70	299.86	1.33	04C-NE
ITDD-23-087	53.24	69.96	1.19	SE-A
ITDD-23-088	83.32	86.32	0.96	02-NE
ITDD-23-088	199.94	210.19	1.28	04-NE
ITDD-23-088	272.46	274.62	2.21	05-NE
ITDD-23-088	287.18	287.96	0.74	05C-NE
ITDD-23-088	294.83	295.63	0.48	05B-NE
ITDD-23-089	63.26	72.02	1.37	SE-A
ITDD-23-089	155.53	161.53	1.22	08-NE
ITDD-23-090	161.74	169.95	1.03	03-NE
ITDD-23-090	253.07	263.50	0.98	02-NE
ITDD-23-090	386.98	389.98	1.62	1
ITDD-23-090	442.90	445.66	1.79	04-NE
ITDD-23-090	465.61	471.85	1.57	04C-NE
ITDD-23-090	564.45	567.45	1.56	06-NE
ITDD-23-090	580.60	581.60	0.57	07-NE
ITDD-23-091	62.26	63.07	0.95	01E-SW
ITDD-23-091	426.02	427.97	0.89	01D-SW
ITDD-23-091	479.83	489.24	1.04	1
ITDD-23-092	92.81	95.83	1.57	01A-SW
ITDD-23-092	103.81	109.42	1.23	1
ITDD-23-093	43.65	51.65	1.47	SE-A
ITDD-23-094	80.58	88.26	1.63	1
ITDD-23-095	46.35	48.48	0.70	02C-NE
ITDD-23-095	202.91	206.91	0.63	01A-SW
ITDD-23-095	216.19	223.07	1.38	1
ITDD-23-096	88.95	97.18	1.62	1
ITDD-23-097	38.70	44.12	1.48	1
ITDD-23-098	62.59	67.59	1.64	1
ITDD-23-098	194.04	196.69	1.02	05-NE
ITDD-23-099	63.04	65.04	1.91	01A-SW

holeid	from	to	Li2O_pct	Grade_shell
ITDD-23-099	67.96	72.49	1.10	1
ITDD-23-100	27.85	28.85	0.35	1
ITDD-23-100	32.49	33.49	0.56	01B-SW
ITDD-23-101	76.74	81.74	1.55	1
ITDD-23-102	52.60	56.09	1.16	02C-NE
ITDD-23-102	202.45	204.35	0.99	01A-SW
ITDD-23-102	226.35	233.36	1.55	1
ITDD-23-103	197.00	200.00	1.33	1
ITDD-23-104	55.89	57.89	0.93	1
ITDD-23-104	58.89	59.89	1.45	01B-SW
ITDD-23-105	97.01	99.52	1.47	02C-NE
ITDD-23-105	110.73	116.40	1.49	02-NE
ITDD-23-105	214.09	215.79	0.96	01A-SW
ITDD-23-105	220.44	229.59	1.32	1
ITDD-23-105	370.38	375.38	1.24	05-NE
ITDD-23-106	133.08	135.23	0.95	01B-SW
ITDD-23-107	194.96	195.83	0.66	01A-SW
ITDD-23-107	197.74	199.94	1.37	1
ITDD-23-107	209.54	213.54	1.81	01B-SW
ITDD-23-108	75.26	81.81	1.46	1
ITDD-23-108	86.52	88.52	1.73	01B-SW
ITDD-23-109	120.09	127.08	1.28	1
ITDD-23-109	247.87	255.66	1.69	05-NE
ITDD-23-110	55.33	56.10	1.35	01A-SW
ITDD-23-110	58.58	62.84	2.15	1
ITDD-23-111	27.80	34.40	1.51	1
ITDD-23-113	97.33	99.89	1.75	1
ITDD-23-114	66.26	67.26	0.49	01A-SW
ITDD-23-114	72.40	77.06	0.97	1
ITDD-23-114	77.15	78.15	1.32	1
ITDD-23-115	34.08	41.00	1.26	1
ITDD-23-116	112.82	117.36	2.18	01A-SW
ITDD-23-116	132.12	134.17	0.91	1
ITDD-23-117	30.22	33.22	0.33	02-NE

holeid	from	to	Li2O_pct	Grade_shell
ITDD-23-117	35.00	37.69	0.33	02A-NE
ITDD-23-117	143.90	145.00	2.81	01A-SW
ITDD-23-117	166.63	169.18	0.74	1
ITDD-23-118	155.35	156.56	1.76	01A-SW
ITDD-23-118	160.13	164.07	0.93	1
ITDD-23-120	109.66	115.92	1.24	01A-SW
ITDD-23-120	126.06	127.18	0.52	1
ITDD-23-120	253.93	259.63	1.86	05-NE
ITDD-23-112	124.79	131.18	1.74	1
ITDD-23-112	142.43	144.36	1.20	01B-SW
ITDD-23-119	118.90	119.42	0.31	01A-SW
ITDD-23-119	124.13	130.85	1.57	1
ITDD-23-121	34.85	40.85	0.57	02-NE
ITDD-23-121	44.12	46.12	0.33	02A-NE
ITDD-23-121	163.40	169.82	1.92	01A-SW
ITDD-23-121	182.04	183.59	2.59	1
ITDD-23-121	331.55	337.47	1.83	05-NE
ITDD-23-122	157.52	158.16	0.73	01A-SW
ITDD-23-122	164.11	168.11	1.49	1
ITDD-23-123	151.75	159.40	2.39	1
ITDD-23-123	285.88	286.88	1.40	05-NE
ITDD-23-124	80.04	81.04	0.99	1
ITDD-23-125	133.72	134.77	0.60	1
ITDD-23-125	144.94	147.97	1.43	01B-SW
ITDD-23-126	105.80	108.37	1.02	1
ITDD-23-127	81.91	82.66	1.11	1
ITDD-23-128	178.46	183.31	2.24	1
ITDD-23-129	153.61	155.00	0.83	01A-SW
ITDD-23-129	157.10	160.35	1.97	1
ITDD-23-130	88.49	91.08	1.15	1
ITDD-23-130	201.33	203.33	0.60	05-NE
ITDD-23-130	240.32	242.41	1.46	05B-NE
ITDD-23-131	99.48	101.48	1.98	1
ITDD-23-131	272.94	278.00	0.96	05-NE
ITDD-23-132	69.51	72.73	1.66	01C-SW

holeid	from	to	Li2O_pct	Grade_shell
ITDD-23-132	166.14	169.88	1.36	01A-SW
ITDD-23-132	172.68	178.59	1.59	1
ITDD-23-133	150.20	154.79	1.20	1
ITDD-23-134	32.45	34.95	2.43	01C-SW
ITDD-23-134	135.63	137.16	0.50	01A-SW
ITDD-23-134	138.85	141.96	2.24	1
ITDD-23-135	111.38	112.27	0.13	1
ITDD-23-135	134.02	138.59	1.25	04-NE
ITDD-23-135	205.63	206.63	0.54	05-NE
ITDD-23-135	247.22	248.46	0.31	05B-NE
ITDD-23-136	75.02	75.76	0.43	1
ITDD-23-136	85.97	89.97	1.73	04-NE
ITDD-23-136	283.33	286.25	0.21	06-NE
ITDD-23-136	318.38	319.63	0.32	07-NE
ITDD-23-137	81.68	85.18	1.48	01C-SW
ITDD-23-137	182.18	187.28	0.98	01A-SW
ITDD-23-137	189.80	196.65	1.44	1
ITDD-23-137	207.90	208.90	1.53	01B-SW
ITDD-23-138	289.52	296.62	1.01	1
ITDD-23-140	27.30	30.62	0.84	1
ITDD-23-141	39.98	44.45	1.32	1
ITDD-23-141	47.25	51.61	0.63	04-NE
ITDD-23-142	36.36	40.36	1.37	02-NE
ITDD-23-142	40.36	41.36	1.50	02A-NE
ITDD-23-142	126.70	128.70	2.05	1
ITDD-23-144	94.46	99.42	1.85	04-NE
ITDD-23-139	304.00	315.16	1.63	1
ITDD-23-143	48.05	49.46	1.18	02-NE
ITDD-23-143	49.87	52.40	2.21	02A-NE
ITDD-23-143	156.45	158.76	0.71	1
ITDD-23-143	164.12	169.75	1.09	04-NE
ITDD-23-143	187.65	191.02	0.58	04C-NE
ITDD-23-143	231.53	233.40	0.64	05-NE
ITDD-23-143	251.16	251.77	0.94	05C-NE
ITDD-23-143	341.86	344.37	1.52	06-NE

holeid	from	to	Li2O_pct	Grade_shell
ITDD-23-143	347.82	349.48	0.73	06A-NE
ITDD-23-143	359.64	361.75	0.42	06B-NE
ITDD-23-143	383.35	388.72	1.72	07-NE
ITDD-23-143	398.90	400.75	2.40	07A-NE
ITDD-23-145	290.15	302.05	1.39	1
ITDD-23-146	132.78	134.82	0.34	01A-SW
ITDD-23-146	142.88	147.88	1.29	1
ITDD-23-146	267.31	276.18	1.57	05-NE
ITDD-23-147	41.30	44.43	1.96	02-NE
ITDD-23-147	45.04	47.62	1.35	02A-NE
ITDD-23-147	138.02	140.27	1.11	1
ITDD-23-147	268.30	271.03	1.63	05-NE
ITDD-23-147	285.15	287.81	1.57	05C-NE
ITDD-23-147	307.66	310.36	2.16	05B-NE
ITDD-23-147	391.75	401.23	0.65	07-NE
ITDD-23-147	404.20	409.13	0.77	07A-NE
ITDD-23-147	430.72	436.67	2.01	08-NE
ITDD-23-147	448.24	449.52	1.54	08C-NE
ITDD-23-147	479.02	486.52	1.20	08A-NE
ITDD-23-148	60.55	61.40	1.07	04B-NE
ITDD-23-148	62.30	64.65	0.50	1
ITDD-23-148	73.61	77.87	1.17	04-NE
ITDD-23-148	257.50	260.54	3.18	06-NE
ITDD-23-148	262.83	266.60	1.39	06A-NE
ITDD-23-148	317.40	320.17	2.11	07-NE
ITDD-23-148	326.16	328.99	1.44	07A-NE
ITDD-23-149	46.51	48.45	1.52	01E-SW
ITDD-23-149	434.80	440.56	1.66	1
ITDD-23-150	123.60	129.60	1.74	01A-SW
ITDD-23-150	142.44	146.34	2.15	1
ITDD-23-150	293.11	301.75	1.45	05-NE
ITDD-23-151	8.66	10.35	0.68	01E-SW
ITDD-23-151	348.98	351.05	1.17	01D-SW
ITDD-23-151	411.87	421.66	1.84	1
ITDD-23-152	53.19	55.35	0.44	02-NE

Source: GE21 (2024).

Table 10-8: Mineralized Intercepts by Bandeira Drill Holes

holeid	from	to	Legth	Li2O %	Domain
ITDD-23-142	126.70	128.70	2.00	2.05	1
ITDD-23-144	82.50	82.98	0.48	2.34	1
ITDD-23-144	94.46	99.42	4.96	1.85	04-NE
ITDD-23-139	304.00	315.16	11.16	1.63	1
ITDD-23-143	48.05	49.46	1.41	1.18	02-NE
ITDD-23-143	49.87	52.40	2.53	2.21	02A-NE
ITDD-23-143	156.45	158.76	2.31	0.71	1
ITDD-23-143	164.12	167.19	3.07	1.34	04-NE
ITDD-23-143	168.75	169.75	1.00	1.43	04-NE
ITDD-23-143	187.65	188.03	0.38	2.99	04C-NE
ITDD-23-143	189.75	190.05	0.30	0.32	04C-NE
ITDD-23-143	190.45	191.02	0.57	0.65	04C-NE
ITDD-23-143	231.53	233.40	1.87	0.64	05-NE
ITDD-23-143	251.16	251.77	0.61	0.94	05C-NE
ITDD-23-143	341.86	344.37	2.51	1.52	06-NE
ITDD-23-143	347.82	349.48	1.66	0.73	06A-NE
ITDD-23-143	359.64	361.75	2.11	0.42	06B-NE
ITDD-23-143	383.35	384.95	1.60	1.79	07-NE
ITDD-23-143	385.37	388.72	3.35	1.89	07-NE
ITDD-23-143	398.90	400.75	1.85	2.40	07A-NE
ITDD-23-145	283.58	284.05	0.47	1.70	01A-SW
ITDD-23-145	290.15	290.59	0.44	2.33	1
ITDD-23-145	290.95	302.05	11.10	1.38	1
ITDD-23-146	132.78	134.82	2.04	0.34	01A-SW
ITDD-23-146	142.88	147.88	5.00	1.29	1
ITDD-23-146	267.31	276.18	8.87	1.57	05-NE
ITDD-23-147	41.30	44.43	3.13	1.96	02-NE
ITDD-23-147	45.04	47.62	2.58	1.35	02A-NE
ITDD-23-147	138.02	140.27	2.25	1.11	1
ITDD-23-147	268.30	271.03	2.73	1.63	05-NE
ITDD-23-147	285.15	287.81	2.66	1.57	05C-NE
ITDD-23-147	307.66	310.36	2.70	2.16	05B-NE
ITDD-23-147	391.75	392.34	0.59	1.87	07-NE
ITDD-23-147	393.84	395.03	1.19	0.75	07-NE
ITDD-23-147	395.79	396.24	0.45	0.47	07-NE
ITDD-23-147	396.66	398.68	2.02	1.30	07-NE
ITDD-23-147	399.92	401.23	1.31	0.63	07-NE

holeid	from	to	Legth	Li2O %	Domain
ITDD-23-147	404.20	405.27	1.07	1.00	07A-NE
ITDD-23-147	406.79	409.13	2.34	1.12	07A-NE
ITDD-23-147	430.72	436.67	5.95	2.01	08-NE
ITDD-23-147	479.02	480.29	1.27	1.25	08A-NE
ITDD-23-147	481.53	481.90	0.37	0.95	08A-NE
ITDD-23-147	483.52	486.52	3.00	2.13	08A-NE
ITDD-23-147	488.57	489.06	0.49	2.05	08B-NE
ITDD-23-148	60.55	61.40	0.85	1.07	04B-NE
ITDD-23-148	62.30	64.65	2.35	0.50	1
ITDD-23-148	73.61	77.87	4.26	1.17	04-NE
ITDD-23-148	257.50	260.54	3.04	3.18	06-NE
ITDD-23-148	262.83	266.60	3.77	1.39	06A-NE
ITDD-23-148	317.40	320.17	2.77	2.11	07-NE
ITDD-23-148	326.16	328.99	2.83	1.44	07A-NE
ITDD-23-149	46.51	48.45	1.94	1.52	01E-SW
ITDD-23-149	434.80	438.60	3.80	1.94	1
ITDD-23-149	439.41	440.56	1.15	1.61	1
ITDD-23-150	123.60	129.60	6.00	1.74	01A-SW
ITDD-23-150	142.44	146.34	3.90	2.15	1
ITDD-23-150	293.11	301.75	8.64	1.45	05-NE
ITDD-23-151	8.66	10.35	1.69	0.68	01E-SW
ITDD-23-151	348.98	351.05	2.07	1.17	01D-SW
ITDD-23-151	411.87	421.66	9.79	1.84	1
ITDD-23-152	53.19	55.35	2.16	0.44	02-NE
ITDD-23-152	56.15	58.31	2.16	1.29	02A-NE
ITDD-23-152	165.09	166.09	1.00	0.42	1
ITDD-23-152	183.78	185.86	2.08	0.30	04-NE
ITDD-23-152	250.73	252.51	1.78	0.92	05A-NE
ITDD-23-152	272.95	274.60	1.65	1.52	05-NE
ITDD-23-152	291.98	295.53	3.55	2.02	05B-NE
ITDD-23-154	108.52	113.42	4.90	1.57	1
ITDD-23-154	116.50	118.26	1.76	0.56	04-NE
ITDD-23-154	119.76	121.15	1.39	1.46	04-NE
ITDD-23-154	296.12	298.14	2.02	1.58	06-NE
ITDD-23-154	302.70	303.78	1.08	2.80	06A-NE
ITDD-23-154	305.07	306.29	1.22	2.38	06A-NE
ITDD-23-154	308.01	308.78	0.77	1.09	06A-NE

holeid	from	to	Legth	Li2O %	Domain
ITDD-23-154	310.17	310.99	0.82	0.77	06A-NE
ITDD-23-154	332.07	335.08	3.01	1.80	06B-NE
ITDD-23-154	336.32	337.38	1.06	0.68	06B-NE
ITDD-23-154	337.82	338.28	0.46	0.90	06B-NE
ITDD-23-154	359.89	361.12	1.23	2.19	07-NE
ITDD-23-154	361.50	363.56	2.06	1.89	07-NE
ITDD-23-154	369.23	370.37	1.14	1.24	07A-NE
ITDD-23-155	44.50	49.50	5.00	1.71	02-NE
ITDD-23-155	49.50	50.49	0.99	1.71	02A-NE
ITDD-23-155	149.36	151.36	2.00	1.67	1
ITDD-23-156	63.03	67.36	4.33	1.30	02A-NE
ITDD-23-156	209.37	211.94	2.57	0.90	04-NE
ITDD-23-156	213.86	218.63	4.77	2.02	04-NE
ITDD-23-156	290.10	292.08	1.98	0.94	05A-NE
ITDD-23-156	299.55	301.20	1.65	1.11	05-NE
ITDD-23-156	301.70	302.52	0.82	1.30	05-NE
ITDD-23-156	305.01	306.31	1.30	1.41	05-NE
ITDD-23-156	313.78	317.61	3.83	1.78	05B-NE
ITDD-23-157	78.37	79.17	0.80	0.77	02-NE
ITDD-23-157	87.20	89.20	2.00	0.93	02A-NE
ITDD-23-157	190.25	194.07	3.82	0.61	01A-SW
ITDD-23-157	203.54	205.60	2.06	1.78	1
ITDD-23-157	354.35	359.35	5.00	1.53	05-NE
ITDD-23-158	13.30	14.55	1.25	1.44	01E-SW
ITDD-23-158	393.02	396.02	3.00	1.09	01D-SW
ITDD-23-158	444.60	445.03	0.43	1.22	01A-SW
ITDD-23-158	445.93	446.80	0.87	0.86	01A-SW
ITDD-23-158	453.28	453.59	0.31	0.39	1
ITDD-23-158	453.97	455.14	1.17	2.92	1
ITDD-23-158	456.50	468.92	12.42	2.02	1
ITDD-23-160	66.94	67.50	0.56	0.50	1
ITDD-23-160	230.18	230.77	0.59	1.50	05-NE
ITDD-23-160	234.27	237.37	3.10	1.18	05-NE
ITDD-23-161	13.66	14.34	0.68	1.77	02-NE
ITDD-23-161	25.12	25.77	0.65	1.41	02A-NE
ITDD-23-161	129.12	133.12	4.00	1.27	1
ITDD-23-161	174.56	177.56	3.00	2.57	04C-NE

holeid	from	to	Legth	Li2O %	Domain
ITDD-23-161	313.74	315.43	1.69	2.10	06-NE
ITDD-23-161	322.93	324.22	1.29	0.95	06A-NE
ITDD-23-161	326.51	327.94	1.43	1.10	06A-NE
ITDD-23-161	351.41	354.37	2.96	1.16	06B-NE
ITDD-23-161	377.01	378.76	1.75	0.15	07-NE
ITDD-23-162	53.69	56.49	2.80	1.10	01E-SW
ITDD-23-162	395.57	398.57	3.00	1.56	01D-SW
ITDD-23-162	458.62	462.24	3.62	1.22	1
ITDD-23-163	204.32	206.32	2.00	0.87	02-NE
ITDD-23-163	245.30	245.81	0.51	0.20	02B-NE
ITDD-23-163	256.24	257.48	1.24	1.78	02E-NE
ITDD-23-163	298.22	299.76	1.54	0.66	1
ITDD-23-163	301.28	302.28	1.00	0.21	1
ITDD-23-163	348.35	349.35	1.00	0.14	04-NE
ITDD-23-163	354.35	359.42	5.07	0.72	04C-NE
ITDD-23-163	382.72	385.73	3.01	1.03	05A-NE
ITDD-23-163	387.92	389.09	1.17	1.51	05A-NE
ITDD-23-163	392.27	394.69	2.42	1.26	05A-NE
ITDD-23-163	395.05	397.65	2.60	0.96	05A-NE
ITDD-23-163	404.30	410.30	6.00	0.75	05-NE
ITDD-23-163	425.03	434.90	9.87	2.11	05B-NE
ITDD-23-163	469.10	473.67	4.57	1.75	06-NE
ITDD-23-163	474.65	477.57	2.92	1.79	06A-NE
ITDD-23-163	511.31	517.88	6.57	1.62	07-NE
ITDD-23-164	64.12	65.36	1.24	1.46	02C-NE
ITDD-23-164	80.29	83.39	3.10	1.22	02-NE
ITDD-23-164	87.48	100.06	12.58	1.50	02A-NE
ITDD-23-164	170.49	173.30	2.81	1.73	1
ITDD-23-164	325.78	326.42	0.64	1.82	05-NE
ITDD-23-164	328.68	333.75	5.07	0.74	05-NE
ITDD-23-164	415.18	417.35	2.17	0.86	07-NE
ITDD-23-164	418.75	419.65	0.90	0.54	07-NE
ITDD-23-164	424.78	427.02	2.24	0.84	07A-NE
ITDD-23-164	434.58	437.39	2.81	0.78	08-NE
ITDD-23-164	438.59	443.52	4.93	2.06	08-NE
ITDD-23-165	79.48	80.70	1.22	0.20	02C-NE
ITDD-23-165	100.21	101.21	1.00	0.35	02-NE

holeid	from	to	Legth	Li2O %	Domain
ITDD-23-165	195.00	202.00	7.00	2.08	1
ITDD-23-165	202.64	202.99	0.35	0.72	1
ITDD-23-165	338.94	342.77	3.83	1.42	05-NE
ITDD-23-166	89.68	90.72	1.04	1.58	05D-NE
ITDD-23-166	97.55	99.71	2.16	2.03	05-NE
ITDD-23-167	65.42	67.10	1.68	0.12	02C-NE
ITDD-23-167	228.46	229.56	1.10	0.81	01A-SW
ITDD-23-167	230.45	238.50	8.05	1.93	1
ITDD-23-167	345.55	351.27	5.72	1.86	05-NE
ITDD-23-168	88.20	88.79	0.59	1.07	05D-NE
ITDD-23-168	116.69	120.59	3.90	0.88	05-NE
ITDD-23-169	32.29	33.27	0.98	1.71	02D-NE
ITDD-23-169	199.77	200.44	0.67	0.43	04B-NE
ITDD-23-169	214.79	215.79	1.00	0.53	1
ITDD-23-169	241.60	243.89	2.29	1.27	04-NE
ITDD-23-169	359.01	360.46	1.45	2.26	06-NE
ITDD-23-170	101.62	106.04	4.42	1.46	05-NE
ITDD-23-171	51.37	52.05	0.68	1.22	1
ITDD-23-171	52.69	54.96	2.27	0.64	1
ITDD-23-171	208.35	208.77	0.42	1.74	05D-NE
ITDD-23-171	222.89	228.56	5.67	1.95	05-NE
ITDD-23-172	15.84	16.93	1.09	1.89	02-NE
ITDD-23-172	26.83	27.74	0.91	1.11	02A-NE
ITDD-23-172	136.38	140.13	3.75	1.78	1
ITDD-23-172	180.94	185.33	4.39	1.58	04C-NE
ITDD-23-172	317.72	320.13	2.41	2.05	06-NE
ITDD-23-172	331.69	332.79	1.10	2.92	06A-NE
ITDD-23-172	350.08	352.13	2.05	0.52	06B-NE
ITDD-23-172	353.90	354.98	1.08	2.17	06B-NE
ITDD-23-172	368.65	368.95	0.30	1.89	07-NE
ITDD-23-172	369.88	371.88	2.00	1.84	07-NE
ITDD-23-173	122.48	129.13	6.65	1.50	05-NE
ITDD-23-174	55.70	57.78	2.08	0.74	02C-NE
ITDD-23-174	211.36	212.40	1.04	0.72	01A-SW
ITDD-23-174	213.11	214.99	1.88	2.09	1
ITDD-23-174	216.09	221.72	5.63	1.58	1
ITDD-23-174	342.54	346.82	4.28	1.65	05-NE

Source: GE21 (2024).

LITHIUM IONIC

Table 10-9: Mineralized Intercepts by Bandeira Drill Holes

holeid	from	to	Li2O_pct	Grade_shell	holeid	from	to	Li2O_pct	Grade_shell	holeid	from	to	Li2O_pct	Grade_shell	holeid	from	to	Li2O_pct	Grade_shell	holeid	from	to	Li2O_pct	Grade_shell
ITDD-23-152	56.15	58.31	1.29	02A-NE	ITDD-23-161	174.56	177.56	2.57	04C-NE	ITDD-23-167	228.46	229.56	0.81	01A-SW	ITDD-23-176	56.11	61.88	1.00	1	ITDD-23-185	539.78	540.32	0.59	07-NE
ITDD-23-152	165.09	166.09	0.77	1	ITDD-23-161	313.74	315.43	2.10	06-NE	ITDD-23-167	230.45	238.50	1.93	1	ITDD-23-176	221.74	223.08	0.91	05D-NE	ITDD-23-185	567.15	569.57	2.00	08-NE
ITDD-23-152	183.78	186.86	0.65	04-NE	ITDD-23-161	322.93	327.94	0.61	06A-NE	ITDD-23-167	345.55	351.27	1.86	05-NE	ITDD-23-176	230.14	235.14	1.57	05-NE	ITDD-23-186	16.90	17.95	0.32	01E-SW
ITDD-23-152	250.73	252.51	0.92	05A-NE	ITDD-23-161	351.41	354.37	1.16	06B-NE	ITDD-23-168	88.20	88.79	1.07	05D-NE	ITDD-23-177	77.86	80.86	0.20	02C-NE	ITDD-23-187	196.58	198.86	1.85	1
ITDD-23-152	272.95	274.60	1.52	05-NE	ITDD-23-161	377.01	378.76	0.16	07-NE	ITDD-23-168	116.69	120.59	0.88	05-NE	ITDD-23-177	110.89	113.89	1.12	02-NE	ITDD-23-189	70.07	72.93	0.97	1
ITDD-23-152	291.98	295.53	2.02	05B-NE	ITDD-23-162	53.69	56.49	1.10	01E-SW	ITDD-23-169	32.29	33.27	1.71	02D-NE	ITDD-23-177	199.14	200.30	1.03	01A-SW	ITDD-23-191	53.51	58.65	1.71	1
ITDD-23-154	108.52	113.42	1.57	1	ITDD-23-162	395.57	398.57	1.56	01D-SW	ITDD-23-169	199.77	200.44	0.43	04B-NE	ITDD-23-177	204.16	209.98	2.18	1	ITDD-23-188	130.48	139.59	2.45	03-NE
ITDD-23-154	116.50	121.15	0.71	04-NE	ITDD-23-162	458.62	462.24	1.22	1	ITDD-23-169	214.79	215.79	0.87	1	ITDD-23-177	354.96	363.55	1.02	05-NE	ITDD-23-188	272.46	275.86	2.07	02-NE
ITDD-23-154	296.12	298.14	1.58	06-NE	ITDD-23-163	204.32	206.32	0.87	02-NE	ITDD-23-169	241.60	243.89	1.27	04-NE	ITDD-23-178	171.00	173.18	0.67	1	ITDD-23-188	347.55	356.50	1.30	02B-NE
ITDD-23-154	302.70	310.99	0.97	06A-NE	ITDD-23-163	244.30	247.81	0.26	02B-NE	ITDD-23-169	359.01	360.46	2.26	06-NE	ITDD-23-180	171.59	177.38	1.78	02-NE	ITDD-23-188	391.25	394.86	0.77	1
ITDD-23-154	332.07	338.28	1.13	06B-NE	ITDD-23-163	256.24	257.48	1.78	02E-NE	ITDD-23-170	101.62	106.04	1.46	05-NE	ITDD-23-180	264.35	269.85	1.15	1	ITDD-23-188	461.28	471.60	1.17	04-NE
ITDD-23-154	359.89	363.56	1.82	07-NE	ITDD-23-163	298.22	302.28	0.53	1	ITDD-23-171	51.37	54.96	0.77	1	ITDD-23-180	390.61	401.35	1.85	05-NE	ITDD-23-188	483.13	485.78	0.39	04C-NE
ITDD-23-154	369.23	370.37	1.24	07A-NE	ITDD-23-163	348.35	349.35	0.54	04-NE	ITDD-23-171	222.83	228.56	1.95	05-NE	ITDD-23-181	203.14	205.32	1.26	01A-SW	ITDD-23-188	581.89	584.23	0.17	06-NE
ITDD-23-155	44.50	49.50	1.65	02-NE	ITDD-23-163	354.35	359.42	0.72	04C-NE	ITDD-23-172	15.84	16.93	1.89	02-NE	ITDD-23-181	223.00	229.00	1.02	1	ITDD-23-188	631.34	643.24	1.61	08-NE
ITDD-23-155	49.50	50.49	2.03	02A-NE	ITDD-23-163	382.72	397.65	0.78	05A-NE	ITDD-23-172	26.83	27.74	1.11	02A-NE	ITDD-23-182	30.47	31.47	0.40	02D-NE	ITDD-23-192	49.72	50.72	0.29	02C-NE
ITDD-23-155	149.36	151.36	1.67	1	ITDD-23-163	404.30	410.30	0.75	05-NE	ITDD-23-172	136.38	140.13	1.78	1	ITDD-23-182	151.73	152.75	0.47	04A-NE	ITDD-23-192	196.40	202.91	1.40	01A-SW
ITDD-23-156	61.03	62.03	0.11	02-NE	ITDD-23-163	425.03	434.90	2.11	05B-NE	ITDD-23-172	180.94	185.33	1.58	04C-NE	ITDD-23-182	181.36	182.40	0.77	04B-NE	ITDD-23-192	210.10	210.75	1.46	1
ITDD-23-156	63.03	67.36	1.30	02A-NE	ITDD-23-163	469.10	473.67	1.75	06-NE	ITDD-23-172	317.72	320.13	2.05	06-NE	ITDD-23-182	201.09	202.74	1.21	1	ITDD-23-192	346.48	355.84	1.50	05-NE
ITDD-23-156	209.37	218.63	1.36	04-NE	ITDD-23-163	474.65	477.57	1.79	06A-NE	ITDD-23-172	331.69	332.79	2.92	06A-NE	ITDD-23-182	226.06	231.25	1.32	04-NE	ITDD-23-193	48.07	49.34	0.47	10-NE
ITDD-23-156	290.10	292.08	0.94	05A-NE	ITDD-23-163	511.31	517.88	1.62	07-NE	ITDD-23-172	350.08	354.98	0.79	06B-NE	ITDD-23-182	358.81	359.69	0.35	06-NE	ITDD-23-193	65.08	68.85	1.39	09-NE
ITDD-23-156	299.55	306.31	0.76	05-NE	ITDD-23-164	64.12	65.36	2.61	02C-NE	ITDD-23-172	368.65	371.88	1.43	07-NE	ITDD-23-183	177.37	178.64	3.40	1	ITDD-23-194	96.22	96.94	1.02	05D-NE
ITDD-23-156	313.78	317.61	1.78	05B-NE	ITDD-23-164	80.29	83.39	1.22	02-NE	ITDD-23-173	122.48	129.13	1.50	05-NE	ITDD-23-184	21.01	22.05	0.56	02-NE	ITDD-23-194	114.65	119.50	1.15	05-NE
ITDD-23-157	78.37	79.17	0.77	02-NE	ITDD-23-164	87.48	100.06	1.50	02A-NE	ITDD-23-174	55.70	57.78	0.74	02C-NE	ITDD-23-184	156.12	159.73	1.03	1	ITDD-23-195	80.91	86.51	0.86	1
ITDD-23-157	87.20	89.20	0.93	02A-NE	ITDD-23-164	170.48	173.30	1.73	1	ITDD-23-174	211.36	212.40	0.72	01A-SW	ITDD-23-184	188.74	189.51	0.87	04-NE	ITDD-23-196	110.73	113.82	0.93	05D-NE
ITDD-23-157	190.25	194.07	0.61	01A-SW	ITDD-23-164	325.78	333.75	0.67	05-NE	ITDD-23-174	213.11	221.72	1.55	1	ITDD-23-184	201.67	210.57	1.28	04C-NE	ITDD-23-196	137.13	146.05	1.42	05-NE
ITDD-23-157	203.54	205.60	1.78	1	ITDD-23-164	415.18	419.65	0.76	07-NE	ITDD-23-174	342.54	346.82	1.65	05-NE	ITDD-23-184	337.76	341.69	1.20	06-NE	ITDD-23-197	94.36	95.84	0.57	1
ITDD-23-157	354.35	359.35	1.53	05-NE	ITDD-23-164	424.78	427.02	0.84	07A-NE	ITDD-23-175	214.57	216.50	0.58	02-NE	ITDD-23-184	348.01	349.42	1.94	06A-NE	ITDD-23-197	97.91	102.40	1.76	04-NE
ITDD-23-158	393.02	396.02	1.09	01D-SW	ITDD-23-164	434.58	443.52	1.40	08-NE	ITDD-23-175	275.37	276.40	0.48	02E-NE	ITDD-23-184	384.79	387.52	0.75	07-NE	ITDD-23-198	67.98	71.67	0.91	10-NE
ITDD-23-158	444.60	446.80	0.68	01A-SW	ITDD-23-165	79.48	80.70	0.20	02C-NE	ITDD-23-175	323.64	325.56	1.85	1	ITDD-23-185	240.77	244.06	1.84	02-NE	ITDD-23-198	93.91	99.94	1.26	06-NE
ITDD-23-158	453.28	468.92	1.87	1	ITDD-23-165	100.21	101.21	1.48	02-NE	ITDD-23-175	383.34	385.19	1.02	04C-NE	ITDD-23-185	360.36	365.03	1.54	1	ITDD-23-200	69.11	72.49	1.06	05-NE
ITDD-23-160	66.94	67.50	0.50	1	ITDD-23-165	195.00	202.99	1.88	1	ITDD-23-175	398.59	407.49	1.34	05A-NE	ITDD-23-185	417.41	420.23	0.98	04-NE	ITDD-23-202	85.10	87.62	1.78	1
ITDD-23-160	230.18	237.37	0.72	05-NE	ITDD-23-165	338.94	342.77	1.42	05-NE	ITDD-23-175	479.11	480.55	0.60	06-NE	ITDD-23-185	434.34	437.34	1.22	04C-NE	ITDD-23-202	252.08	253.19	1.20	05D-NE
ITDD-23-161	13.66	14.34	1.77	02-NE	ITDD-23-166	89.68	90.72	1.58	05D-NE	ITDD-23-175	484.82	492.19	1.80	06A-NE	ITDD-23-185	443.78	447.25	1.10	05A-NE	ITDD-23-202	258.82	262.81	1.83	05-NE
ITDD-23-161	25.12	25.77	1.41	02A-NE	ITDD-23-166	97.55	99.71	2.03	05-NE	ITDD-23-175	502.82	503.65	1.52	07-NE	ITDD-23-185	520.91	521.41	0.04	06-NE	ITDD-23-209	41.61	51.61	1.21	SE-A
ITDD-23-161	129.12	133.12	1.27	1	ITDD-23-167	65.42	67.10	0.12	02C-NE	ITDD-23-175	524.36	529.94	1.11	08-NE	ITDD-23-185	529.52	531.92	3.57	06A-NE	ITDD-23-199	127.38	129.42	2.03	02C-NE

Source: GE21 (2024).

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Table 10-10: Mineralized Intercepts by Bandeira Drill Holes

holeid	from	to	Li2O_pct	Grade_shell
ITDD-23-199	270.33	272.10	0.93	01A-SW
ITDD-23-199	288.91	294.47	1.59	1
ITDD-23-199	408.52	413.16	0.74	05-NE
ITDD-23-211	16.51	18.46	0.77	1
ITDD-23-211	197.53	198.63	1.54	05D-NE
ITDD-23-211	211.54	212.82	0.40	05-NE
ITDD-23-212	110.38	112.78	1.21	05D-NE
ITDD-23-212	124.48	124.98	0.71	05-NE
ITDD-23-213	54.87	103.98	1.26	SE-A
ITDD-23-218	56.17	72.40	1.65	SE-A
ITDD-23-215	37.48	43.52	1.36	1
ITDD-23-215	187.71	189.90	0.40	05D-NE
ITDD-23-215	203.86	212.54	1.78	05-NE
ITDD-23-216	55.24	60.12	1.54	01A-SW
ITDD-23-216	65.36	70.42	1.13	1
ITDD-23-216	197.59	206.18	1.59	05-NE
ITDD-23-219	56.49	62.54	0.85	01A-SW
ITDD-23-219	67.05	69.31	0.53	1
ITDD-23-219	197.86	200.53	1.62	05-NE
ITDD-23-220	66.48	69.48	0.70	05D-NE
ITDD-23-220	76.92	78.00	1.60	05-NE
ITDD-23-222	57.30	63.57	1.22	1
ITDD-23-222	197.78	202.62	1.45	05-NE
ITDD-23-223	64.00	64.70	1.20	05D-NE
ITDD-23-223	94.04	98.19	1.49	05-NE
ITDD-23-221	113.37	163.37	1.72	SE-A
ITDD-23-221	163.37	167.10	1.79	SE-A
ITDD-23-224	28.43	34.32	1.96	1
ITDD-23-224	166.46	172.45	1.73	05-NE
ITDD-23-225	78.99	85.97	0.85	05-NE
ITDD-23-226	35.27	42.50	2.12	1
ITDD-23-226	171.61	179.57	1.53	05-NE
ITDD-23-227	9.76	14.82	1.24	1
ITDD-23-227	149.37	154.62	2.19	05D-NE
ITDD-23-227	179.03	181.93	1.67	05-NE

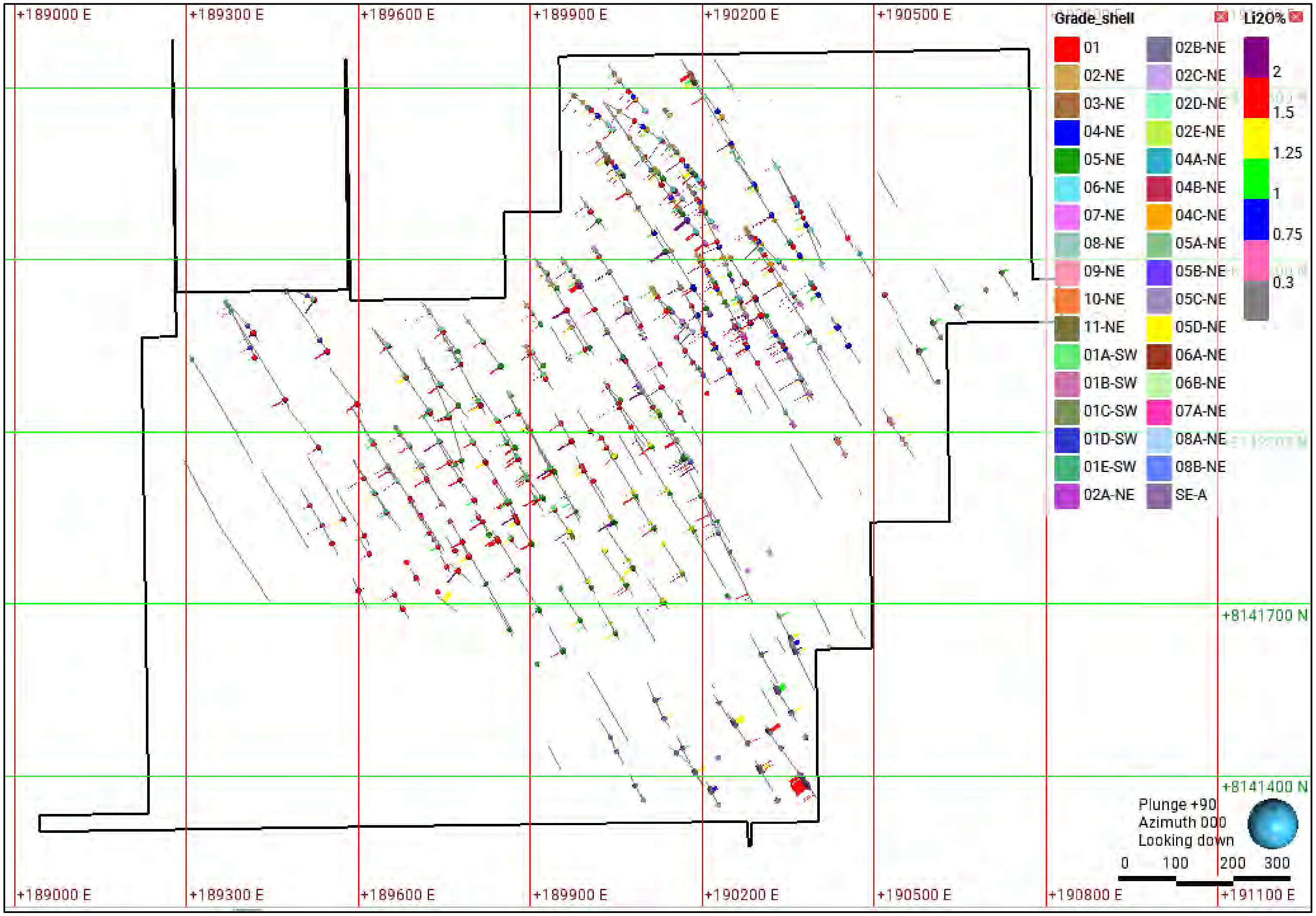
holeid	from	to	Li2O_pct	Grade_shell
ITDD-23-228	98.34	122.94	1.29	SE-A
ITDD-23-229	122.55	124.72	1.30	05-NE
ITDD-23-230	136.25	137.06	1.63	05D-NE
ITDD-23-230	161.98	167.49	1.65	05-NE
ITDD-23-210	139.91	142.91	1.79	05-NE
ITDD-23-210	219.57	223.51	1.98	07-NE
ITDD-23-210	256.99	259.01	1.75	08-NE
ITDD-23-210	276.43	278.98	0.65	08C-NE
ITDD-23-210	285.60	287.94	1.22	08A-NE
ITDD-23-210	298.00	302.98	0.83	08B-NE
ITDD-23-231	129.79	136.35	1.12	05-NE
ITDD-23-232	116.40	116.98	0.86	05D-NE
ITDD-23-232	138.70	145.95	1.35	05-NE
ITDD-23-233	125.59	129.17	0.58	05D-NE
ITDD-23-233	146.75	148.90	1.27	05-NE
ITDD-23-234	95.12	97.53	1.44	07-NE
ITDD-23-234	147.34	148.34	0.74	08-NE
ITDD-23-235	104.46	111.29	1.20	07-NE
ITDD-23-235	167.04	171.04	1.29	08-NE
ITDD-23-235	188.10	189.10	0.73	08A-NE
ITDD-23-235	206.29	207.29	0.32	08B-NE
ITDD-23-236	101.89	104.89	1.39	07-NE
ITDD-23-236	173.04	174.04	1.15	08-NE
ITDD-23-159	16.50	18.75	0.43	02-NE
ITDD-23-159	23.36	25.16	0.77	02A-NE
ITDD-23-159	115.78	117.32	0.42	1
ITDD-23-159	278.40	279.00	1.24	05D-NE
ITDD-23-159	287.50	292.65	0.98	05-NE
ITDD-23-159	350.16	353.08	0.89	07-NE
ITDD-23-159	372.21	379.28	1.78	08-NE
ITDD-23-159	413.39	415.32	0.46	08C-NE
ITDD-23-159	425.97	437.60	1.40	08A-NE
ITDD-23-159	445.38	450.94	1.52	08B-NE
ITDD-23-243	45.06	54.06	1.52	11-NE
ITDD-23-246	45.70	50.70	1.17	11-NE

holeid	from	to	Li2O_pct	Grade_shell
ITDD-23-247	86.62	96.77	0.95	11-NE
ITDD-23-248	71.41	76.41	1.02	11-NE
ITDD-23-249	122.10	124.10	0.56	11-NE
ITDD-24-250	43.42	49.42	1.09	11-NE
ITDD-24-251	193.16	197.00	1.28	11-NE
ITDD-24-252	94.07	101.07	1.14	11-NE
ITDD-24-253	181.75	188.30	1.01	11-NE
ITDD-24-254	90.69	98.50	0.71	03-NE
ITDD-24-254	125.73	132.87	1.33	02D-NE
ITDD-24-254	190.25	191.25	0.15	02-NE
ITDD-24-255	143.39	143.93	0.86	02D-NE
ITDD-24-256	177.72	209.30	1.51	11-NE
ITDD-24-257	189.17	207.78	2.03	11-NE
ITDD-24-258	105.66	108.66	1.53	02C-NE
ITDD-24-258	116.44	122.44	1.34	02-NE
ITDD-24-259	146.95	178.95	1.26	11-NE
ITDD-24-261	148.31	158.33	1.38	1
ITDD-24-262	220.00	267.48	1.16	11-NE
ITDD-24-264	114.40	116.17	1.95	11-NE
ITDD-24-265	54.27	56.65	1.59	05-NE
ITDD-24-266	46.22	53.22	1.25	10-NE
ITDD-24-266	53.22	59.28	0.95	09-NE
ITDD-24-266	118.28	129.00	1.19	06-NE
ITDD-24-266	189.55	190.75	0.51	07-NE
ITDD-24-266	215.41	217.41	0.49	07A-NE
ITDD-24-267	35.48	39.00	0.97	05D-NE
ITDD-24-267	46.19	47.14	0.56	05-NE
ITDD-24-268	83.74	90.63	1.37	16-SW
ITDD-24-268	94.87	103.34	1.81	15-SW
ITDD-24-268	124.62	126.57	2.37	07-NE
ITDD-24-268	176.52	179.57	0.73	08-NE
ITDD-24-269	76.25	76.98	1.11	1
ITDD-24-269	88.72	93.47	2.28	04-NE
ITDD-24-270	70.65	77.32	2.11	16-SW
ITDD-24-270	110.03	122.03	1.09	15-SW

holeid	from	to	Li2O_pct	Grade_shell
ITDD-24-270	142.75	146.48	2.01	07-NE
ITDD-24-271	70.38	73.38	0.89	07-NE
ITDD-24-272	67.38	70.00	1.62	1
ITDD-24-272	214.26	215.99	0.45	05B-NE
ITDD-24-273	51.58	52.80	0.66	07-NE
ITDD-24-273	141.71	143.52	0.60	08-NE
ITDD-24-274	169.03	170.03	1.10	05-NE
ITDD-24-274	185.82	189.61	0.59	05B-NE
ITDD-24-275	156.38	159.55	0.74	07-NE
ITDD-24-275	206.21	210.09	1.07	08-NE
ITDD-24-275	213.70	215.17	2.49	08C-NE
ITDD-24-276	35.00	85.00	1.37	09-NE
ITDD-24-276	85.00	99.70	1.49	09-NE
ITDD-24-276	182.00	183.00	2.23	07-NE
ITDD-24-276	189.38	192.03	0.37	07A-NE
ITDD-24-277	26.73	33.73	0.83	09-NE
ITDD-24-277	206.04	211.57	0.99	07-NE
ITDD-24-278	101.24	104.96	1.83	09A-NE
ITDD-24-279	94.92	99.46	0.81	09-NE
ITDD-24-279	133.82	135.45	0.46	09A-NE
ITDD-24-280	137.41	153.41	1.77	02-NE
ITDD-24-282	85.72	89.24	1.60	05-NE
ITDD-24-282	131.78	153.05	1.02	15-SW
ITDD-24-282	200.75	208.57	1.51	07-NE
ITDD-24-282	210.46	211.82	1.69	07A-NE
ITDD-24-282	250.50	252.56	0.50	08-NE
ITDD-24-282	264.64	269.20	1.79	08C-NE
ITDD-24-282	283.28	286.21	0.98	08A-NE
ITDD-24-283	105.10	119.94	1.72	09-NE
ITDD-24-283	146.03	149.28	1.35	07-NE
ITDD-24-283	193.34	200.02	0.62	08-NE
ITDD-24-283	218.85	221.33	1.08	08C-NE
ITDD-24-286	24.25	31.25	1.01	09-NE
ITDD-24-286	113.12	114.12	0.36	09A-NE
ITDD-24-285	115.78	119.50	0.81	07-NE

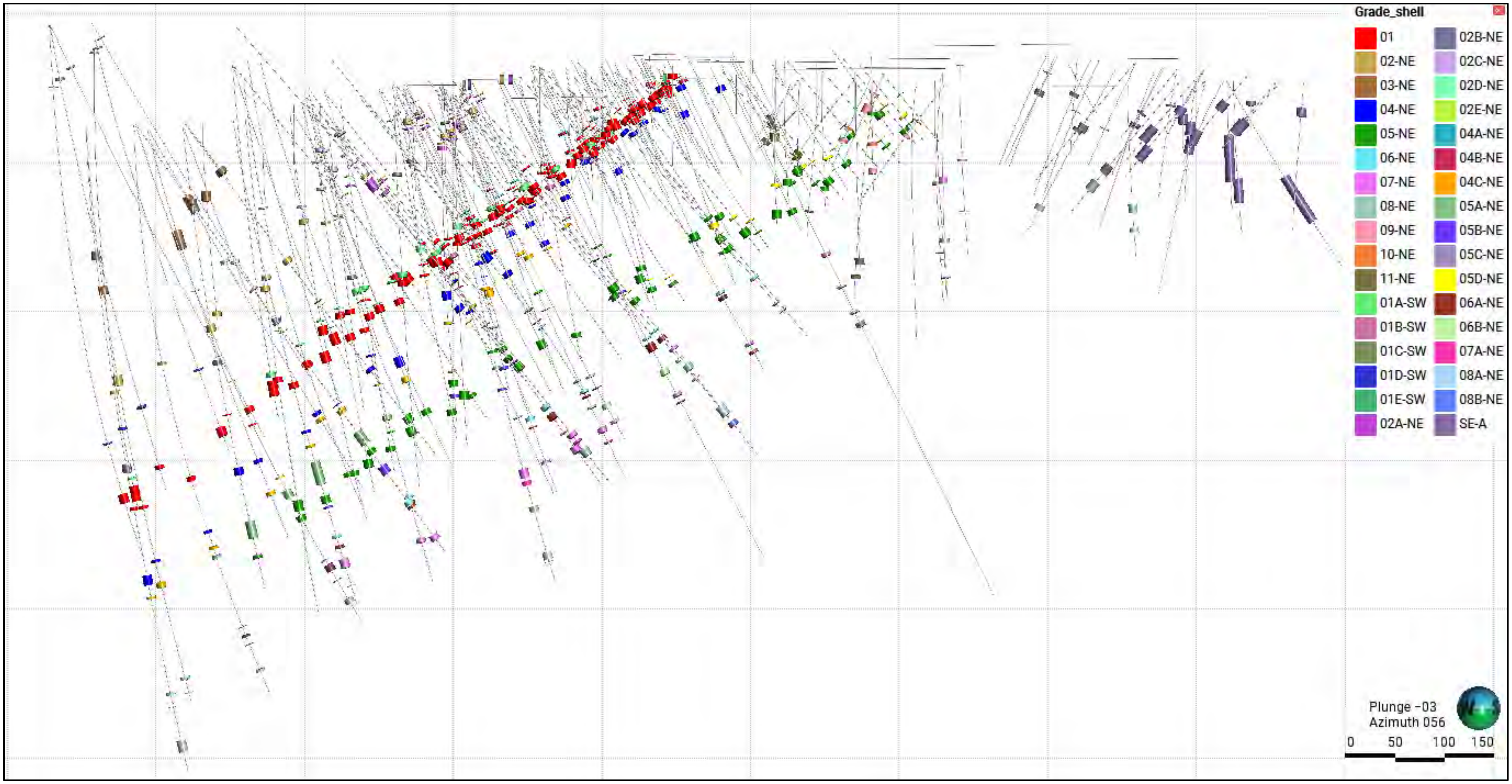
holeid	from	to	Li2O_pct	Grade_shell
ITDD-24-285	157.87	171.87	1.54	08-NE
ITDD-24-289	77.14	81.80	0.93	05-NE
ITDD-24-289	148.13	152.61	0.57	15-SW
ITDD-24-290	108.26	110.26	0.96	07-NE
ITDD-24-290	159.87	160.85	0.35	08-NE
ITDD-24-290	176.45	183.45	1.72	08C-NE

Source: GE21 (2024).



Source: GE21 (2024).

Figure 10-2: Horizontal Projection of Bandeira Drill Holes with Mineralized Intercepts (scale in metres)



Source: GE21 (2024).

Figure 10-3: Oblique View of Drill Holes with Mineralized Intercepts (scale in metres)

10.10 Qualified Person's Comments

No significant drilling, sampling, or recovery factors would impact the outcome of the drilling results and the Mineral Resource estimate (Section 14).

In the QP's opinion, based on a review of all possible information, the drilling procedures put in place by Lithium Ionic meet acceptable industry standards. The data can be and has been used for Geological and Resource Modelling.

11.0 SAMPLE PREPARATION, ANALYSIS, AND SECURITY

11.1 Sampling

Samples are prepared from HQ (63.5 mm) and NQ (47.6 mm) diameter drill cores. The sampling procedures described in this section reflect MGLIT's current Standard Operating Procedures (SOP).

Sample intervals in the mineralized zones are defined based on one metre. Mineralized samples must have a minimum length of 1.00 m and a maximum length of 1.50 m. In some situations, samples shorter than 1.00 m can be selected; the SOP describes these situations in detail.

Outside the mineralized domains, the sampling definition is 1.50 m, and samples can range from 1.00 to 3.00 m.

The visual indicators for sample interval definition include lithological contacts, mineral structures, and mineralization.

Lithium Ionic's sample collection and sample definition procedures are:

- The drilling contractor team transports drill core from the drill rig to a drill-logging and sampling area one or more times per shift.
- The disposition and orientation of boxes are checked, and the depths are marked.
- Groups of three core boxes are photographed and logged.
- Sample intervals are marked on the core box.
- A line is drawn along the drill core at high angles to the foliation, to orient the saw cut before sampling. The right half of the core is selected as a sample, and the other half is retained for future reference.
- Sample tags are attached to the core box at the end of each sample.
- Sample bags are numbered before sampling.
- Sample tags are inserted in the bags only after samples are bagged.
- After the samples are tagged and bagged, they are weighed.
- The core is cut lengthwise along the core axis. A geologist defines the position of the cut, and a geology technician performs the cutting.
- For weathered material, a spatula or a machete is used to split the sample into two subsamples along the drilling direction.
- Fresh-rock cores are cut in half using a diamond saw and flushed with water between cuts.

After bagging, the samples are weighed, and the weight is registered; sample batches are assembled and sent to the laboratory. The standard batch size is 35 samples, consisting of 29 core samples and six QC samples.

11.2 Sample Preparation, Control, and Custody

A sample is selected and marked with a tag. After logging, it is inserted into the project database. Cores are split in half using a diamond saw. Half of the core is left in the core box, while the other half is stored in plastic bags, accompanied by a printed sample tag, and sent to the lab.

SGS Geosol (SGS), an independent commercial laboratory, prepares and analyzes drill-core samples. The SGS facility has ISO 9001, ISO 14001, and ISO 17025 certifications. A parcel transport company delivers the sample shipment to the SGS facility in Vespasiano, Minas Gerais. Samples are in the custody and control of the transportation company representatives at all times until delivery to the laboratory, where samples are held in a secure enclosure until processing. Upon delivery, SGS sends a confirmation email with details of samples received. The chain of custody of each batch is carefully maintained from collection at the drill rig to delivery at the laboratory to prevent accidental contamination or mixing of samples, and to render active tampering as difficult as possible.

All samples received at SGS are inventoried and weighed before processing. Samples are dried at 105°C, crushed to 75% passing (P_{75}) a 3 mm sieve, homogenized, split (jones riffle splitter), and 250 g to 300 g of sample are pulverized in a steel mill to P_{95} 150 mesh.

11.3 Density Measurements

The density SOP' Lithium Ionic' states that density measurements should be taken for every geochemical sample generated. When the drill core quality does not allow for the density assay, this should be registered in the density sampling plan with a specified tag.

Density assay in the unsampled half-cores generally does not include drying or sample sealing.

For heterogeneous samples, three density assays were taken: one at the top, one in the middle, and one at the base of the sample. Homogenous samples were generated in only one density assay. All density data is stored in a database.

A summary of the procedures described in the density SOP is presented next:

- Sample selection and registration in the density plan
- Density samples must have a minimum length of 10 cm and a maximum of 25 cm
- Weighing of the sample (PA)
- Weighing of the sample submerged (PB)
- Density values are acquired from the following formula:
  - D = PA / (PA – PB)
  - D = Density
  - PA = Sample weight (in the air)
  - PB = Sample weight (submerged in water).

Not implementing drying and sealing of density samples might be acceptable, considering the deposit's climate and lithological characteristics. Nevertheless, assessing the impact of sample humidity and porosity in the bulk density measurement process is strongly recommended based on Lipton's 2014 proposed methodology.

11.4 Sample Preparation

All samples are inventoried and weighed before processing them. Samples are dried at 105°C, crushed to 75% passing <3 mm, sieve, homogenized, split (Jones Riffle splitter), and pulverized (250 to 300 g of sample) in a steel mill to 95% passing 150 mesh.

11.5 Sample Analysis

The chemical assays were performed using the ICP90A method, a multi-element analysis involving fusion with sodium peroxide (Na_2O_2) and ICP-OES. If the lithium results exceeded 15,000 ppm, the samples were re-analyzed using the ICP90Q_Li method, which has higher detection limits.

All chemical analyses conducted by SGS are reported to Lithium Ionic on PDF certificates, accompanied by an MS Excel digital file.

11.6 Quality Assurance and Quality Control

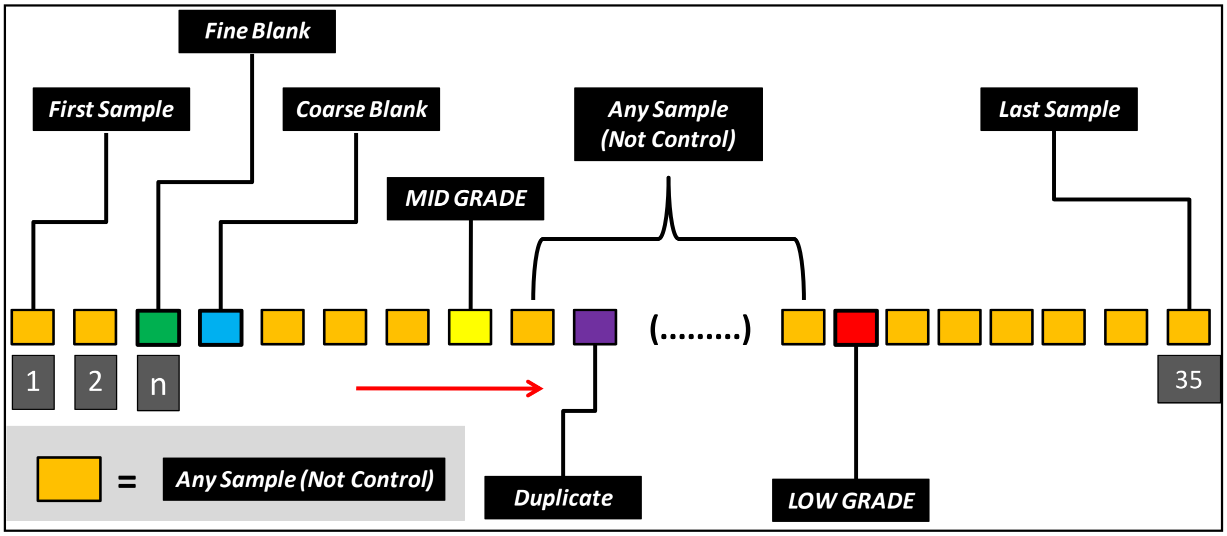
The implementation of the QA/QC program was proposed by the independent company, GE21. The sample batch composition includes six QC samples for every 29 regular samples. The QC composition of the batches comprises:

- Coarse (preparation) and fine (analytical) blanks: 5.7% of the batch or two blanks per batch—one of each type.
- Standards: 5.7% of the batch or two standards per batch.
- Crushed duplicates: 2.8% of the batch, or one sample per batch.
- Pulverized duplicates: 2.8% of the batch, or one sample per batch.

Additionally, one sample is selected for the check assay procedure for every sample batch, representing 3% of the batch. Check samples are chosen from the pulverized material of a regular sample reserved by the primary laboratory. These samples are sent to a secondary laboratory, ALS Vancouver, British Columbia, Canada, monthly. ALS Vancouver is ISO 17025 accredited.

The same control-sample proportion criteria should be respected on check assay batches: two standards, two blanks, and two duplicates. Particle-size analysis (PSA) is also performed on the check-assay samples. Figure 11-1 presents the batch-composition scheme for batches with mineralized samples or zones, and unmineralized batches. Figure 11-1 shows the proportion of QC samples in the MGLIT geochemical database.

Non-Mineralized Zone



Mineralized Zone

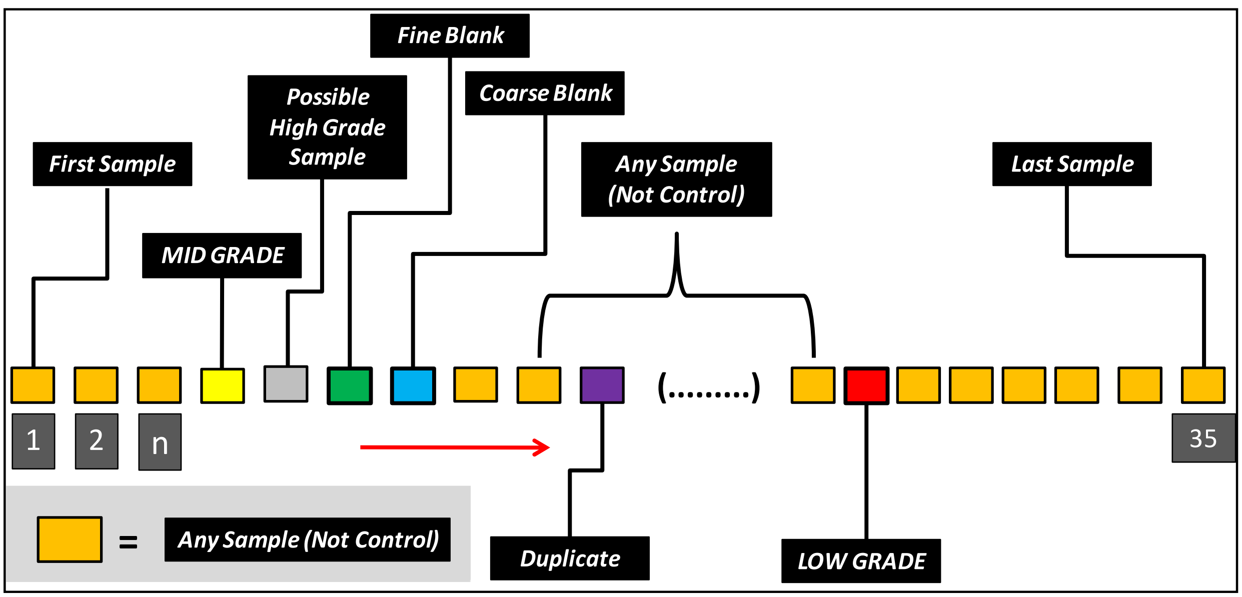


Figure 11-1: QA/QC Program

Table 11-1: QA/QC Program Summary

CRM/SRM	Crushed Duplicates	Pulverized Duplicates	Preparation Blanks	Analytical Blanks	Check Assay	Total QA/QC Samples	Total Database
649	321	319	326	326	72	1,941	12,385
5.2%	2.6%	2.6%	2.6%	2.6%	0.6%	15.7%	100%

Notes: CRM = certified reference material; SRM = standardized reference material.

11.6.1 Preparation Blank—Coarse Blank

Preparation blank samples are inserted in the sample batch before the physical preparation of the samples. This measure helps to track any contamination problems that might occur in the granulometric-reduction or sample-splitting process. Blank samples are inserted at the beginning of the possibly mineralized intervals, following the sequence:

- Mineralized sample
- Analytical/fine blank
- Preparation/coarse blank.

If an unmineralized batch is assembled, blank samples must be inserted at the beginning of the batch.

MGLIT uses a commercial blank, ITAK-QG-01, as its coarse blank material. More than 95% of the coarse blank samples are below the 5x detection limit threshold, indicating no major contamination. Figure 11-2 presents the preparation blank control chart for lithium.

Type of control	Blank
Reference	ITAK QG-01
Variable	Li ppm
Number of analysis	326

Blank code	ITAK-QG-01
Limit of Detection (LOD)	10.0
Upper limit (5 x LOD)	50.0
Reference Value (REF)	5.0
Standard deviation	11.642

Minimum	10.0
Maximum	129.0
Average	14.8
Median	10.0

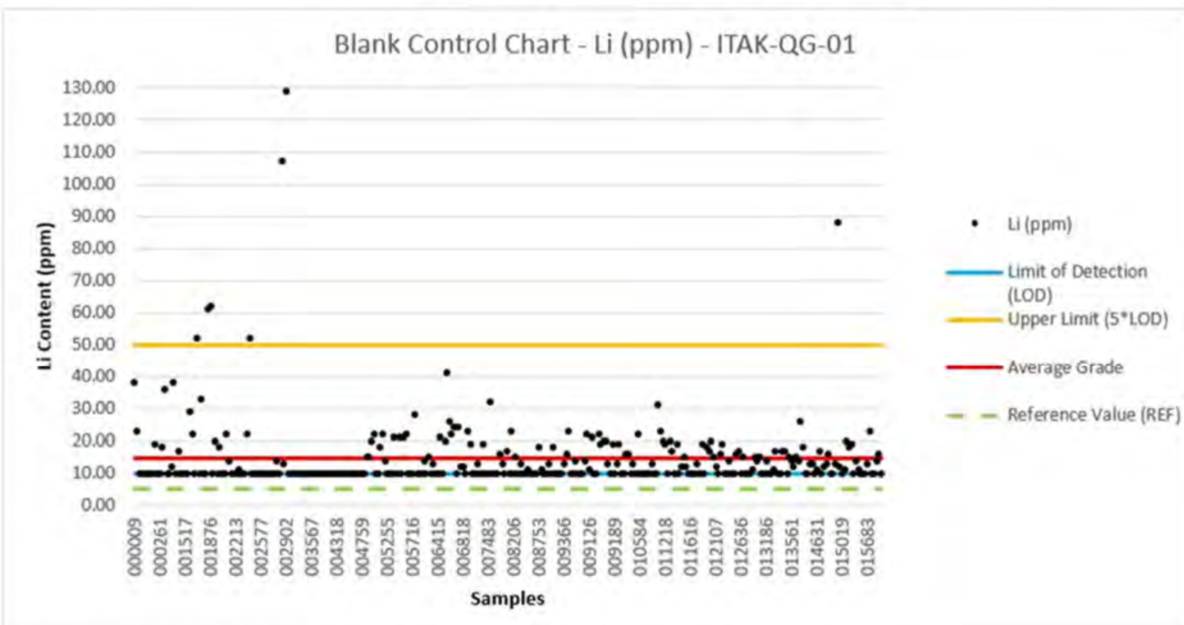


Figure 11-2: Blank Control Chart—ITAK QG-01

11.6.2 *Analytical Blank—Fine Blank*

Analytical or fine blank samples were inserted in the analytical batches after the samples' physical preparation. This control was used to assess potential contamination issues that might have occurred during the sample digestion or fusion processes and to evaluate any miscalibrations of the analytical equipment. Blank samples are inserted at the beginning of the possibly mineralized intervals, following the sequence:

1. Mineralized sample
2. Analytical/fine blank
3. Preparation/coarse blank.

If an unmineralized batch was assembled, blank samples must be inserted at the beginning of the batch.

Lithium Ionic used three types of commercial Fine Blank controls: ITAK-QF-15, ITAK-QF-16 and ITAK-QF-18. No systematic contamination or calibration problems were indicated in the final stage of the geochemical analysis. Figure 11-3 to Figure 11-5 present the analytical blanks control charts for lithium.

Type of control	Blank
Reference	ITAK QF-15
Variable	Li ppm
Number of analysis	38

Blank code	ITAK-QF-15
Limit of Detection (LOD)	10.0
Upper limit (3 x LOD)	30.0
Reference Value (REF)	18.7
Standard deviation	13.096

Minimum	10.0
Maximum	62.0
Average	17.7
Median	12.0

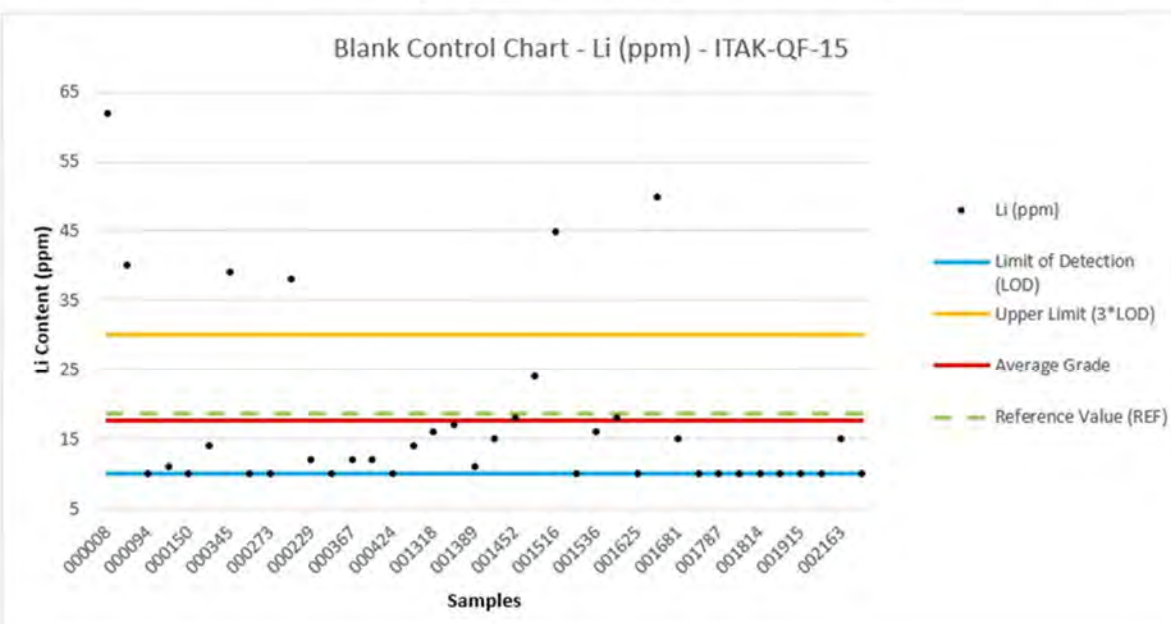


Figure 11-3: Blank Control Chart—ITAK QF-15

Type of control	Blank
Reference	ITAK QF-16
Variable	Li ppm
Number of analysis	229

Blank Code	ITAK-QF-16
Limit of Detection (LOD)	10.0
Upper limit (3 x LOD)	30.0
Reference Value (REF)	36.6
Standard deviation	5.889

Minimum	10.0
Maximum	74.0
Average	13.8
Median	12.0

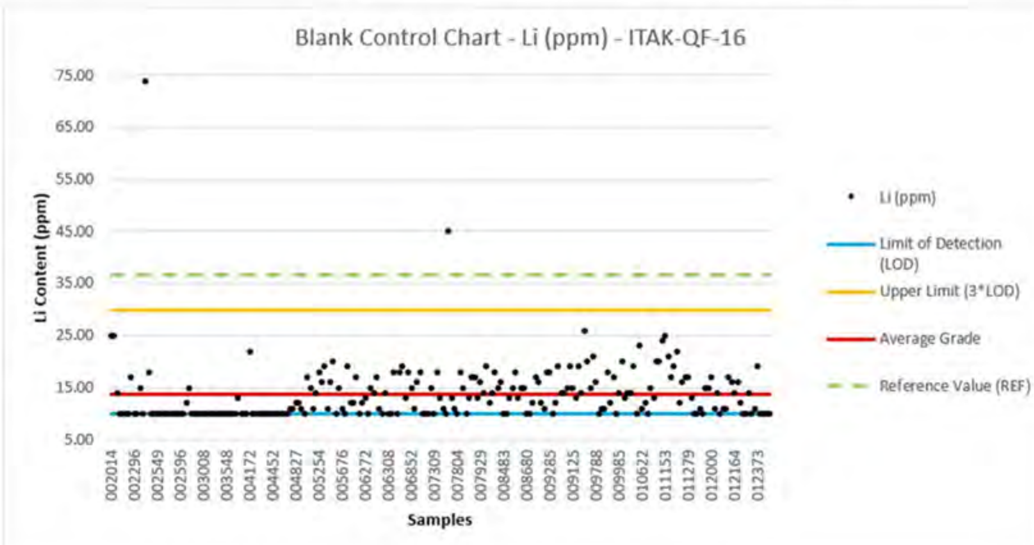


Figure 11-4: Blank Control Chart—ITAK QF-16

Type of control	Blank
Reference	ITAK QF-18
Variable	Li ppm
Number of analysis	59

Blank code	ITAK-QF-18
Limit of Detection (LOD)	10.0
Upper limit (3 x LOD)	30.0
Reference Value (REF)	18.3
Standard deviation	3.303

Minimum	10.0
Maximum	22.0
Average	12.1
Median	10.0

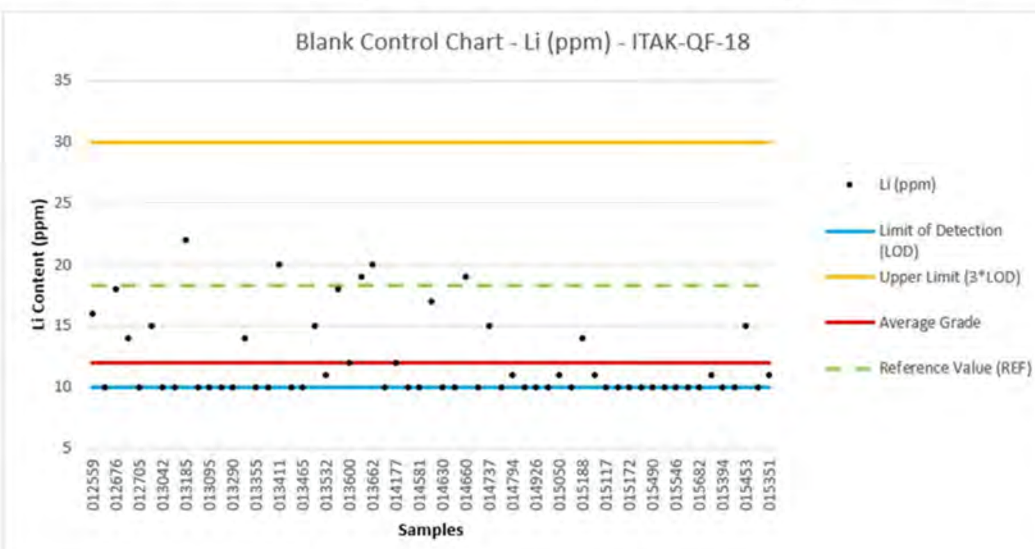


Figure 11-5: Blank Control Chart—ITAK QF-18

11.6.3 Certified or Standard Reference Material—CRM/SRM

Certified or standard reference materials are materials for which one or more parameters have been certified by a technically valid and recognized procedure. A certifying body has issued a certificate or other accurate documentation. These materials are used as QC samples to evaluate the accuracy of the analytical methods and procedures.

Lithium Ionic uses four CRMs or SRMs: ITAK – 1100, ITAK – 1101, OREAS 750, and OREAS 752.

These reference materials evaluate high-, medium-, and low-grade assay results.

Medium-grade or high-grade reference materials are inserted at the beginning of the possible mineralized zones. The insertion can occur immediately or a few samples before the mineralized zone. The low-grade materials are inserted at the end of the zone where the geologist interprets mineralization. The insertion can be immediately after or a few samples after the mineralized zone. The order of the reference materials can be changed based on geological features or mineralization characteristics.

Figure 11-6 to Figure 11-9 present Lithium's CRM/SRM control charts. More than 80% of the samples are constrained within the two standard deviation limits.

Type of Control	CRM
Reference	ITAK-1100
Variable	Li (%)
Number of analysis	228

Code	ITAK-1100
Certificate Value	0.243
Standard Deviation	0.004
Upper limit (+2SD)	0.250
Lower limit (-2SD)	0.236

Minimum	0.226
Maximum	0.270
Average	0.248
Median	0.248
Bias	1.98%

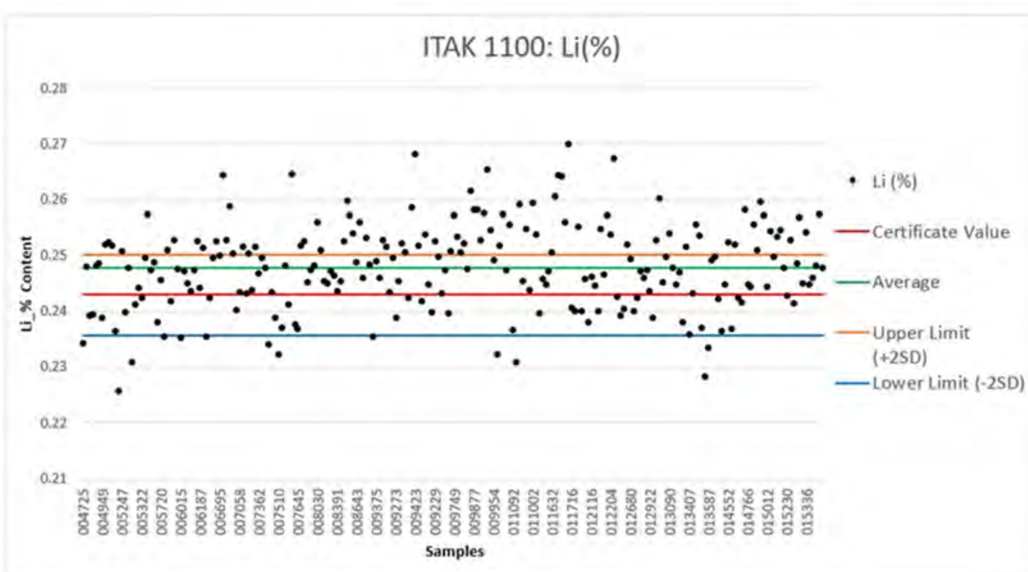


Figure 11-6: Standard Reference Material Chart—ITAK 1100

Type of Control	CRM
Reference	ITAK-1101
Variable	Li (%)
Number of analysis	223

Code	ITAK-1101
Certificate Value	0.671
Standard desviation	0.010
Upper limit (+2SD)	0.691
Lower limit (-2SD)	0.651

Minimum	0.644
Maximum	0.720
Average	0.685
Median	0.685
Bias	2.042%

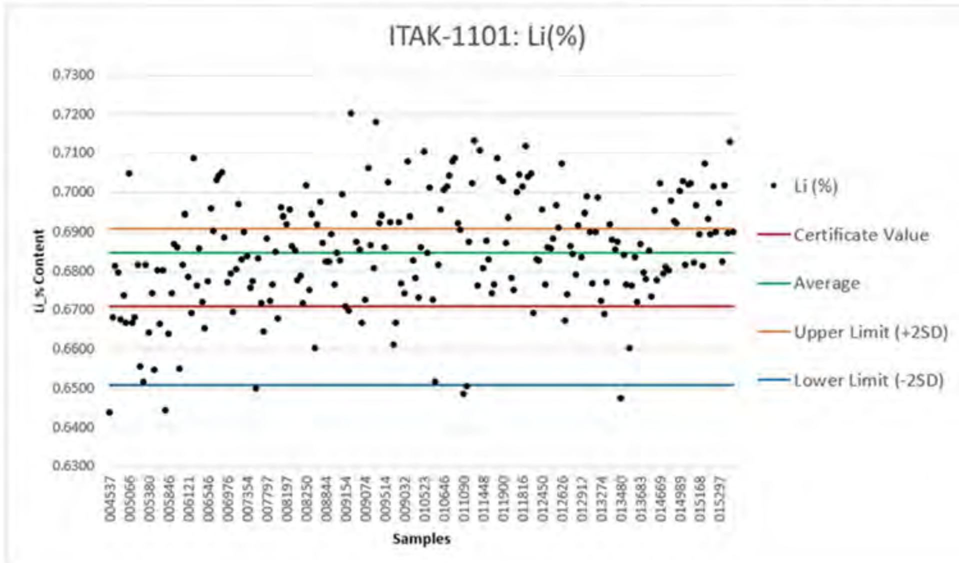


Figure 11-7: Standard Reference Material Chart—ITAK 1101

Type of Control	CRM
Reference	OREAS-750
Variable	Li (%)
Number of analysis	97

Code	OREAS-750
Certificate Value	0.230
Standard desviation	0.010
Upper limit (+2SD)	0.250
Lower limit (-2SD)	0.210

Minimum	0.209
Maximum	0.252
Average	0.228
Median	0.230
Bias	-0.674%

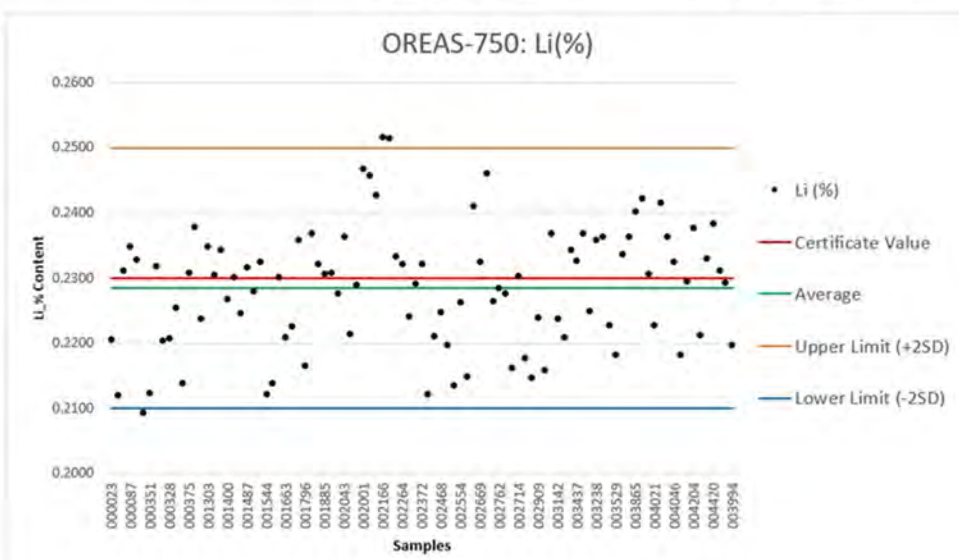


Figure 11-8: Standard Reference Material Chart—OREAS 750

Type of Control	CRM
Reference	OREAS-752
Variable	Li (%)
Number of analysis	101

Code	OREAS-752
Certificate Value	0.707
Standard desviation	0.010
Upper limit (+2SD)	0.727
Lower limit (-2SD)	0.687

Minimum	0.635
Maximum	0.739
Average	0.701
Median	0.702
Bias	-0.780%

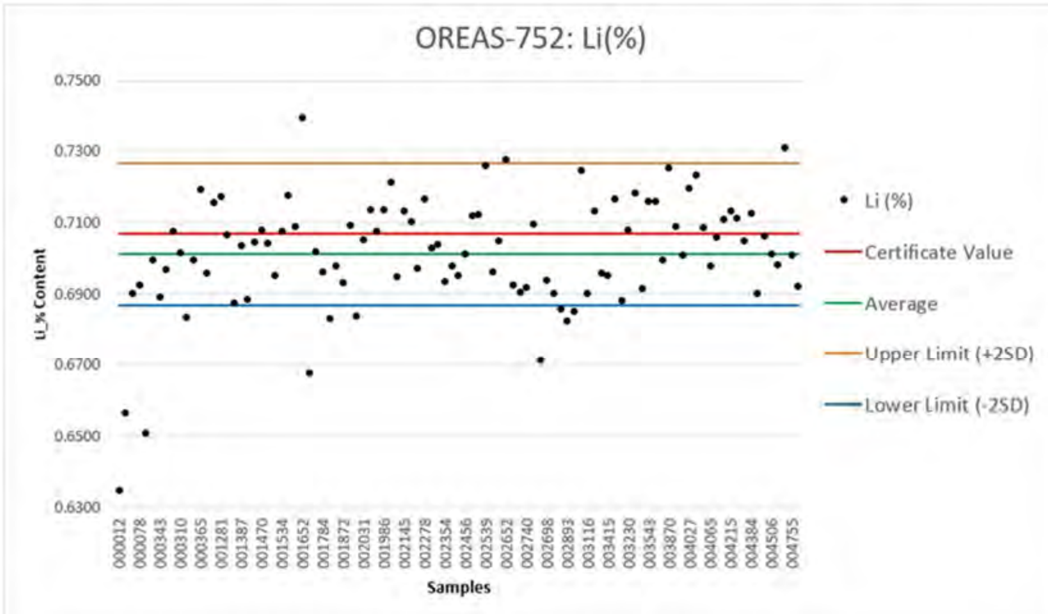


Figure 11-9: Standard Reference Material Chart—OREAS 752

11.6.4 Crushed Duplicates

Duplicates are used in the QC program to evaluate the precision of geochemical analysis. Insertion of blind duplicates of crushed material is used to test the laboratory's reproducibility and determine if the crushing process generates bias or imprecision in the results.

In all, 321 crushed duplicates were evaluated. Control charts for this control type show high correlations and good reproducibility, with over 90% of the samples falling below the 20% HARD limit (Figure 11-10).

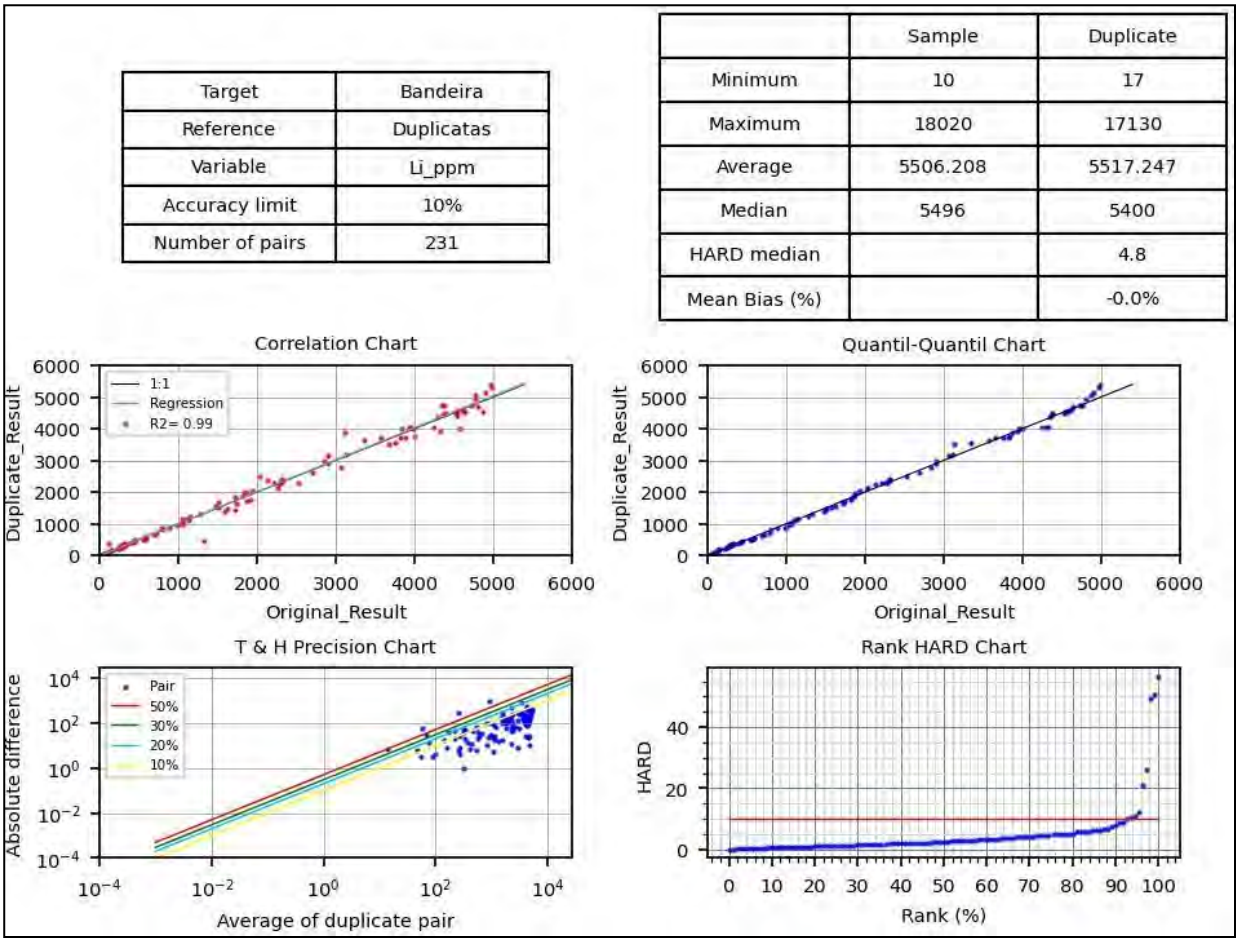


Figure 11-10: Crushed Duplicates Control

11.6.5 Pulverized Duplicates

Duplicates are used in the quality control program to evaluate the precision of the geochemical analysis. The insertion of blind duplicates of pulverized material is used to test the laboratory's reproducibility and determine if the milling process is not generating bias or imprecision in the results.

A total of 319 pulverized duplicates were evaluated. Control charts for this control type show high correlations and good reproducibility, with approximately 91% of the samples falling below the 5% HARD limit (Figure 11-11).

Type of control	Duplicate
Reference	Pulverized
Variable	Li (ppm)
Accuracy limit	5%
Pair Count	319

	SMP	DUP
Minimum	19.0	32.0
Maximum	22900.0	23330.0
Average	7388.7	7403.7
Median	7175.0	7269.0
Below HARD	94.4%	

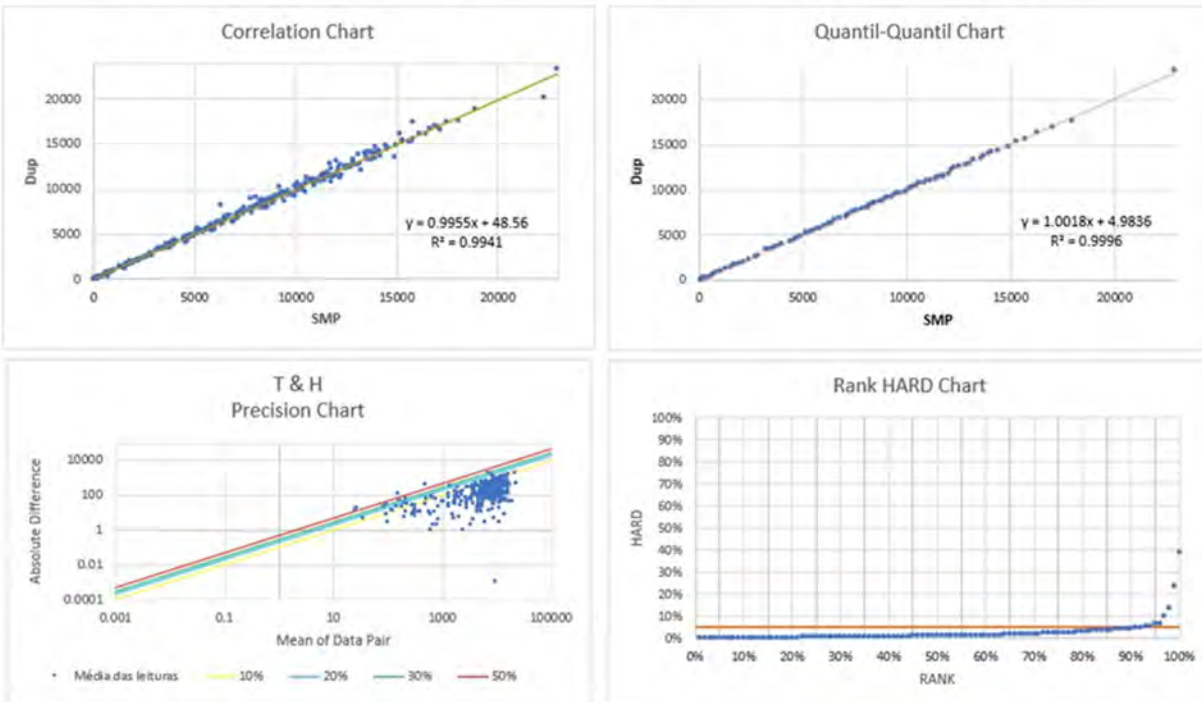


Figure 11-11: Pulverized Duplicates Control Chart

11.6.6 Check Assay

MGLIT has submitted check assay batches for analysis at the ALS Laboratory in Vancouver. This procedure is used to verify the reliability of the primary laboratory results by crosschecking them with a secondary reference laboratory. Check assay results are presented in Figure 11-12. Only one sample of 112 has returned a pair above the 15% HARD limit, representing 1.4% of the total check assays.

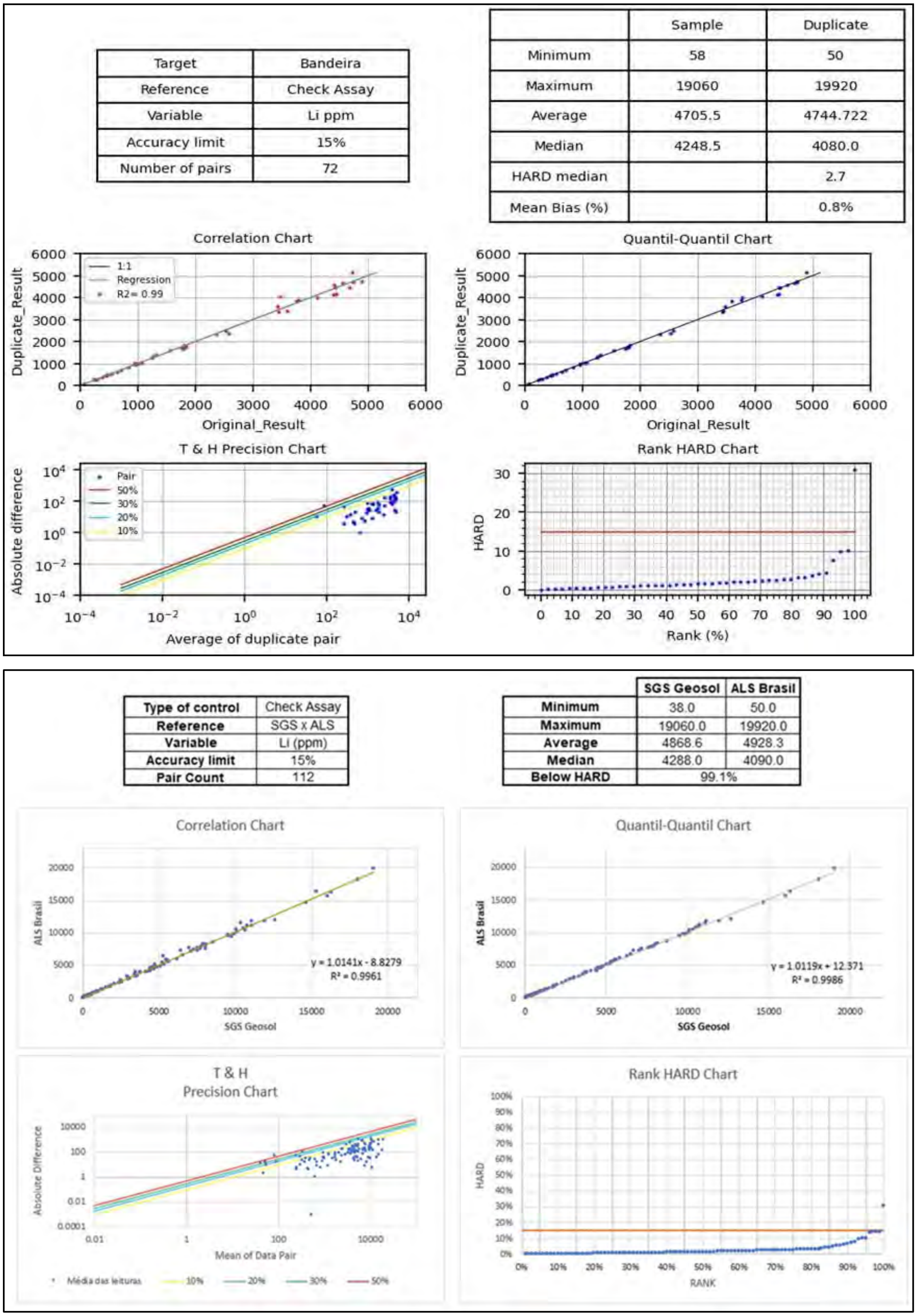


Figure 11-12: Check the Assay Control Chart

11.7 Qualified Person's Opinion

The QP believes that the sampling, sample preparation, security, and analysis performed by Lithium Ionic and hired companies are suitable for estimating Mineral Resources as part of the feasibility study. QA procedures follow industry best practices, and QC results are within industry standards, attesting to the quality of the database information.

12.0 DATA VERIFICATION

12.1 Qualified Person's Verification

GE21 independent QPs Mr. Carlos José Evangelista Silva and Mr. Leonardo Silva Santos Rocha have visited the Bandeira Project in Araçuaí since 2023 to evaluate the Company's infrastructure, operational procedures, and the results of activities performed by Lithium Ionic staff. Both QPs specialize in geological exploration and Mineral Resource estimation.

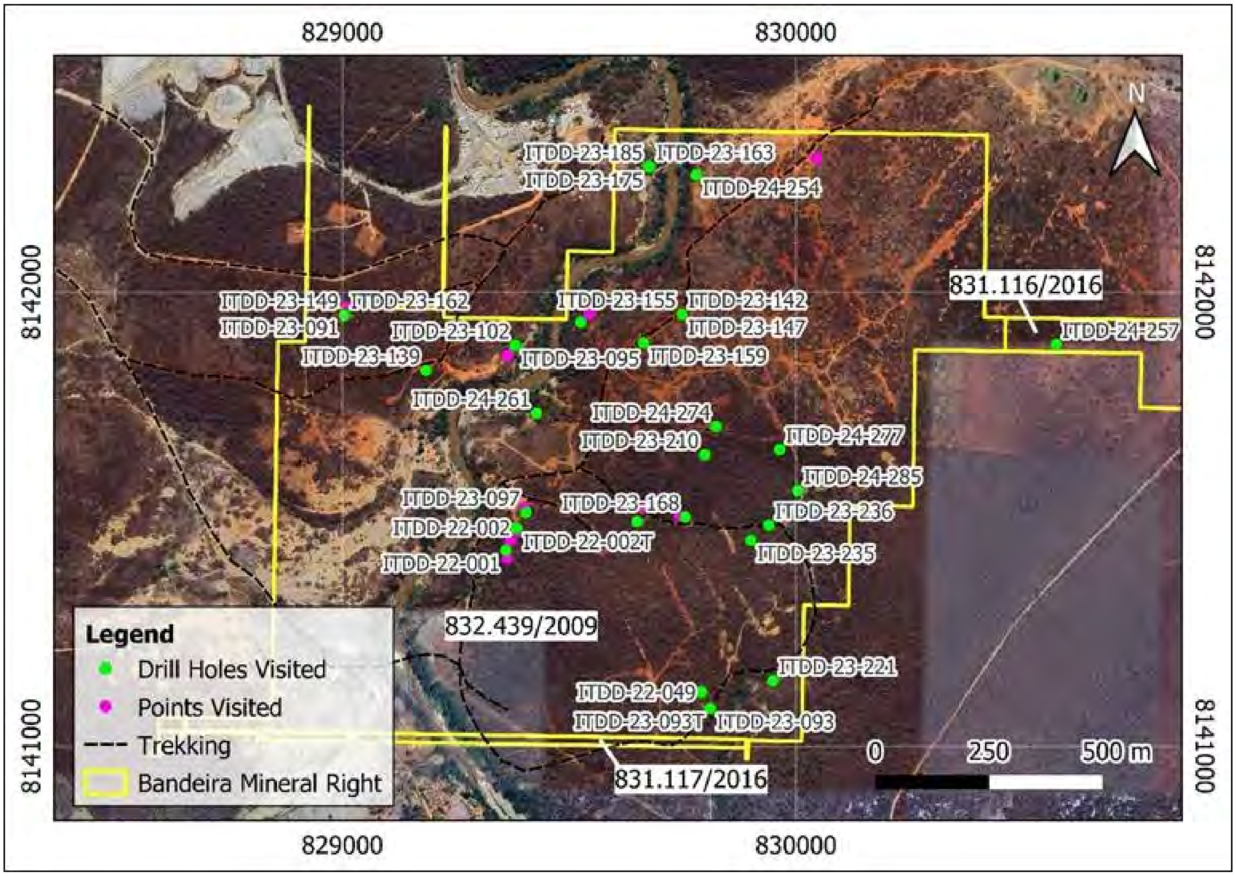
Mr. Silva conducted site visits on September 13 and 14, 2023; December 12, 2023; and November 26 and 27, 2024. Mr. Rocha visited the Project on April 11, 2024 (Figure 12-1).

The QPs' inspections focused on the following:

- Trenches (Figure 12-2)
- Collar landmarks (Figure 12-3 and Figure 12-4)
- Drilling rigs (Figure 12-5)
- Office and drill-core sheds (1, 2, and 3) (Figure 12-5 to Figure 12-10)
- Installations and overall core-shed procedures flowchart
- Core-box archive and drill-hole landmark checking
- Drill-core saw and drill-core sample bags
- Batches of sample bags
- Pulverized and crushed samples returned from labs
- Density-test procedures using water-displacement method
- Physical file storage for drill-hole logs and bulletins
- Mineralization style and sampling procedures.

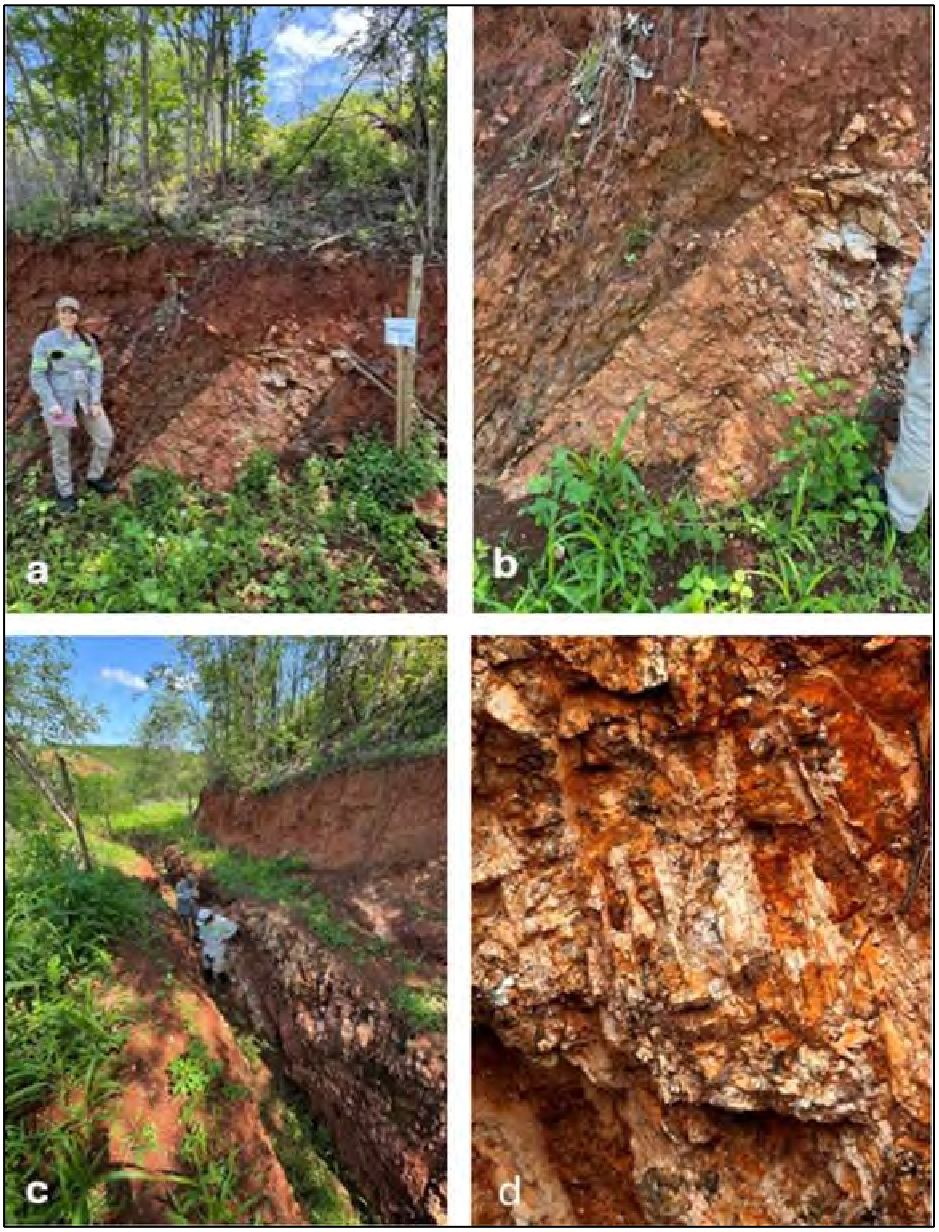
The assay data were cross-checked within the drill-sample database. Digital assay records were randomly selected and scrutinized against the available laboratory assay certificate reports.

A comprehensive review of the assay database was conducted to identify errors, including overlaps, interval gaps, and typographical errors in assay values. The database was found to exhibit high accuracy, instilling confidence in the reliability of the data.



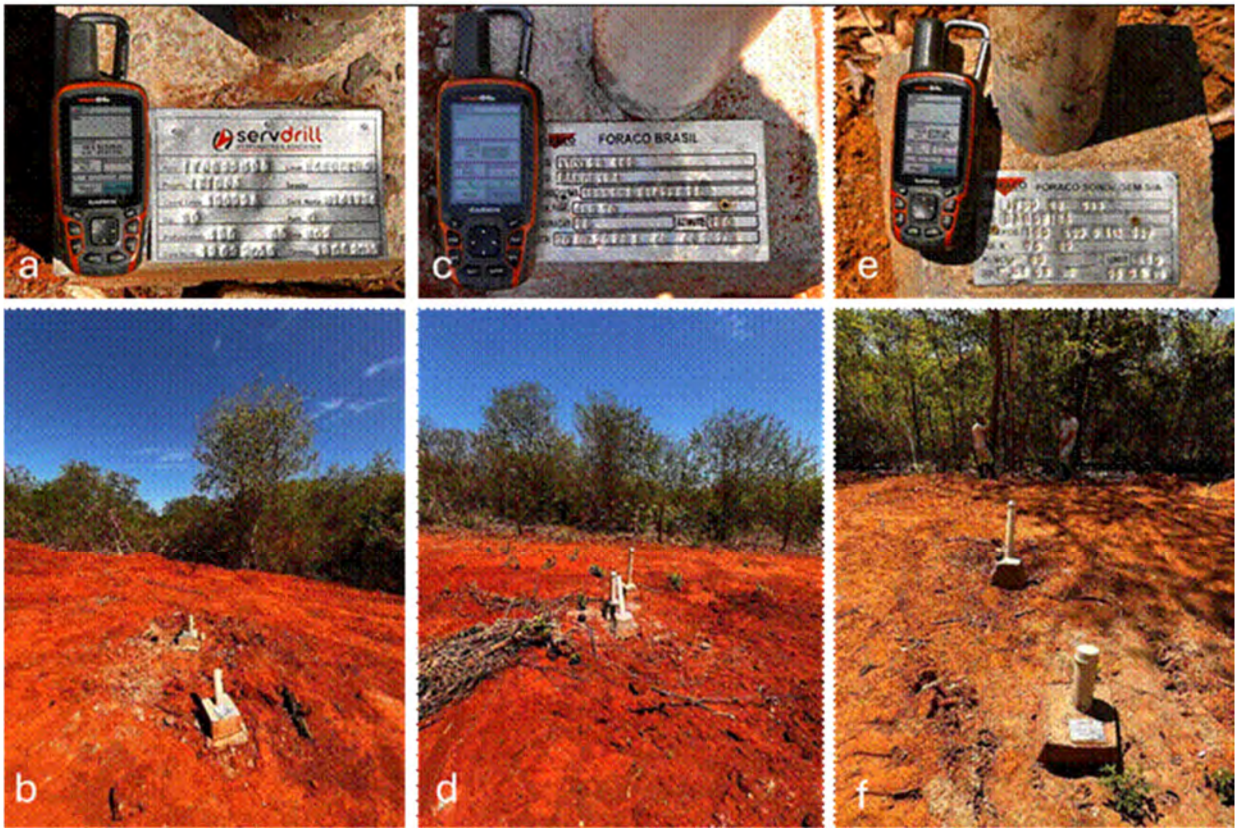
Source: GE21 (2024).

Figure 12-1: Field Points During the Site Visit on September 13 and 14, 2023



Notes: a) Pegmatite Vein with Spodumene Outcrop; b) Pegmatite Vein with Spodumene Outcrop; c) Trench ITTRE-22-001—Pegmatite Vein with Spodumene Outcrop; d) Trech ITTRE-22-001—Spodumene Pegmatite Vein Outcrop
Source: GE21 (2024).

Figure 12-2: Spodumene Pegmatites Outcrop and Trench on Lithium Ionic Bandeira Property Site Visit November 25, 2024



Notes: a and b) Collar Landmarks—Drilling Site ITDD-23-196; c) and d) Collar Landmarks—Drilling Site ITDD-23-162; e and f) Collar Landmarks—Drilling Site ITDD-23-093

Source: GE21 (2024).

Figure 12-3: Collar Landmarks, September 2023 Site Visit

Notes: a and b) Collar Landmarks—Drilling Site ITDD-24-254; c and d) Collar Landmarks—Drilling Site ITDD-24-257; e and f) Collar Landmarks—Drilling Site ITDD-24-285.

Source: GE21 (2024).

Figure 12-4: Collar Landmarks, November 2024 Site Visit

Notes: a) Drill Rig on Site of Bandeira Drilling on 13/09/2023 at DDH ITDD-23-192—Azimuth 140°, dip ~70°; b) Drill Rig on Site of Bandeira Drilling on 13/09/2023 at DDH ITDD-23-192—Spodumene in Pegmatite Vein Cores Recovered from Drilling, depth 355 m; c) Drill Rig on Site of Bandeira Drilling on 13/09/2023 at DDH ITDD-23-192—Technicians Recovering the Cores and using the REFLEX ACT III for Core Orientation; d) Drill Rig on Site of Bandeira Drilling on 13/09/2023 at DDH ITDD-23-192— Lithium Ionic Staff Using REFLEX GYRO IQ to Perform the Survey Measurement

Source: GE21 (2024).

Figure 12-5: Drilling Rig and Survey Equipment on Lithium Ionic Bandeira Property, September 13, 2023, Site Visit

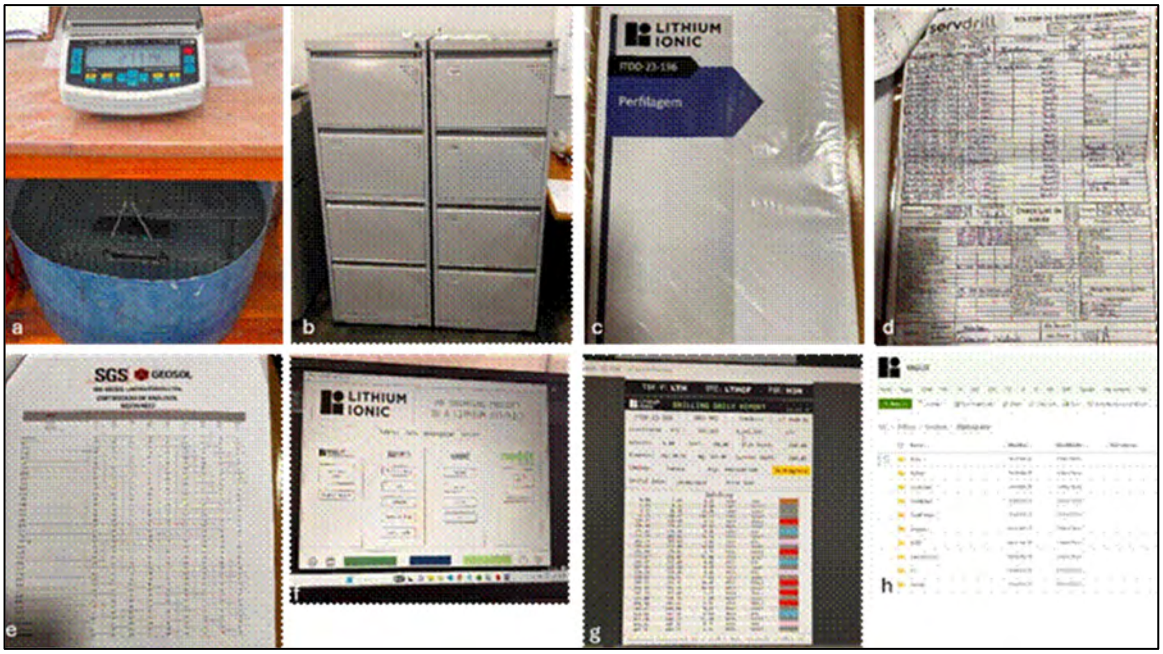
Notes: a) Office and Core Shed 1—External View; b) Office and Core Shed 1—Internal View; c) Shed 1 —Team Present at QP's Visit; d) Core Shed 2—External View; e) Core Shed 2—Internal View; f) Shed 2—Core Box Storage; g) Core Shed 3—External View; h) Core Shed 3—Internal View; i) Shed 3—Core Box Storage.
Source: GE21 (2024).

Figure 12-6: Lithium Ionic Core Shed Storage in Araçuaí

Notes: a) Marking for Sawing; b) Core saw; c) Cores after Sampling with Assays Identified; d) Identified Samples to Send to Lab; e) QA/QC—Standard to Insert in Batch; f) Batch to Send to Lab; g and h) Storage of Pulverized Samples and Crushed Samples after Return from Labs, Custody Chair.

Source: GE21 (2024).

Figure 12-7: Workflow, Sampling, QA/QC, and Chain of Custody

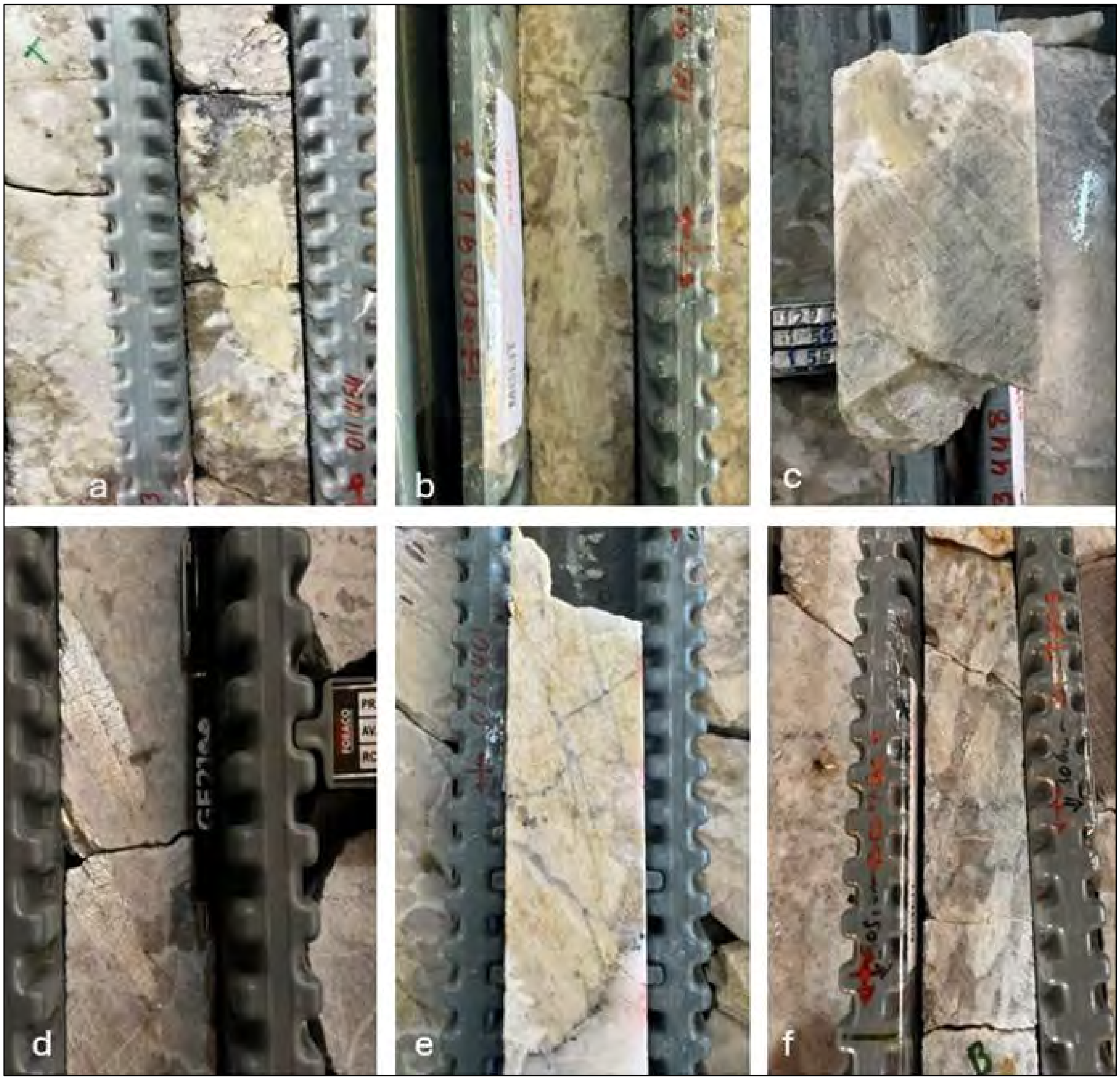


Notes: a) Density Measurement—Core Weighed Under Water; b) Physical Drill-Hole File Storage; c) DDH ITDD-23-196 Folder with Drill-Hole Documents; d) DDH ITDD-23-196 Folder—Daily Drilling Bulletin; e) DDH ITDD-23-196 Folder—Assay Results, Certificates; f) Lithium Ionic Customized Database Management System for Mineral Research; g) Customized Database Management System—Registration of the Drilling Daily Report; h) Lithium Ionic Cloud Data Center Lithium Ionic.
Source: GE21 (2024).

Figure 12-8: Density Measurement and Physical and Digital File Storage

Notes: a) ITDD-23-091—479 m to 489 m; b) ITDD-23-120—109 m to 115 m.
Source: GE21 (2024).

Figure 12-9: Core Boxes of the Interval Mineralized Spodumene Pegmatite



Notes: a) ITDD-23-163—146 m; b) ITDD-23-162—460.5 m; c) ITDD-24-254—129 m; d) ITDD-23-120—111 m; e) ITDD-24-257—1,197 m; f) ITDD-23-139—305 m

Source: GE21 (2024).

Figure 12-10: Bandeira Spodumene Pegmatite Intercept Core Boxes of the Modelled Mineralized Spodumene Zone—Detail of the Spodumene Crystal

12.2 Qualified Person's Opinion

No significant issues were identified with the database. The QPs believe that the practices and procedures used to generate the Lithium Ionic database are sufficient to support Mineral Resource estimation. Some observations that were recorded during visits as they relate to the generation, collection, control, and storage of exploration data on-site at Araçuaí are:

- Reviewing the QA/QC
- Field checking core shed
- Drilling in progress
- Reviewing density procedures
- Discussions of the current geological interpretations with Lithium Ionic geologists.
- Drill-hole collars have a physical identification marker comprising a concrete pad with a metal plate designating the drilling contractor, drill-hole number, drilling area, orientation, map coordinates, start and end date drilled, and total depth. A PVC pipe protruding from the marker provides a physical record of the drill-hole orientation.
- All core boxes were labelled and adequately stored in a core shed. Sample tags were present in the boxes, and it was possible to validate sample numbers and confirm the presence of mineralization in the witness half-core samples from the mineralized zone.
- The QPs considered the drill-hole logging standard industry practice logging procedures, which Lithium Ionic has standardized. They reviewed logging procedures for randomly selected drill cores and verified the completeness of the logs.
- Lithium Ionic has its own database software. Data storage procedures at the Company are industry standard practice. As part of the validation process, 12 holes were verified. Database validation was conducted with the Lithium Ionic staff according to standard validation procedures, including a review of collar locations, drill-hole deviations, and database check-assay review. The QPs found no inconsistencies in the database.
- An extensive database of humidity density information was collected during the exploration phase. Assessing the impact of density samples' moisture and porosity on bulk density measurements is strongly recommended.
- The QPs checked the Lithium Ionic procedures for sampling management, storage, logging, sample preparation, and assay. They considered it within acceptance limits and in compliance with mineral-industry practices.
- Rock-type descriptions fit with the checked mineralization style. Lithium Ionic has demonstrated that it understands the geology of the area.

13.0 MINERAL PROCESSING AND METALLURGICAL TESTING

The underground mine ore body at Bandeira Project is SRP-type spodumene-rich pegmatites (cf. Pedrosa-Soares et al., 2023), characterized by non-zoned to poorly zoned pegmatites, rich in spodumene crystals (average size 5 cm to 30 cm) disseminated in a matrix composed of albite, quartz, perthitic microcline (i.e., potassium feldspar with exsolved albite lamellae), muscovite, and petalite, totalling over 90% volume, with subordinate amounts (up to 10% volume) of accessory and alteration minerals, such as lithium minerals (cookeite, montebrasite, triphylite, and zabuyelite), apatite, niobium–tin–tantalum and iron–manganese oxides, graphite, and clay minerals (kaolinite and montmorillonite).

The mineral processing and metallurgical testing are comprehensive, encompassing chemical and mineralogical analyses, physical tests for hardness, particle size distribution in crushing assays, abrasiveness, and spodumene concentration tests. These tests are specifically designed to understand spodumene's behaviour when subjected to simulations of the industrial process of ore mineral concentration. This information is indispensable for devising an efficient and cost-effective processing method.

13.1 Ore Mineralogical Characterization

The lithium minerals present in the Bandeira Deposit pegmatites are meticulously characterized visually through systematic logging of drilling cores and the selection of samples from core intervals. Following macroscopic determination, samples are described in more detail after examining polished thin sections under an optical microscope. Macroscopic and microscopic observations are accompanied by a modal evaluation (in vol%) of spodumene relative to other matrix contents, particularly those that may significantly interfere with ore processing. This approach allows relevant information to be gathered, providing a foundation for further analysis and decision-making. In addition to the lithium minerals listed in Table 13-1, the spodumene ore from the Bandeira Deposit contains the gangue minerals albite, quartz, perthitic potassium feldspar, and muscovite.

Table 13-1: Lithium Minerals Identified at Bandeira Deposit

Mineral	Formula	Specific Density (g/cm^3)	Hardness Mohs	Li_2O % weight	Li_2O[1] % weight
Montebrasite	$LiAl(PO_4)(OH)$	3.0–3.1	5.5–6.0	10.21	9.0
Cookeite	$(Al, Li)_3Al_2(Si, Al)_4O10(OH)_8$	2.6–2.7	2.5 –3.5	2.86	2.5
Elbaite	$Na(Li,Al)_3Al_6(BO_3)_3Si_6O_{18}(OH)_4$	2.9–3.1	7.5	4.07	4.0
Spodumene	$LiAlSi_2O_6$	3.1–3.2	6.5–7.0	8.03	7.4
Spodumene Partially Altered	-	<3.1	<6.5	-	<7.4
Lepidolite (Polylithionite–Trilithionite)	$KLi_2Al(Si_4O_{10})(F, OH_2)$ $K(Li_{1.5}Al_{1.5})(AlSi_3O_{10})(F,OH_2)$	2.8–2.9	2.5–3.5	6.46–7.70	7.1
Lithiophilite–Triphylite	$LiMn(PO_4)$–$LiFe(PO_4)$	3.4–3.6	4	9.53–9.47	9.0
Petalite (Cristal)	$LiAlSi_4O_{10}$	2.4	6.5	4.90	4.7
Petalite Altered (*Mass*)	-	<2.4	<6.5	<4.90	3.0
Zabuyelite	Li_2CO_3	2.09	3	40.44	40.0

Source: www.mindat.org; Pöllmann & König (2021).
Note: [1] Actual lithium oxide grade is usually determined.

Other accessory minerals besides those listed in Table 13-1, typically present in amounts less than 1% volume, including apatite, beryl, cassiterite, columbite-tantalite (including iron-columbite determined by scanning electron microscopy (SEM)–energy-dispersive X-ray spectroscopy (EDS)), and graphite.

The mineralogical characterization of the Bandeira ore was conducted using X-ray diffraction (XRD) analysis with a Bruker-AXS D8 Advance ECO instrument, using CuKα radiation (40 kV/25 mA) with a nickel filter, a step size of 0.02° 2Ɵ, and an accumulated counting time of 192 seconds per step, with a position-sensitive linear detector of the silicon drift type, LynxEye XE, collected from 5° to 105° 2Ɵ in θ-2θ geometry on the goniometer. Quantitative analysis was calculated using the total multi-phase spectrum refinement method (Rietveld method), by fundamental parameters, with Bruker-AXS Diffract Topas software, Version 6.

The average mineralogical analysis is presented in Table 13-2.

Table 13-2: Average Mineralogical Composition for Seven Metallurgical Drill Holes (X-Ray Diffraction, RietveldMethod)

Mineral	%Weight
Albite	31.70
Quartz	26.50
Microcline	15.00
Spodumene	14.30
Muscovite	6.10
Montebrasite	3.30
Petalite	1.10
Others (Polylithionite, Elbaite, Cookeite, and Pyrite)	2.00

Thin section microscopy and visual modal analyses also revealed some accessory minerals with total contents of less than 1% in volume: sphalerite, blue tourmaline, beryl, cassiterite, columbite/tantalite, iron columbite, lithiophilite/triphylite, apatite, zabuyelite, and graphite.

13.2 Ore Chemical Analysis

The average chemical analyses for the Bandeira Deposit, considering samples from drill holes used for metallurgical tests and the mean values from the geological exploration database (7,516 chemical analysis, cut-off grade of Li_2O >0.5%), are presented in Table 13-3.

Table 13-3: Average Chemical Composition for Seven Metallurgical Drill Holes

Metal Oxides	Metallurgical Drill Holes	Geological Database
Li_2O (% weight)	1.40	1.37
Fe_2O_3 (% weight)	0.69	0.70
Al_2O_3 (% weight)	15.40	14.40
K_2O (% weight)	2.30	2.58
P_2O_5 (% weight)	0.87	0.85
CaO (% weight)	0.41	0.45
SnO_2 (ppm)	437.00	280.00
Ta_2O_5 (ppm)	82.00	80.00
Nb_2O_5 (ppm)	160.00	130.00

13.3 Metallurgical Testing

SGS Geosol conducted preliminary metallurgical tests using heavy liquid separation (HLS). TOMRA carried out ore-sorting tests in Germany and at Steinert in Brazil. Ore variability testwork campaigns were developed at research centers and laboratories such as SGS Geosol, SGS Chile, Centro de Tecnologia Mineral (CETEM), and Metso Outotec. These tests were aimed at understanding the behaviour of the ore under different processing conditions, which is crucial for optimizing the processing method and ensuring the production of high-quality lithium concentrate.

13.3.1 Preliminary Heavy Liquid Separation Test at SGS Geosol

Samples from drill holes ITDD-22-001, -002, and -007 were combined to generate a composite, and sent to SGS Geosol. Before the HLS test, the composite sample was prepared according to the procedure shown in Figure 13-1, to proceed with the HLS test. This test aims to evaluate the performance of dense media separation in obtaining lithium concentrate for the Bandeira Project, according to market specifications, by varying the dense media's particle size distribution and density.

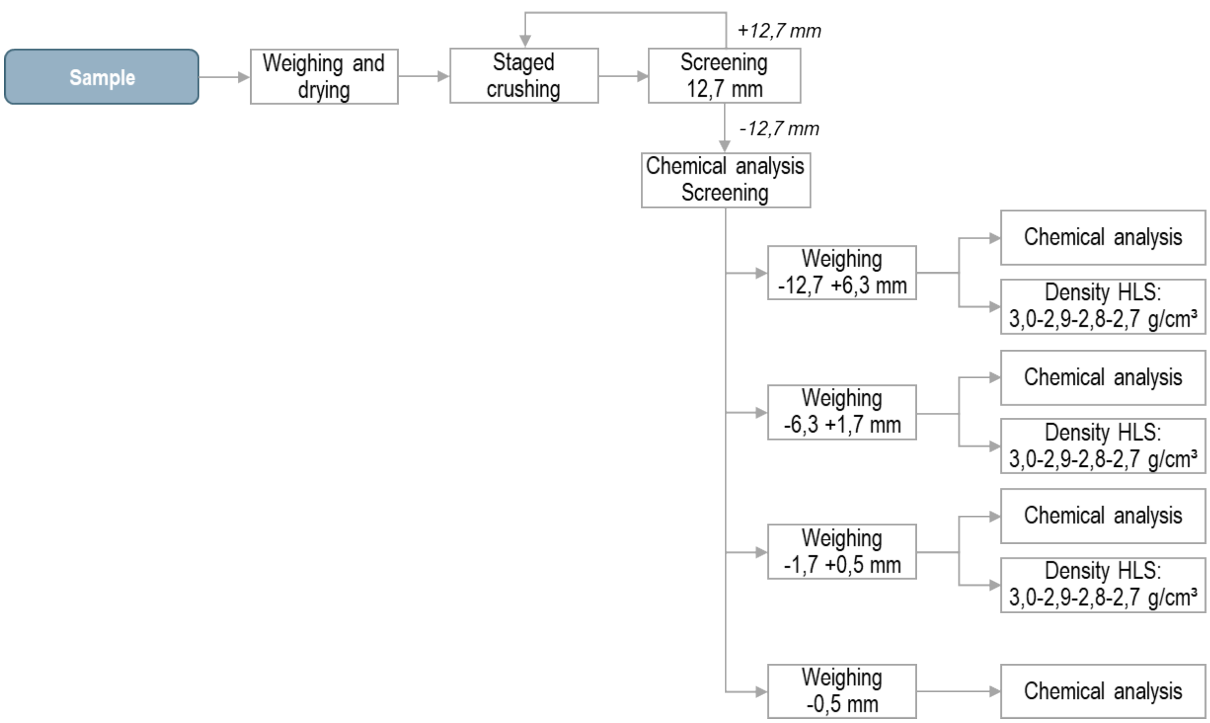


Figure 13-1: Bandeira Composite Sample Preparation Procedure

A 20 kg sample was dried and crushed in a jaw crusher with openings of 31.5 mm, 25.4 mm, and 12.7 mm to obtain material with 100% passing (P_{100}) 12.7 mm. After this, particle size analysis was conducted using a sequence of 12.7 mm, 6.3 mm, 1.7 mm, and 0.5 mm sieves. For each size fraction, a representative sample was collected for chemical analysis. HLS tests were conducted at 3.0 g/cm³, 2.9 g/cm³, 2.8 g/cm³, and 2.7 g/cm³ densities for the size fractions −12.7+6.3 mm, −6.3+1.7 mm, and −1.7+0.5 mm.

The particle-size distribution of the P_{100} 12.7 mm material is presented in Figure 13-2. Approximately 12% of the mass does not have a suitable particle size for the dense-media separation stage, meaning it is smaller than 0.5 mm. However, the Bandeira Project sees this as an opportunity for future study and potential improvement—that is, concentrating the −0.5 mm fraction using gravity equipment or flotation.

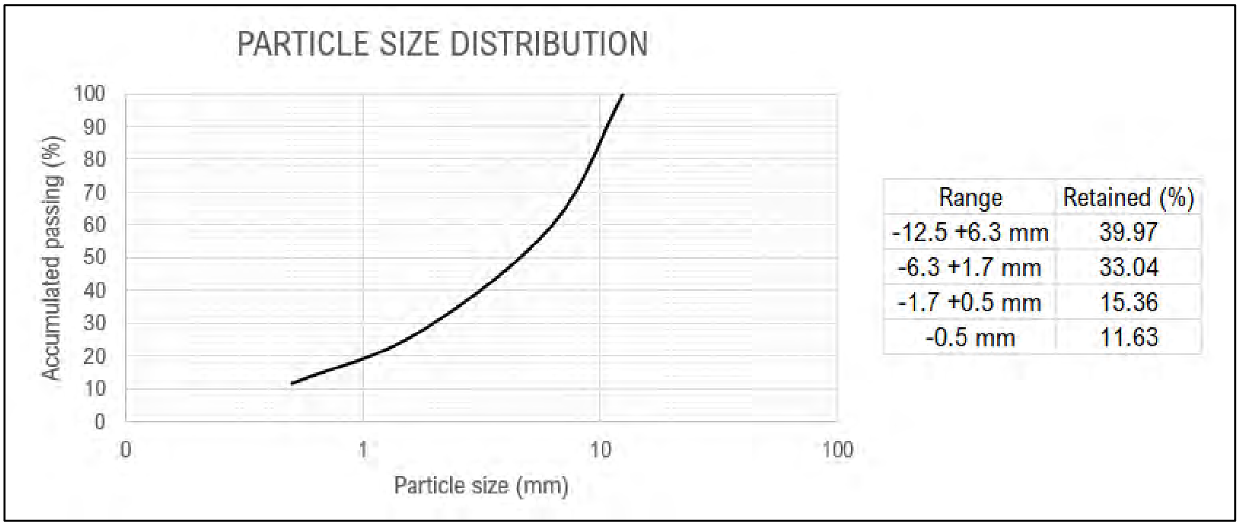


Figure 13-2: Product Size Distribution After Crushing to P100 12.7 mm

Chemical analysis identified the predominance of aluminum oxide (17.10%), potassium oxide (2.39%), and lithium oxide (1.63%) (Figure 13-3). The presence of aluminum can be mainly attributed to albite, K-feldspar, and spodumene. Potassium is predominant in K-feldspar, while lithium is predominant in spodumene. With respect to iron oxide, which is the primary contaminant for market specifications, the concentration in the ore is 0.23%. The mineral origin of iron is mainly schists (biotite). In addition to the presence of iron, there is concern regarding schist density, which can vary between 2.40 g/cm³ and 3.05 g/cm³, similar to the cut-off density used for dense-media separation commonly employed for spodumene concentration, considering the density of the mineral of interest varies between 3.15 g/cm³ and 3.20 g/cm³ (Peixoto et al., 2016).

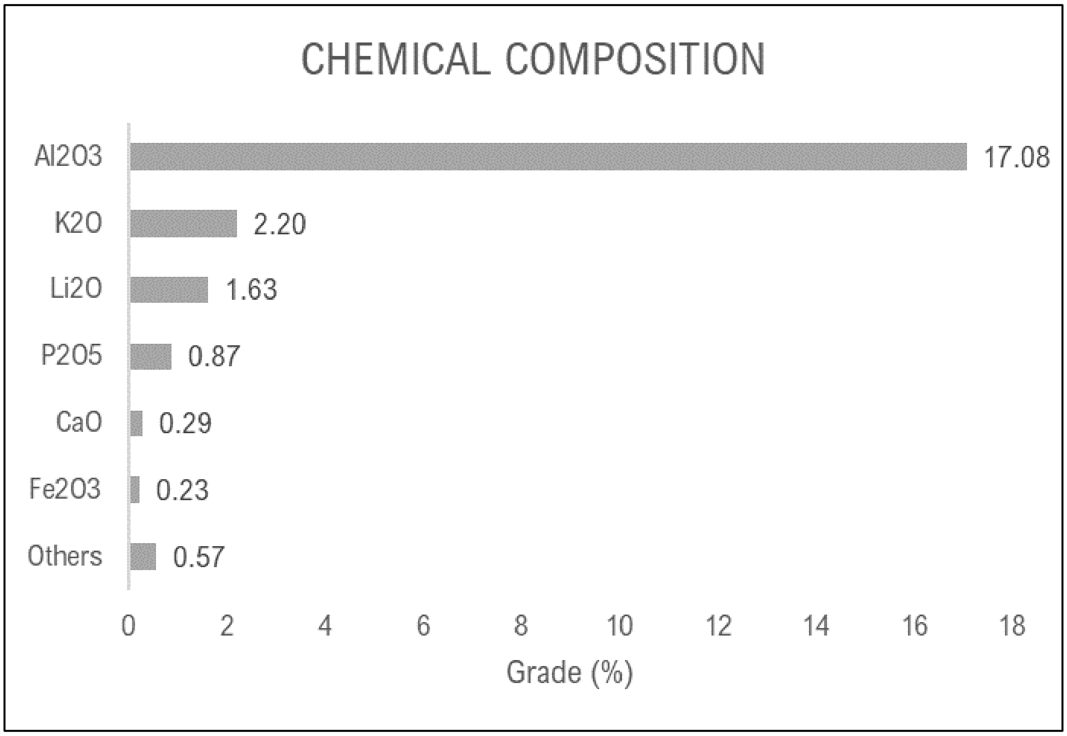


Figure 13-3: Bandeira Composite Sample Chemical Analysis

The heavy liquid separation tests were conducted for each particle size fraction: −12.7 +6.3 mm, −6.3 +1.7 mm, and −1.7 +0.5 mm—using organic liquid to evaluate the optimal density to achieve the market specification of lithium concentrate (i.e., a minimum of 5.5% Li_2O and a maximum of 1% Fe_2O_3). The densities evaluated were 2.7 g/cm³, 2.8 g/cm³, 2.9 g/cm³, and 3.0 g/cm³, for which solutions with different proportions of methylene iodide (3.29 g/cm³) and acetone (0.79 g/cm³) were prepared.

The tests for the particle size fractions of −12.7 +6.3 mm and −6.3 +1.7 mm were conducted in beakers, while the test for the finer particle size fraction (−1.7 +0.5 mm) was carried out using a separating funnel. The test involves mixing the ore and the dense-media solution in the reactor (beaker or separating funnel) and waiting for separation. Afterward, the sunken material, the dense media, and the floated material are collected separately. Densities were evaluated sequentially as shown in Figure 13-4, and for each stage, chemical composition and mass partition were assessed.

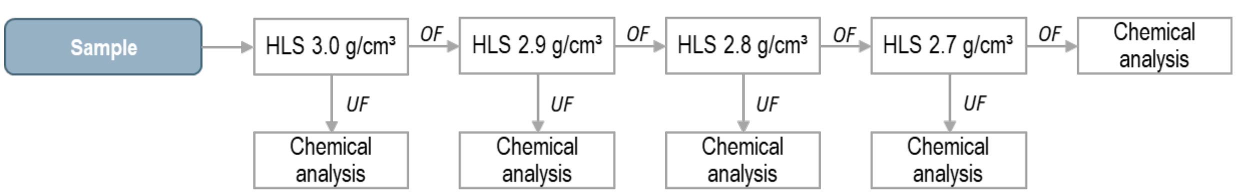


Figure 13-4: HLS Test Flowsheet

Figure 13-5 presents the cumulative content of lithium oxide and ferric oxide for each density of the three particle size fractions evaluated. The content was calculated based on the individual content of each sample and the mass partition.

It can be noted that the cut-off density increases with particle size. For finer particles, obtaining a concentrate meeting the specification is possible using a cut-off density of 2.7 g/cm^3. However, for the intermediate particle size range, the cut-off should be performed at 2.8 g/cm^3, and for the coarser material, at 2.9 g/cm^3.

The lithium oxide content in the floated material for the coarser particles is approximately three times higher than that in the floated material for the finer particles. This indicates lower liberation of spodumene in the coarser particle size range.

Regarding iron oxide, it was found that the maximum content limit was met for all tested densities.

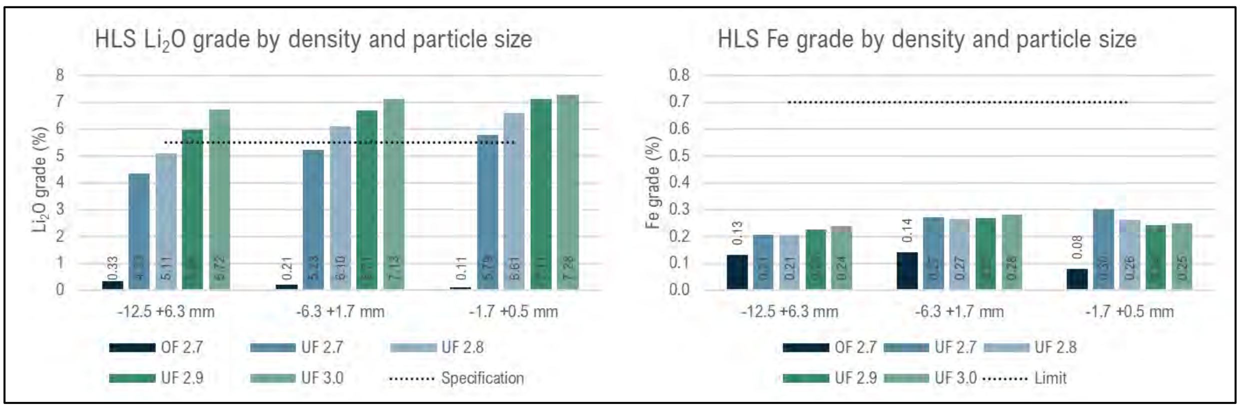


Figure 13-5: Li_2O and Fe Chemical Analysis Results for each HLS Step

The recovery results by particle-size range and the overall recovery of the HLS are presented in Figure 13-6, along with the lithium oxide content in the concentrate. For the particle size range −12.7 +6.3 mm, the cut density was 2.84 g/cm³, representing a recovery of 70.5%. These values were obtained by interpolation. The density of the −6.3 +0.5 mm range was 2.71 g/cm³, and the recovery was 90.1%. However, the HLS recovery was 74.8% considering the loss of fines (i.e., fractions smaller than 0.5 mm) representing 12% of the mass and 11% of the lithium.

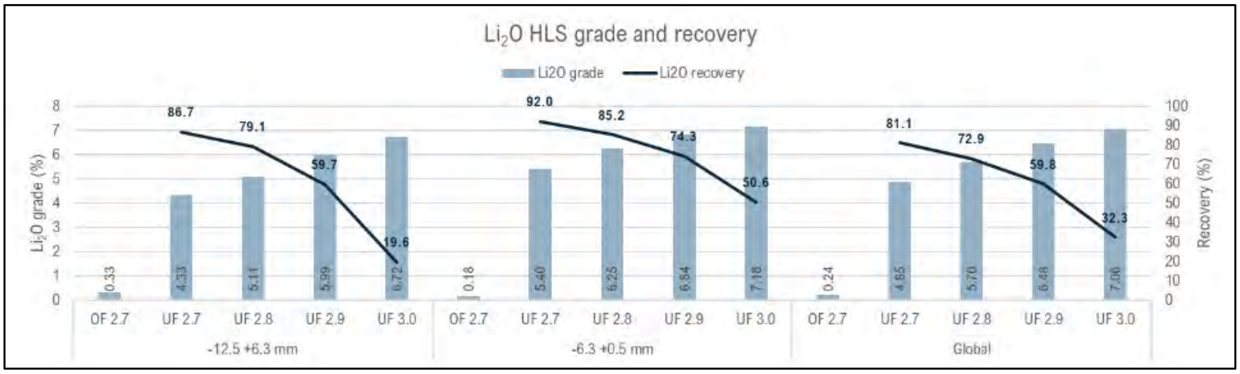


Figure 13-6: Li_2O Recovery and Grade per HLS Step

13.3.2 Vendor Tests

Testwork conducted by vendors comprises:

- Ore sorter
- Bond crushing (impact) work index (CWi)
- Crushing equipment to determine Bond ball mill work index (BWi), ore abrasiveness, and equipment working capacity.

13.3.3 Ore Sorter at TOMRA

A composite sample from six drill holes (ITDD-22-013, -015, -029, -032, -035, and 036) with lithium oxide content ranging from 1.31% to 1.52% was sent to TOMRA in Germany to evaluate the applicability of the ore sorter in the pre-concentration stage. The material was crushed to achieve P_{100} 31.5 mm and separated into three particle size ranges (−31.5 +19.1 mm, −19.1 +9.5 mm, and −9.5 mm). Tests were conducted on two particle size ranges, −31.5 +19.1 mm and −19.1 +9.5 mm, while the −9.5 mm material was weighed, and its content determined to complete the mass and metal content balance of the test. A preliminary sample analysis indicated the use of an X-ray transmission (XRT) sensor for conducting the test.

The XRT sensor is based on the atomic density of the material, where higher transmitted X-ray-intensity corresponds to lower absorption and lower atomic density. Electromagnetic radiation, between 90 keV and 200 keV, is directed onto the sample, and the transmitted radiation is detected and converted into an electrical signal to generate a grayscale image pixel by pixel. Hence, a lighter shade indicates lower absorption and, thus, lower atomic density. Two sensors are used to distinguish thickness and atomic density, with each sensor acquiring a different energy band (Veras, 2018; Wotruba & Harbeck, 2012).

The ore sorter tests were conducted using the principle of cascade classification (Figure 13-7). The sample was fed via a vibratory feeder onto a conveyor belt and analyzed by a DUOLINE X-ray sensor. The initial configuration of the equipment was programmed to eliminate all particles with at least 30% high atomic density. Subsequently, the previously classified low-density material was reclassified, removing all particles with at least 80% of high and medium atomic density. Lastly, the particles not rejected in the intermediate stage underwent further classification, where particles with at least 50%

of high- and medium-density were eliminated, while those with low atomic-density pixels were retained, constituting the ore sorter concentrate.

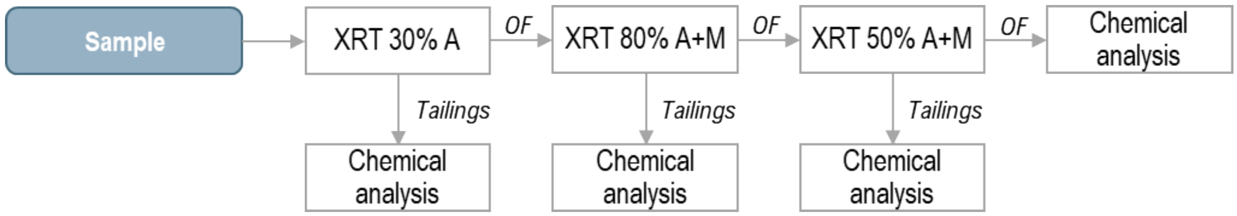


Figure 13-7: Ore Sorter Test Procedure Using XRT Sensor

The results obtained for the particle-size range of −31.5 +19.1 mm and −19.1 +9.5 mm are presented in Table 13-4 and Table 13-5, respectively. The −9.5 mm fraction accounted for 16.9% of the mass, which will be sent to the dense-medium concentration stage. From the results, it is possible to observe that with the decrease in the ore sorter's average atomic density cut-off, the concentrate grade increases, and the metallurgical recovery decreases for both particle-size ranges. Therefore, Configuration 2 was selected as the most promising, as it could enrich the feed grade by 25% to 26%, recovering 91% to 94% of the lithium.

*Table 13-4: Ore Sorter Results for the **−31.5** +19.1 mm Size Fraction*

Configuration	Mass Reduction (%)	Conc. Li_2O Grade (%)	Reject Li_2O Grade (%)	Li_2O Recovery (%)	Enrichment (%)
1	17.15	1.46	0.23	96.85	17
2	24.81	1.56	0.30	93.97	25
3	48.43	1.74	0.73	71.69	39

*Table 13-5: Ore Sorter Results for the **−19.1** + 9.5 mm Size Fraction*

Configuration	Mass Reduction (%)	Conc. Li_2O Grade (%)	Reject Li_2O Grade (%)	Li_2O Recovery (%)	Enrichment (%)
1	16.49	1.52	0.29	96.37	16
2	26.86	1.65	0.43	91.26	26
3	55.01	1.95	0.80	66.51	50

Subsequently, tests were conducted at TOMRA to evaluate the effect of dilution with shale on the equipment's performance. For this purpose, two drill holes were selected, ITDD-22-054 and ITDD-22-098, with 10% dilution at the intersection with the pegmatite. The samples were crushed to achieve P_{100} 31.5 mm and separated into four particle size ranges (−31.5 +19.1 mm, −19.1 +9.5 mm, −9.5 mm +0.85 mm, and −0.85 mm). Tests were conducted for two particle-size ranges, −31.5 +19.1 mm and −19.1 +9.5 mm, while the material from the other size ranges was weighed, and its content was determined to complete the metallurgical balance.

The tests used the same cascade classification principle previously applied (Figure 13-7). Table 13-6 and Table 13-7 present the results of the ore sorter test for the particle size range −19.1 +9.5 mm for the two drill holes. It is possible to observe that the results obtained for both samples were similar and indicate that Configuration 1 is the most suitable. This is because, in this set-up, enrichment between 19% and 20% was achieved with 94% to 96% recovery.

*Table 13-6: Ore Sorter Results for the **−19.1** + 9.5 mm Size Fraction (ITDD-22-054)*

Configuration	Mass Reduction (%)	Conc. Li_2O Grade (%)	Reject Li_2O Grade (%)	Li_2O Recovery (%)	Enrichment (%)
1	20.81	1.77	0.43	94.00	19
2	27.15	1.83	0.56	89.83	23
3	50.68	2.29	0.70	76.09	54

*Table 13-7: Ore Sorter Results for the Size Fraction of **−19.1** +9.5 mm (ITDD-22-098)*

Configuration	Mass Reduction (%)	Conc. Li_2O Grade (%)	Reject Li_2OGrade (%)	Li_2O Recovery (%)	Enrichment (%)
1	19.90	1.61	0.26	96.19	20
2	30.89	1.72	0.48	88.94	29
3	54.45	1.98	0.80	67.28	48

The results for the particle-size range −31.5 +19.1 mm are presented in Table 13-8 and Table 13-9 for drill holes ITDD-22-054 and ITDD-22-098, respectively. There were discrepancies in the results between the two samples for the coarse particle size range despite the difference in lithium oxide content in the test feed being less than 5% (1.31% for ITDD-22-054 and 1.26% for ITDD-22-098). Since a) no significant variation was observed in the results of the tests with and without dilution for the particle size range of −19.1 +9.5 mm, and b) no relevant effect of particle size on the undiluted test was observed, the result of drill hole ITDD-22-054 for coarse particle size was not considered in the ore sorter application analysis, as it differs from the other results obtained. Therefore, the second configuration is the most interesting, as it recovered almost 93% of lithium, with an enrichment of 17%.

*Table 13-8: Ore Sorter Results for the **−31.5** +19.1 mm Size Fraction (ITDD-22-054)*

Configuration	Mass Reduction (%)	Conc. Li_2O Grade (%)	Reject Li_2OGrade (%)	Li_2O Recovery (%)	Enrichment (%)
1	21.35	1.47	0.74	87.97	12
2	30.63	1.62	0.62	85.54	23
3	48.03	1.93	0.65	76.32	47

*Table 13-9: Ore Sorter Results for the **−31.5** +19 mm Size Fraction (ITDD-22-098)*

Configuration	Mass Reduction (%)	Conc. Li_2O Grade (%)	Reject Li_2OGrade (%)	Li_2O Recovery (%)	Enrichment (%)
1	14.90	1.39	0.49	94.17	11
2	20.71	1.47	0.43	92.84	17
3	42.17	1.70	0.65	78.24	35

SGS Chile—Crushability Work Index

The Bond low-energy impact test was conducted at SGS Chile to determine the CWi, a factor indicating the power required for crushing. For the assay, 20 pieces cut to a thickness of 51 mm were sent. Each specimen was subjected to the impact of two hammers mounted on a pendulum. The test was repeated, increasing the pendulum angle and, therefore, increasing the impact until the sample fractured. CWi results vary from 4.1 kWh/t to 10.2 kWh/t. The average result was 7.0 kWh/t, characterizing a medium CWi. Table 13-10 and Table 13-11 give the results obtained for this test.

Table 13-10: Average CWi Results for the Bond Low-Energy Impact Tests

Specimen No	Impact Energy (Joules)	Work Index (kWh/t)
1	14.9	5.9
2	10.4	4.1
3	14.9	5.9
4	10.4	4.1
5	14.9	5.9
6	26	10.2
7	26	10.2
8	20.1	7.9
9	10.4	4.1
10	26	10.2
11	10.4	4.1
12	14.9	5.9
13	26	10.2
14	26	10.2
15	20.1	7.9
16	14.9	5.9
17	14.9	5.9
18	20.1	7.9
19	20.1	7.9
20	14.9	5.9

Table 13-11: Bond Low-Energy Impact Testwork Statistics

Parameter	kWh/t
Maximum Impact Work Index	10.2
Minimum Impact Work Index	4.1
Average Impact Work Index	7
Standard Deviation	2.3

The specific gravity of the specimens was 2.68 g/cm^3.

Metso Outotec Crushability Tests

Metso Outotec performed crushability tests to define crushing size with three composite samples of a minimum of 50 kg. The material was classified as abrasive and very easy to crush (Table 13-12). In general, the results did not vary between the composite samples.

Table 13-12: Crushability Tests Results

	Composite 1	Composite 2	Composite 3
Samples	ITDD-22-023T/030T and ITDD-23-083T	ITDD-22-048T	ITDD-23-093T/087T
Abrasion Index (Bond)	Average (0.295 g)	Average (0.300 g)	Average (0.212 g)
Abrasion Index (Macon)	Abrasive (1,698 g/t)	Abrasive (1,602 g/t)	Abrasive (1,600 g/t)
Crushability (Macon)	69.0 % (very easy)	68.8% (very easy)	79.0 % (very easy)
Work Index (Bond)	Average (12.25 kWh/st)	Average (11.35 kWh/st)	Average (10.50 kWh/st)
Bulk Density	1.56 t/m³	1.61 t/m³	1.60 t/m³
Specific Gravity	2.66 t/m³	2.71 t/m³	2.70 t/m³
Jaw Crusher Crushability	Crusher 75 x 50 mm - Smooth Jaw Plates. CSS=4.5 mm - Load Cell on Toggle	Crusher 75 x 50 mm - Smooth Jaw Plates. CSS=4.5 mm - Load Cell on Toggle	Crusher 75 x 5 0 mm - Smooth Jaw Plates. CSS=4.5 mm - Load Cell on Toggle
Volumetric Capacity Index	Standard methods (107.84%)	Standard methods (107.40%)	Maximum value (116.47%)
Strength Index	Smallest leaflet setting (96.21%)	Smallest leaflet setting (106.96%)	Minimum setting reduced 20% (88.57%)
Product Flakiness Index	Cubical material (13.29 %)	Cubical material (5.45%)	Cubical material (4.91%)

13.3.4 Ore Variability

A comprehensive study was conducted to analyze the geological and metallurgical variability of the ore. First, seven drill holes without schists were selected for use in evaluating the HLS performance for different samples, and one for determining crushability work index (Phase 1). Then, fifteen new samples from eleven drill holes were selected to evaluate the ore sorter and HLS performance in other areas and depths with schist dilution (Phase 2).

Chemical and Mineralogical Characterization for the Seven Drill Holes

The seven metallurgical drill holes were prepared for chemical and mineralogical analysis (Table 13-13 and Table 13-14). In addition, two composite samples were prepared to evaluate the combined behaviour of the samples.

Table 13-13: Chemical Analysis for the Seven Drill Holes and Two Composites

	Al (%)	Be (ppm)	Ca (%)	Cr (ppm)	Fe_2O_3 (%)	K_2O (%)	Li_2O (%)	Nb (ppm)	P (%)	Sn (ppm)	Ta (ppm)
ITDD-22-048T	8.1	170	0.18	864	0.83	2.34	1.14	175	0.28	275	99
ITDD-23-093T	8.58	155	0.22	102	0.57	2.02	1.12	84	0.24	348	45
ITDD-23-087T	7.86	188	0.12	37	0.70	1.98	1.78	90	0.25	353	61
ITDD-22-023T	8.09	142	0.23	31	0.56	2.34	1.59	106	0.39	174	46
ITDD-22-002T	8.04	193	0.9	1008	0.76	2.82	1.21	127	0.49	299	72
ITDD-23-083T	8.7	138	0.3	144	0.56	2.39	1.62	110	0.37	293	112
ITDD-22-030T	7.95	297	<0.1	19	0.74	2.37	1.46	109	0.63	644	49
COMPOSITE1	7.89	175	0.32	14	0.83	2.18	1.26	92	0.38	365	54
COMPOSITE2	8.23	148	0.38	18	0.84	2.16	1.58	99	0.47	268	44

Table 13-14: Mineralogical Analysis by DRX (Rietveld) for the Seven Drill Holes (Wt%)

	Albite	Chlorite	Elbaite	Microcline	Montebrasite	Muscovite	Petalite	Polylithionite	Pyrite	Quartz	Spodumene
ITDD-22-002	32.5	0.3	1.1	20.8	5.1	4.0	1.2	0.2	0.1	23.3	11.4
ITDD-22-023	32.1	0.3	0.9	16.1	1.9	4.2	1.2	0.4	0.0	25.6	17.2
ITDD-22-030	25.2	1.1	1.3	15.7	3.1	7.0	1.1	0.4	0.,0	34.3	10.7
ITDD-22-048	32.8	0.3	0.3	12.8	3.3	8.4	1.3	0.6	0.1	27.8	12.2
ITDD-23-083	35.6	0.4	0.7	16.1	3.6	3.7	1.6	1.8	0.1	19.3	17.2
ITDD-23-087	28.9	0.4	0.4	12.4	2.2	6.4	0.7	0.4	0.0	28.2	20.0
ITDD-23-093	34.5	0.6	0.7	11.4	3.8	9.2	0.9	0.4	0.1	26.8	11.6

Undiluted Samples—Heavy Liquid Separation Tests

Figure 13-8 shows the location of the selected eight drill holes, those with a maximum 100 m depth and minimum 5 m interception, except ITDD-23-134T, which was used only for the Bond Low-Energy Impact Test. A total of 906 kg was sent to SGS Geosol to be prepared, which includes crushing, screening, and sampling. The HLS was performed in duplicate at two particle size ranges −12.7 +6.3 mm and −6.3 +0.85 mm for three densities 2.8 g/cm³, 2.7 g/cm³ and 2.4 g/cm³, simulating a rougher–scavenger circuit and a polishing step for petalite recovery.

HLS rougher-scavenger results are presented in Table 13-15 and Figure 13-16 for each particle-size range. The 2.4 g/cm³ step did not present significative mass for all samples, which indicates a minor presence of petalite. In general, rougher concentrate presented a lithium oxide grade above 5.5% with an average global recovery of 84% for the coarse and 89% for the medium fraction.

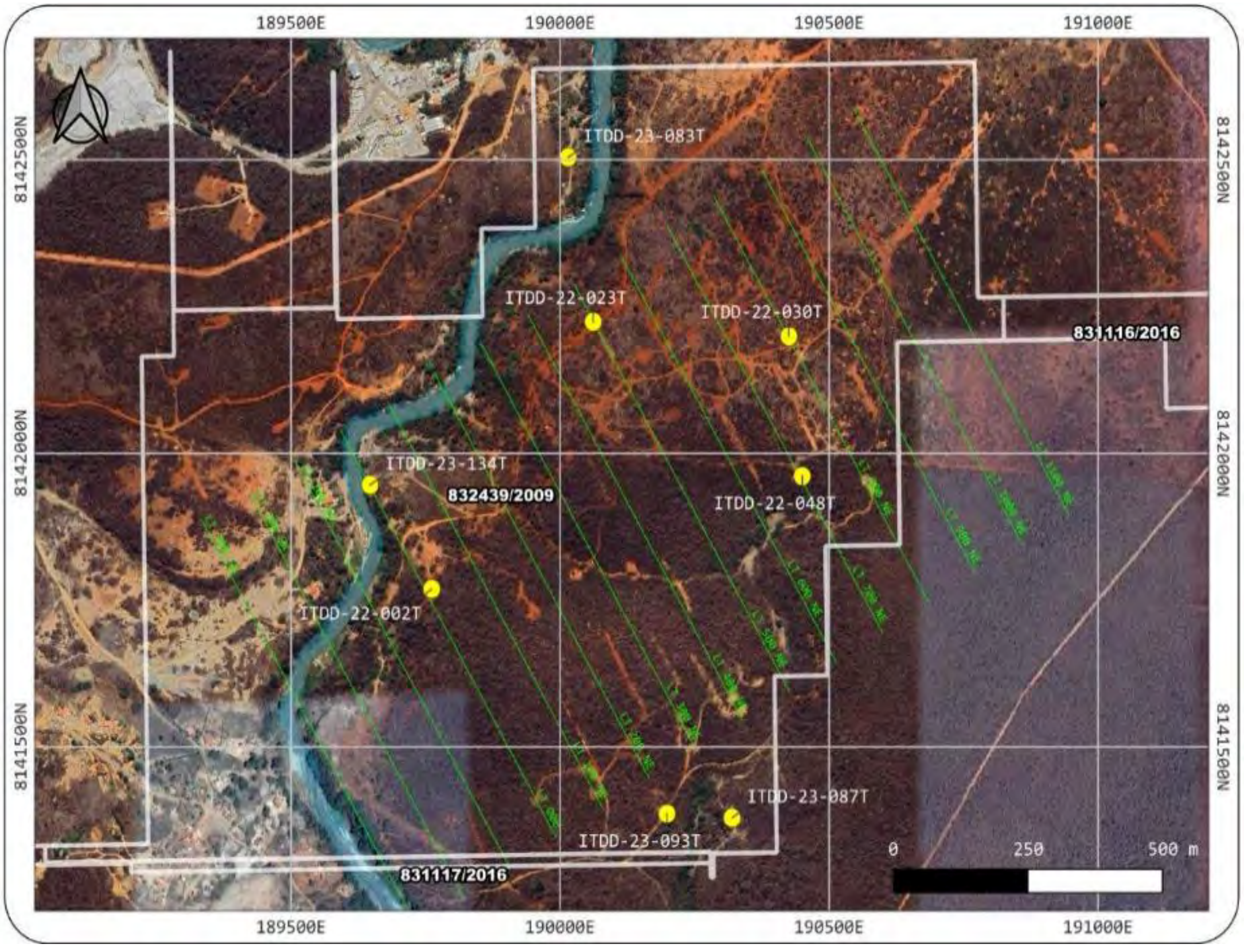


Figure 13-8: Variability Study Drill Holes

*Table 13-15: HLS Results for Coarse Fraction **(−12.7 +6.35 mm)***

Drill Hole	Li_2O Feed Grade (%)			Li_2O Float Grade (%)			Li_2O Sink Grade (%)			Li_2O HLS Recovery (%)		
	T1	T2	$\bar{x}$	T1	T2	$\bar{x}$	T1	T2	$\bar{x}$	T1	T2	$\bar{x}$
ITDD-22-002T	1.10	1.40	1.25	0.33	0.26	0.29	4.18	3.95	4.06	76.80	88.18	82.50
ITDD-22-023T	1.60	1.48	1.54	0.22	0.23	0.23	5.82	5.55	5.68	89.90	89.30	89.61
ITDD-22-030T	0.83	1.63	1.23	0.38	0.35	0.36	7.13	7.65	7.39	60.40	84.49	72.42
ITDD-22-048T	1.26	0.95	1.10	0.26	0.28	0.27	5.40	5.43	5.41	86.20	78.00	82.08
ITDD-23-083T	1.61	2.14	1.88	0.10	0.14	0.12	6.76	6.33	6.55	95.30	95.93	95.61
ITDD-23-087T	1.53	2.12	1.83	0.38	0.21	0.30	4.96	5.57	5.27	83.20	94.43	88.81
ITDD-23-093T	0.60	0.59	0.60	0.19	0.13	0.16	6.75	6.15	6.45	72.30	81.80	77.06
Composite 1	1.40	-	-	0.27	-	-	4.52	-	-	87.20	-	-
Composite 2	1.33	-	-	0.29	-	-	5.50	-	-	84.40	-	-

*Table 13-16: HLS Results for Fine **Fraction (−6.35 +0.85** mm)*

Drill Hole	Li_2O Feed Grade (%)			Li_2O Float Grade(%)			Li_2O Sink Grade(%)			Li_2O HLS Recovery (%)		
	T1	T2	x̄	T1	T2	x̄	T1	T2	x̄	T1	T2	x̄
ITDD-22-002T	1.14	1.07	1.10	0.17	0.17	0.17	5.59	4.98	5.29	88.32	87.71	88.01
ITDD-22-023T	1.59	1.33	1.46	0.22	0.17	0.19	6.75	6.01	6.38	89.57	90.25	89.91
ITDD-22-030T	1.44	1.36	1.40	0.31	0.27	0.29	7.37	6.56	6.96	82.64	84.37	83.51
ITDD-22-048T	0.96	1.00	0.98	0.18	0.13	0.16	6.25	6.83	6.54	85.33	89.91	87.62
ITDD-23-083T	1.45	1.48	1.46	0.12	0.12	0.12	7.15	7.25	7.20	93.48	93.89	93.69
ITDD-23-087T	1.51	1.58	1.54	0.19	0.21	0.20	6.55	6.37	6.46	91.25	90.26	90.76
ITDD-23-093T	1.04	1.19	1.12	0.16	0.15	0.15	6.99	6.74	6.87	87.67	90.48	89.08
Composite 1	1.34	-	-	0.19	-	-	6.74	-	-	89.1	-	-
Composite 2	1.42	-	-	0.18	-	-	6.54	-	-	90.8	-	-

Composite samples were tested to evaluate the combined behaviour of seven drill holes. The composite results fit the polynomial adjustment (Figure 13-9 and Figure 13-10).

The metallurgical recovery polynomial adjustment adherence with the composite results is shown in Figure 13-11, with an R^2 = 0.89.

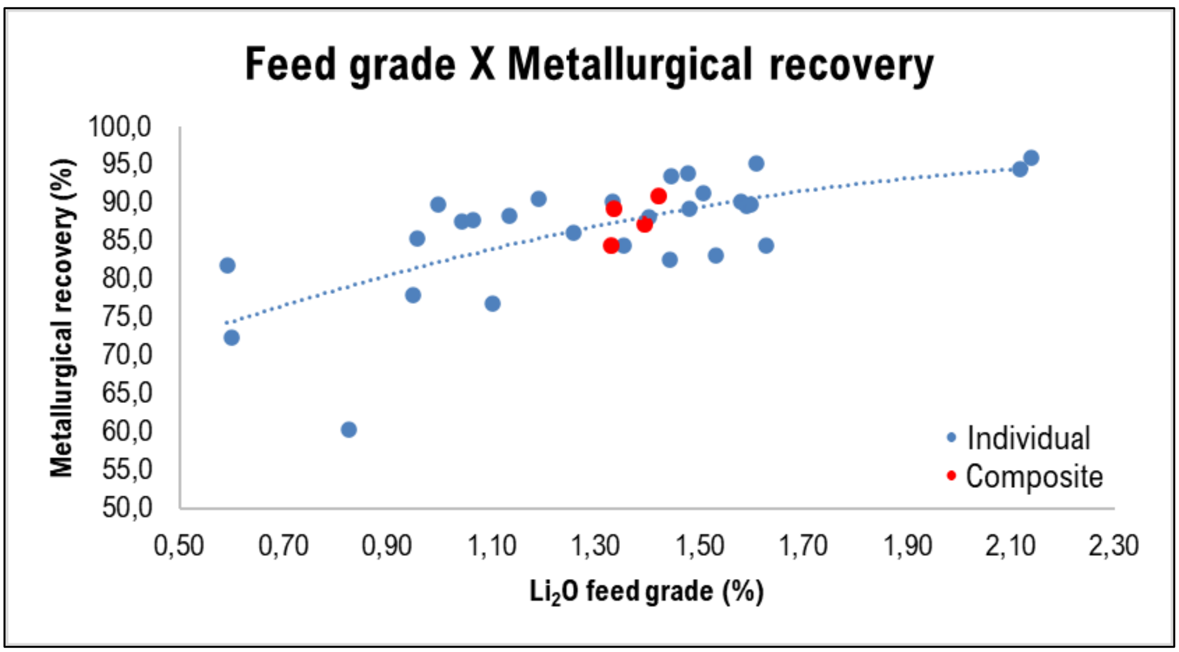


Figure 13-9: HLS Metallurgical Recovery as a Function of Feed Grade

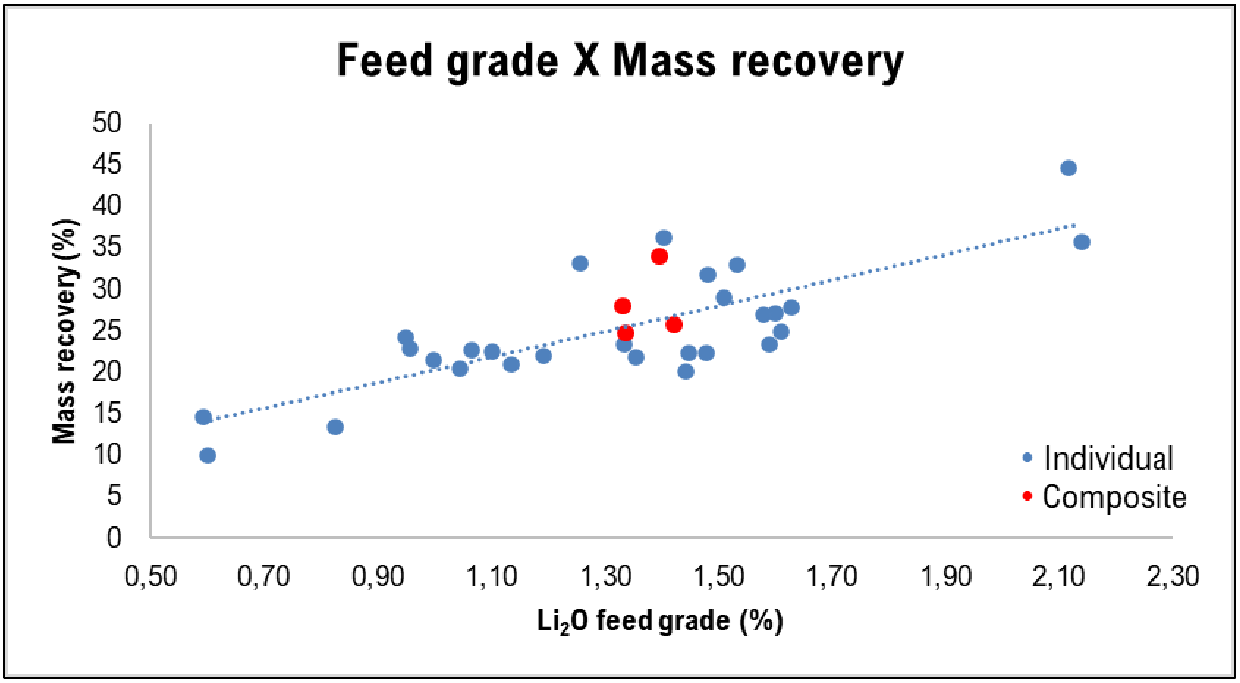


Figure 13-10: HLS Mass Recovery as a Function of Feed Grade

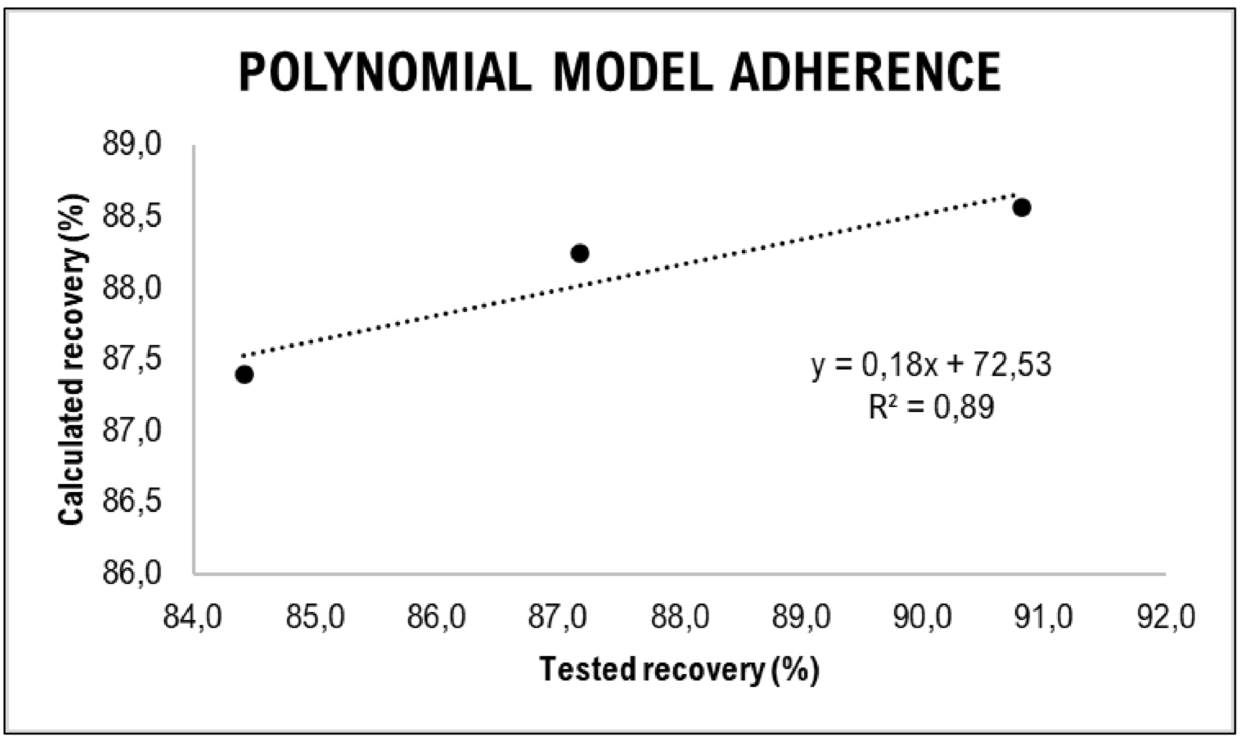


Figure 13-11: Metallurgical Polynomial Model Adherence

All HLS samples were analyzed using X-ray diffraction to understand the mineralogical behaviour of HLS. The main lithium-bearing minerals found were spodumene, montebrasite, petalite, and elbaite.

As shown in Figure 13-12 and Figure 13-13, spodumene is mainly in the concentrate for both particle-size distributions. Montebrasite distribution is presented in Figure 13-14 and Figure 13-15, reported mainly in the tailings fraction. The same behaviour applies to petalite distribution (Figure 13-16 and Figure 13-17). Elbaite distribution has no concentration preference following the mass distribution (Figure 13-18 and Figure 13-19).

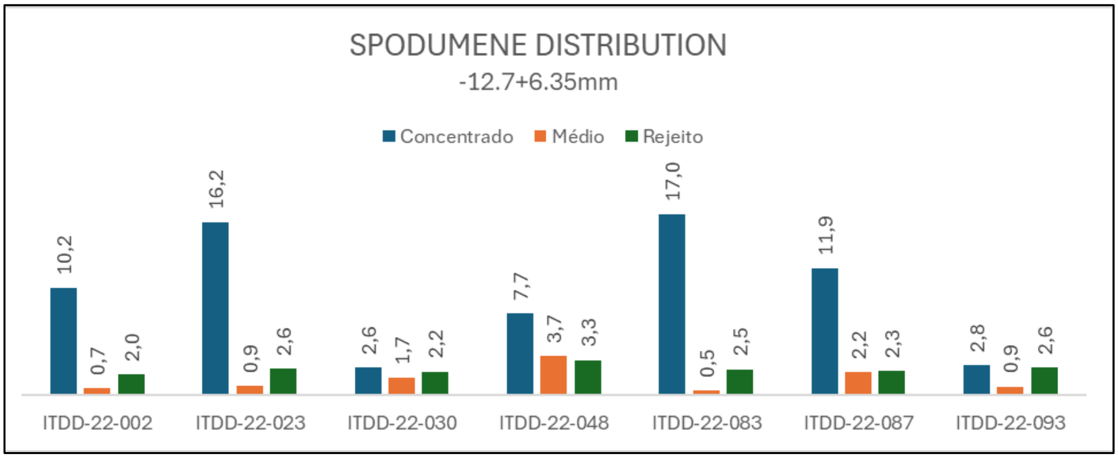


*Figure 13-12: Spodumene Mass Distribution in HLS Test for Coarse Material (**−12.7 +6.35** mm)*

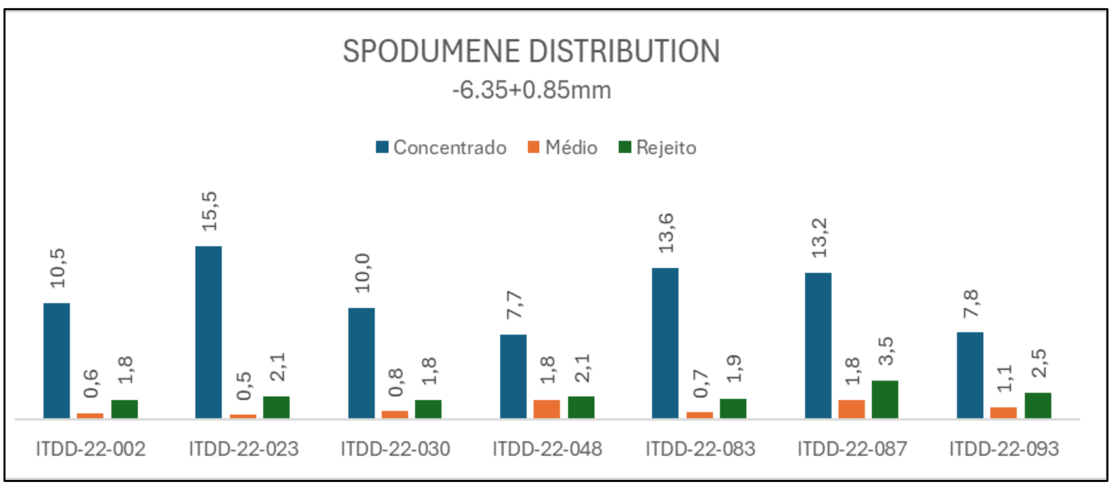


*Figure 13-13: Spodumene Mass Distribution in HLS Test for Fine Material (**−6.35 +0.85** mm)*

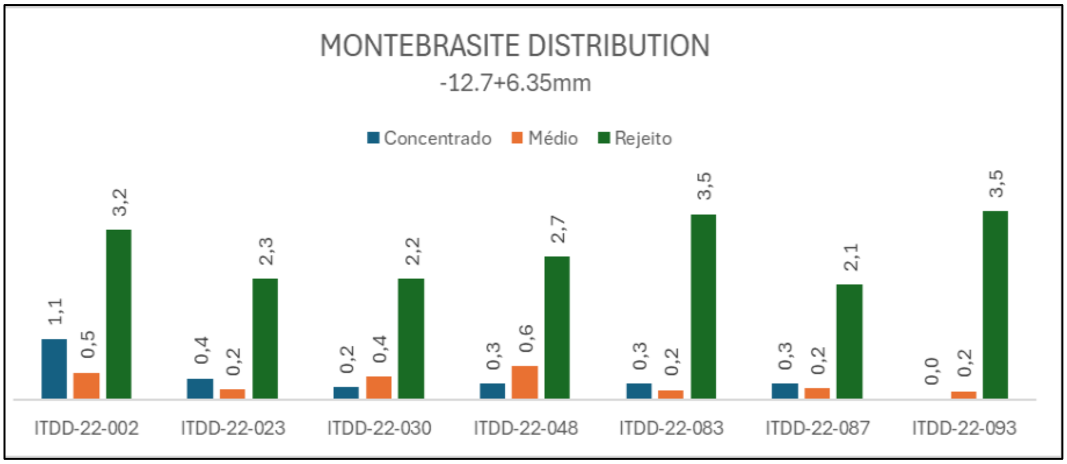


*Figure 13-14: Montebrasite Mass Distribution in HLS Test for Coarse Material (**−12.7 +6.35** mm)*

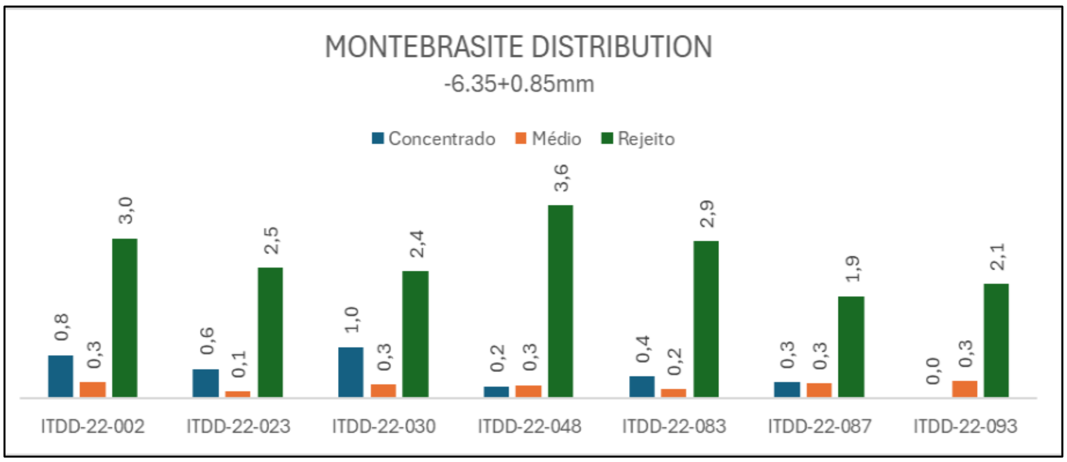


*Figure 13-15: Montebrasite Mass Distribution in HLS Test for Fine Material (**−6.35 +0.85** mm)*

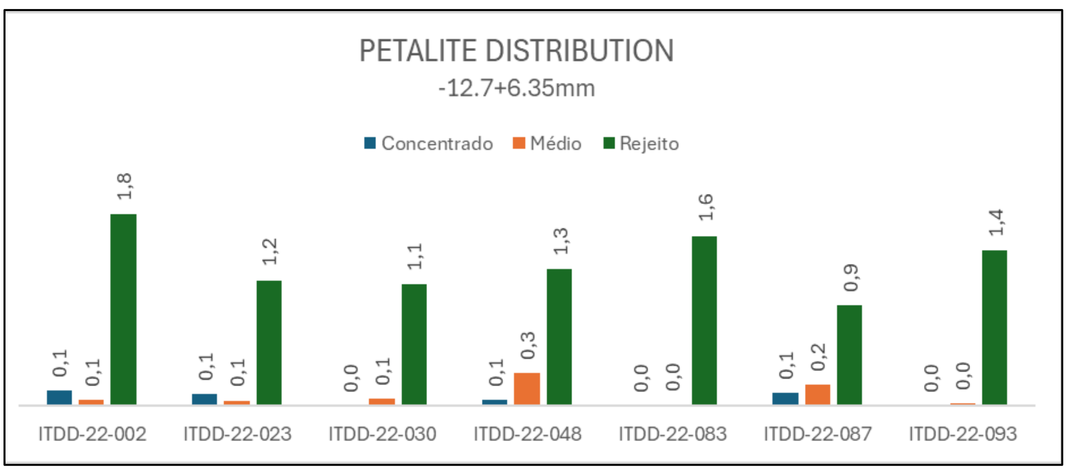


*Figure 13-16: Petalite Mass Distribution in HLS Test for Coarse Material (**−12.7 +6.35** mm)*

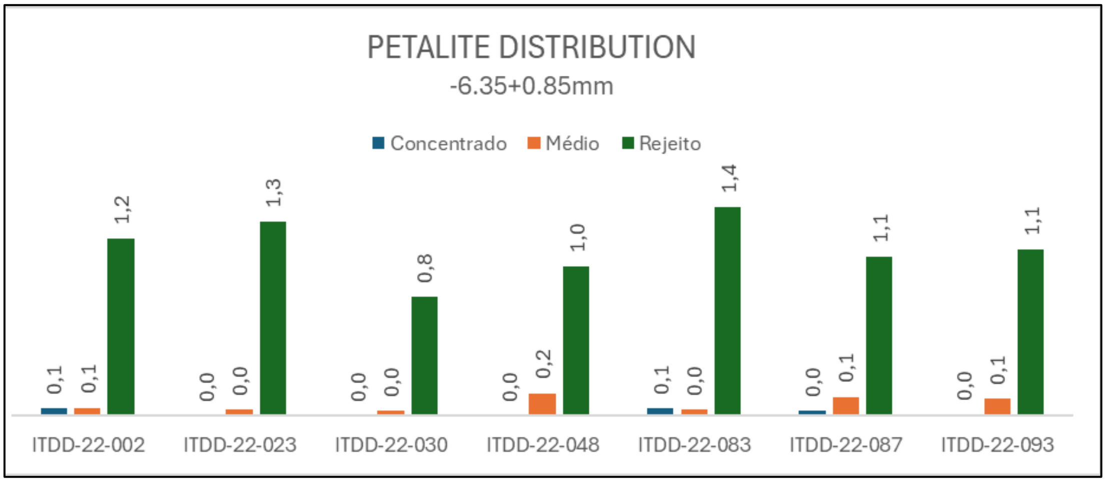


*Figure 13-17: Petalite Mass Distribution in HLS TEST for Fine Material (**−6.35 +0.85** mm)*

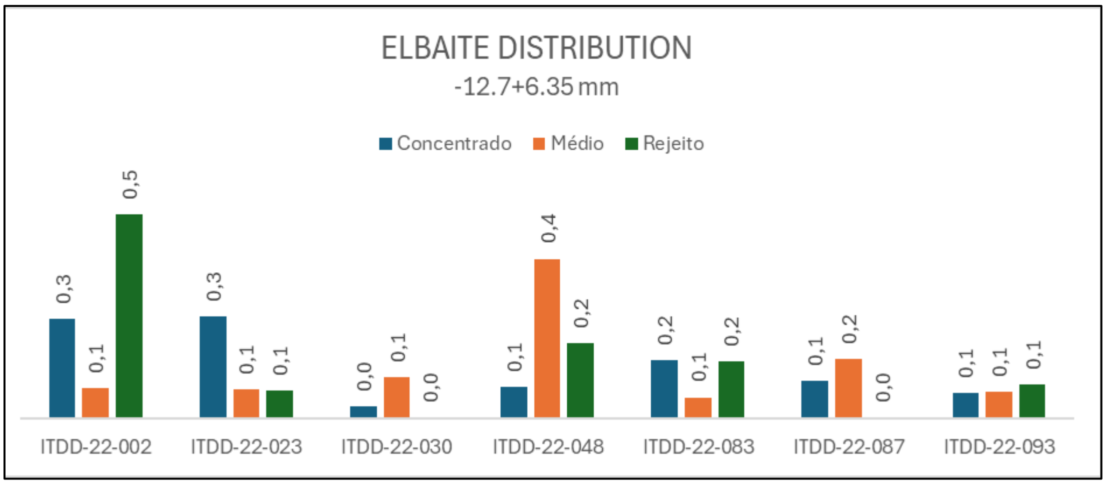


*Figure 13-18: Elbaite Mass Distribution in HLS Test for Coarse Material (**−12.7 +6.35** mm)*

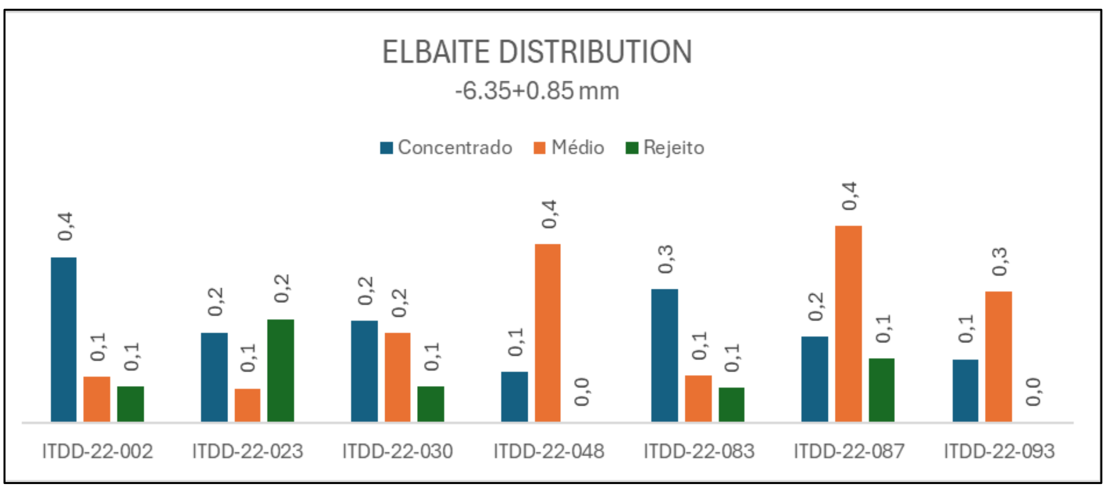


*Figure 13-19: Elbaite Mass Distribution in HLS Test for Fine Material (**−6.35 +0.85** mm)*

Diluted Variability Samples—Ore Sorter and HLS Tests

Figure 13-20 shows the location of the 11 new drill holes (Phase 2 in blue). From among those 11, two drill holes (ITDD-23-065 and ITDD-23-073) were sampled at three different depths to evaluate the metallurgical response over the life-of-mine (LOM). Ore sorter tests and HLS were performed for the 15 samples.

Ore sorter tests were done in two particle-size ranges: 31.5 + 19.1 mm and 19.1 + 7.5 mm. Then, both composites were combined with a size fraction below 7.5 mm that did not pass through the ore sorter concentration. These composite samples were used to perform HLS tests in two particle-size ranges—12.7 + 6.35 mm and −6.35 +0.5 mm—in three densities: 2.8 g/cm³, 2.7 g/cm³, and 2.45 g/cm³). Ore sorter results are presented in Figure 13-21. Lithium average recovery for the coarse and fine fractions was 93.6% and 92.6%, respectively.

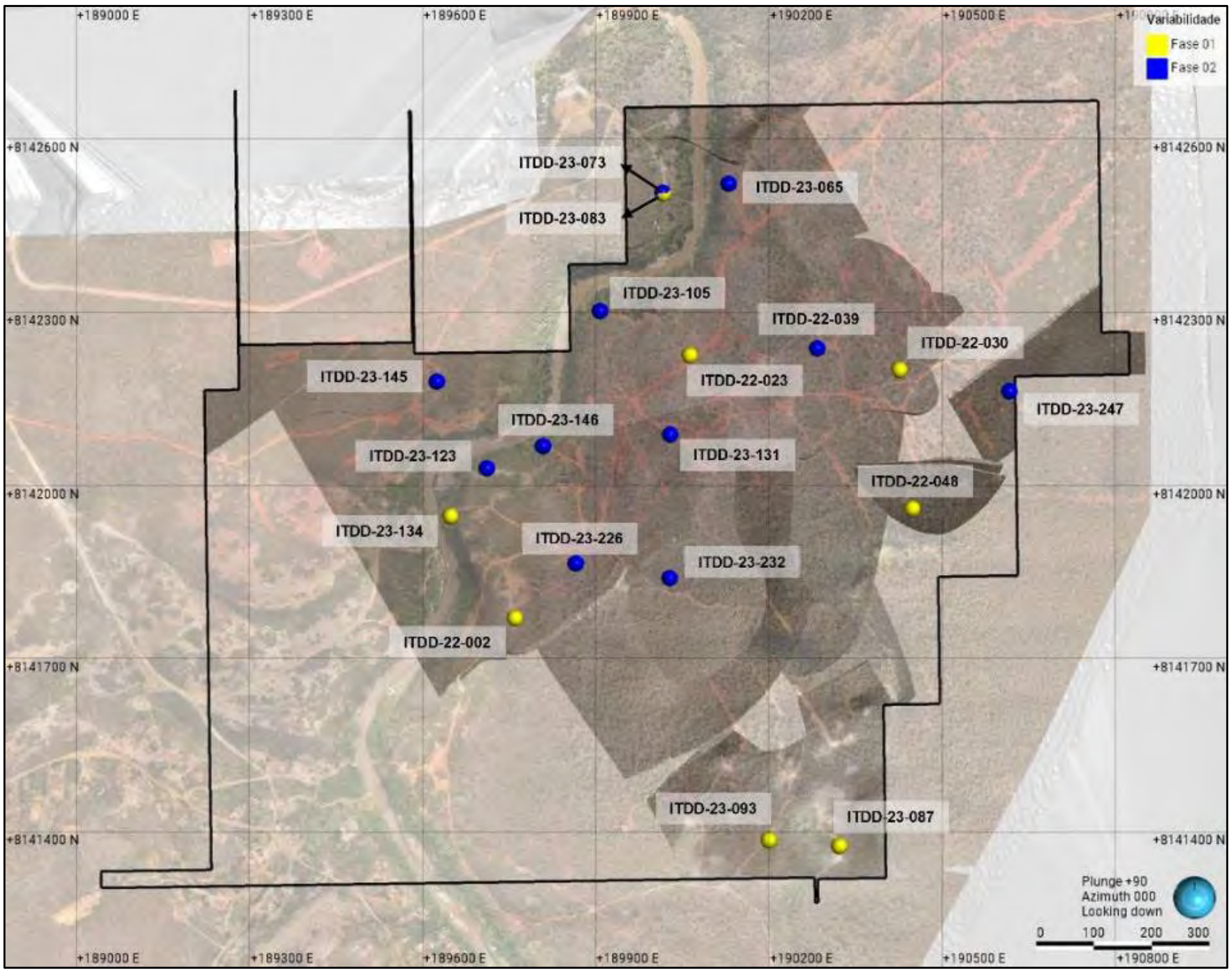


Figure 13-20: Variability Additional Drill-Hole Locations (Phase 2 in Blue)

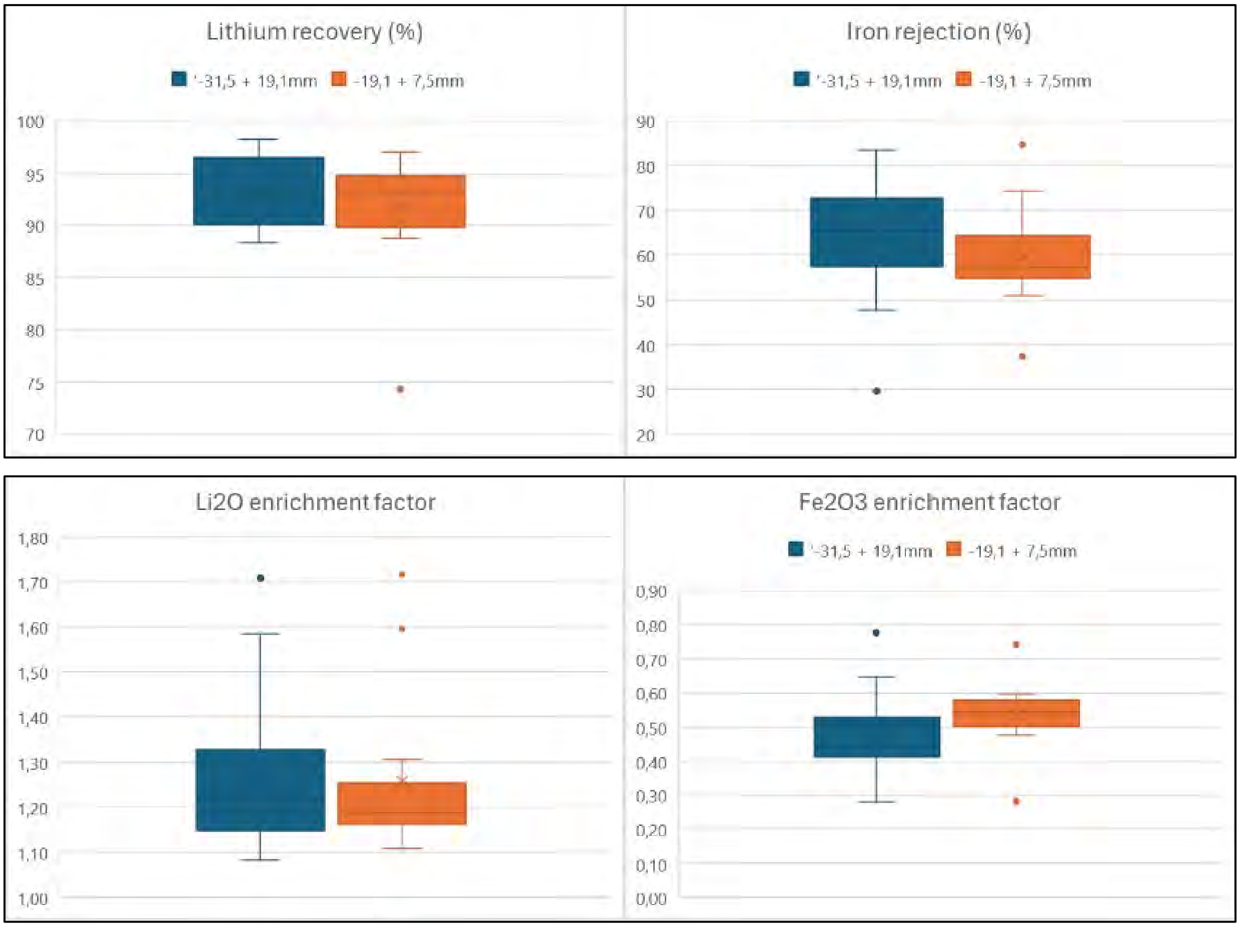


Figure 13-21: Ore Sorter Results for Lithium and Iron

Coarse and fine ore sorter concentrate was combined with the −7.5 + 0.5 mm fine fraction to perform HLS tests. The particle sizes used in HLS were −12.7 +6.35 mm and −6.35 +0.5 mm. A 3-stage circuit was simulated by the HLS test using 2.80 g/cm³, 2.70 g/cm³, and 2.45 g/cm³ fluid density targets. Table 13-17, Table 13-18, and Table 13-19 present the HLS results. Rougher average metallurgical recovery was 77.8%, with 22.1% mass recovery. The scavenger step increases the metallurgical recovery to 86.1%, with 34.0% mass recovery. The polishing step using 2.45 g/cm³ increases average metallurgical recovery to 88.2% and average mass recovery to 34.7%. Figure 13-22 indicates the polishing effect.

Table 13-17: HLS Rougher Step Results

Sample	Size	Cut-Point (g/cm^3)	Recovery Mas (%)	Recovery Met (%)	Li_2O Feed (%)	Li_2O Conc. (%)	Li_2O Tailings (%)
ITDD-23-065 270,2 a 277,97	−6.35 +0.5 mm	2.80	28.7	85.1	2.22	6.57	0.46
ITDD-23-065 351,23 a 380,7	−6.35 +0.5 mm	2.80	8.7	47.4	0.97	5.27	0.56
ITDD-23-065 455,28 a 462,88	−6.35 +0.5 mm	2.80	12.4	81.0	0.7	4.59	0.15
ITDD-23-073 76,82 a 84,66	−6.35 +0.5 mm	2.80	25.1	90.0	1.83	6.55	0.24
ITDD-23-073 205,62 a 214,3	−6.35 +0.5 mm	2.80	24.4	88.2	2.01	7.25	0.31
ITDD-23-073 406,21 a 428,35	−6.35 +0.5 mm	2.80	15.0	71.9	1.17	5.60	0.39
ITDD-23-146 266,31 a 277,18	−6.35 +0.5 mm	2.80	19.1	81.7	1.53	6.56	0.35
ITDD-23-145 289,82 a 303,05	−6.35 +0.5 mm	2.80	19.1	82.0	1.59	6.84	0.35
ITDD-23-226 170,61 a 180,57	−6.35 +0.5 mm	2.80	16.4	73.1	1.53	6.83	0.49
ITDD-22-039 85,24 a 96,86	−6.35 +0.5 mm	2.80	25.7	85.4	1.59	5.29	0.31
ITDD-23-247 84,62 a 99,58	−6.35 +0.5 mm	2.80	12.0	79.1	0.81	5.36	0.19
ITDD-23-232 137,7 a 146,95	−6.35 +0.5 mm	2.80	20.6	80.6	1.53	6.00	0.38
ITDD-23-105 219,44 a 230,59	−6.35 +0.5 mm	2.80	14.3	80.4	1.16	6.54	0.27
ITDD-23-123 148,16 a 160,4	−6.35 +0.5 mm	2.80	14.2	81.2	1.08	6.19	0.24
ITDD-23-131 97,48 a 103,88	−6.35 +0.5 mm	2.80	25.4	88.9	1.36	4.76	0.20
ITDD-23-065 270,2 a 277,97	−12.7 +6.35 mm	2.80	44.6	89.7	3.30	6.63	0.61
ITDD-23-065 351,23 a 380,7	−12.7 +6.35 mm	2.80	7.8	37.0	1.07	5.04	0.73
ITDD-23-065 455,28 a 462,88	−12.7 +6.35 mm	2.80	23.5	74.7	0.90	2.85	0.30
ITDD-23-073 76,82 a 84,66	−12.7 +6.35 mm	2.80	30.3	82.9	2.10	5.75	0.51
ITDD-23-073 205,62 a 214,3	−12.7 +6.35 mm	2.80	31.0	85.7	2.25	6.23	0.47
ITDD-23-073 406,21 a 428,35	−12.7 +6.35 mm	2.80	25.2	68.6	1.99	5.41	0.84
ITDD-23-146 266,31 a 277,18	−12.7 +6.35 mm	2.80	29.4	83.9	2.19	6.27	0.50
ITDD-23-145 289,82 a 303,05	−12.7 +6.35 mm	2.80	34.2	83.7	2.03	4.95	0.50
ITDD-23-226 170,61 a 180,57	−12.7 +6.35 mm	2.80	25.1	69.3	2.08	5.73	0.85
ITDD-22-039 85,24 a 96,86	−12.7 +6.35 mm	2.80	31.5	84.7	2.14	5.74	0.48
ITDD-23-247 84,62 a 99,58	−12.7 +6.35 mm	2.80	13.0	64.9	0.87	4.32	0.35
ITDD-23-232 137,7 a 146,95	−12.7 +6.35 mm	2.80	25.8	71.6	1.59	4.42	0.61
ITDD-23-105 219,44 a 230,59	−12.7 +6.35 mm	2.80	14.0	71.0	1.25	6.33	0.42
ITDD-23-123 148,16 a 160,4	−12.7 +6.35 mm	2.80	20.3	84.8	1.65	6.90	0.32
ITDD-23-131 97,48 a 103,88	−12.7 +6.35 mm	2.80	27.2	86.4	1.60	5.07	0.30

Table 13-18: HLS Scavenger Step Results

Sample	Size	Cut-Point (g/cm^3)	Recovery Mas (%)	Recovery Met (%)	Li_2O Feed (%)	Li_2O Conc. (%)	Li_2O Tailings (%)
ITDD-23-065 270,2 a 277,97	6.35 +0.5 mm	2.70	13.4	32.7	0.46	1.13	0.36
ITDD-23-065 351,23 a 380,7	6.35 +0.5 mm	2.70	5.6	6.2	0.56	0.62	0.55
ITDD-23-065 455,28 a 462,88	6.35 +0.5 mm	2.70	10.9	38.4	0.15	0.53	0.11
ITDD-23-073 76,82 a 84,66	6.35 +0.5 mm	2.70	13.8	44.9	0.24	0.79	0.16
ITDD-23-073 205,62 a 214,3	6.35 +0.5 mm	2.70	8.2	23.5	0.31	0.89	0.26
ITDD-23-073 406,21 a 428,35	6.35 +0.5 mm	2.70	15.5	25.8	0.39	0.64	0.34
ITDD-23-146 266,31 a 277,18	6.35 +0.5 mm	2.70	9.2	25.9	0.35	0.98	0.28
ITDD-23-145 289,82 a 303,05	6.35 +0.5 mm	2.70	15.1	46.5	0.35	1.09	0.22
ITDD-23-226 170,61 a 180,57	6.35 +0.5 mm	2.70	6.5	24.9	0.49	1.89	0.40
ITDD-22-039 85,24 a 96,86	6.35 +0.5 mm	2.70	12.2	48.4	0.31	1.24	0.18
ITDD-23-247 84,62 a 99,58	6.35 +0.5 mm	2.70	9.5	47.7	0.19	0.97	0.11
ITDD-23-232 137,7 a 146,95	6.35 +0.5 mm	2.70	14.7	62.8	0.38	1.60	0.16
ITDD-23-105 219,44 a 230,59	6.35 +0.5 mm	2.70	14.6	47.7	0.27	0.87	0.16
ITDD-23-123 148,16 a 160,4	6.35 +0.5 mm	2.70	13.5	43.9	0.24	0.77	0.15
ITDD-23-131 97,48 a 103,88	6.35 +0.5 mm	2.70	38.7	75.3	0.20	0.39	0.08
ITDD-23-065 270,2 a 277,97	-12.7 +6.35 mm	2.70	18.1	50.7	0.61	1.72	0.37
ITDD-23-065 351,23 a 380,7	-12.7 +6.35 mm	2.70	6.4	12.4	0.73	1.41	0.68
ITDD-23-065 455,28 a 462,88	-12.7 +6.35 mm	2.70	20.9	71.9	0.30	1.02	0.11
ITDD-23-073 76,82 a 84,66	-12.7 +6.35 mm	2.70	11.4	18.4	0.51	0.83	0.47
ITDD-23-073 205,62 a 214,3	-12.7 +6.35 mm	2.70	8.7	27.9	0.47	1.49	0.37
ITDD-23-073 406,21 a 428,35	-12.7 +6.35 mm	2.70	28.9	45.2	0.84	1.31	0.65
ITDD-23-146 266,31 a 277,18	-12.7 +6.35 mm	2.70	13.7	45.2	0.50	1.64	0.32
ITDD-23-145 289,82 a 303,05	-12.7 +6.35 mm	2.70	17.4	36.8	0.50	1.06	0.38
ITDD-23-226 170,61 a 180,57	-12.7 +6.35 mm	2.70	13.5	49.5	0.85	3.12	0.50
ITDD-22-039 85,24 a 96,86	-12.7 +6.35 mm	2.70	10.4	46.9	0.48	2.17	0.28
ITDD-23-247 84,62 a 99,58	-12.7 +6.35 mm	2.70	11.3	52.8	0.35	1.64	0.19
ITDD-23-232 137,7 a 146,95	-12.7 +6.35 mm	2.70	19.7	57.8	0.61	1.79	0.32
ITDD-23-105 219,44 a 230,59	-12.7 +6.35 mm	2.70	19.1	46.9	0.42	1.04	0.28
ITDD-23-123 148,16 a 160,4	-12.7 +6.35 mm	2.70	19.8	29.5	0.32	0.47	0.28
ITDD-23-131 97,48 a 103,88	-12.7 +6.35 mm	2.70	45.9	12.7	0.30	0.08	0.48

Table 13-19: Polishing HLS Results

Sample	Size	Cut-Point (g/cm^3)	Recovery Mas (%)	Recovery Met (%)	Li_2O Feed (%)	Li_2O Conc. (%)	Li_2O Tailings (%)
ITDD-23-065 270,2 a 277,97	-6.35 +0.5 mm	2.45	2.3	27.4	0.36	4.22	0.27
ITDD-23-065 351,23 a 380,7	-6.35 +0.5 mm	2.45	5.7	48.8	0.55	4.72	0.30
ITDD-23-073 205,62 a 214,3	-6.35 +0.5 mm	2.45	0.8	6.6	0.26	2.05	0.24
ITDD-23-073 406,21 a 428,35	-6.35 +0.5 mm	2.45	1.0	13.5	0.34	4.84	0.30
ITDD-23-065 351,23 a 380,7	-12.7 +6.35 mm	2.45	8.9	49.4	0.68	3.79	0.38
ITDD-23-073 205,62 a 214,3	-12.7 +6.35 mm	2.45	2.2	6.2	0.37	1.06	0.36
ITDD-23-073 406,21 a 428,35	-12.7 +6.35 mm	2.45	4.5	30.7	0.65	4.45	0.47

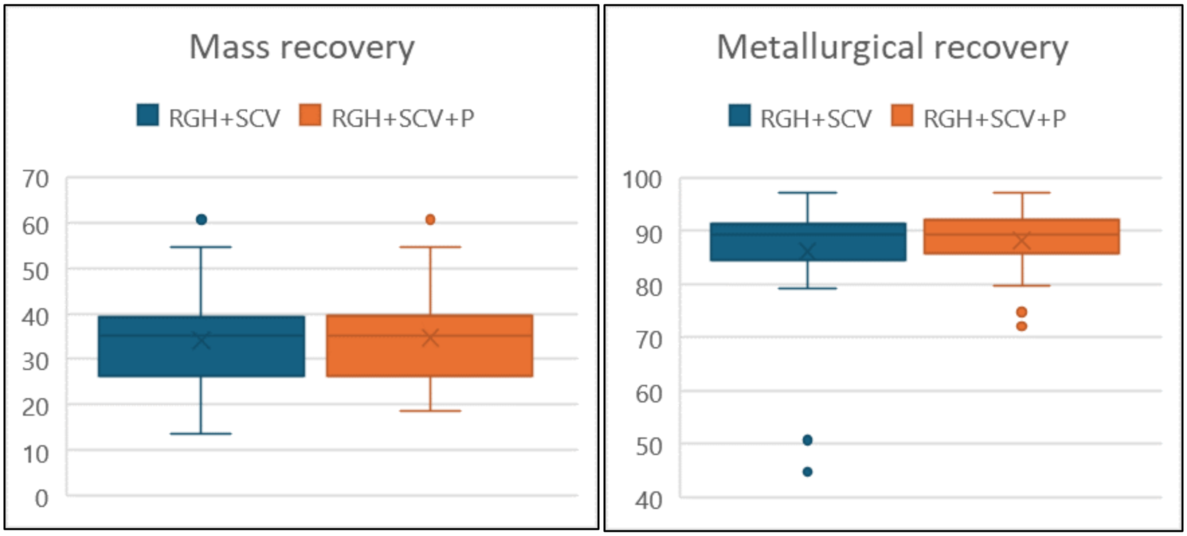


Figure 13-22: Comparative Recovery for 2-Stage and 3-Stage Circuits (−12.7 mm +0.5 mm)

13.4 Pilot Plant—Ore Sorter (Steinert) and Dense Media Separation (SGS Geosol)

After completion of the variability study from seven drill holes, a bulk reserve of the composite was tested using ore sorter equipment and the SGS Geosol DMS pilot plant Figure 13-23). In addition, an additional composite sample was used to perform HLS tests by size to evaluate spodumene liberation.

13.4.1 Ore Sorter Pilot Plant and Heavy Liquid Separation

Ore sorter tests were performed using the flowsheet shown in Figure 13-23. For the coarse material (−25.4 +6.35 mm), each sample had a mass of around 7 kg. Two samples were tested individually, and the other five samples were compiled into one bulk sample to improve test representativeness. The −12.7 +6.35 mm material was tested individually.

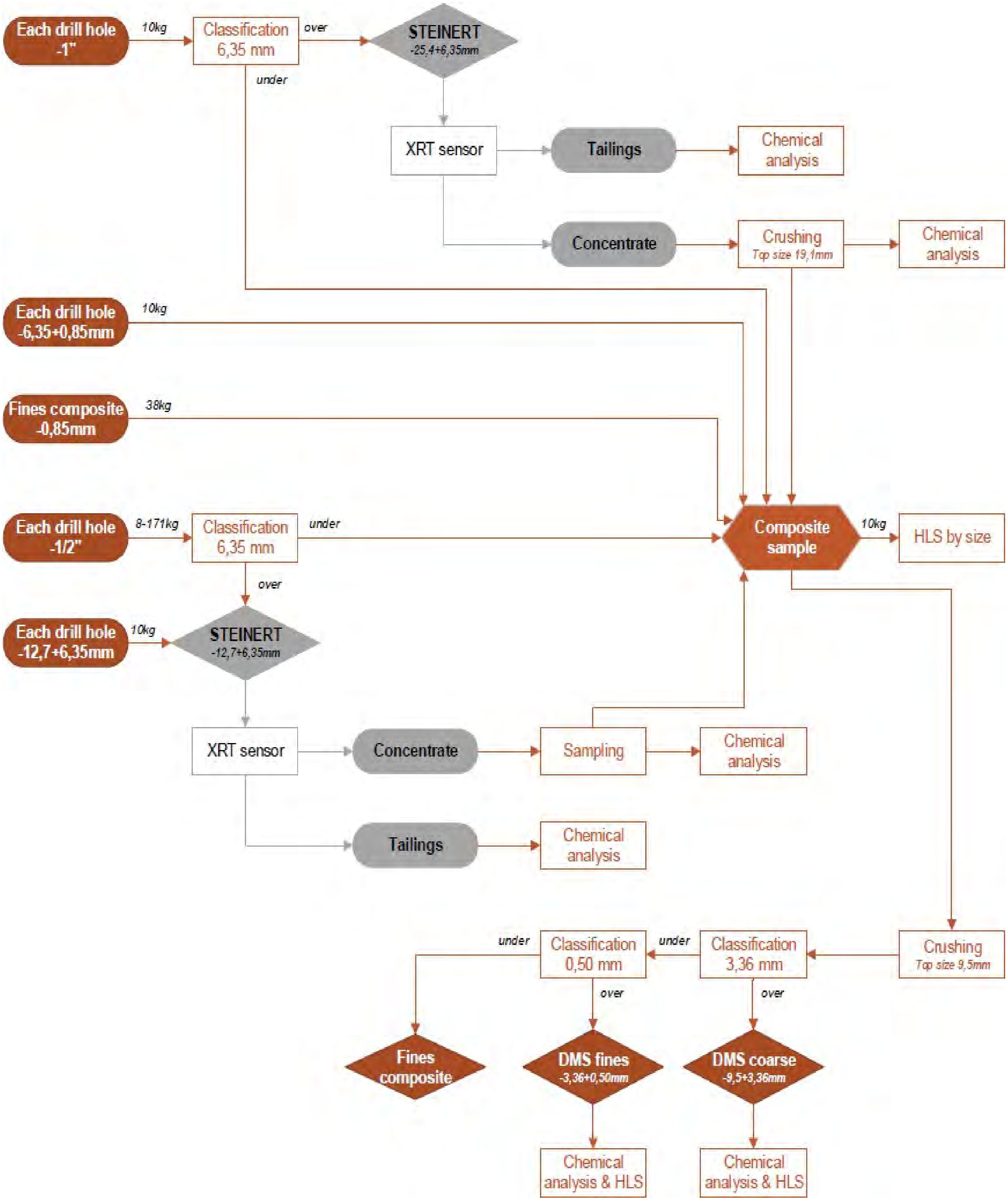


Figure 13-23: Pilot Plant Flowsheet

Ore sorter results are shown in Table 13-20. Lithium recovery ranged from 88.1% to 96.1%, with an average mass loss of 18.1% and an enrichment factor of 1.12. Mass recovery to the concentrate should be lower to increase lithium recovery once undiluted samples are used. New tests using diluted samples were completed to validate the ore sorter results. Regarding iron and potassium, the tailings enrichment factor was 1.37 and 2.34, respectively, with good results of discharging schist and feldspar to tailings.

The degree of liberation was evaluated by performing an HLS test on seven particle-size ranges, from a top size of 19.1 mm down to 0.5 mm. To avoid sampling error, all the mass retained in a 15.9 mm sieve was used in the coarser HLS test. For the HLS test with a particle size between 1.7 mm and 15.9 mm, 500 g was sampled from the total mass retained in each sieve, and for the finer samples, 150 g was used. SGS Geosol recommends this procedure as best practice.

The tests used two densities, 2.8 g/cm³ and 2.7 g/cm³, simulating rougher and scavenger stages. The results for each particle-size range are shown in Table 13-21. The results generally indicated that the recovery decreases as the particle-size increases. Similarly, the lithium oxide grade decreases as the particle-size increases.

Table 13-22 presents the grade and recovery results accumulated by mass distribution. Figure 13-24 shows the ore sorter pilot plant. Figure 13-25 shows the results of each HLS particle-size range.

Figure 13-24: Ore Sorter Pilot Plant

Table 13-20: Ore Sorter Pilot Plant Results

Sample	Particle Size	Feed			Concentrate			Tailing			Recovery			
		Li_2O (%)	Fe (%)	K (%)	Li_2O (%)	Fe (%)	K (%)	Li_2O (%)	Fe (%)	K (%)	Mass (%)	Li_2O (%)	Fe (%)	K (%)
ITDD-23-087T	−25.4 +6.35 mm	1.36	0.51	1.62	1.43	0.45	1.37	0.61	1.08	4.19	91.3	96.1	81.3	77.4
ITTD-22-002T	−25.4 +6.35 mm	0.96	0.68	1.90	1.07	0.48	1.47	0.53	1.51	3.74	80.9	89.5	57.4	62.4
Composite	−25.4 +6.35 mm	1.21	0.54	1.74	1.29	0.51	1.27	0.46	0.75	5.77	89.5	96.0	85.3	65.3
ITTD-22-048T	−12.7 +6.35 mm	1.03	0.73	1.83	1.11	0.67	1.34	0.67	1.01	4.00	81.6	88.1	74.6	59.8
ITDD-23-087T	−12.7 +6.35 mm	1.59	0.65	1.79	1.76	0.63	1.29	0.82	0.72	4.03	81.6	90.5	79.6	58.7
ITTD-23-083T	−12.7 +6.35 mm	1.80	0.48	1.84	2.02	0.48	1.15	0.90	0.47	4.60	79.9	89.9	80.3	49.9
ITTD-22-002T	−12.7 +6.35 mm	1.23	0.88	2.16	1.59	0.53	1.56	0.31	1.79	3.71	72.1	93.0	43.3	52.1
ITTD-23-093T	−12.7 +6.35 mm	0.66	0.51	1.82	0.72	0.54	1.37	0.35	0.36	3.82	81.7	90.2	87.0	61.5
ITTD-22-030T	−12.7 +6.35 mm	1.19	0.46	1.83	1.33	0.50	1.14	0.63	0.32	4.56	79.8	89.3	86.0	49.6
ITTD-22-023T	−12.7 +6.35 mm	1.53	0.40	2.07	1.72	0.39	1.42	0.73	0.42	4.79	80.8	90.8	79.6	55.5

Table 13-21: HLS Results for Each Particle-Size Range for Spodumene Liberation

	−19.1 +15.9 mm		**−15.9 +12.7 mm**		**−12.7 +9.5 mm**		**−9.5 +6.3 mm**		**−6.3 +3.4 mm**		**−3.4 +1.7 mm**		**−1.7 +0.5 mm**	
	Li_2O Assay (%)	Li_2O Dist. (%)	Li_2O Assay (%)	Li_2O Dist. (%)	Li_2O Assay (%)	Li_2O Dist. (%)	Li_2O Assay (%)	Li_2O Dist. (%)	Li_2O Assay (%)	Li_2O Dist. (%)	Li_2O Assay (%)	Li_2O Dist. (%)	Li_2O Assay (%)	Li_2O Dist. (%)
Feed	1.25	100.0	1.36	100.0	1.54	100.0	1.51	100.0	1.40	100.0	1.34	100.0	1.30	100.0
Sink 2.8 (g/cm^3)	4.13	59.0	4.97	77.9	5.32	74.1	5.87	75.4	6.02	82.3	6.75	84.2	6.48	89.4
Sink 2.7 (g/cm^3)	1.76	25.1	2.48	10.9	2.09	11.7	1.83	16.2	1.43	8.5	1.22	7.3	0.80	3.2
Float 2.7 (g/cm^3)	0.31	15.9	0.21	11.1	0.31	14.1	0.19	8.4	0.18	9.2	0.15	8.6	0.13	7.4

Table 13-22: Accumulated HLS Results by Particle Size

	−19.1 +15.9 mm	**−15.9 +12.7** mm	**−12.7 +9.5** mm	**−9.5 +6.3** mm	**−6.3 +3.4** mm	**−3.4 +1.7 mm**	**−1.7 +0.5** mm
Mass Retained (%)	1.53	7.96	12.03	12.72	15.58	12.05	13.28
Li_2O Grade by Size (%)	4.13	4.97	5.32	5.87	6.02	6.75	6.48
Li_2O Recovery by Size (%)	84.1	88.9	85.9	91.6	90.8	91.4	92.6

	−19.1 +0.5 mm	**−15.9 +0.5** mm	**−12.7 +0.5** mm	**−9.5 +0.5** mm	**−6.3 +0.5** mm	**−3.4 +0.5 mm**	**−1.7 +0.5 mm**
Li_2O Grade Accumulated (%)	5.93	5.97	6.09	6.26	6.39	6.61	6.48
Li_2O Recovery Accumulated (%)	90.2	90.3	90.5	91.6	91.6	92.0	92.6

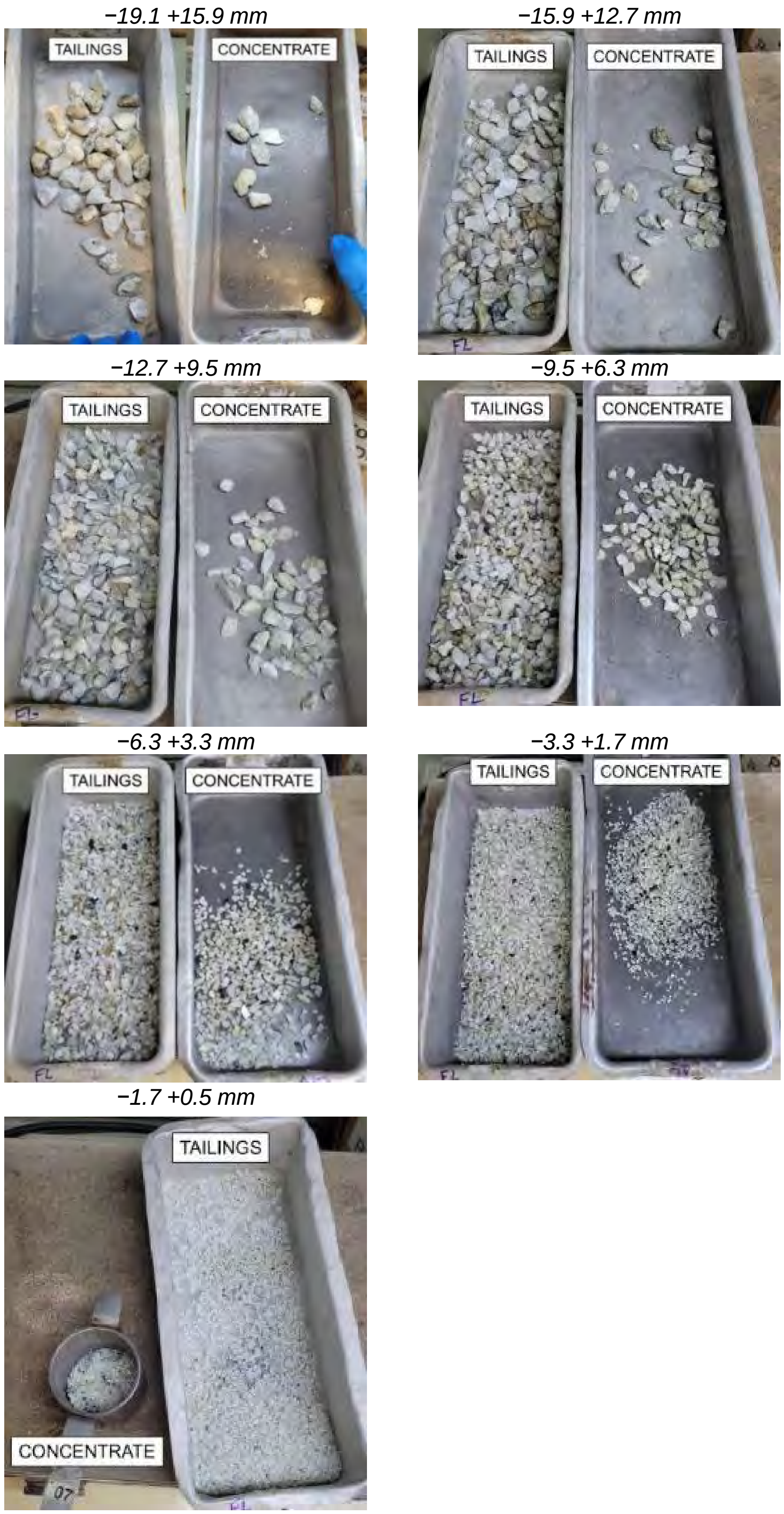


Figure 13-25: HLS Separation for Rougher Stage

13.4.2 Dense Media Separation Pilot Plant (SGS Geosol) Results

Dense Media Separation Pilot Plant Samples

The tests at the DMS pilot plant were conducted using composite samples from the seven drill holes of the variability tests. These samples underwent testing in an ore sorter at Steinert to remove schist and feldspar, followed by particle size adjustment to meet the specification of the DMS pilot plant. The DMS tests were conducted in two size fractions. The coarser fraction was prepared at 9.5 mm +3.55 mm, and the finer fraction was prepared at −3.55 mm +0.5 mm. Following is a list of drill holes from which the samples were composed:

- ITDD-22-048T
- ITDD-23-093T
- ITDD-23-087T
- ITDD-22-023T
- ITDD-22-002T
- ITDD-23-083T
- ITDD-23-030T.

Dense Media Separation Pilot Plant Overview

Figure 13-26 presents a flowchart reproducing the unit operations in the SGS Geosol DMS pilot plant. Twenty-five DMS pilot plant tests were performed (21 rougher and 4 scavenger) to obtain supporting information for the Bandeira Project process development. Figure 13-27 to Figure 13-29 show the DMS pilot plant flowsheet and equipment.

The circuit includes a hopper, manually fed with ore, connected to a vibrating feeder responsible for feeding ore into the static mixer. The solid, dense media (iron silicon) is fed directly into the agitated tank. This dense media undergoes dilution and subsequent pulp density adjustment by injecting water into the tank or the first section of the screen's chute.

The prepared media of appropriate density feeds by gravity into the chute of the first section of the screen. From this point, the dense media is pumped through a demagnetizing coil and a flow divider with manual valves. The flow divider directs part of the dense media to the screen, and the rest recirculates to the agitated tank. The screen's function is to protect the system and retain undesirable or inadequately sized materials. The screen underflow feeds the static mixer positioned just above the DMS cyclone. This static mixer promotes mixing of the ore from the vibrating feeder with the dense media from the screen underflow. The gravity feed of the DMS cyclone establishes a cyclone feed-pressure based on the height of the liquid column relative to the vertical distance between the DMS cyclone feed flange and the pulp level in the static mixer.

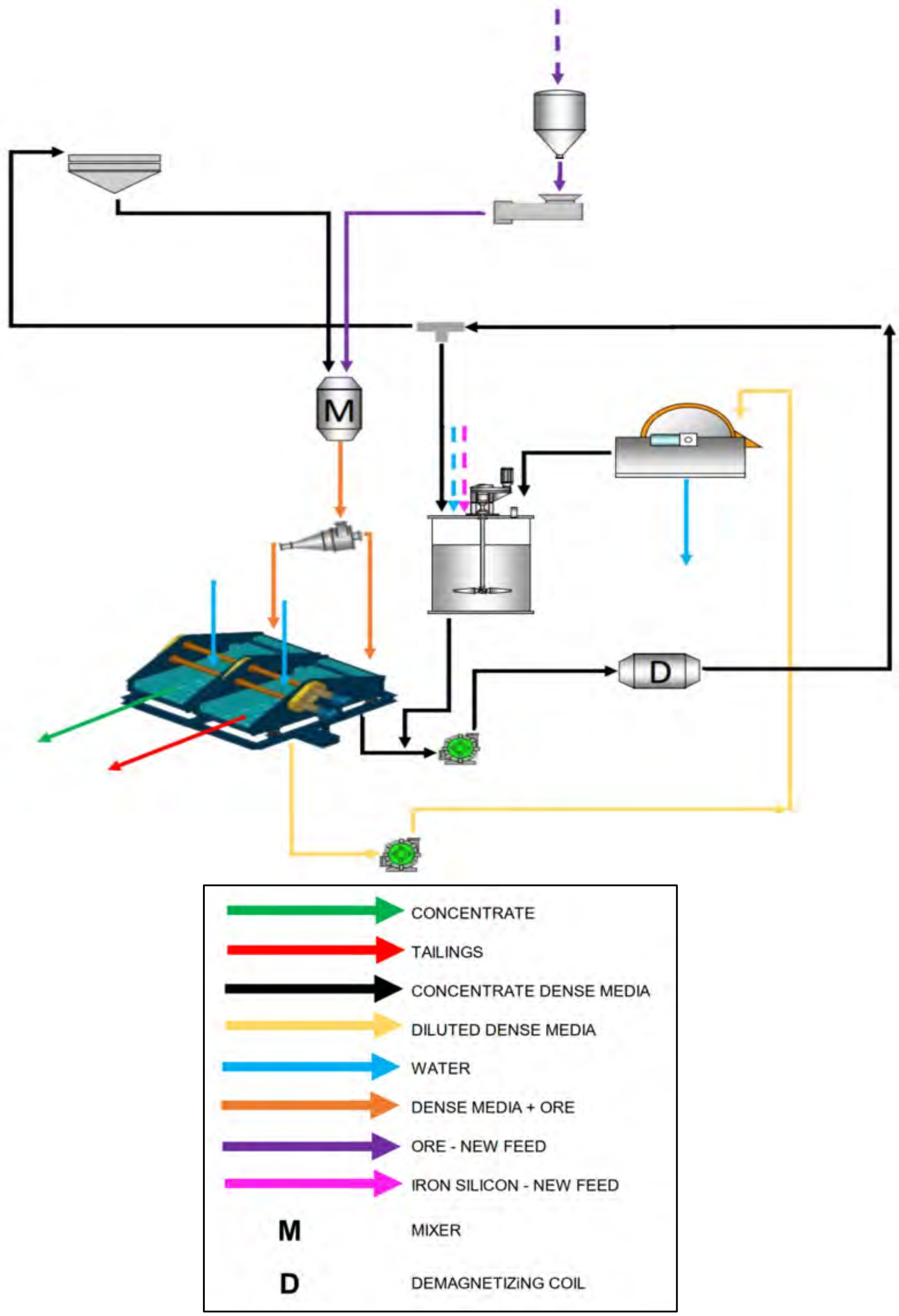


Figure 13-26: DMS Pilot Plant Flowchart

Figure 13-27: DMS Pilot Plant 2nd floor 1/2

Figure 13-28: DMS Pilot Plant 1st Floor 2/2

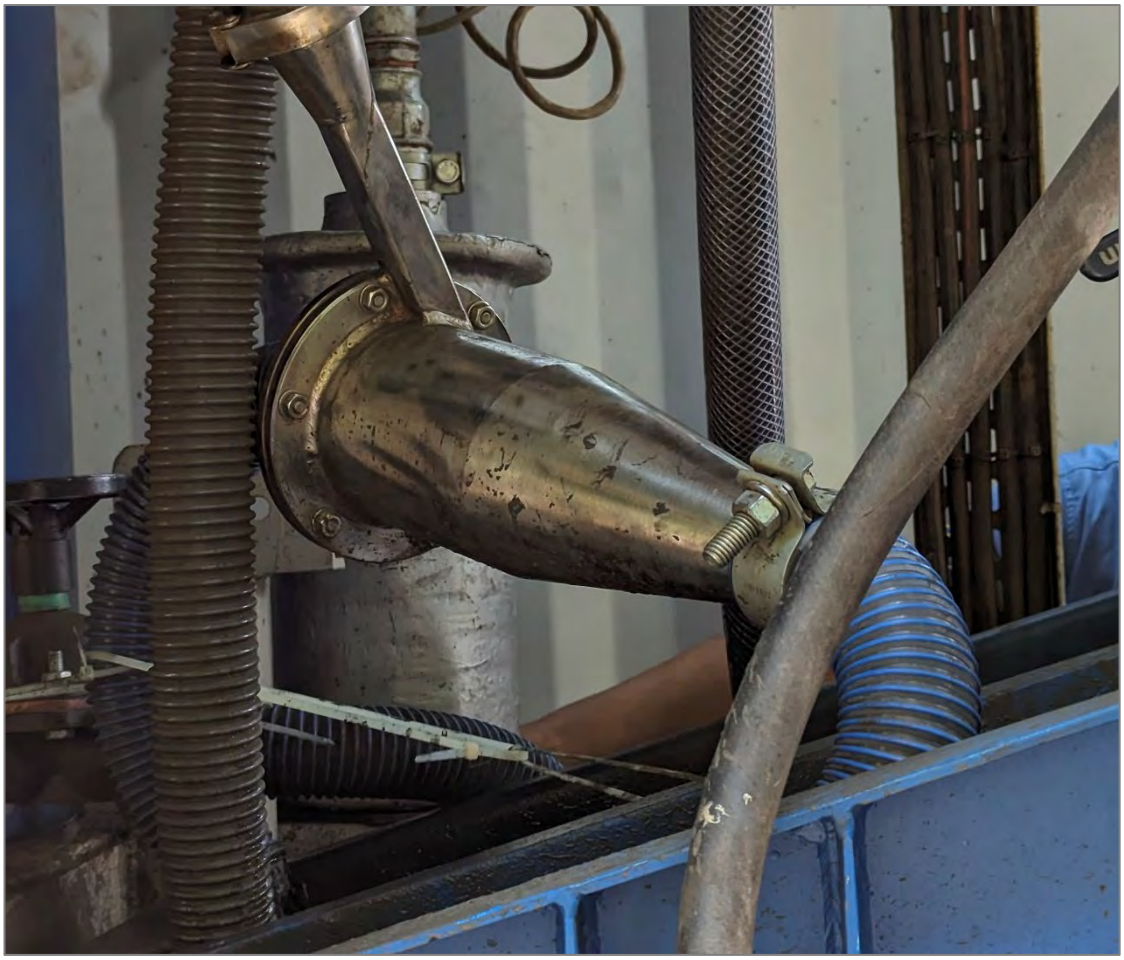


Figure 13-29: DMS Cyclone

The DMS cyclone, positioned at a 20° incline relative to its centreline, separates the mixture by density, partitioning it into sink (underflow) and float (overflow). In this process, the concentrate is directed to the sink flow, and the reject is directed to the float flow. The dewatering screen is partitioned into two parallel sections and two underflow chutes. Each chute receives drainage from half of the parallel sections' area. The cyclone sink is directed to the first section of the screen, and the float is directed to the second section. In the first screen chute, the dense-media concentrate is drained. From the second chute, wash water is injected to remove residual dense media and drain the diluted flow. The diluted dense media is then pumped to the magnetic separator, which retains iron silicon particles and removes excess water, concentrating the dense-media mixture. The concentrated dense media is then recirculated to the agitated tank while the water is discarded. The DMS concentrate is equivalent to the oversize from the first section of the dewatering screen, and the DMS reject is equivalent to the oversize from the second section of the screen.

The scavenger stage test is repeated by refeeding the reject obtained in the rougher stage.

Dense Media Separation Pilot Plant Rougher Stage Results

The results of the pilot tests were presented graphically to define trend lines and points of coherence for a comprehensive analysis.

The initial rougher tests for the coarse fraction were discarded, as they were part of the pilot plant's calibration period. The results of the tests considered for the rougher stage indicated the trend curve for the −9.5 mm +3.35 mm fraction shown in Figure 13-30.

The analysis of these data converges to achieve a metallurgical recovery of about 64.0% to obtain a concentrate with a lithium oxide grade of 5.50% in the −9.5 mm +3.35 mm fraction.

The initial rougher tests for the medium fraction were discarded, as they were part of the pilot plant's calibration period. The results of the tests considered for the rougher stage indicated the trend curve for the −3.35 mm +0.5 mm fraction shown in Figure 13-31.

Although this trend line does not fit the points as well as in that for the coarse fraction, the analysis of these data converges to achieve a metallurgical recovery of about 80.5%, obtaining a concentrate with a lithium oxide grade of 5.50% in the −3.35 mm +0.5 mm fraction.

The combination of the most coherent result points obtained in the two fractions, −9.5 mm +3.35 mm and −3.35 mm +0.5 mm, presented the trend curve shown in Figure 13-32.

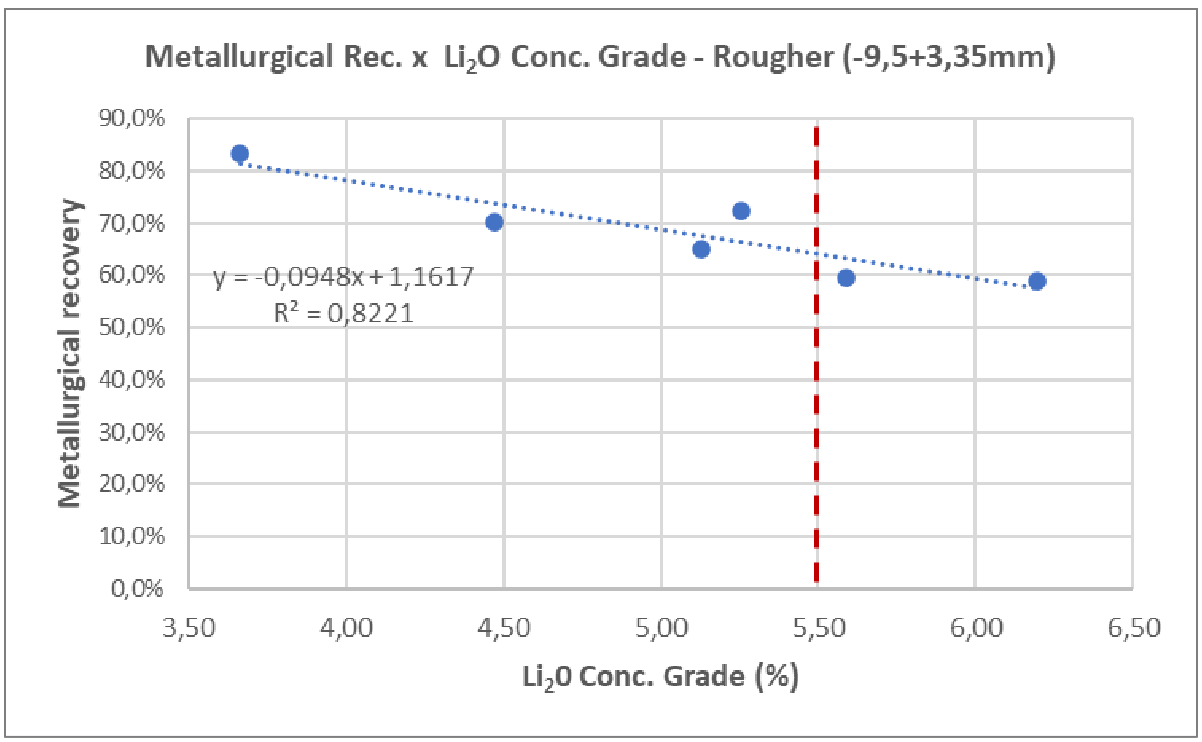


Figure 13-30: Rougher Coarse Metallurgical Recovery x Li_2O Grade in Concentrate

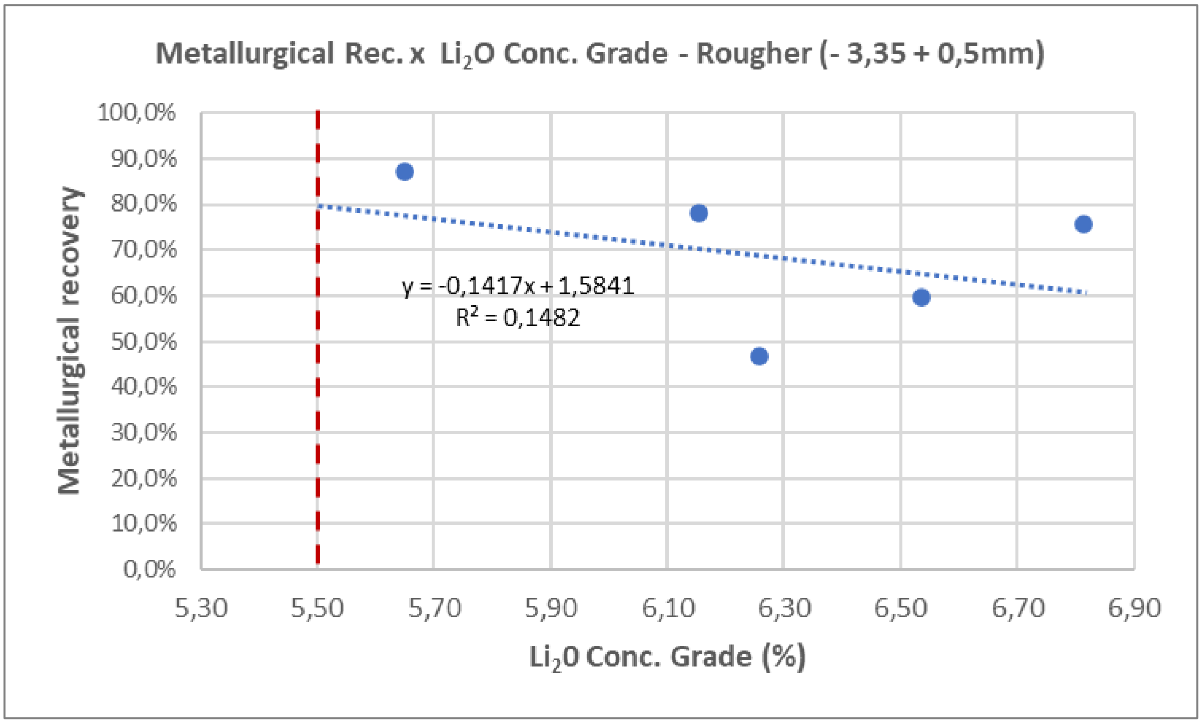


Figure 13-31: Rougher Medium Metallurgical Recovery x Li_2O Grade in Concentrate

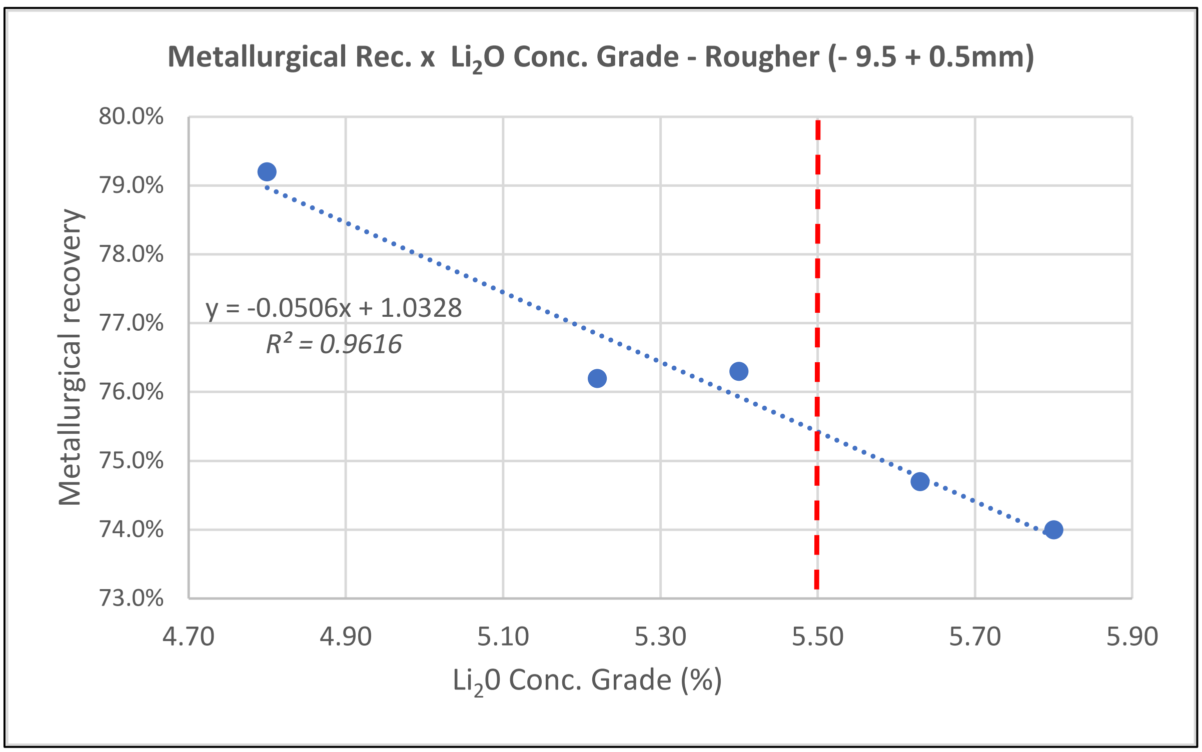


Figure 13-32: Rougher Composite Metallurgical Recovery x Li_2O Grade in Concentrate

The analysis of these data converges to achieve a metallurgical recovery of about 75.42%, to obtain a concentrate with a lithium oxide grade of 5.50% in the rougher stage, considering the combination of the two tested size-fractions. To achieve this metallurgical recovery, the results of Tests 16 and 17 were adopted as references. Since both produced concentrates with lithium oxide grades higher than 5.50%, it was necessary to recalculate the metallurgical recoveries. Table 13-23 presents the results of Tests 16 and 17, as well as the adjusted metallurgical recoveries to obtain a 5.50% concentrate and an overall rougher stage metallurgical recovery of 75.42%.

Table 13-23: Rougher Testwork Results and Metallurgical Recovery

Testwork No.	Li_2O Grade Concentrate (%)	Metallurgical Recovery (%)
Test 16	5.65	87.06
Test 17	5.59	59.48
Rougher Mass Balance		
−9.5 +3.35 mm	5.50	60.41
−3.35 +0.5 mm	5.50	88.42
−9.5 +0.5 mm	5.50	75.42

Therefore, the rougher stage of the DMS plant considered the following recoveries:

- Coarse fraction DMS rougher metallurgical recovery: 60.41%
- Medium fraction DMS rougher metallurgical recovery: 88.42%
- Composite DMS rougher metallurgical recovery: 75.42%.

13.5 Bandeira Project Simplified Mass Balance—Global Recovery on Rougher Stage

The metallurgical recoveries mentioned previously and applied to a macro mass balance of the Project indicate the mass distribution given in Table 13-24.

Thus, the test results analysis suggests that the rougher stage of the DMS circuit can establish an overall metallurgical recovery of 63.15%.

Table 13-24: Rougher Stage Mass Balance

Material	Mass Production (t/a)	Mass Distribution (%)	Li_2O Grade (%)	Li_2O Production (t/a)	Li_2O Distribution (%)
Run-of-Mine	1,300,000	100.0	1.16	15,080	100.00
Coarse DMS Feed	407,655	31.4	1.44	5,862	38.87
Medium DMS Feed	436,476	33.6	1.55	6,765	44.86
DMS Total Feed	844,131	64.9	1.50	12,627	83.73
Coarse DMS Concentrate (Rougher)	64,383	5.0	5.50	3,541	23.48
Medium DMS Concentrate (Rougher)	108,767	8.4	5.50	5,982	39.67
DMS Total Concentrate (Rougher)	173,149	13.3	5.50	9,523	63.15

Material	Mass Production (t/a)	Mass Distribution (%)	Li_2O Grade (%)	Li_2O Production (t/a)	Li_2O Distribution (%)
Schist	193,508	14.9	0.35	683	4.53
Coarse DMS Tailings	238,966	18.4	0.36	850	5.64
Medium DMS Tailings	256,916	19.8	0.14	366	2.42
Coarse DMS Concentrate (Scavenger)	104,307	8.0	1.41	1,471	9.75
Medium DMS Concentrate (Scavenger)	70,793	5.4	0.59	418	2.77
Fines Material (−0.5 mm)	262,361	20.2	0.67	1,770	11.74

13.6 Dense Media Separation Scavenger Stage Potential Gains—Global Recovery

For the scavenger stage, the results of the same tests adopted as references in the rougher stage (Tests 16 and 17) were considered. Table 13-25 presents the metallurgical recoveries and grades of the scavenger concentrates.

Table 13-25: Scavenger Testwork Results and Metallurgical Recovery

Testwork No.	Li_2O Grade Concentrate (%)	Metallurgical Recovery (%)
Test 16	0.59	53.33
Test 17	1.41	63.38

Regarding the scavenger concentrate, there is a possibility of increasing the overall metallurgical recovery; to achieve this, this material needs to undergo a new crushing stage to increase ore liberation and then be re-fed into the DMS circuit. This reprocessing was not tested in the pilot plant. However, considering similar operations and the rougher scavenger testwork results, it is estimated that a potential gain of up to 5.71% in the overall plant metallurgical recovery could be achieved through reprocessing. Thus, obtaining an overall metallurgical recovery of 68.86% would be possible.

14.0 MINERAL RESOURCE ESTIMATES

GE21 conducted comprehensive three-dimensional (3-D) geological modelling, statistical and geostatistical studies, as well as grade estimation for the Lithium Ionic Bandeira Property. This estimation considered various factors, such as the quantity and distribution of available data, interpreted controls on mineralization, mineralization style, and the quality of the sampling data.

The geological modelling and estimation processes were executed using Leapfrog Edge 2024.1.3 software. The UTM Projection—Zone 23 South (SIRGAS 2000) was adopted as the reference coordinate system for the Project database.

This section has been updated to reflect new exploration updated to reflect new exploration data from November 13, 2023, through the effective date of November 20, 2024. This updated resource estimate supersedes the previous effective report date of April 2024.

14.1 Drilling Database

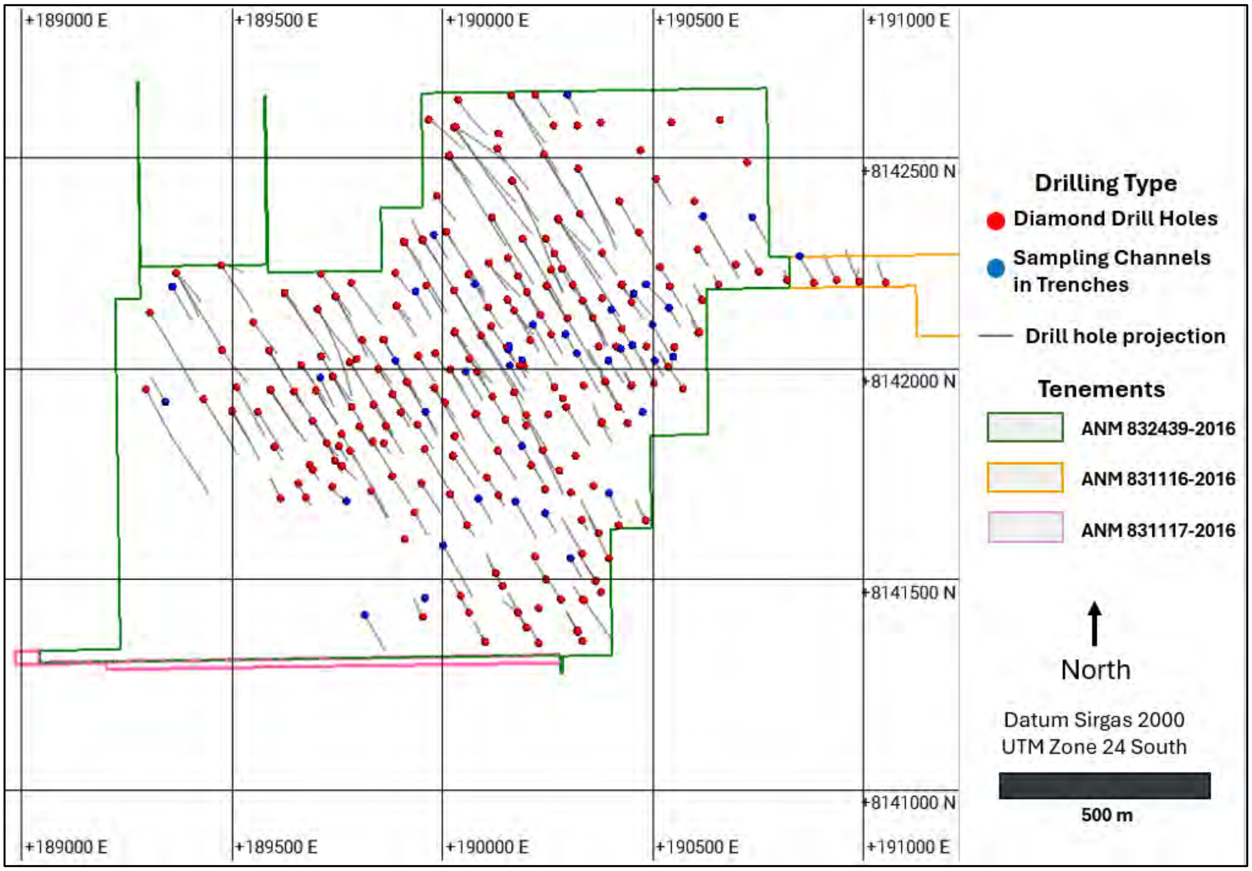
The drilling database underwent a comprehensive visual validation, considering the interrelation of tables, identifying gaps and overlaps, and ensuring the inclusion of crucial information. Using Leapfrog Edge 2024.1.3 software, GE21 also conducted validation checks on the collar, survey, assay, and lithology tables. This stage of the work revealed no significant inconsistencies, as these had already been verified during data verification.

Mineral Resource estimation was based on drill-hole and trench databases, incorporating lithology logs and assay results from HQ-drill core samples. The topographic surface bounds the extent of these estimates. Figure 14-1 illustrates the spatial distribution of the drill holes used in the estimates.

The original data set Lithium Ionic provided encompassed data from 297 surface diamond drill holes (60,301 m) and 44 trench channels (2,923 m) that the Company had executed. This data set reflects work from 2022 until November 20, 2024.

The Bandeira database contains 10,298 assay intervals, comprising 247 assays from trenches and 10,051 assay intervals from drill holes.

The assay table includes data for Li_2O (%) and various elements, including Li (ppm), Al (%), As (ppm), B (%), Ba (ppm), Be (ppm), Ca (%), Cd (ppm), Co (ppm), Cr (ppm), Cu (ppm), Fe (%), K (%), La (ppm), Mg (%), Mn (ppm), Mo (ppm), Nb (ppm), Ni (ppm), P (%), Pb (ppm), Sb (ppm), Sc (ppm), Sn (ppm), Sr (ppm), Ta (ppm), Ti (%), V (ppm), W (ppm), Y (ppm), and Zn (ppm). Following a thorough review of the database, the Li_2O (%) data was extracted explicitly for subsequent statistical analysis, block modelling, and Mineral Resource estimates.



Source: GE21 (2025).

Figure 14-1: Drill-Hole Location

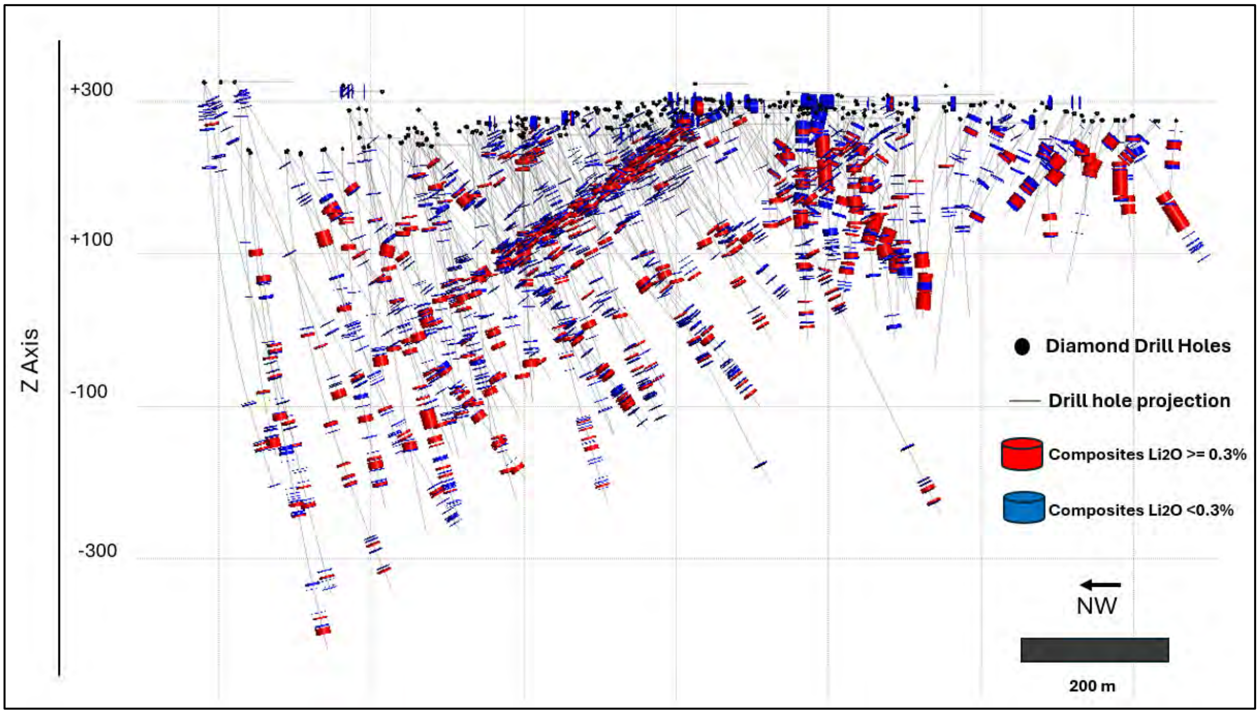
14.2 Geological Modelling

Lithium Ionic undertook a geological interpretation encompassing all documented pegmatite intervals within the Bandeira deposit. Initially, cross-sectional interpretations were crafted using traditional manual techniques and advanced cartographic software platforms such as QGIS, ArcGIS, and Leapfrog. These initial steps laid the groundwork for a robust modelling process.

The Lithium Ionic team interpreted a set of grade shell sections, with an envelope delimiting a zone with a cut-off grade of 0.3% Li_2O (%) (Figure 14-2 and Figure 14-3). The resulting interpretations were developed into a series of implicit 3-D models aligned with two prevailing strike directions: 235° and 140° (Figure 14-4 and Figure 14-5).

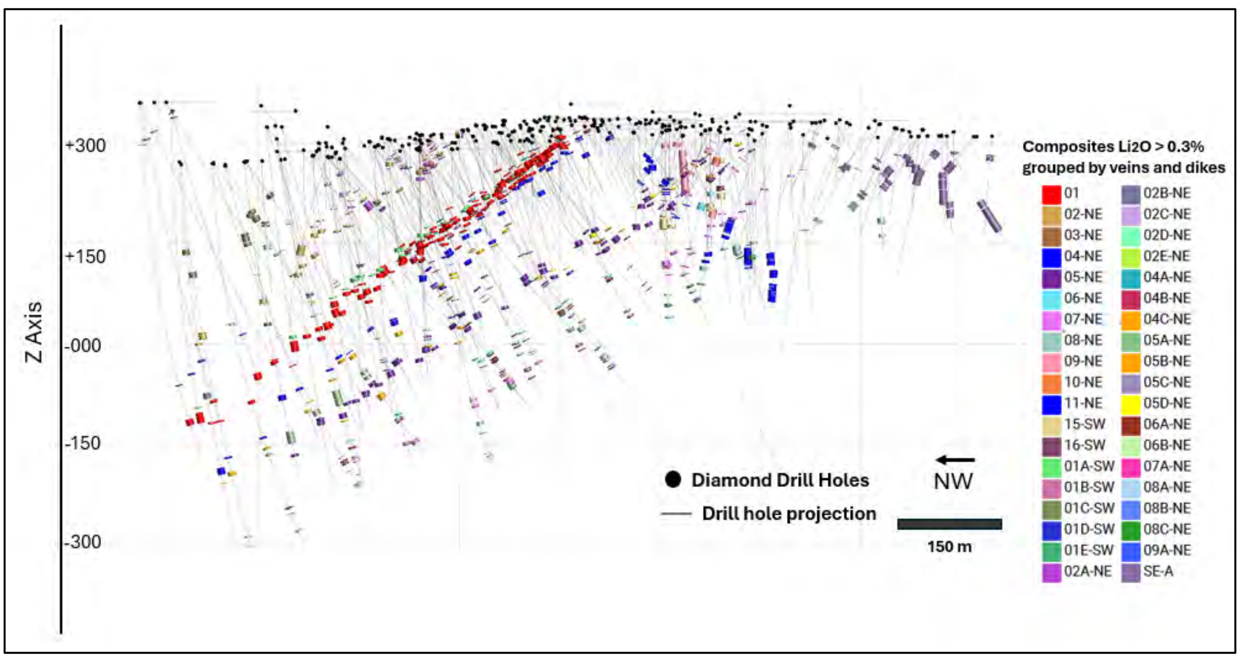
Lithium Ionic also conducted weathering modelling, basing the analysis on the descriptions provided in the logs (Figure 14-6).

The QP considers that the geological interpretations and modelling are suited to an estimation of the Mineral Resource. The quality assurance procedures follow industry best practices, and the model honours the mineralized pegmatite intervals and has adequate continuity of the modelled bodies.



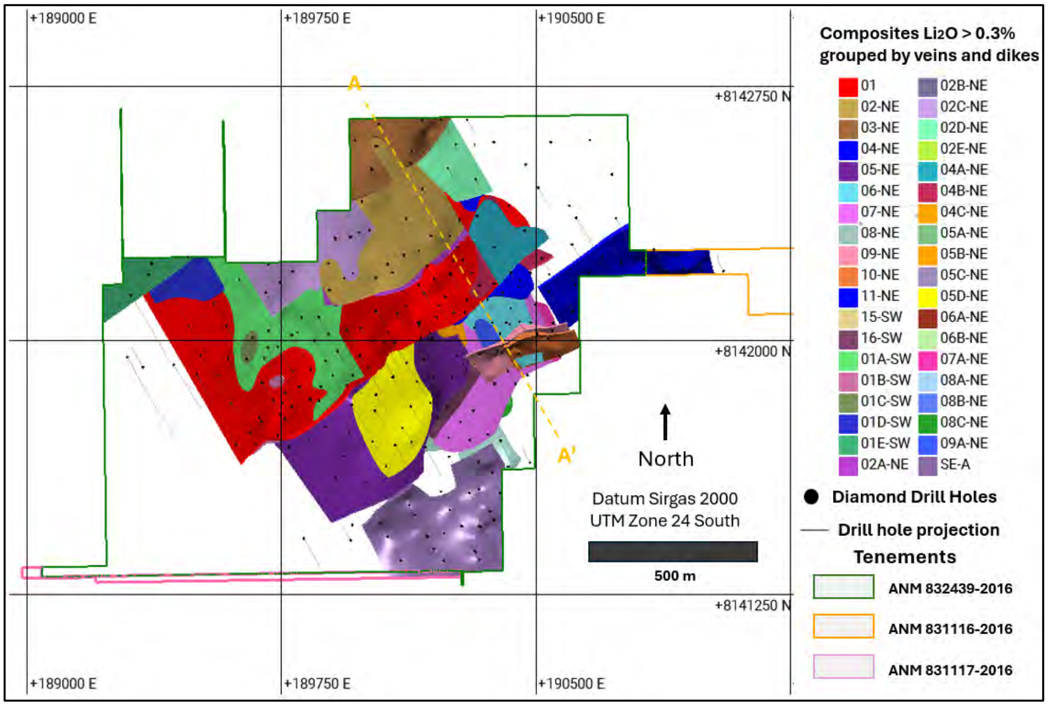
Source: GE21 (2025).

Figure 14-2: Assay Composites Classified by Li_2O >0.3% Grade Limit in Pegmatites Veins (Oblique View NW–SE)



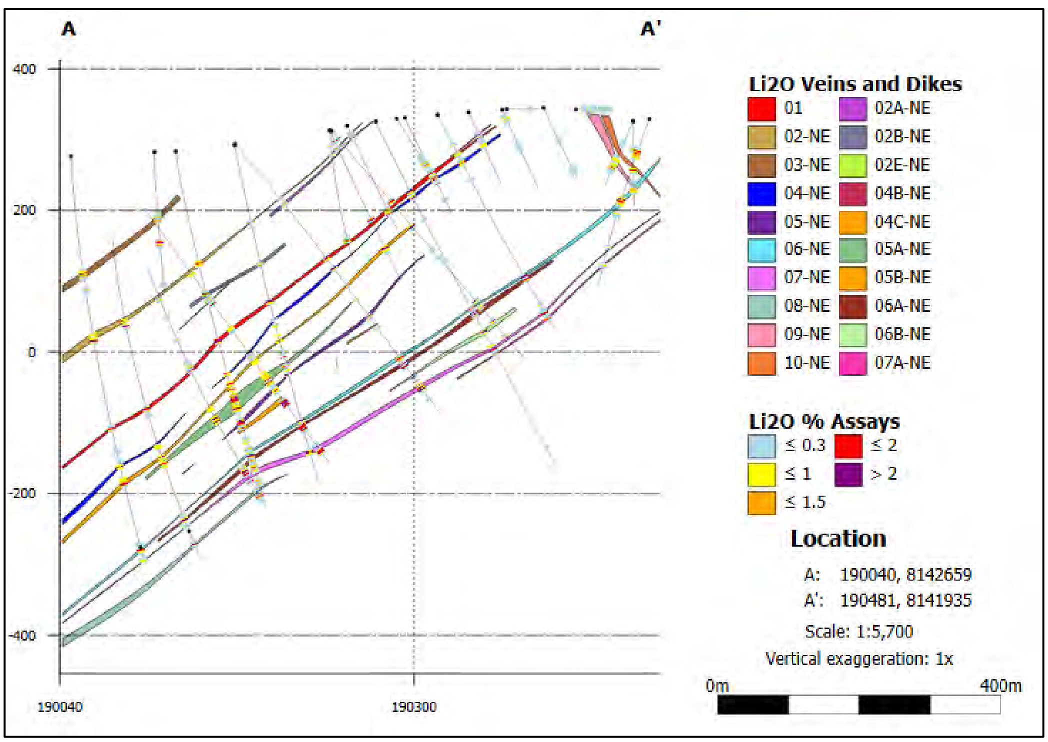
Source: GE21 (2025).

Figure 14-3: Assay Composites Within the Li_2O >0.3% Limit in Pegmatite Veins Grouped by Separated Lenses and Dykes



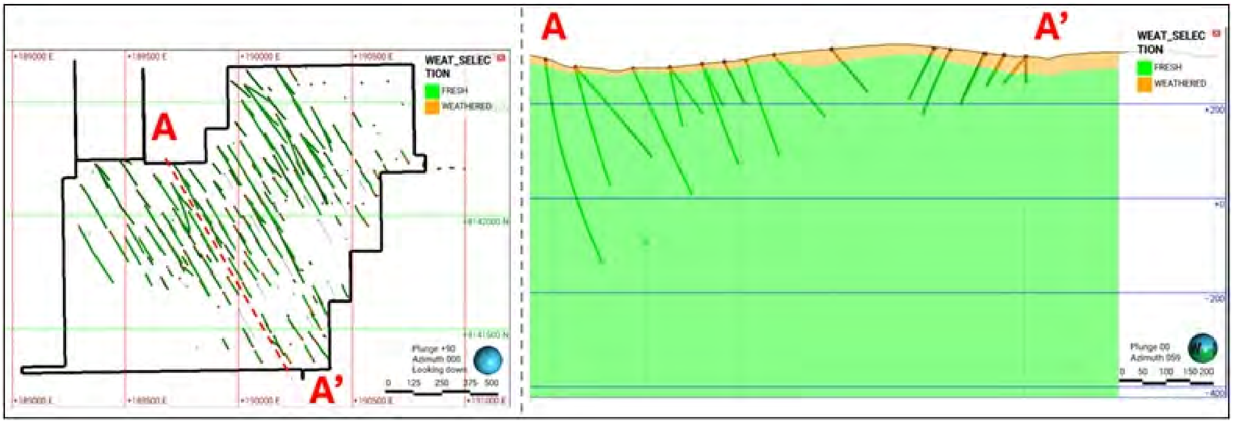
Source: GE21 (2025).

Figure 14-4: Spodumene Grade Shells Modelled with Assay Composites Li_2O >0.3% (Plan View)



Source: GE21 (2025).

Figure 14-5: Spodumene Grade Shell Model—Assay Composites Li_2O >0.3% (Cross-Section)



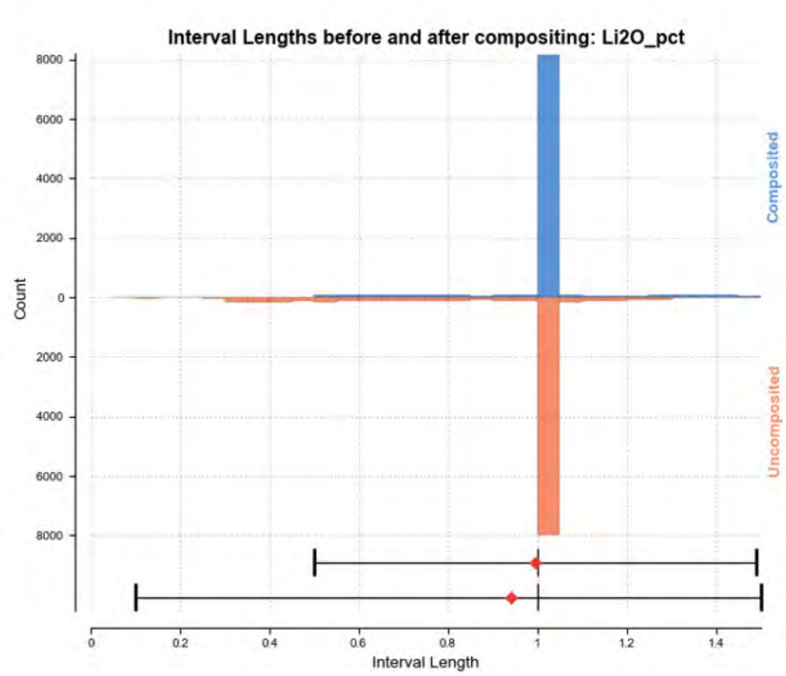
Source: GE21 (2025).

Figure 14-6: Weathering Zone Model (Left, Plan View; Right, Cross-Section View)

14.3 Geostatistical Structural Analysis

14.3.1 Sample Regularization

The analysis of the sample support showed that over 95% of the drilling samples are greater than 1 m long. GE21 regularly analyzed 1 m samples for complementary studies of statistics and geostatistics (Figure 14-7).



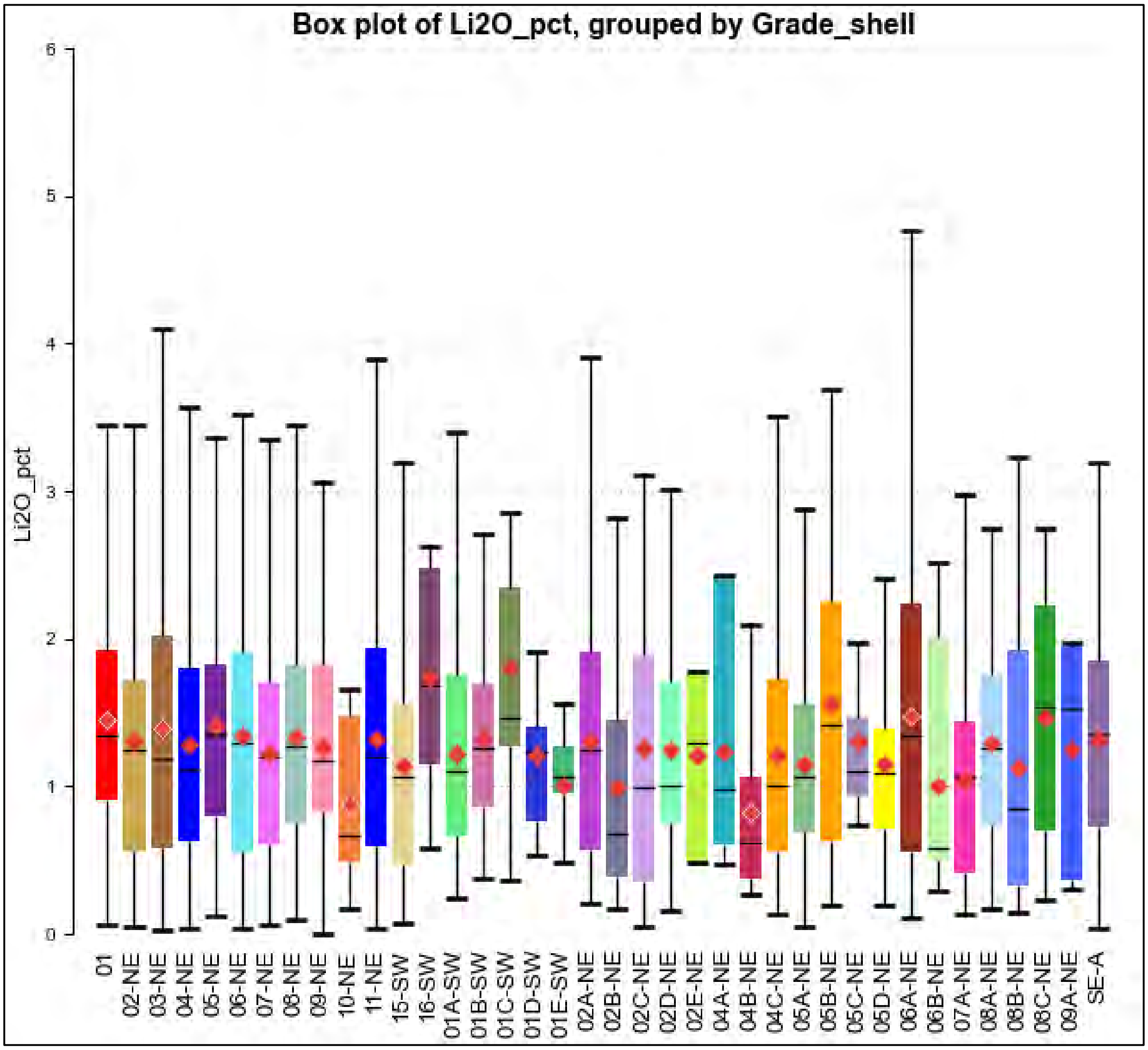
	Composited	Uncomposited
Count	9,555	10,440
Length	9,518.3	9,808.0
Mean	0.996156	0.939459
SD	0.115734	0.183888
CV	0.11618	0.195738
Variance	0.0133943	0.0338147
Minimum	0.5	0.1
Q1	1	1
Q2	1	1
Q3	1	1
Maximum	1.49	1.5

Source: GE21 (2025).

Figure 14-7: Bandeira Assay Interval Length Statistics

14.3.2 Exploratory Data Analysis

Statistical analysis on composited drilling samples was performed for the Li_2O% variable inside each modelled typology. Figure 14-8 and Table 14-1 show the statistics for pegmatite veins.



Source: GE21 (2025).

Figure 14-8: Li_2O (%) Box Plots of the Spodumene Pegmatite Vein Model Statistics

Table 14-1: Li_2O (%) Spodumene Pegmatite Vein Model Statistics

Domain	Count	Length	Mean	Standard Deviation	Coefficient of Variation	Variance	Minimum	Lower Quartile	Median	Upper Quartile	Maximum
1	644	632	1.46	0.77	0.53	0.60	0.07	0.91	1.34	1.93	5.99
02-NE	135	135	1.30	0.86	0.66	0.74	0.05	0.56	1.24	1.72	4.56
03-NE	77	77	1.39	1.01	0.72	1.01	0.02	0.58	1.18	2.02	4.10
04-NE	181	180	1.28	0.81	0.63	0.65	0.04	0.63	1.11	1.80	4.05
05-NE	321	317	1.41	0.75	0.53	0.57	0.12	0.80	1.36	1.83	3.58
06-NE	61	60	1.34	0.85	0.63	0.73	0.04	0.56	1.29	1.92	3.52
07-NE	123	122	1.22	0.71	0.59	0.51	0.06	0.60	1.19	1.71	3.74
09-NE	123	122	1.27	0.63	0.50	0.40	0.01	0.82	1.17	1.82	3.06
01A-SW	107	104	1.22	0.71	0.58	0.50	0.24	0.66	1.10	1.76	3.54
01B-SW	23	22	1.31	0.64	0.49	0.41	0.38	0.86	1.26	1.70	2.71
01C-SW	10	9	1.80	0.73	0.41	0.54	0.37	1.27	1.47	2.34	2.86
01D-SW	10	10	1.21	0.46	0.38	0.21	0.53	0.77	1.23	1.40	1.91
01E-SW	9	8	1.00	0.45	0.45	0.20	0.32	0.95	1.06	1.27	1.56
02A-NE	57	55	1.31	0.84	0.64	0.70	0.21	0.57	1.24	1.91	3.91
02B-NE	27	27	0.99	0.75	0.76	0.57	0.18	0.39	0.68	1.45	2.82
02C-NE	29	29	1.25	0.94	0.75	0.89	0.05	0.35	0.99	1.89	3.10
04A-NE	5	5	1.24	0.86	0.69	0.74	0.47	0.60	0.98	2.43	2.43
04B-NE	10	10	0.82	0.62	0.76	0.39	0.27	0.38	0.62	1.07	2.17
04C-NE	60	61	1.21	0.80	0.66	0.64	0.14	0.56	1.00	1.73	4.15
05A-NE	79	79	1.15	0.66	0.57	0.43	0.05	0.69	1.06	1.56	3.31
05B-NE	34	33	1.56	1.02	0.65	1.04	0.20	0.62	1.42	2.25	3.69
05C-NE	5	4	1.31	0.51	0.39	0.26	0.74	0.94	1.10	1.47	1.97
06A-NE	45	46	1.48	1.07	0.72	1.14	0.10	0.55	1.34	2.24	5.23
06B-NE	17	17	1.01	0.80	0.80	0.64	0.29	0.49	0.58	2.01	2.51
07A-NE	19	19	1.05	0.78	0.75	0.61	0.14	0.42	1.07	1.44	3.52
SE-A	319	318	1.32	0.71	0.54	0.50	0.03	0.73	1.35	1.85	3.19
02D-NE	19	19	1.25	0.81	0.65	0.65	0.15	0.74	1.00	1.71	3.01
08-NE	111	110	1.32	0.74	0.56	0.54	0.09	0.75	1.27	1.82	3.65

Domain	Count	Length	Mean	Standard Deviation	Coefficient of Variation	Variance	Minimum	Lower Quartile	Median	Upper Quartile	Maximum
10-NE	18	18	0.88	0.51	0.58	0.26	0.17	0.48	0.66	1.48	1.66
02E-NE	4	4	1.21	0.57	0.47	0.33	0.48	0.48	1.30	1.78	1.78
05D-NE	33	32	1.15	0.72	0.63	0.52	0.19	0.71	1.09	1.39	3.47
11-NE	187	186	1.32	0.89	0.68	0.80	0.04	0.59	1.20	1.94	3.89
08A-NE	31	30	1.29	0.71	0.55	0.51	0.17	0.73	1.25	1.76	2.75
08B-NE	12	12	1.12	0.96	0.85	0.91	0.15	0.32	0.85	1.92	3.23
08C-NE	21	21	1.46	0.85	0.58	0.73	0.23	0.71	1.54	2.22	2.75
15-SW	45	46	1.14	0.74	0.65	0.54	0.07	0.47	1.06	1.56	3.47
16-SW	14	14	1.74	0.79	0.45	0.62	0.58	1.14	1.68	2.48	2.63
09A-NE	7	6	1.25	0.77	0.62	0.59	0.31	0.36	1.52	1.95	1.97
Total	3,032	2,999	1.26								

Source: GE21 (2025).

14.3.3 Variographic Analysis

The structural analysis of the domains was conducted to determine the variographic parameters, which are essential for determining the spatial continuity model of the grade variables and for the grade estimate.

Variograms were generated explicitly for Li_2O% within the spodumene vein suite. This approach considered the geological similarity among them, enhancing the robustness of the variograms. Two distinct sets of veins were considered:

- NW Vein Suite
- SE Vein Suite.

The variographic analysis was executed using Leapfrog software. Figure 14-9 to Figure 14-12 show the variograms for the Li_2O% variable for each set of vein domains. Additionally, Table 14-2 presents the variographic parameters obtained from all analyses. These parameters were applied in the grade estimation process.

Table 14-2: Variographic Parameters

Variogram Name	Variance	Nugget	Normalized Nugget	Structures	Sill	Normalized Sill	Structure	Major	Semi-Major	Minor	Dip (°)	Dip Azi. (°)	Pitch (°)
NW	0.63	0.14	0.22	Structure 1	0.23	0.36	Spherical	53	12	1.6	35	330	0
				Structure 2	0.26	0.41	Spherical	107	65	2.5	35	330	0
SE	0.56	0.08	0.15	Structure 1	0.23	0.40	Spherical	50	24	1.8	46	155	0
				Structure 2	0.25	0.45	Spherical	81	60	6	46	155	0

Source: GE21 (2025).

14.4 Block Model

A block model was built to carry out the grade estimation. The model's dimensions (12 m x 12 m x 4 m) were defined based on the minimum spacing of the drilling grid. The sub-block model was set at 1.5 m x 1.5 m x 2 m to ensure the geometric adherence of the modelled bodies. The dimensions of the block models and the attributes are shown in Table 14-3 and Table 14-4.

Table 14-3: Block Model Dimensions

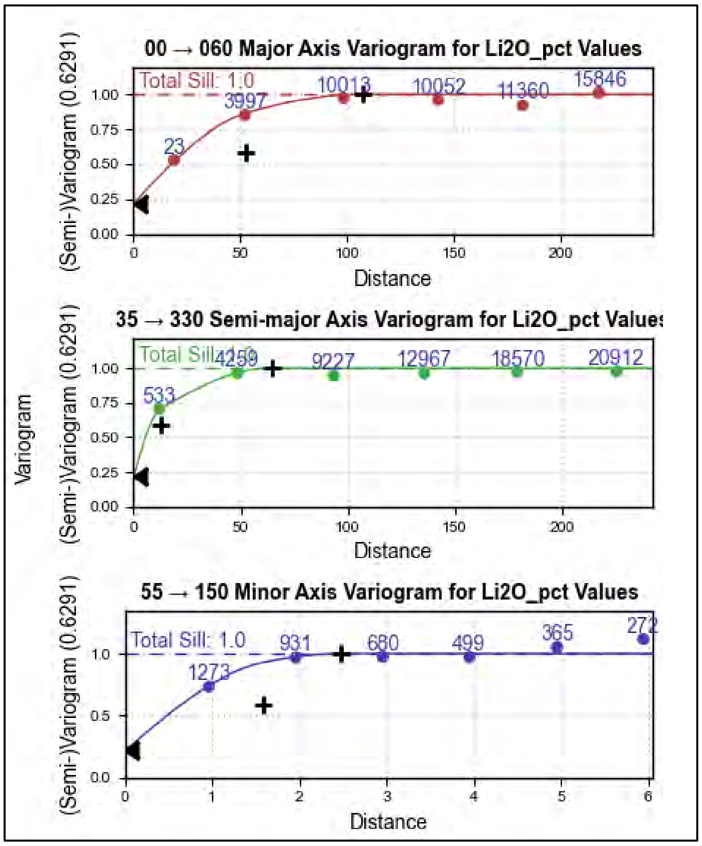
Attribute	X	Y	Z
Minimum Coordinates (Center) (m)	189,006	8,141,106	-510
Maximum Coordinates (Center) (m)	193,002	8,142,798	458
Minimum Coordinates (Corner) (m)	189,000	8,141,100	-512
Maximum Coordinates (Corner) (m)	193,008	8,142,804	460
Number of Nodes	334	142	243
Block Size (m)	12	12	4
Sub-Block	1.5	1.5	2

Source: GE21 (2025).
Notes: Azimuth: 0 Degrees (rotate clockwise around the Z-axis when looking down)
Dip: 0 Degrees (then turn around the X-axis down from the horizontal plane)
Pitch: 0 Degrees (then rotate clockwise around the Z-axis when looking down.

Table 14-4: Block Model Variables Summary

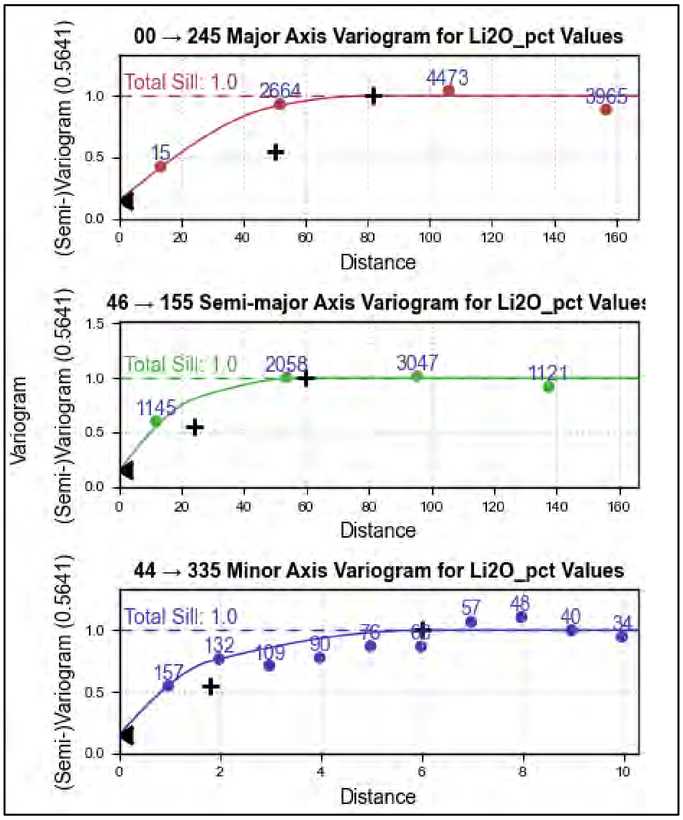
Attribute Name	Type	Deals	Background	Description
GM_weat	Character	-		Weathering model
GM_ grad	Character	-		Spodumene veins model
Class	Character	-		Mineral classification
Density	Real	4	−99	Density values
GM_miner	Character	-		Bandeira mineral right
Li_2O_ok	Real	4	−99	Li_2O OK estimation

Source: GE21 (2025).



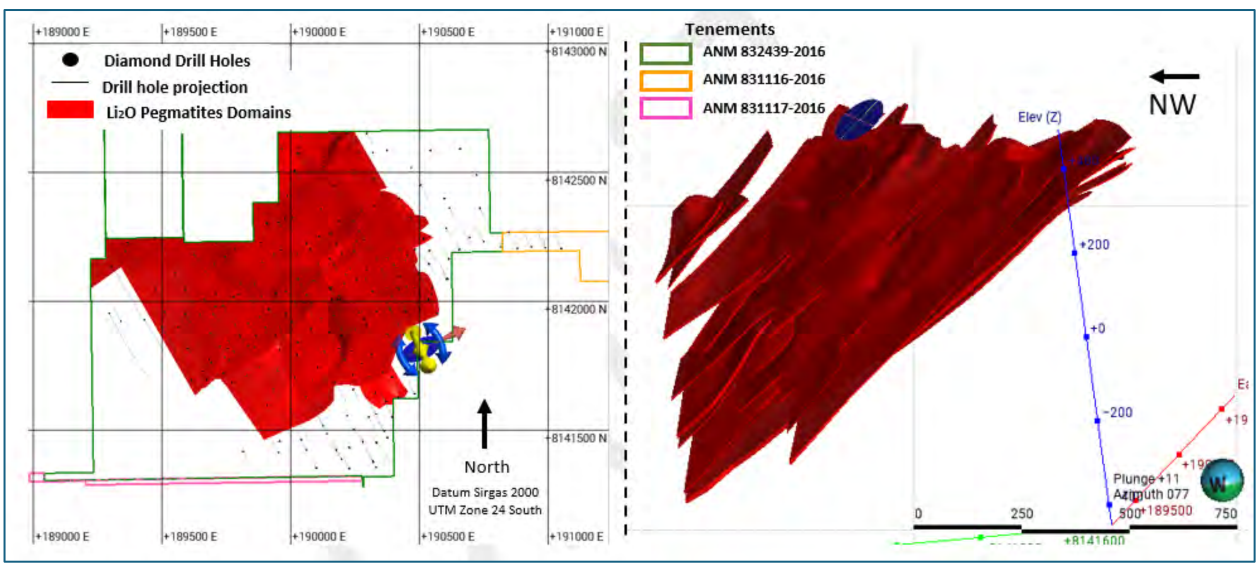
Source: GE21 (2025).

Figure 14-9: Variographic Model—Domains Set NW



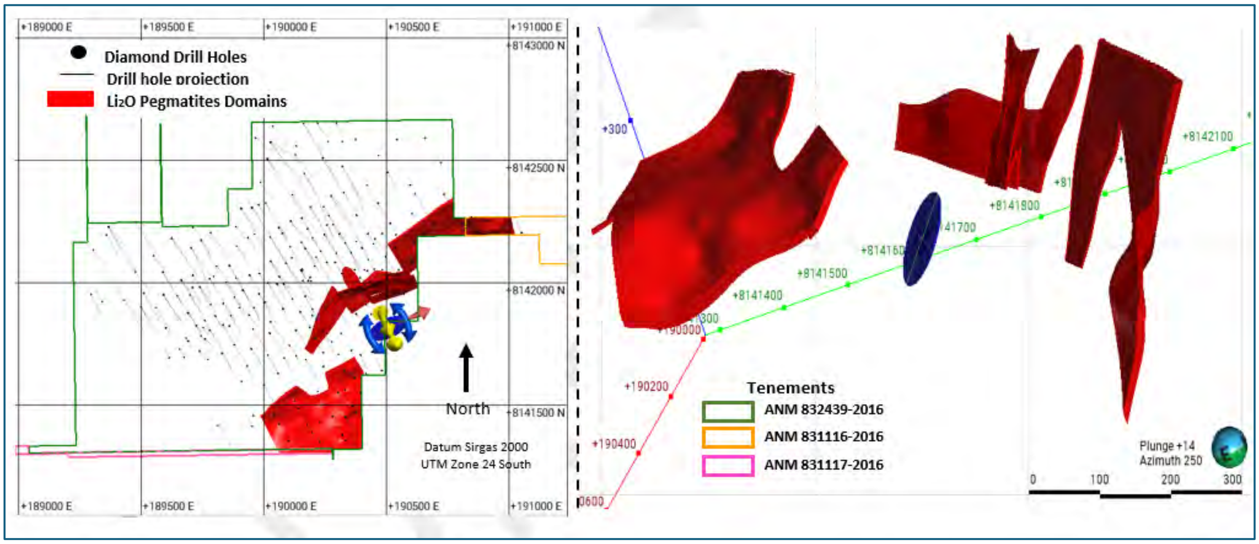
Source: GE21 (2025).

Figure 14-10: Variographic Model—Domains Set SE



Source: GE21 (2025).

Figure 14-11: Variographic Ellipsoid—Domains Set NW



Source: GE21 (2025).

Figure 14-12: Variographic Ellipsoid—Domains Set SE

14.5 Grade Estimation

Ordinary kriging (OK) was carried out using the Leapfrog Edge 2024.1.3 software to estimate the Li_2O (%) variable based on the structural analysis results described in this Technical Report.

Each mineralized vein was estimated independently, using a hard-boundary strategy to ensure that samples from one domain did not influence neighbouring domains. The variograms were initially modelled considering the structural continuity across the entire set of domains, followed by an adjustment for honouring the specific behaviour for each domain. Table 14-5 shows the main parameters of the OK strategy applied in the grade estimation.

Table 14-5: OK Parameters

Type	Steps	Ellipsoid Ranges			Number of Samples	
		Maximum	Intermediate	Minimum	Minimum	Maximum
Li_2O	Step 1	50	50	4	6	16
	Step 2	100	100	8	6	16
	Step 3	150	150	16	4	16
	Step 4	1,500	1,500	1,600	4	16

Source: GE21 (2025).
Notes: Dynamic variable orientation for estimation was applied to each domain in Leapfrog software.
Moving the neighbourhood from the ellipsoid. Dip = 37° Dip Azimuth = 323° Pitch = 00° (NW Veins).
Moving the neighbourhood from the ellipsoid. Dip = 20° Dip Azimuth = 128° Pitch = 28° (SE Veins).
Maximum number of samples per drill = 2.

14.6 Estimation Validation

The QP validated the estimate through visual inspection (Figure 14-13 and Figure 14-14), as well as global and local bias analysis. For these bias checks, the nearest neighbour (NN) method was used as the comparison estimate, supported by NN-check plots. Figure 14-15 and Figure 14-16 present the results of the global bias analysis of the estimated Li_2O% and density variables. The analysis confirmed the expected estimation smoothing by OK within the acceptance limits. The comparison showed that OK globally preserved the average grades, and the resulting global bias is within the industry-accepted tolerance range.

The local bias assessment using the swath plot method aims to evaluate potential deviations by comparing average grades from the OK and NN estimates within swath plot intervals along the X, Y, and Z axes. Figure 14-17 and Figure 14-18 present the validation results for the Li_2O% and density swath plots.

The results from the OK grade estimate validation show that the smoothing effect, or local and global bias, are inside acceptance limits for Mineral Resource estimation.

14.7 Density

The density (g/cm³) in the spodumene pegmatites was estimated using inverse distance weighting (IDW). An exponent of 2, a minimum of 1 sample, and a maximum of 28 samples were used as parameters.

The schist density was defined as the mean of the 8,660 samples from the Lithium Ionic database. The weathered zone does not have measurements, and GE21 has adopted the value 1.8 g/cm³ for this domain, a common value used by other companies in the Jequitinhonha Valley region. GE21 recommends carrying out additional density tests in weathered zones.

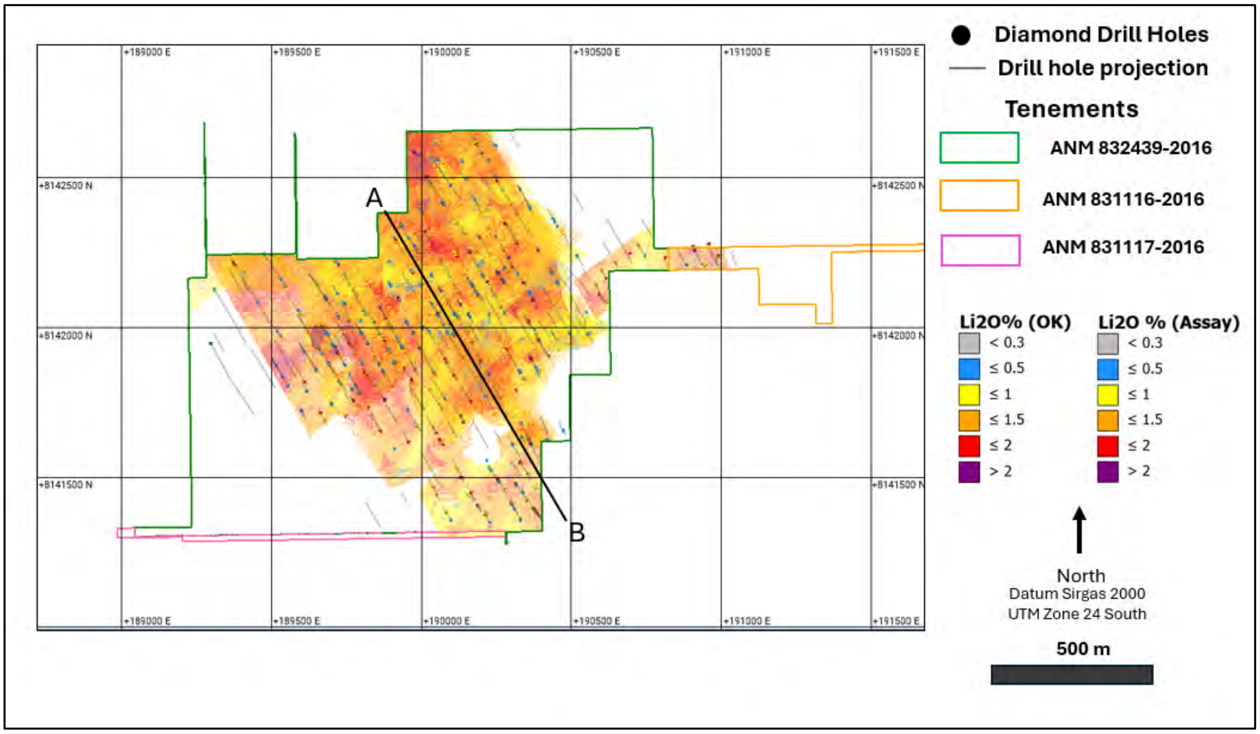
Table 14-6 shows the average IDW densities of each estimated pegmatite domain and the adopted densities of the host rocks.

Table 14-6: Density Values

Spodumene Domains	Density Mean (g/cm³)	Spodumene Domains	Density Mean (g/cm³)	Spodumene Domains	Density Mean (g/cm³)
1	2.68	01B-SW	2.68	05C-NE	2.69
02-NE	2.66	01C-SW	2.67	05D-NE	2.66
03-NE	2.70	01D-SW	2.71	06A-NE	2.70
04-NE	2.66	01E-SW	2.34	06B-NE	2.69
05-NE	2.69	02A-NE	2.60	07A-NE	2.71
06-NE	2.69	02B-NE	2.71	08A-NE	2.74
07-NE	2.71	02C-NE	2.64	08B-NE	2.73
08-NE	2.71	02D-NE	2.65	09A-NE	2.71
09-NE	2.46	02E-NE	2.71	SE-A	2.62
10-NE	2.32	04A-NE	2.53		

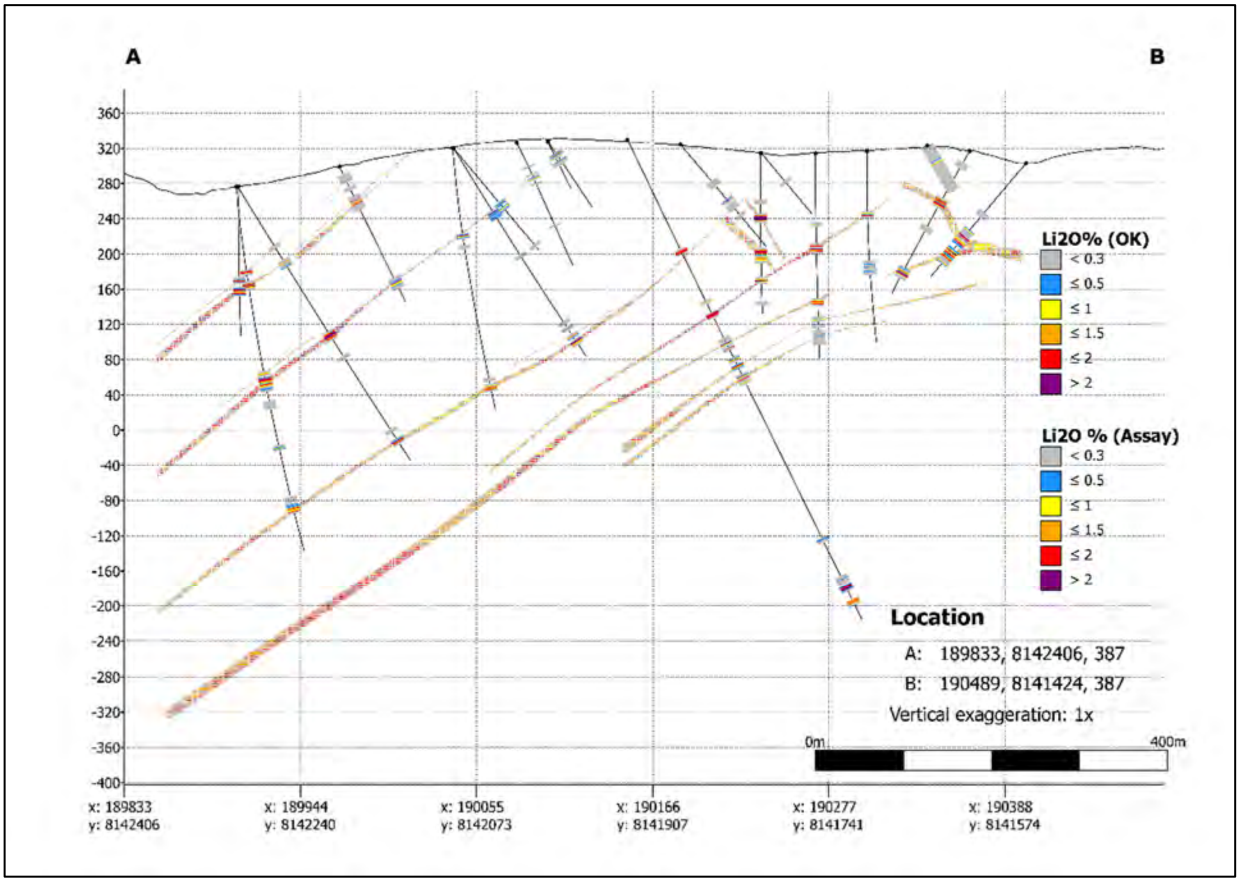
Spodumene Domains	Density Mean (g/cm³)	Spodumene Domains	Density Mean (g/cm³)	Spodumene Domains	Density Mean (g/cm³)
11-NE	2.56	04B-NE	2.49	Domains	Density Mean g/cm³
15-SW	2.69	04C-NE	2.68		
16-SW	2.70	05A-NE	2.66	Shists Rocks	2.8
01A-SW	2.70	05B-NE	2.70	Weathered Zone	1.8

Source: GE21 (2025).



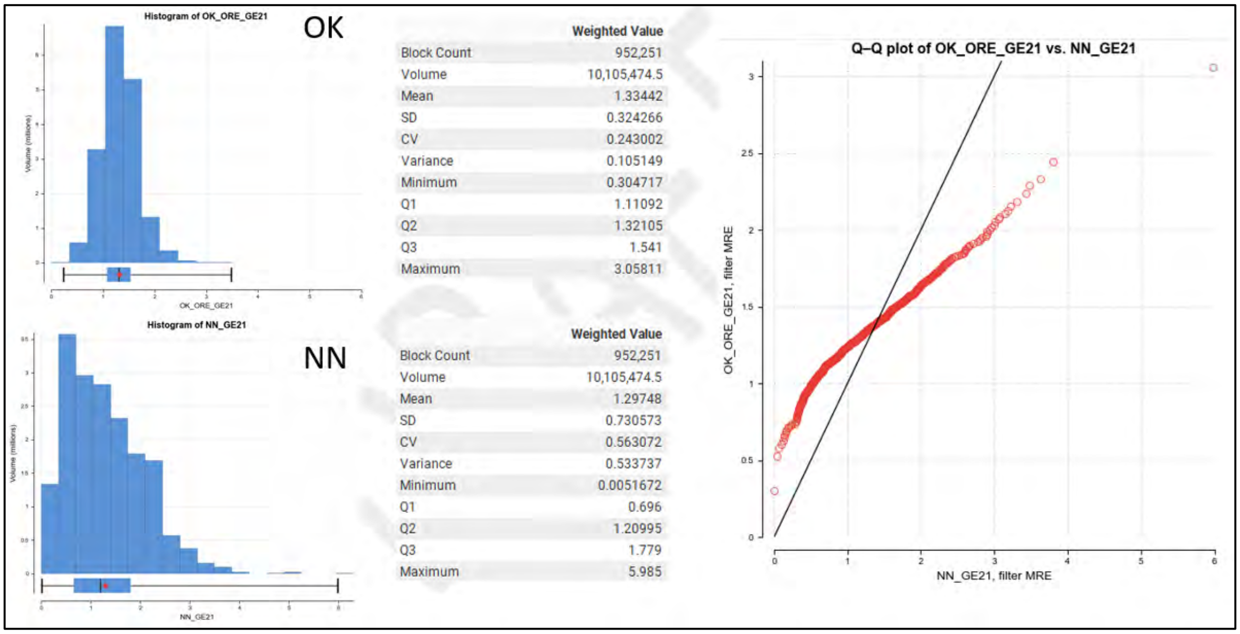
Source: GE21 (2025).

Figure 14-13: Bandeira Project Li_2O % Grades Estimation (Plan View)



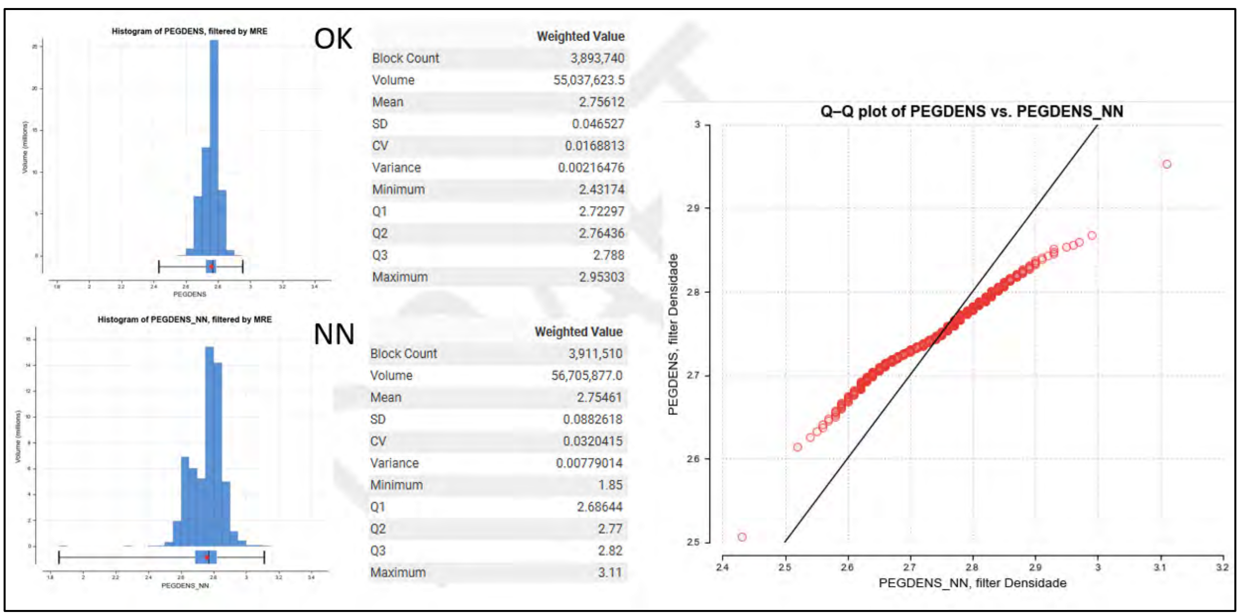
Source: GE21 (2025).

Figure 14-14: Bandeira Project Li_2O % Grades Estimation (Cross-Section)



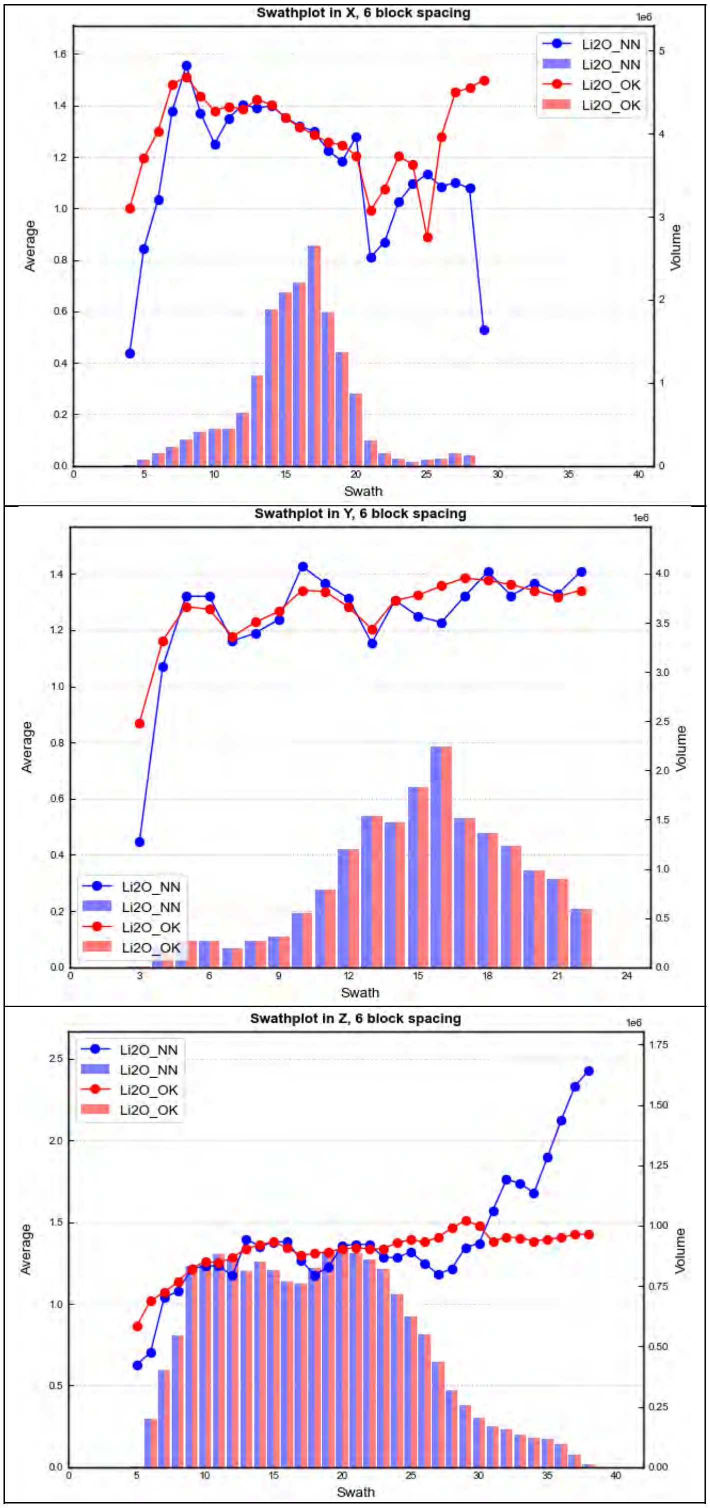
Source: GE21 (2025).

Figure 14-15: Estimation Validation—NN-Check of Li_2O



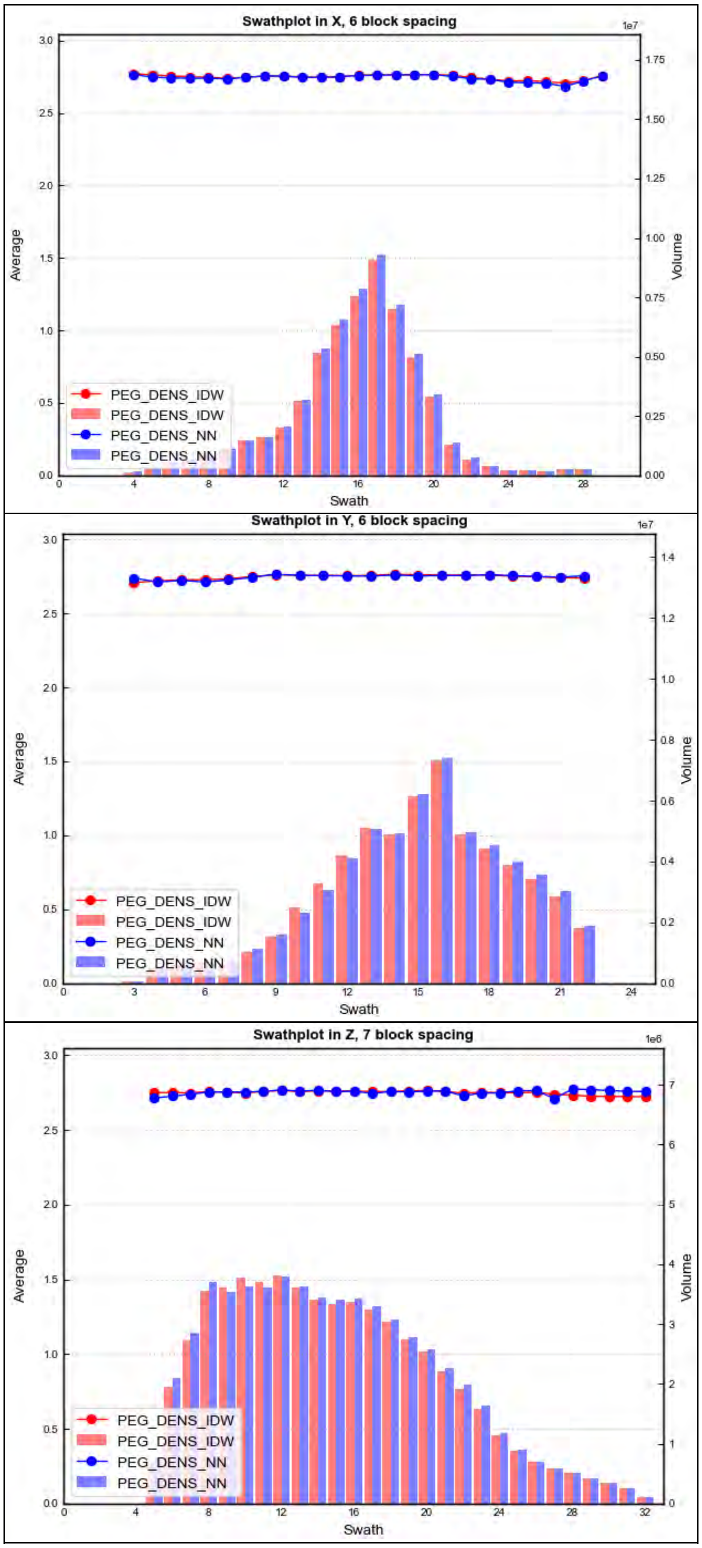
Source: GE21 (2025).

Figure 14-16: Estimation Validation—NN-Check of Density



Source: GE21 (2025).

Figure 14-17: Estimation Validation—Swath Plot on the X, Y, and Z Axes for Li_2O Grades



Source: GE21 (2025).

Figure 14-18: Estimation Validation—Swath Plot on the X, Y, and Z Axes for Density

14.8 Classification of Mineral Resources

The Mineral Resource was classified per CIM Definition Standards and *CIM Standards for Mineral Resources & Mineral Reserves* (CIM 2014), using geostatistical and classical methods and economically and mining-appropriate parameters relevant to the deposit type.

The classification boundaries made by GE21 for the Measured, Indicated, and Inferred categories were established through an approach that considered a comprehensive set of factors.

These factors included the sampling procedure analysis, sample grid spacing, survey methodology, and quality of assay data.

Additionally, drilling spacing and the progressive expansion of the search radius during grade estimation stages were also considered, as well as the average anisotropic distance of the samples and the continuity of pegmatite mineralization.

This multi-faceted approach ensured the robustness and accuracy of the classification process.

- The Measured Mineral Resource classification referenced the 50 m of the average Euclidean distance to sample (AvgD) used in OK estimation, with a minimum of six composites in at least three different drill holes.
- The Indicated Mineral Resource classification referenced the 100 m of the AvgD used in OK, with a minimum of six composites in at least three different drill holes.
- The Inferred Mineral Resource classification is all remaining estimated blocks.
- The total Mineral Resources were limited to the boundaries of the mining rights.
- The total Mineral Resources were constrained by the boundaries of the Mining Rights and the RPEEE (Reasonable Prospect for Eventual Economic Extraction) process for underground mining.

The resource classification was supported by a grade shell representing the underground mining appliance (Reasonable Prospect for Eventual Economic Extraction—RPE3), performed through a restricted wireframe based on a grade shell elaborated considering a cut-off of 0.5% Li2O.

The calculations for the applied cut-off for the resource were based on the project's economic factors. That is, the values of the main costs were considered, including the extraction and processing costs of the ore, as well as other costs related to the production chain, taxes, and transportation expenses.

The long-term selling price value is based on the average of the projected curve values for the sale of 5.5% spodumene concentrate at Shanghai Port in China.

The calculation details are presented in Table 14-7 to Table 14-10.

The cut-off calculation resulted in 0.31%. However, a more conservative cut-off of 0.5% Li_2O was chosen for the RPEEE.

Table 14-7: Financial Assumptions

COG Inputs	Unit	Value
Selling Price SPO 5.5%	$/t concentrate	1,877.88
Selling Cost (CIF China)	$/t concentrate	112.47
TFRM	R$/t concentrate	2.11
CFEM	%	2.00
Royalties	%	1.00
Selling Price SPO 5.5%-Net	$/t concentrate	1,864.40
FLX	BRL/USD	5.07

Table 14-8: Expected Costs

Costs	Unit	Value
Mine Cost	$/t	36.73
Pre-Operation Mine Cost	$/t	0.48
G&A	$/t	3.00
Plant Cost	$/t	24.63
SIB Cost	$/t	4.89

Table 14-9: Operational Parameters

Metallurgical Recovery SC5.5 (%)	69
Mass Recovery SC5.5 (%)	14.5
SPO Concentrate Grade 5.5	5.5

Table 14-10: Cut-Off Grade

Calculated Cut-Off	Li_2O
Cut-Off Grade %	0.31

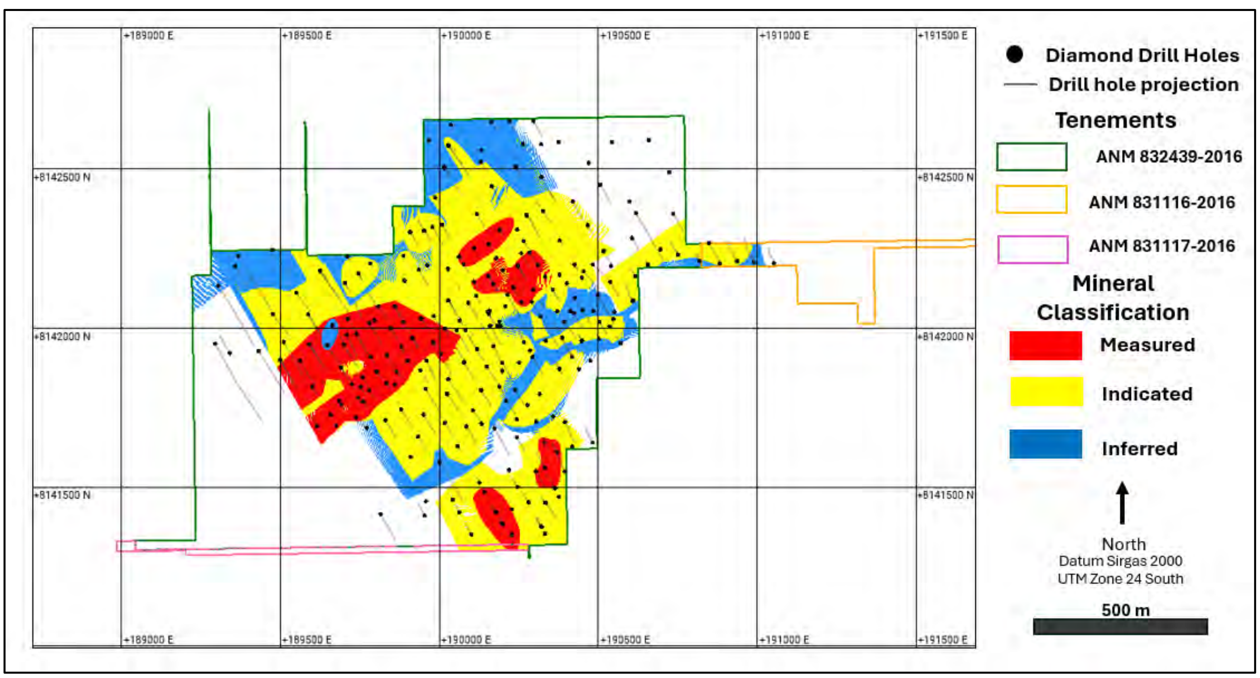
The Bandeira Mineral Resources estimate results are shown in Table 14-11, Figure 14-19, and Figure 14-20.

Table 14-11: Bandeira Mineral Resource Estimates (Base-Case Cut-Off Grade of 0.5% Li_2O)

Deposit/Cut-Off Grade	Category	Resource (Mt)	Grade % Li_2O	Contained LCE (kt)
Bandeira (0.5% cut-off)	Measured	3.36	1.38	115
	Indicated	23.91	1.33	786
	Measured + Indicated	27.27	1.34	901
	Inferred	18.55	1.34	615

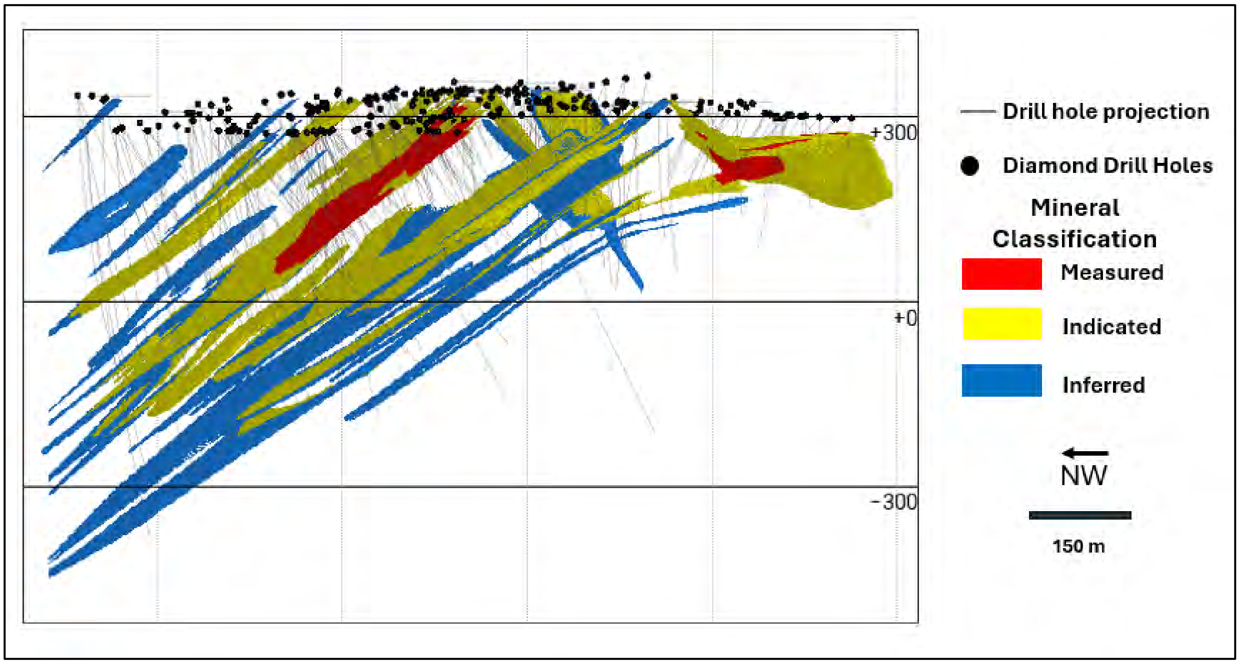
Source: GE21, 2025.
Notes:

- The Mineral Resource estimates effective date is November 20, 2024.
- Carlos J. E. Silva (MAIG #7868) prepared the Mineral Resource estimate using CIM (2014).
- The report meets the Canadian Securities Administrators' NI 43-101 requirements.
- Mineral Resources are not Mineral Reserves and have no economic viability. There is no certainty that any portion of the Mineral Resource will be converted into a Mineral Reserve.
- Figures are rounded to appropriate levels of precision, and discrepancies may occur due to rounding.
- The spodumene pegmatite domains were modelled using composites with Li_2O grades exceeding 0.3%.
- Grade estimation was conducted using OK within Leapfrog Edge 2024.1.3 software.
- The Mineral Resource estimate is confined to the Lithium Ionic Bandeira mining right (ANM) and includes only fresh rock domains.
- The Mineral Resource estimate was restricted by interpreting suitable-grade shells using a 0.5% Li_2O cut-off for underground resources.
- Inferred Mineral Resources are conceptual in nature and can only form the basis for economic analyses with further drilling and evaluation.
- The Mineral Resource estimate may be materially affected by environmental, legal, tax, sociopolitical, permitting, title, marketing, and other relevant factors.



Source: GE21 (2025).

Figure 14-19: Resource Classification with RPEEE (Plan View)



Source: GE21 (2025).

Figure 14-20: Resource Classification with RPEEE (Cross-Section)

15.0 MINERAL RESERVE ESTIMATES

This section details the Mineral Reserve at the Bandeira Project, which was converted from Measured and Indicated Mineral Resources completed on February 20, 2024. This work reflects the mineral resource with an effective date of November 11, 2023. It requires additional work to reflect the updated mineral resource with an effective date of November 20, 2024.

The Mineral Reserve estimation uses only Measured and Indicated Mineral Resources, with all modifying factors applied, to convert to Mineral Reserves. Note that Inferred Resources were excluded from the Mineral Reserve estimation.

The Mineral Reserve estimates were made using metal prices and foreign exchange rates in accordance with SEC Industry Guide 7. Industry Guide 7 requires the use of prices that reflect current economic conditions at the time of Mineral Reserve determination. The assumptions used in this Mineral Reserve estimate for the period ending February 20, 2024, are a selling price of $1,900/t of concentrate at 5.5% Li_2O and an exchange rate of R$5.07 to US$1.00.

There is no known mining, metallurgical, infrastructure, permitting, or other relevant factors that could materially affect the Mineral Reserve estimates.

The Mineral Reserve estimates for the Bandeira Project are shown in Table 15.1.

Table 15.1: Bandeira Project Mineral Reserve, Dated February 20, 2024

Ore Reserve Class	Volume (Mm^3)	Mass (dry Mt)	Li_2O (%)	Contained Li_2O (t)
Proven	0.85	2.30	1.17	26,910
Probable	5.50	14.90	1.15	171,350
Total	6.35	17.20	1.16	199,520

Notes:

- The Mineral Resources dated November 13, 2023, are the basis for the Ore Reserve.
- Only the Measured and Indicated Mineral Resources for the Project have been considered as potentially economic for the mining study.
- Conventional sublevel stoping and room-and-pillar mining methods and equipment have been proposed.
- Mineral ore reserve grades are diluted along lithological boundaries and assume a selective mining operation.
- For the sublevel stoping mining method, ore reserve volumes and tonnages assume 90% mine recovery, 14% of planned dilution, and 0% of operational dilution since the stopes are being cabled.
- For the room-and-pillar mining method, mineral ore reserve volumes and tonnages assume 100% mine recovery, 9% of planned dilution, and 10% of operational dilution due to overbreaking.
- For the ore from development to work, ore reserve volumes and tonnages assume 100% mine recovery, 46% of planned dilution, and 10% of operational dilution due to overbreaking.
- Considering all three variations of extraction methods adopted in this project, the average dilution rate is 17%.
- An original assumed set of optimization parameters was used in the derivation of the current LOM plan, which was developed as part of this Feasibility Study.
- The mineral ore reserve has been reported within an optimized and engineered underground mining project with a total of 3.27 Mt of waste materials originating from the development works, determined assuming a long-term Li_2O price of $1,900/t of concentrate with 5.5% Li_2O content.
- The processing plant is expected to produce at a maximum feed rate of 1.3 Mt/a (dry basis).

16.0 MINING METHODS

This section summarizes the underground mine studies developed for the Bandeira Project. The Bandeira Project mine design contemplates two underground mining methods.

The primary ore bodies, accounting for approximately 16.2 Mt of the deposit, are proposed to be extracted using a bottom-up longhole sublevel stoping method. Simultaneously, the secondary southeast orebody, comprising approximately 1.0 Mt, is expected to be mined using the room-and-pillar method.

The selection of the mine method took into consideration the dip of the veins present in the orebody, one being more horizontally oriented and the other more vertically oriented.

The production of run-of-mine (ROM) ore is scheduled to be 1.3 Mt/a on a dry basis. The concentrate production is given by the following formula:

Production of Concentrate (t) = (metallurgical recovery (%)/concentrate grade (%) x (ROM (t) x Li_2O Content (%).

The metallurgical recovery assumed is 68.9%, and the Li_2O concentrate grade is 5.50%.

A gradual increase in ore production will occur over the first years of production until reaching the nominal capacity of the Project.

The focus in the first year is on developing the two main declines and incorporating multiblast techniques to enhance operational efficiency. Over the second year, room-and-pillar mining begins at a slower pace compared to mine full capacity, gradually increasing production as the mine is developed and more mining faces become operational simultaneously. Full capacity is reached after three years of work, counting from the beginning of the mining operation.

Regarding sublevel stoping production, a ramp-up period of four years is considered, from the start of mine’s opening. Production increases as the mine develops, reaching 1.1 Mt/a in the second year of plant production.

The mine’s production operating schedule will be three six-hour shifts per day, with a two-hour interval between shifts for mining ventilation to dissipate blasting gases. The mine will operate 360 days per year, totalling 6,480 hours per year of planned production. The administrative operating schedule will be one nine-hour shift per weekday, including one hour for lunch.

16.1 Geotechnical Characterization

The information obtained so far from the geotechnical description of the drill-core samples and results obtained in laboratory tests for the different lithological types of the Bandeira Project target, allows the definition of different geotechnical domains.

The predominant lithology is schists (host rock) and pegmatites (ore). From observations of discontinuities and anisotropies through geotechnical descriptions of the drill-core samples, the presence of at least two families of discontinuities were identified. Generally, these structures have small openings and do not contain filling material.

The structural conditions should be better investigated through geotechnical mapping surveys during the implementation of mining operations to better understand the behaviour of these geotechnical structures in the massif in relation to excavation openings and slope stability. However, the data and information obtained from the descriptions of the drill-core samples can be considered sufficient for geomechanical characterization and classification work, allowing the definition of resistance parameters and geotechnical indices that enable the development of project work for the implementation of the mining activities planned for the Bandeira Project target.

The geomechanical domains were classified from the geotechnical description of the drill-core samples, which allowed the determination of fracturing patterns, rock-quality designation (RQD) indexes, degree of alteration, and characteristics of the discontinuities.

This study adopts the widely used rock mass rating (RMR) (Bieniawski, 1973), a system for classifying the quality of rock masses in geotechnical engineering. It is used to evaluate rock stability and determine the feasibility and necessary support for engineering projects such as tunnels, foundations, and slopes.

The five-class RMR is a 100-point scale, with higher values indicating better rock mass conditions. The classes are defined as:

- Very good (RMR 81-100)
- Good (RMR 61-80)
- Fair (RMR 41-60)
- Poor (RMR 21-40)
- Very poor (RMR <20).

16.1.1 Soil and Saprolite Domain

The soil and saprolite domain correspond to an interval of approximately from the surface to 25.0 m below the surface of the massif, characterized by an intense weathering process that determines a predominant alteration pattern (W6/W5) and very low mechanical resistance parameters, with an R0/R1 pattern. There is also evidence of significant water flow in this geomechanical domain.

For this domain, the massif can be characterized as Class V according to Bieniawski’s classification. It is important to note that the underground mining activities planned for the Bandeira Project target will be developed below this domain, with only the access ramps being developed in this part of the massif. Regarding the mine entrance box cut, only the first two benches should be implemented in this geomechanical domain.

16.1.2 Schist Domain (Salinas Formation)

The schist domain is divided into two subdomains based on the RQD index.

Schist Subdomain 1—RQD <50%

This schist subdomain is positioned immediately below the soil and saprolite domain and has a highly variable thickness, from absent of nearly so to a maximum depth of 40 m. It exhibits a predominant F4/F3 fracturing pattern and moderate alteration, which partially compromises mechanical resistance parameters of the massif. In this subdomain, the R3/R4 pattern will be very common. Evidence of water presence is frequent along fractured planes.

The RQD values range from 5% to 50%, with predominant values around 40%. There is evidence of at least three families of usually unidirectional discontinuities—rough, sealed, or filled with resistant material.

Schist Subdomain 2—RQD >50%

This schist subdomain typically begins at depths greater than 40 m and is characterized by predominantly intact rock with well-preserved original mechanical-resistance parameters. There is no evidence of water flow, allowing us to assert that the hydro-geotechnical characteristics of this domain define very low hydraulic transmissivity and storage capacity, which confers impermeable massif characteristics.

The low degree of fracturing in this domain is defined by the predominance of at least two families of discontinuities, which characterize an F1/F2 fracturing pattern, with an RQD index ranging from 85% to 95%, more commonly above 90%. Fractures are typically rough or irregular, flat, unaltered, and show no signs of groundwater flow. Thus, this domain presents excellent geomechanical conditions, high mechanical resistance parameters, and excellent self-support conditions for the implementation of underground openings and allows for the implementation of slopes with steep face angles.

Regarding uniaxial strength parameters for this subdomain type, laboratory test results showed uniaxial compression strength values ranging from 30.66 MPa to 309.86 MPa, with an average value of 112.45 MPa. This variation is justified by the rupture models observed in the test specimens, where it is noted that for thirty tests, eight showed values below 50 MPa, with ruptures occurring along preferential planes of weakness.

Generally, this lithological domain does not present prominent foliation, commonly exhibiting a massive aspect. When the values found for the eight tests below 50 MPa are disregarded, an average resistance value of 139.91 MPa is observed a very good resistance value, indicative of the possibility to have significant free spans, with adequate safety parameters in underground mining operations, and slopes with steep face angles.

16.1.3 Pegmatite Domain (Ore)

The pegmatite domain is characterized by the presence of a massif of intact or nearly intact rock, without changing the original resistance parameters of the rock, with a predominant R5 pattern.

At least two families of fracture were identified in this domain, with an F2/F1 fracturing pattern, the former being more common. The RQD value ranges from 65% to 90%, with values around 85% being more common. Fractures are typically rough and irregular, with no evidence of alterations, indicating an absence of water flow.

The pegmatite domain can be present at different depths according to the observations of drill core and generally presents good mechanical resistance conditions. The values found for uniaxial compression strength in pegmatite specimens ranged from 59.23 MPa to 125.36 MPa, with an average of 90.36 MPa, which can be considered a good resistance value for the implementation of underground mining, with rib and sill pillars planned for this lithological type.

The results obtained from uniaxial compression tests suggest that adopting the average value for pillar dimensioning is conservative. Figure 16-1 shows the geotechnical domains adopted for the Project.

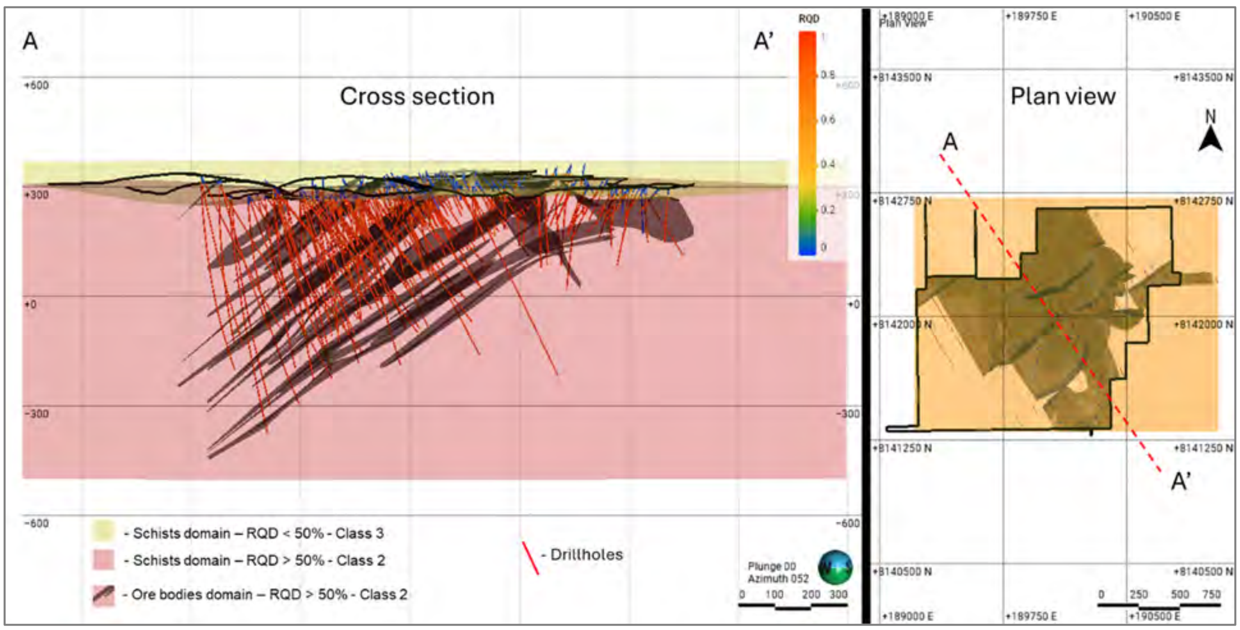


Figure 16-1: Bandeira Project Geotechnical Domains—Left, Cross-Section View; Right, Plan View

16.1.4 Geotechnical Recommendations

Geotechnical recommendations for underground mining activities to be implemented in the Bandeira Project orebody region are described here, based on the obtained information from domains.

16.1.5 Mining Method

For the area where the orebody exhibits a steep dip and considering the characteristics of the host rock with high resistance parameters, the recommended mining method is sub-level open stope. For the sector where the orebody shows a gentle dip, given the geomechanical characteristics of the ore, which has resistance parameters that allow the room-and-pillar method is recommended. This is because the characteristics of the host rock will allow safe operation with a high extraction rate.

16.1.6 Dimensioning of Room Openings and Pillars for Stopes

Room-and-Pillar

For determining the optimal size of the rooms and pillars, the results obtained for geomechanical characterization and classification are summarized in a spreadsheet (Table 16-1). This spreadsheet uses the provided information to estimate the stresses that the pillars would be subjected to, based on a geometry that considers the tributary area theory for stress estimation.

Table 16-1: Room-and-Pillar Dimensioning

	Simulation Number	1	2	3	4	5	6	7	8	9	10
Geomechanical Data	Poisson Coef.	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
	RMR	68.00	68.00	68.00	68.00	68.00	68.00	68.00	68.00	68.00	68.00
	RCS (MPa)	83.00	83.00	83.00	83.00	83.00	83.00	83.00	83.00	83.00	83.00
	RCS ratting	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
	RMS (MPa)	50.63	50.63	50.63	50.63	50.63	50.63	50.63	50.63	50.63	50.63
	DRMS (MPa)	38.07	38.07	38.07	38.07	38.07	38.07	38.07	38.07	38.07	38.07
	Rock density (t/m^3)	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70
Layout	Overlay height (m)	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
	Merg. stope (rd)	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Pillar Sizing	Reduction scale factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
	Blast reduction factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
	Vertical tension (MPa)	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35
	Horizontal Tension (MPa)	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34
	Pilar resistance (MPa)	40.59	30.56	24.99	18.81	15.38	13.16	11.58	17.76	15.19	13.37
	Load on the pillar (MPa)	14.25	14.25	14.25	14.25	14.25	14.25	14.25	11.54	9.70	9.70
	Pillar height (m)	2.00	3.00	4.00	6.00	8.00	10.00	12.00	8.00	10.00	12.00
	Pillar width(m)	3.00	3.00	3.00	3.00	3.00	3.00	3.00	4.00	4.00	4.00
	Pillar length(m)	3.00	3.00	3.00	3.00	3.00	3.00	3.00	4.00	4.00	4.00
	Tributary area length (m)	10.00	10.00	10.00	10.00	10.00	10.00	10.00	12.00	11.00	11.00
	Tributary area width (m)	10.00	10.00	10.00	10.00	10.00	10.00	10.00	12.00	11.00	11.00
	Mine recovery	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.89	0.87	0.87
	Safety factor	2.85	2.15	1.75	1.32	1.08	0.92	0.81	1.54	1.57	1.38

In the highlighted line in yellow, the layout option to be adopted for room-and-pillar mining specifies that the rooms should have a width of 8 m and the pillars should be 4 m by 4 m. This layout provides safety factors of 154 and a predicted recovery of about 88%.

Given the conditions predicted for the room roof rock, installing grouted rock bolts is planned to provide additional safety for the operations. These rock bolts should be 3.20 m long due to the span, with a grid spacing of 1.50 m by 1.50 m. The support should be installed initially, as soon as the room is opened.

16.1.7 Sublevel Open-Stope Mining

For mining using the sublevel open-stope method, based on the results obtained from previous geomechanical characterization and considering the RMR values, in Schist Subdomain 1 the host rocks exhibit this geotechnical domain, thus significantly restricting underground mining activities to less than one mining panel. On the other hand, Schist Subdomain 2—the host rock below 40 m—has a fracture pattern that shows predominant RQD values above 85% and an RMR of 72.

For the first subdomain with an RMR value of 40, the mining rock mass rating (MRMR) can be estimated by adjusting for the influence of mining activities. Assuming an adjustment of 94% due to blasting effects, 70% due to structural conditions, 100% due to induced stress (considering the shallow depth of the operations), and a 90% adjustment for the compromise of resistance parameters due to weathering processes associated with exposure time, the MRMR value would be:

MRMR = 40 x 0.94 x 0.70 x 1 x 0.90 = 23.68.

Figure 16-2 shows the correlation between the MRMR of 23.68 and the stability index for an opening in a rock mass with these characteristics, allowing for the following considerations regarding the expected stability conditions for Schist Domain 1 in the proposed Bandeira Project underground mine:

- The stable zone has a hydraulic radius limit of 3.0 m, and a transition zone up to a hydraulic radius of 10.0 m. Openings with larger dimensions would be in the caving zone and, therefore, unstable.
- Openings within the Transition Zone would require systematic support.
- Assuming a panel length of 50 m, a height limit would be 30 m, since an opening with these dimensions would define a hydraulic radius condition of 9.375 m, very close to the caving limit.
- Note that the mining activities will be primarily conducted in a rock mass with an RMR of 72.

The purple line and the red line in Figure 16-2 show the working range of the hydraulic radius to keep the excavations in the transition zone. The hydraulic radius indicates the excavation size.

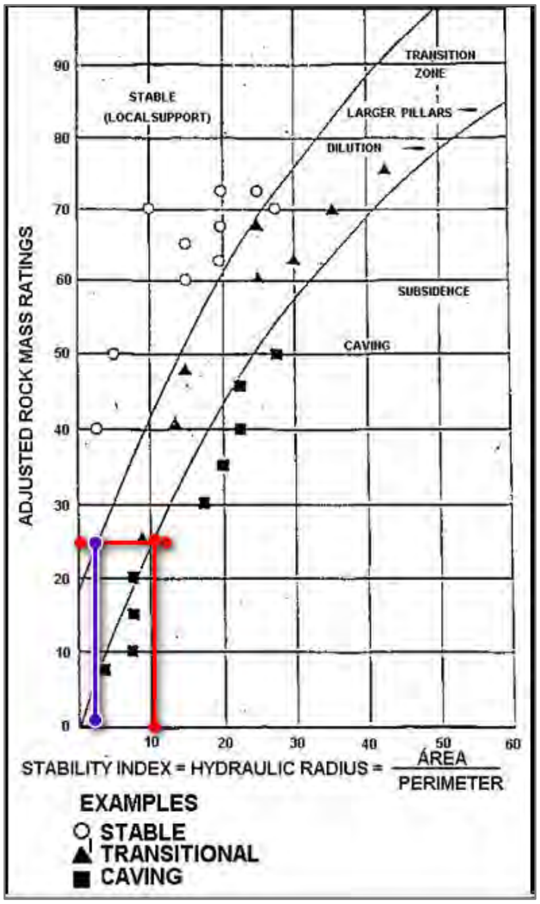


Figure 16-2: Correlation Between MRMR And Stability Index for an MRMR Value of 23.68

For mining conditions below 40 m, thus in a Class II massif and RMR 72, assuming adjustments due to mining activities with 94% attributed to blasting, 85% adjustment due to structural conditions, no interference due to weathering processes, and a 90% adjustment due to factors associated with stress redistribution, an MRMR value would be calculated as follows:

MRMR = 72 x 0.94 x 0.85 x 1 x 0.90 = 51.77

The resulting value of 51.77, plotted on the chart correlating the stability index of the opening defined from the hydraulic radius value and the MRMR value (Figure 16-3), allows the following considerations for the mining openings implemented below 40 m depth, which represents almost all planned openings:

- Under these geomechanical conditions, the predicted stability conditions for the mining openings will be favourable. As observed in Figure 16-3 openings with dimensions defining hydraulic radius values up to 14 m exhibit self-supporting conditions without the need for systematic support systems. It is also noted that between 14 and 25 m of hydraulic radius values, openings could be executed with support systems applied, with supports in this range needing to be more stringent due to proximity to the 25 m limit. Beyond 25 m, the openings are unstable, with a very great possibility of widespread collapse.

- Based on the above results, considering that a panel with 75 m exposure of hanging wall would allow the implementation of a free span of 75 m along the strike, defining a hydraulic radius condition of 18.75 m, a value well below the permissible limit of 25 m.
- For the described condition, the use of grouted steel cables installed in the hanging wall region would be necessary to minimize mine dilution, since the overall stability of the stopes would be assured based on the geomechanical conditions predicted for the country rock mass.

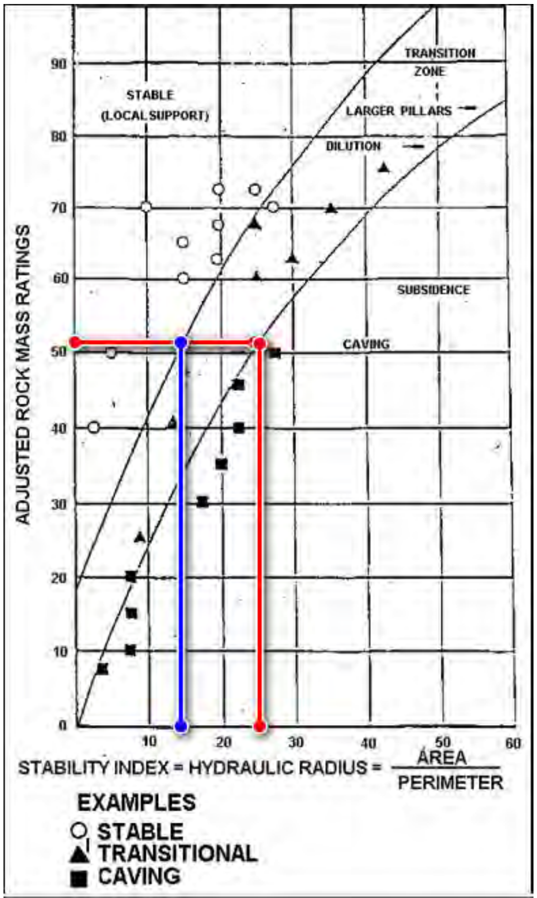


Figure 16-3: Correlation Between MRMR and Stability Index for an MRMR Value of 51.77

Regarding the stability conditions of the stope's roof, defined from the planned sill pillars, it is observed that the pegmatite has an RMR of 69, with the predominant characteristic being a fracturing pattern that consistently yields RQD values above 80%. With these characteristics, assuming the same adjustment pattern is adopted for the surrounding rock mass, an MRMR value would be obtained as follows:

MRMR = 69 x 0.94 x 0.85 x 1 x 0.90 = 49.62

For these rock mass conditions, Figure 16-4 suggests that the pegmatite mass exhibits a mechanical strength pattern very similar to that predicted for the surrounding rock mass, indicating a highly favourable condition. Under these conditions, the following considerations are made regarding the expected behaviour of the roof mass to be implemented in the ore:

- Figure 16-4 indicates that openings with a hydraulic radius of up to 13 m present very satisfactory stability conditions, without the need for systematic support systems. There is a transitional zone between 13 m and 23 m, where stability conditions will depend on support systems to be implemented, with these becoming more stringent as openings approach the hydraulic radius limit of 23 m.
- Based on Figure 16-4, it is verified that for the stope roof, assuming a pegmatite body with 25 m thickness and a clear span along the strike of 75 m, the hydraulic radius value is 9.35 m, significantly below the upper limit. This indicates a very comfortable condition for the stability of the stope roofs, with the support systems to be used aiming to maximize local safety conditions.

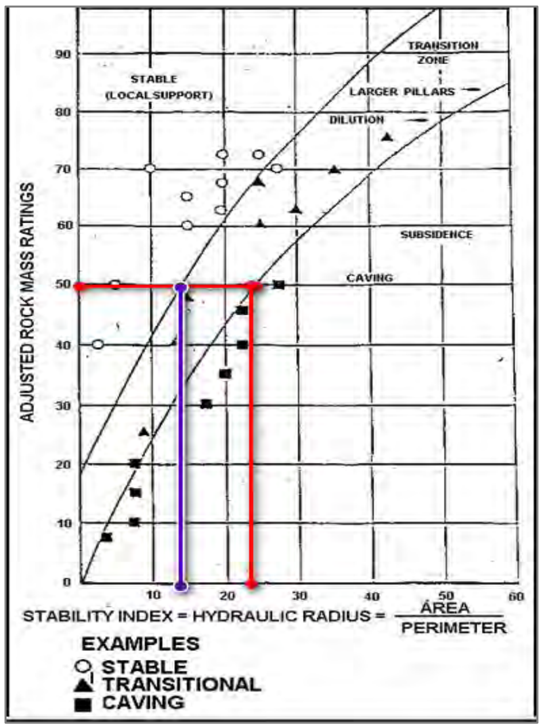


Figure 16-4: Correlation Chart Between MRMR and Stability Index for an MRMR Value of 49.62 in Pegmatite

Regarding the maximum free spans, the results obtained for the massif in the hanging wall region allow the adoption of panel heights ranging between 45 m and 60 m, which are values practiced in underground mines operating in similar geomechanical environments.

The sill pillars between mining panels should have thicknesses of 4 m.

The interlevel should have heights defined based on drilling equipment capabilities, with interlevel around 10 m to 12 m showing good stability behaviour during mining operations in mines with similar geomechanical contexts.

Regarding rib pillars, the characteristics of the massif suggest that the spacing between them can be up to 80 m, with this maximum span also being defined based on the body's thickness. A width of 4 m for rib pillars is sufficient to ensure adequate stability conditions for the excavation.

Concerning the crown pillar at the surface, a rock thickness of 10 m is recommended. In this horizon, the massif should exhibit alteration patterns ranging from A3, moderately altered, to sound rock, A1. Therefore, 10 m, considering these characteristics along with the soil/saprolite horizon, should be the minimum thickness for the crown pillar.

For the barrier pillar of the main access ramp relative to the stopes, 20 m defines a safe pillar condition, even considering variations in orebody positioning. This minimum distance provides adequate safety conditions, regardless of whether the ramp is positioned in the hanging wall (HW) or footwall (FW). Ideally, this structure should be positioned in the hanging wall.

For situations involving parallel ore bodies, practices and observations of stope behaviour under these conditions indicate that a pillar thickness between Stopes of 4 m ensures adequate safety conditions for mining activities. It is necessary to adopt additional precautions regarding installed support systems and blasting operational procedures. Drifts between these stopes to improve ventilation conditions are possible, provided that maximum feasible free spans are adhered to.

16.2 Hydrological Characterization

The hydrological data in the Bandeira Project area comes from the historical series of the rain gauge station 1642028, located in Araçuaí, spanning October 2003 to March 2023. On average, the multi-year average precipitation was around 651.2 mm. It is observed that the rainiest month in the region is December (164.7 mm), while the driest month is July (1.2 mm).

The inventory of springs during the dry period allows for identifying the location of springs at their lowest elevation, indicating that downstream areas have continuous surface water flow throughout the year (perennial drainage). In the absence of water points during this period, it can be assumed that water occurrences in the drainages are only occasional, associated with the rainy season or occasional precipitation.

Sixty-three points were registered over the dry period, including:

- 2 springs
- 41 dry drainages
- 20 control points.

Geologically, it is believed that this saturated zone is a package of silty-sandy material with a high amount of organic material, overlying the Salinas Formation. It is recharged by rainwater and, due to its low permeability and hydraulic conductivity, remains moist for almost the entire year.

Geophysical studies of electrical resistivity and spontaneous potential indicated that there is a higher presence of regions with lower resistivities, mainly in the western and eastern portions of the project area, except for the massif located in the extreme western portion, whose location limits the saturated zone, with unsaturation evident from the beginning.

It is possible to observe three important locations with lower saturation compared to others in the central portion of the target area. Zones of high saturation were identified even at lower elevations in the area, and these anomalies could be correlated as possible associations with geological structures.

16.3 Hydrogeological Characterization

16.3.1 Regional Hydrogeological Context

The Bandeira Project is in the Jequitinhonha Valley, in the middle sector of the Jequitinhonha River basin, and it is characterized by a semi-arid climate. The prevailing conditions make the use of underground water resources the main alternative for suppling water. However, the predominance of fissure aquifers and reports of high salinity in the water impose restrictions on any use of groundwater in the region (Menegasse et al., 2003).

According to previous investigations, lithologies in the region can be classified into four aquifer units:

Unit 1: These comprise rare alluvial covers found in some portions of the Jequitinhonha River, Araçuaí River, and Piauí river, all three with very small dimensions. They may be locally important, although properties along these rivers do not face water-scarcity issues, as they are perennial.

Unit 2: Aquifers in this unit are granular in nature and consist of thick packages of coarsely stratified sediments from the São Domingos Formation, which can exceed 100 m thick in the Virgem da Lapa region. This unit also includes other eluvial-colluvial covers that overlay tertiary planation surfaces.

Unit 3: This unit, the largest in the area, comprises lithologies from the Macaúbas Group, especially the Salinas Formation. The hydrogeological characteristics of the Salinas Formation are primarily fractured aquifers with a small contribution in its altered portion of granular material where it has considerable thickness. The Salinas Formation is widespread, supporting a relief dominated by gentle to moderately undulating and polyconvex hills, predominantly composed of schist, representing dissected areas with altitudes generally up to 500 m. It has an alteration layer of variable thickness, averaging 10 m, with a dense drainage network clearly dictated by the regional structural pattern (schistosity, fracturing, faulting), facilitating surface runoff at the expense of infiltration. When composed of quartzite, the Salinas Formation occupies higher altimetric positions, supporting plateaus and cliffs.

Portions of the Salinas Formation, predominantly composed of schist, have the possibility of constituting reasonably significant aquifers, by regional standards, when the following conditions coexist:

- Patterns of metamorphic–structural discontinuity
- Thick alteration levels
- Gentle relief
- Overlap with the São Domingos Formation.

Unit 4: This unit encompasses intrusive granitic rocks and is highly significant. The granitoids in the region are little altered or unaltered, not forming an expressive alteration layer (soil + weathered layer), as occurs in humid tropics where the weathering layer can reach tens of metres, giving rise to extensive aquifers. Granite terrains occupy elevated topographic portions, with morphologies resembling "sugarloafs," cliffs, and ridges. They have drainage networks in radial and dendritic patterns, especially in larger bodies. Fractures represent the most important means by which local granitic rocks can conduct and store water.

Figure 16-5 presents a conceptual model of regional groundwater circulation. In this condition, primary permeability is very low, with fractured aquifers predominating. Recharge occurs through the fracture system, which also controls surface drainage. This structural control of drainage is less pronounced compared to areas where schist and quarzitic rocks of the Macaúbas Group and Espinhaço Supergroup occur, respectively. Discharge from these fractured aquifers occurs predominantly in valley bottoms.

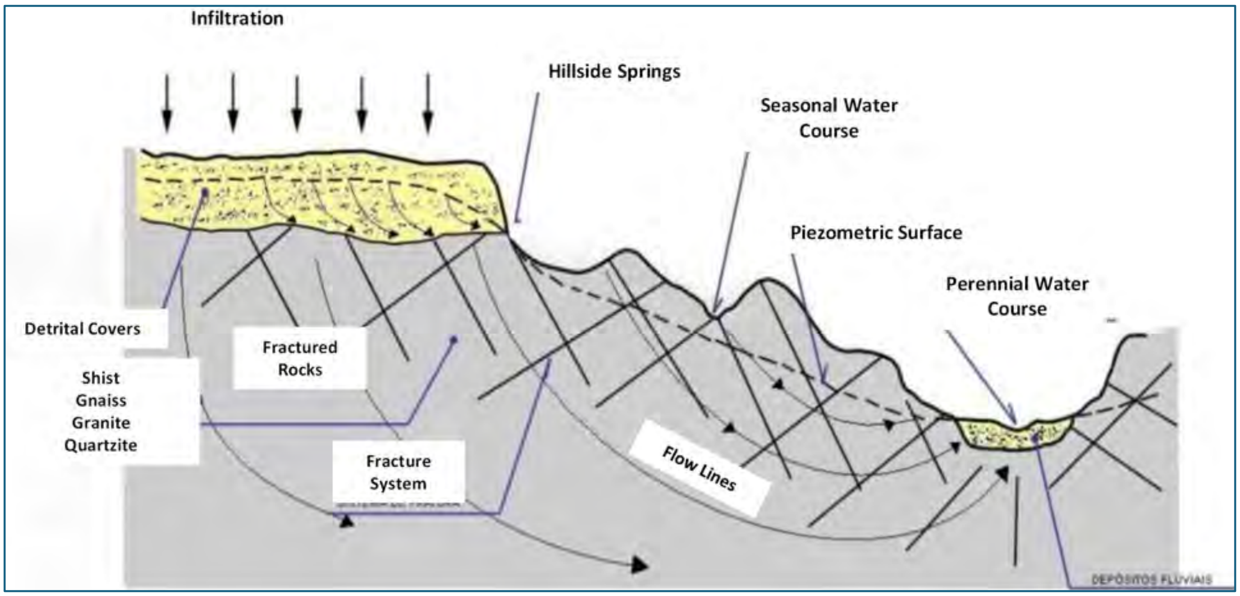


Figure 16-5: Conceptual Model of Regional Groundwater Circulation

Therefore, it can be said that the watercourses present in the Project area are represented by perennial drainage, where alluvial deposits/coverings prove to be very important in water supply.

The exception is Piauí Creek, which exhibits incipient drainage, almost dry, for at least two months of the year (September and October). The significance of these alluvial ridges on the riverbanks becomes evident during the dry period when they release water stored during the rainy season, contributing to surface flow.

Short and medium-term underground flows originate from the hydrogeological cover units and possibly from the alluvial ridges deposited by rivers. Drainage in the fractured aquifer is represented by longer-term flows that are logically dependent on the degree of rock fracturing.

16.3.2 Conceptual Hydrogeological Model

The conceptual hydrogeological model aims to understand the hydrogeological units and the behaviour of groundwater flow, from infiltration in the soil to its discharge. It involves characterizing the hydrogeological environment, developing the potentiometric surface, and understanding the zones of recharge and discharge, as well as the conditions for storage and circulation of groundwater.

The boundary conditions for developing the conceptual hydrogeological model were defined by considering the limits of the local micro-watersheds that supply the Jequitinhonha River, Piauí Creek, and Santana Creek.

In general, the behaviour of hydrogeological systems is directly related to the lithological units present in the area. Each type of rock or geological unit has specific characteristics of primary (interstitial), secondary (fractures and faults), or tertiary (conduits) porosity that define how groundwater is transmitted and stored. Thus, the geometry of a particular aquifer unit almost always coincides with the geometry of the geological unit in question.

The lithological types occurring in a particular area generally define the local hydrogeological behaviour. Each geological unit will present its own porous characteristics that influence the flow of groundwater, and this should determine how water circulates and is stored.

The four hydrogeological units defined for the study area are:

- Aquifer of Coverage—this aquifer is composed of unconsolidated sediments resulting from the weathering of the superficial rocks where groundwater circulates and is stored. According to borehole data, this alteration of rocks can reach depths of up to approximately 40 m in rocky outcrops and 20 m in the floodplain of the Jequitinhonha River.
- Alluvial Aquifer—this unit encompasses a shallow, essentially granular aquifer of the free, heterogeneous, and anisotropic type. Recharge occurs through precipitation, raising the water level of the Jequitinhonha River. Locally, sandy and gravelly soils are observed, with less thickness, providing low storage capacity and high conductivity, resulting in ephemeral water conditions for water bodies.
- Fissure Aquifer—in this aquifer, porosity is considered secondary, as primary porosity is negligible and is represented by fractures and faults in rocks, also dependent on the degree of weathering. The aquifer has moderate hydraulic conductivity and internal interconnectivity, being linked to geological structures. Geophysical interpretation suggests that this aquifer may be influenced by geological structures, leading to a heterogeneous aquifer system with both saturated and unsaturated portions.
- Aquiclude—this unit has negligible primary porosity, and low water transmissivity indicates the absence of geological structures and a low degree of rock weathering. In the context of geophysical interpretation, this unit may be represented by zones with high resistivity indicating minimal saturation, forming natural hydraulic barriers.

16.3.3 Conditions of Groundwater Flow

According to the potentiometric map, the overall flow indicates low transmissivity, with closely spaced equipotential. This behaviour is expected due to the characteristics of the fissure aquifer, where flow depends on structural conditions. The low groundwater level in relation to the terrain is noted, as well as the direction of groundwater flow toward the Jequitinhonha River.

16.4 Mine Planning and Design

16.4.1 Access to the Mine and Development

The underground mine of the Bandeira Project will be accessed by two ramps (declines) in the footwall of the orebody. The two ramp portals (entrances) will be constructed in an open pit excavation of box-cut type, with the slopes being designed to be 50°, with a 5 m-wide berm (catch bench), 10 m high, as shown schematically in plan and vertical section in Figure 16-6.

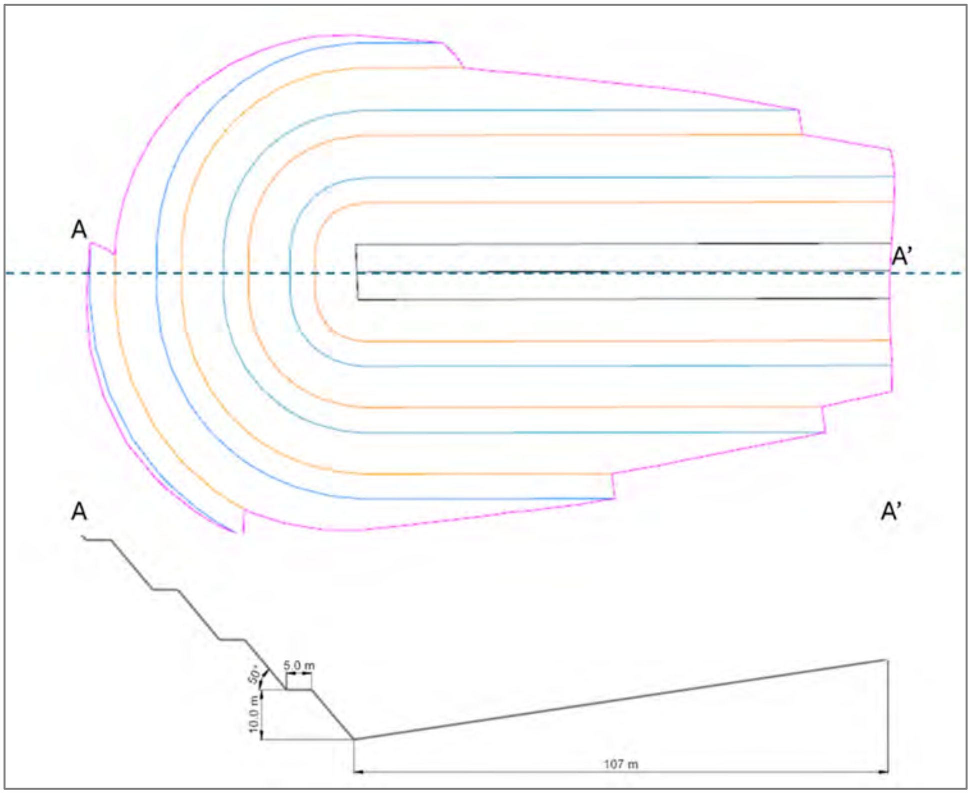


Figure 16-6: Portal of the Underground Mine

The portals will be reinforced with shotcrete to preserve the slopes, prevent erosion, and facilitate safe transportation of ore, waste rock, equipment, and personnel inside the mine.

From the west entrance, one decline was projected to follow the northeast–southwest mineralized trend, while from the east entrance, the decline splits into two: one continues eastward, and the other heads north, providing access to the northeast side of the orebody. Sloped curves will be designed to return to the development direction for the body until it reaches the other end. This eight-shaped pattern will repeat until the last panel of the mine. This configuration allows for optimized entry to all mineralized ore bodies.

The excavation profile will be arched for better stability. The minimum curvature radius will be 25 m with dimensions of 5.5 m high by 5.3 m wide, adequate to accommodate the traffic of 45-tonne capacity trucks, ventilation and service ducts, and equipment access, as illustrated in Figure 16-7.

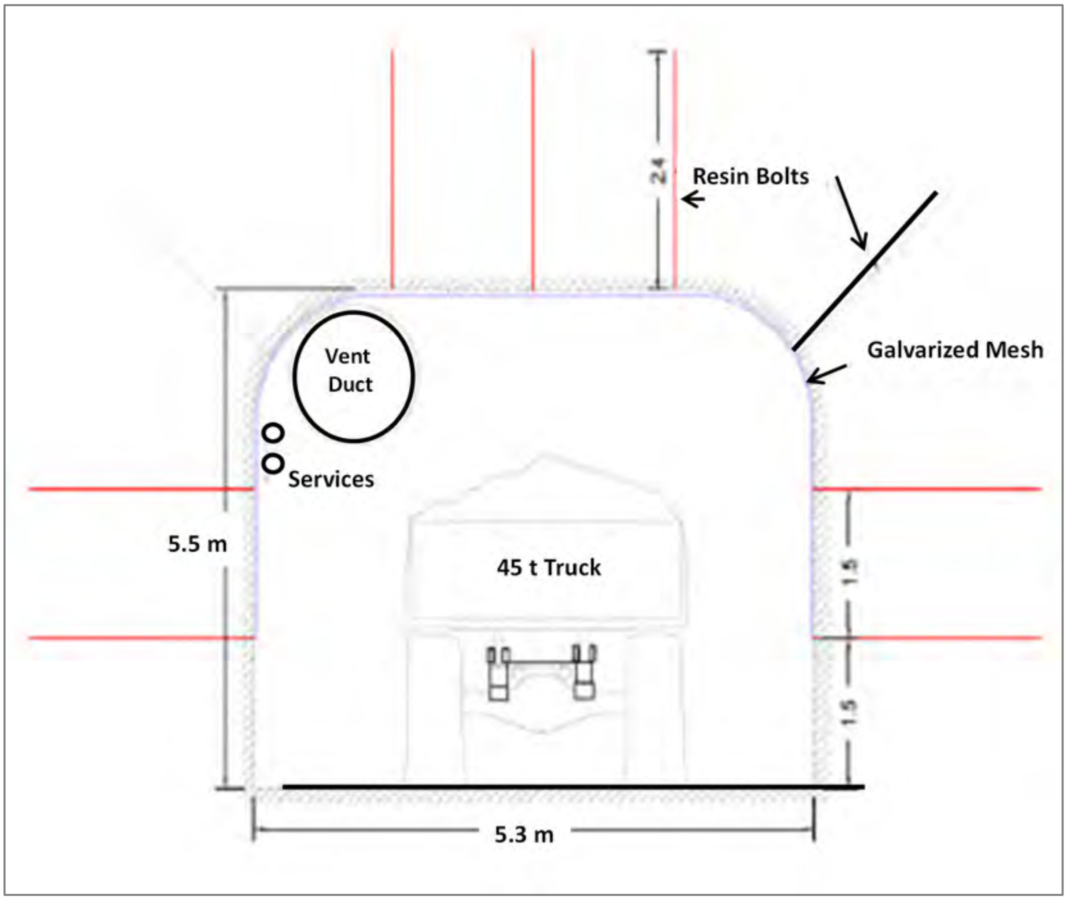


Figure 16-7: Typical Section of the Decline

The ramps, as part of the main ventilation system, serve as a source of fresh air, allowing clean air from the surface to flow through the mine and ventilate the working faces within the panels. Secondary fans are installed at the entrances of each level to collect this air and force it inside the working faces.

The ramps will be designed with a maximum inclination of 15% and with pullouts or mucking bays every 100 m to improve vehicle traffic and facilitate the drifting process.

Each level or mine panel will be accessed from the ramps developed close to the ore bodies.

At each sublevel, crosscuts will be developed to access the bodies, generally with a transversal direction to the mineralized bodies, which must be at least 20 m from the ramp, respecting the pillar between the ramp and the mineralized zones.

Once the mining area is accessed, the development must occur parallel to the orebody's strike. For this project, all ore drives are planned to follow the operational design after completion of the infill drilling model. The ore drives are intended for blast drilling and mineral extraction. Loading points will be opened every 100 m, measuring 16 m wide and 5 m high. The first 3 m will be post excavated with 7 m height to allow the low-bed underground wheel loader (load-haul-dump or LHD) to tip inside the truck. Figure 16-8 shows the positioned drives in brown within the projected stopes in green.

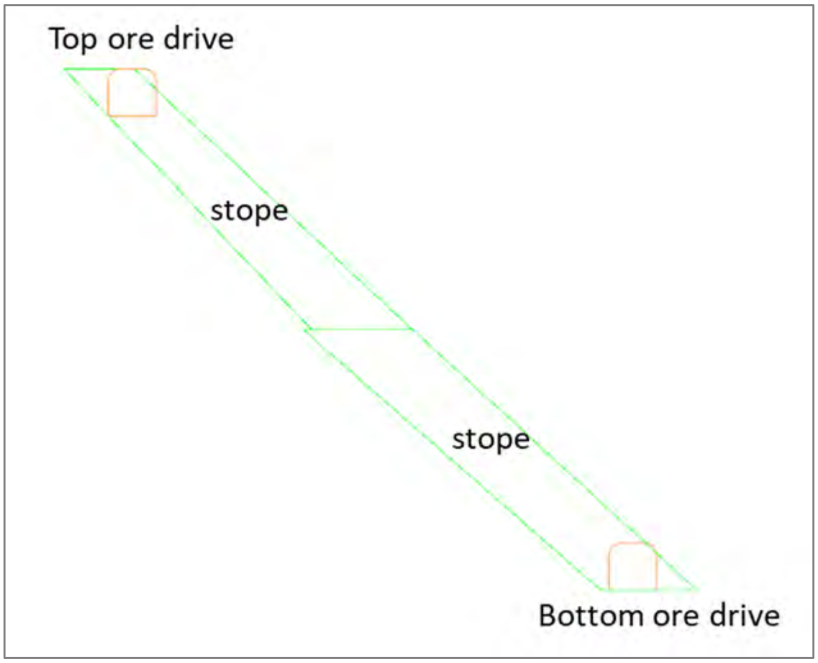


Figure 16-8: Schematic Arrangement of the Gallery Position for Bottom-Up Stope Mining

In each panel, a gallery will be excavated to accommodate facilities such as the electrical substation, pumping station, water tank, bathrooms, and refuge chamber. Additionally, ventilation drives will be excavated to receive the return air, connecting the working faces to the main exhaust system. Exploration bays will also be established at each panel for grade-control drilling, commencing at the ramp. The mucking bays, which will be opened every 100 m, can later be used as sites for grade-control drilling.

The vertical development of the mine will incorporate a network of ventilation raises to facilitate the intake and exhaust of air between the surface and underground areas. The intake ventilation raises will be equipped with escape ladders for emergency exits. These raises will be excavated using a raise borer. The intake raises will have diameters of either 4.1 m or 4.0 m x 4.0 m, while the return raises will have diameters of 4.1 m or 5.0 m x 5.0 m.

Another return raise with a diameter of 2.4 m will be excavated to ventilate the room-and-pillar area and supply clean air during the necessary development activities to reach the main exhaust raise excavation position.

16.4.2 Mine Design Parameters

Ore reserve grades are diluted along lithological boundaries and assume a selective mining operation.

For the sublevel stoping mining method, ore reserve volumes and tonnages assume 90% mine recovery, 14% of planned dilution, and 0% of operational dilution, since the stope stability is being reinforced by cable bolts installed in the hanging wall or in any required area.

For the room-and-pillar mining method, ore reserve volumes and tonnages assume 100% mine recovery, 9% of planned dilution, and 10% of operational dilution due to over-breaking.

For the ore from development works, ore reserve volumes and tonnages assume 100% mine recovery, 46% of planned dilution, and 10% of operational dilution due to over-breaking.

A technical cut-off grade of 0.5% Li_2O was applied to the block model for the classification between ore and waste rock.

The geotechnical parameters adopted for the mine planning design of the sublevel stoping method were:

- Crown pillar: 10 m
- Panel height: 55 m
- Sill pillar: 4 m
- Minimum pillar between parallel stopes: 4 m
- Maximum stopes spam: 80 m
- Rib pillar: 4 m
- Minimum distance between ramp and panels: 20 m.

The panels will be up to 55 m high, with levels of approximately 27.5 m high. Figure 16-9 shows schematically a typical panel of the Bandeira mine, with a representation of the sill pillar, rib pillar, development galleries, and the mining sequence numbered as 1 and 2.

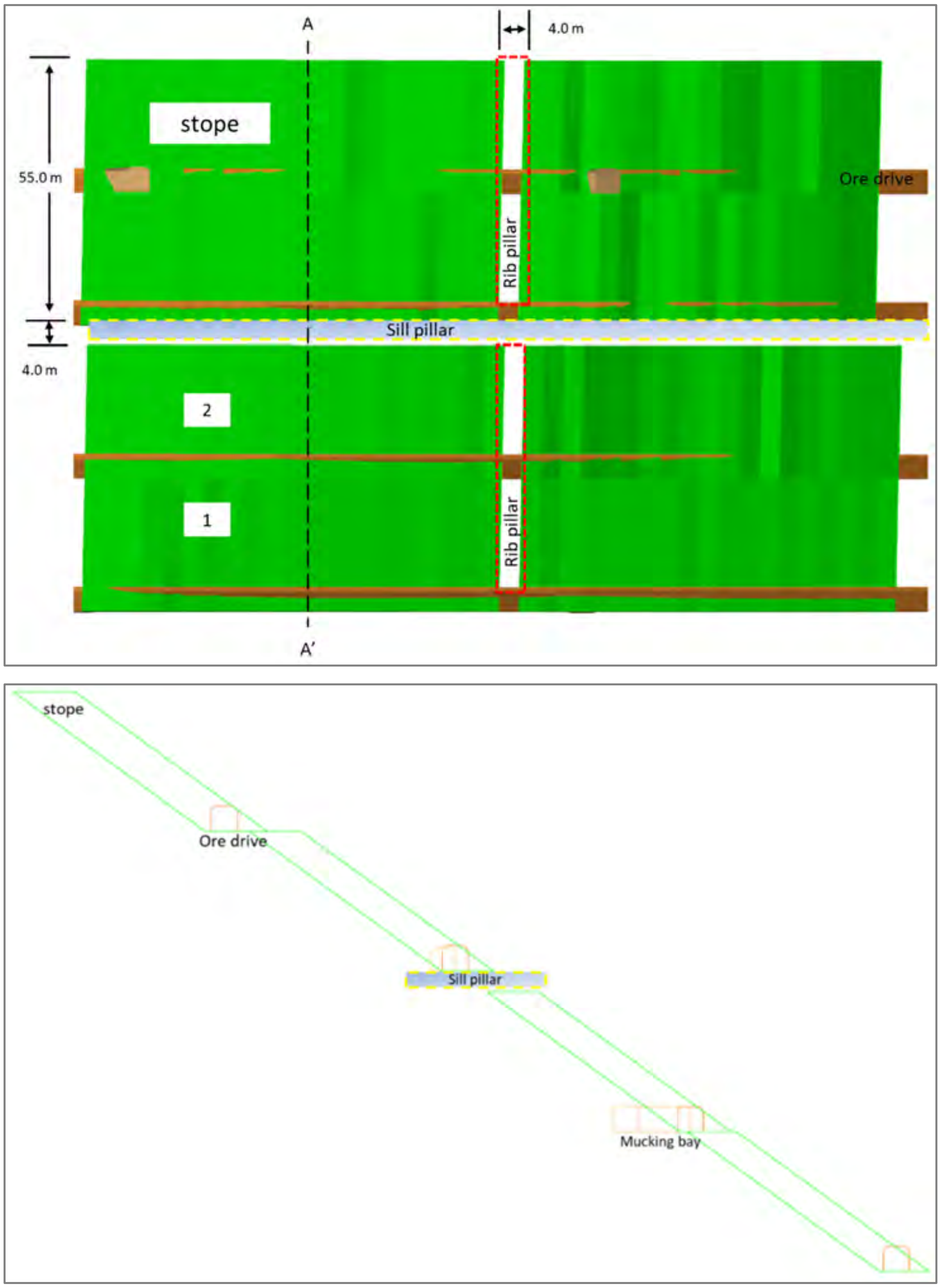


Figure 16-9: Typical Panel of the Bandeira Mine

The geotechnical parameters adopted for the mine planning design of the room-and-pillar method were:

- Pillar width: 4 m
- Pillar length: 4 m
- FW and HW barrier pillar: 20 m
- Maximum panel height: 8 m.

Figure 16-10 shows the schematic drawing of the room-and-pillar mining, where the hatch squares are the pillars, and the white squares are the tributary area.

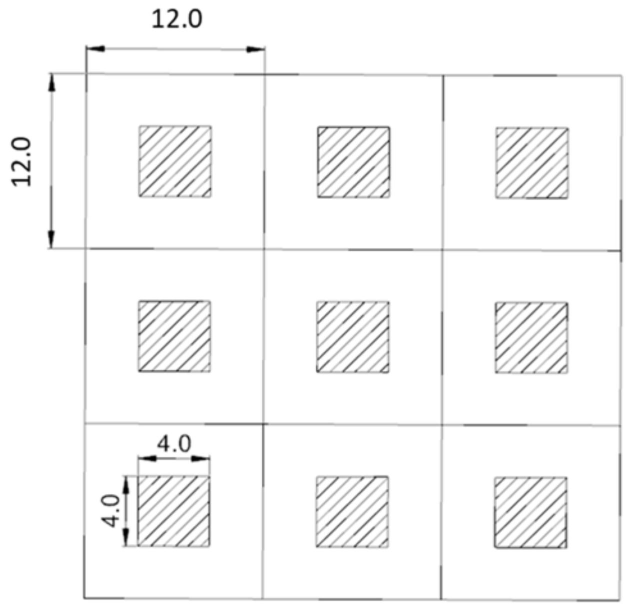


Figure 16-10: Schematic Drawing of the Room-and-Pillar Mining Method

16.4.3 Stope Optimization

The stope design optimization was conducted using the Datamine's Mineable Stope Optimization (MSO) software, allowing for the creation of stopes based on preset dimensions and achieving cut-off values selected based on economic parameters. This software was used to determine the economic division of the mineral deposits.

The MSO algorithms consider economic parameters, geological and geotechnical factors, and operational constraints for the optimal design of stopes throughout the orebody, encompassing elevations from 260 to −420 m. Due to the complexity of the ore bodies along the azimuth, and the number of present veins, a methodology of creating multiple frameworks was adopted for stope optimization. Each vein was optimized in a configuration that best respected the dip angle of the material and its irregular behaviour along the azimuth.

The stopes were optimized following operational and technical parameters, resulting in an estimated mine life of 14 years. In the sublevel stoping method, the scenarios were configured to result in solids divided into dimensions of 55 m high per panel, a minimum thickness of 2 m, and a minimum dip of 37°. The software ensured compliance with the minimum cut-off grade, and dilution was set free to maximize mine recovery, with no dilution skin considered. During the optimization rounds, all resource categories were considered as ore, and inferred stopes was excluded later during the feasibility evaluation of the stopes.

For the room-and-pillar method, chambers measuring 12 x 12 m and internal pillars measuring 4 x 4 m were created.

Table 16-2 presents the parameters used for optimization.

Table 16-2: Optimization Parameters

Item	Value
Optimized Variable	Li_2O
Cut-Off	0.50%
Minimum Mining Width	2 m
Sublevel Panel Height	55 m
Sublevel Stope Height	(20 / 15 / 20) m
Sublevel Stope Width	10 m
Sill Pillar	4 m
Dip	minimum 37°
Azimuth	by lens
Room	12 m x 12 m
Pillar	4 m x 4 m

As a result, solids were generated representing the mined area of the room-and-pillar and the sublevel stoping methods. Figure 16-11 shows the room-and-pillar mine, Figure 16-12 shows the sublevel mine. The Y in the cardinal axis indicates the north direction. The optimization results are presented in Table 16-3.

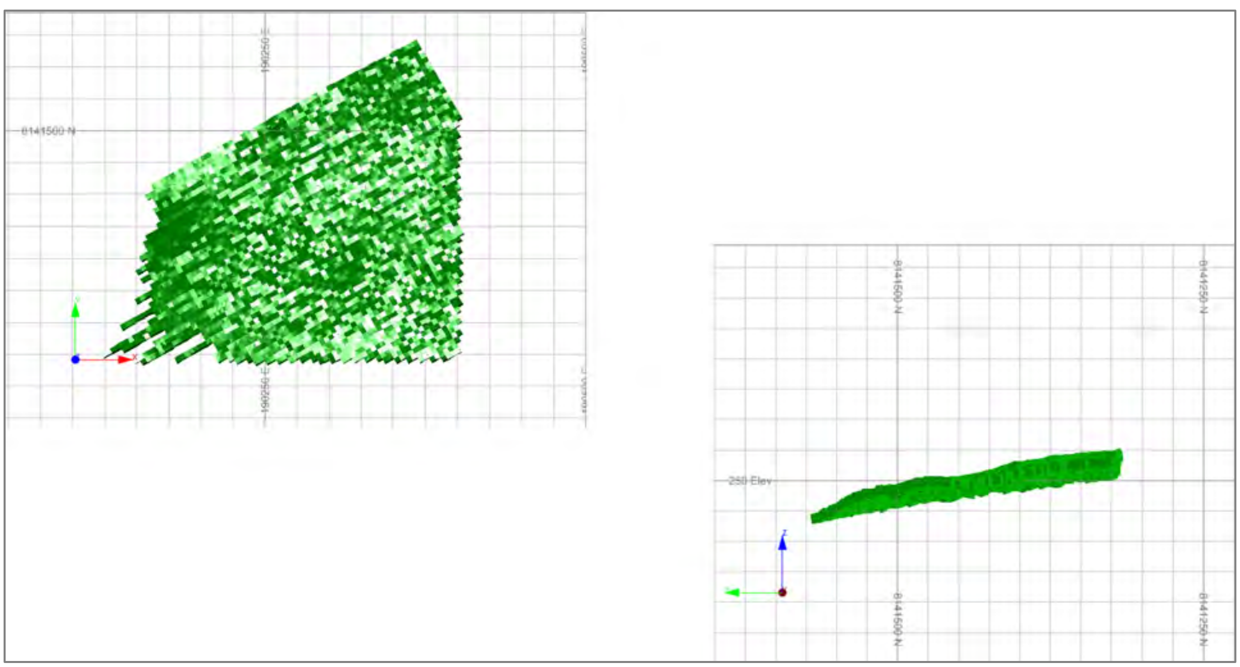


Figure 16-11: Room-and-Pillar Solids

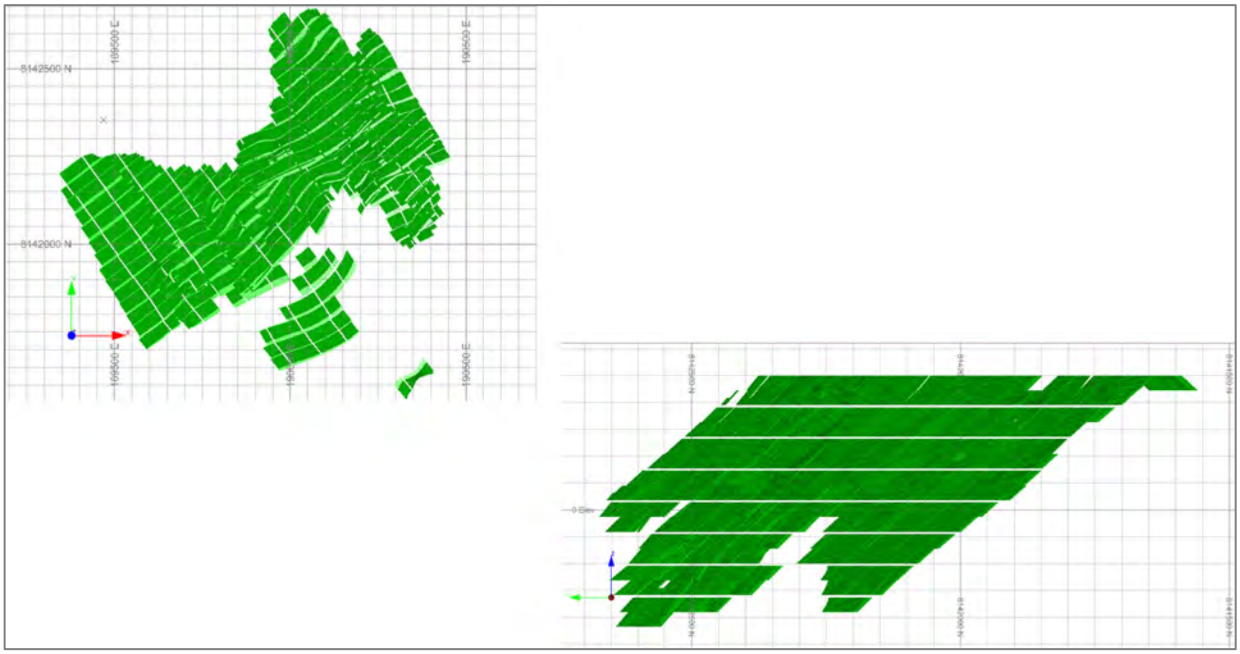


Figure 16-12: Sublevel Stoping Solids

The optimization process outputs a mineable mass of 35.42 Mt at 1.17% Li_2O for the portions mined by the room-and-pillar method and sublevel stoping. The results included the Inferred Mineral Resources and show the Project potential if Inferred Mineral Resources could be treated as ore. Table 16-3 shows detailed results considering all resource categories and potential planned dilution.

Table 16-3: Optimization Results, Including Waste and Inferred Mineral Resources

Category/Material	Tonnes	Li_2O (%)
[1]	1,794,841	1.49
[2]	12,989,975	1.39
[3]	12,955,831	1.47
Waste	7,684,296	0.21
Total	35,424,943	1.17

Access structures to the stopes were created, including crosscuts, ore drives, declines, waste connections, mucking bays, and ventilation drives. The decline 5.30 m wide and 5.50 m high, primary and secondary development drifts will have dimensions of 5.0 x 5.0 m, with an arch radius of 1.25 m. Ventilation raises will have two different diameters: 4.1 m for the sublevel stoping mine and 2.4 m diameter for room-and-pillar mine.

Figure 16-13 illustrates the mine development structures and Figure 16-14 and Figure 16-15 show how these structures connect with the stopes for the room-and-pillar and sublevel stoping methods, respectively.

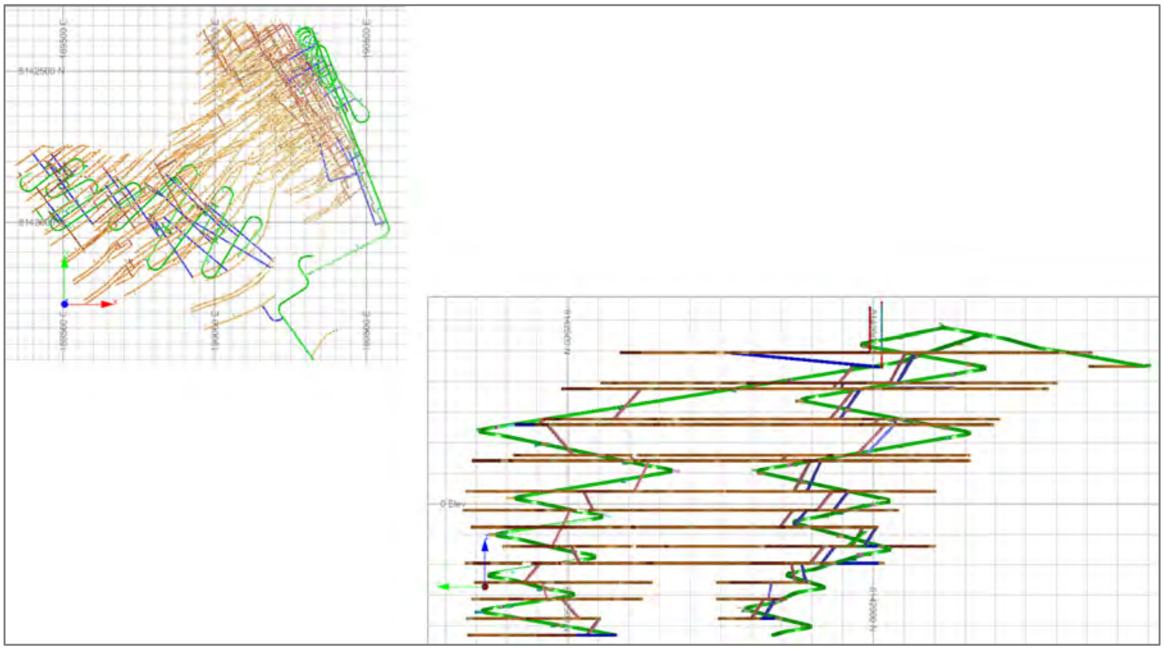


Figure 16-13: Mine Development Structures

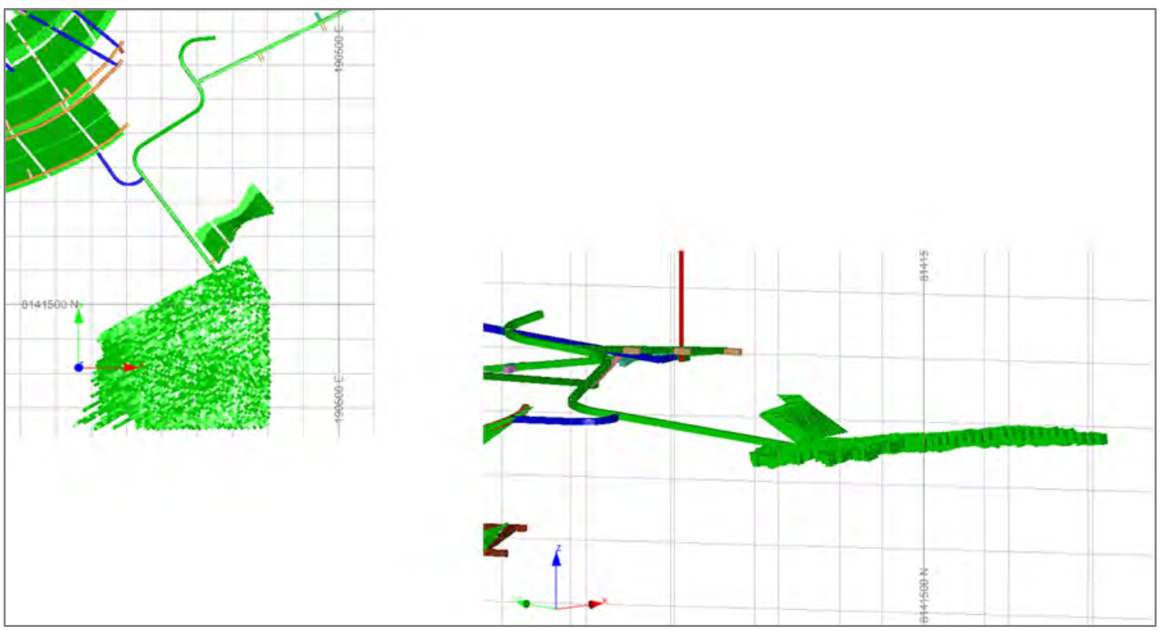


Figure 16-14: Connection Between the Development Structures and Room-and-Pillar Stopes

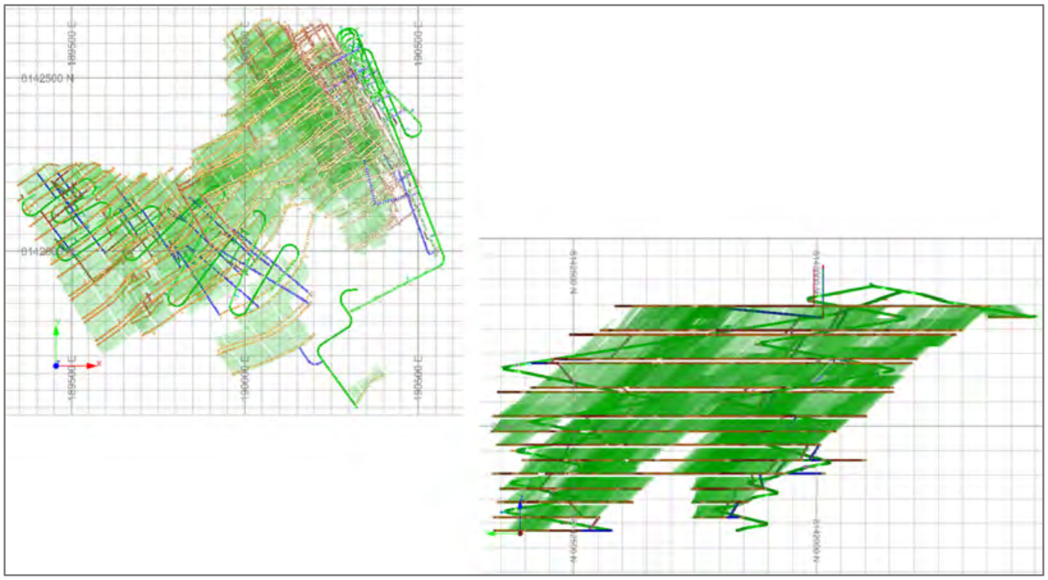


Figure 16-15: Connection Between the Development Structures and Sublevel Stopes

To calculate the reserves a new resource category called "RESCAT" was established, based on the largest amount of metal within a resource category inside the mine solids (stopes). This was necessary to exclude all inferred stopes from the calculations. Additionally, all inferred material present in the reserve stopes was considered as waste and treated as dilution material.

After all development was designed, a feasibility analysis of the stopes was conducted, including all main mine costs such as stoping, mineral process, development, raises, and general and administrative (G&A). Additionally, CFEM (federal mining taxes), TRFM (state taxes for mining activities), and royalties were subtracted from the long-term lithium price used in this evaluation. Table 16-4 presents the first-pass parameters used in the mine economic evaluation.

Table 16-4: First-Pass Parameters in the Stope Optimization

	Unit	Total
Net Concentrate Selling Price 5.5% Li_2O	$/t conc.	1,662
Net Concentrate Selling Price 3.0% Li_2O	$/t conc.	711
Process Cost	$/t	12.3
G&A	$/t	4.0
Mine Cost—Sublevel	$/t	35.0
Mine Cost—Room & Pillar	$/t	42.0
Decline Cost	$/m	5,000
Lateral Development Cost	$/m	4,000
Raise Borer Cost	$/m	7,000
Metallurgical Recovery 1	%	65.9
Metallurgical Recovery 2	%	10.4
Concentrate Grade 1	Li_2O %	5.5
Concentrate Grade 2	Li_2O %	3.0

An average ROM metallurgical recovery of 65% and the mining dilution were already included. The dilution varies from stope to stope, with an average value of 17%. As a result, the ore reserves are 1.96 Mt at 0.97% Li_2O from development, 0.97 Mt at 1.05% Li_2O from room-and-pillar, and 14.27 at 1.19% Li_2O from sublevel stoping, giving a total of 17.20 Mt at 1.19% Li_2O.

After additional tests have been completed, a revised average metallurgical recovery of 68.9% was assumed to produce the 5.5% Li_2O concentrate, and the lower grade concentrate has not been considered at this phase of the Project. Table 16-5 summarizes Bandeira's production profile with the new changes.

Table 16-5: Bandeira's Production Profile

	Unit	Total
Total Project Life (LOM)	years	15
Total LOM Production (Ore Mined)	Mt	17.2
Nominal Plant Capacity	Mt/a	1.3
Average Plant Throughput	Mt/a	1.15
ROM Li_2O Grade (Diluted)	%	1.16
ROM Underground Mine Dilution	%	17
Average Waste Generation	kt/a	218
SPO Annual Production @ 5.5% Li_2O	kt/a	159
SPO Annual Production @ 3.0% Li_2O	kt/a	69
SPO Annual Production @ 5.5% Li_2O Equivalent	kt/a	184
SPO 5.5% Li_2O Metallurgical Recovery	%	65.9
SPO 3.0% Li_2O Metallurgical Recovery	%	10.4
SPO 5.5% Li_2O Mass Recovery	%	13.9
SPO 3.0% Li_2O Mass Recovery	%	6.0

16.4.4 Mining Development

Two declines were developed for the Bandeira underground mine. The east decline starts at Elevation 310 and ends at Elevation −218 in the Z-axis. The west decline begins at Elevation 293 and ends at Elevation −217. Both have a 15% gradient, a minimum radius of 25 m, and footwall access. Safety measures include 20 m pillars between the stopes on mineralized walls and 4 m pillars between galleries.

Sumps developed in crosscuts are 12 m long, with the first 3 m having 0% gradient, and the remaining 9 m having a −15% gradient. Sumps developed in the declines have the first 3 m with 0% gradient, and the next 12 m with −15% gradient. Sumps were created every 360 m of decline development.

One access was developed for the room-and-pillar mine from the east ramp, providing access to the main chamber.

Two extraction configurations were designed for the sublevel stoping mine. For the 'descending–ascending' extraction method, each panel has two accesses for the stopes: one in the upper sublevel and another in the lower sublevel. This setup ensures the drilling of ascending holes from the lower sublevel, as well as holes going down from the higher sublevel, allowing for the mining of the entire 55 m panel.

The other method is 'ascending–ascending' extraction, where the sublevel crosscuts were projected in the lower level and in the middle of the panel. All drilling will be ascending, and extraction will occur in a top-down order after both sublevels are fully developed. All crosscuts are at least 20 m long starting from the decline, with a gradient close to 1%, which prevents water accumulation.

Ore drives were developed from crosscuts along the stopes. Waste connections were designed in sublevels where multiple stopes were generated in different veins, allowing stoping ore in multiple areas. The ore drives include 15 m mucking bays positioned every 100 m to meet maneuvering needs.

Ventilation raises extend from the surface level down to the lowest elevation of the declines. They are connected to the mine through ventilation galleries, with the same development configuration as the crosscuts and ore drives, and subsequently connecting to the ventilation raises. These raises have a minimum incline of 45%, with both intake and return air shafts measuring 4.1 m in diameter. They are separated from nearby excavations by a minimum 7 m pillar. In the room-and-pillar mine, a smaller return raise will be constructed with a diameter of 2.4 m.

Regarding development, the advancement for each structure is shown in Table 16-6.

Table 16-6: Length of Underground Development Structures (m/a)

Year	−2	−1	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Primary Lateral Development	1,518	1,717	1,214	1,723	481	1,636	430	1,053	939	607	736	899	1,125	875	263	-
Secondary Lateral Development	420	3,175	3,806	3,301	4,608	3,420	4,587	3,968	4,062	4,430	4,290	4,063	3,785	3,251	2,009	110
Ramp	1208	480	480	480	481	480	417	436	467	340	320	446	481	480	156	-
Ventilation Raises	336	287	37	617	116	247	124	140	182	108	325	110	328	162	39	-

16.4.5 Stoping Activities

The stoping activities assumed for the room-and-pillar mine are similar to face development. The ore extraction cycle starts with the jumbo performing front drilling on the mine face. Then, the blast team will charge and blast the face at the end of the shift. After the dissipation of the explosive gases, the LHD will load haulage trucks, which will travel to the surface to discharge directly into the crusher or the crusher yard. Once all ore from the face has been mucked, the scaler will remove any loose rock. The jumbo will then drill and install the rock bolts with resin, before starting production drilling, in a new mining cycle. To achieve the required production, several faces will be operated simultaneously.

The room-and-pillar chamber is 8 m high, with two cuts of 4 m. In the first 4 m, mesh will be added to the roof area, and 8 m bolts will be installed with cement grout at the intersections. These activities are crucial to ensure the safety of operations when the lower part is being extracted.

For the sublevel operation, the cycle starts after completing the ore drive development with the roof support reinforcement. Cable bolts (steel strand wires grouted into boreholes) measuring 8 m long will be installed into the hanging wall to control dilution, and 5.5 m cable bolts will be installed to protect the stoping brow area.

Then, the fan drill starts to drill the blast rings upward and downward according to the blast plan. To open the slot free face on the bottom level and top level, a slot driller called RHINO will drill the slot bore holes of 0.710 m for every slot in each position. Once the drilling activities are concluded and the stope region is scaled, the blast team charge the free face rings and blast.

As the free face is opened, the real ore ring blasting begins, initially with a small number of rings, starting on the lower levels and then on the upper levels. As the rings are blasted, a larger space will be opened to accommodate larger blasts, allowing a larger number of rings to be blasted simultaneously. Between the blasts, the LHD loads fragmented ore and mine trucks haul it to the surface.

These activities of ring blasting, loading, and hauling continue until the stope is completely depleted. After that, the void space will be filled with rock fill.

16.4.6 Mining Schedule

Mining scheduling was performed using EPS software version 3.1.144. The software was set up to respect the mine direction and restrictions to deliver a long-term mine plan that offers good predictability over this time frame. Sublevel mining activities occur in retreat at the end of each level's ore drive development, while room-and-pillar mining occurs in advance as the faces are being developed. Targets were set for decline development, lateral gallery development, and mass movement.

Total monthly targets were defined for both decline developments, ranging from 80 m to 90 m per month for the first three months, with production increasing at a varied rhythm from 100 m to 157 m per month. By the start of Year −1, the decline development drops to an average of 100 m per month and in Year 1, it reduces to 80 m per month until the end of the mine’s life.

For lateral development (Including the two declines), production ranges from 80 m per month to 300 m per month at the end of Year −2. As the mine faces increases, production also increases, reaching 350 m per month on Year −1, and growing to an average production of 475 m per month. Lateral development aimed to maintain a consistent pace until Year 6, when it decreased to a range of 350 m per month, decreasing year by year until completing all forecast mine lateral development.

The mining schedule for Bandeira was determined to achieve a plant feed close to 1.3 Mt of ROM. Separate targets were set for the room-and-pillar and sublevel stope methods to achieve the required ROM movement. A target of 1.24 Mt of ROM is achieved in Year 2 and remains consistent until the mine's resources are depleted. The parameters used in the EPS can be seen in Table 16-7. Table 16-8 and Figure 16-16 to Figure 16-22 present the mining scheduling results.

Table 16-7: Mine Scheduling Parameters

	Unit	Scheduled
Sublevel Stoping Production Rates		
Ascending/Descending	ROM t/d	300
Ascending/Ascending	ROM t/d	300
Room-and-Pillar		
Production Rate	ROM t/d	130
Ramp (First Access)	m/month	80
Ramp	m/month	40
Production Drive	m/month	40
Cross Cut	m/month	40
Raise	m/month	50

Table 16-8: Mine Scheduling—Production Plan Bandeira

Year	−2	−1	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Plant Production																
Feed Mass	-	-	830,197	1,240,470	1,300,934	1,111,961	1,178,307	1,265,569	1,287,666	1,268,934	1,257,524	1,275,864	1,305,088	1,279,267	1,302,660	1,298,641
Li_2O (%)	-	-	1.08	1.12	0.99	1.08	1.17	1.14	1.18	1.17	1.11	1.19	1.20	1.22	1.22	1.29
Rec Met 5.5 (%)	68.9	68.9	68.9	68.9	68.9	68.9	68.9	68.9	68.9	68.9	68.9	68.9	68.9	68.9	68.9	68.9
Rec Mass 5.5 (%)	0.00	0.00	13.55	14.02	12.39	13.52	14.65	14.27	14.77	14.65	13.90	14.90	15.02	15.27	15.27	16.18
Total Conc Mass 5.5 (t)	0	0	112,452	173,944	161,248	150,355	172,603	180,632	190,235	185,879	174,761	190,088	196,076	195,400	198,973	210,161
Detailed Production																
Total ROM Mass (t)	18,184	260,009	552,004	1,240,470	1,300,934	1,111,961	1,178,307	1,265,569	1,287,666	1,268,934	1,257,524	1,275,864	1,305,088	1,279,267	1,302,660	1,181,912
Total Li_2O (%) ROM	0.88	1.10	1.08	1.12	0.99	1.08	1.17	1.14	1.18	1.17	1.11	1.19	1.20	1.22	1.22	1.28
Rom Mass Sublevel (t)	-	80,777	213,738	796,534	735,988	952,139	974,591	1,102,092	1,080,489	1,119,393	1,116,355	1,161,328	1,214,391	1,206,503	1,245,723	1,152,577
Li_2O Sublevel (%)	-	1.17	1.04	1.16	1.10	1.11	1.20	1.17	1.22	1.20	1.12	1.21	1.22	1.24	1.23	1.28
Rom Mass RP (t)	-	90,938	184,873	364,750	334,005	-	-	-	-	-	-	-	-	-	-	-
Li_2O RP (%)	-	1.17	1.31	1.12	0.79	-	-	-	-	-	-	-	-	-	-	-
Rom Mass Dev (t)	18,184	88,294	153,393	79,186	230,942	159,822	203,716	163,477	207,177	149,541	141,169	114,536	90,697	72,765	56,938	29,335
Li_2O Dev (%)	0.88	0.96	0.86	0.76	0.93	0.93	1.05	0.94	1.02	0.99	0.98	1.00	1.02	0.99	1.04	1.11
Development																
Dev Primary (m)	1,538	2,076	1,276	2,785	992	1,583	1,520	682	450	498	309	661	624	254	-	-
Dev Secondary (m)	420	2,170	4,237	2,657	4,730	4,238	4,179	5,180	4,685	4,660	4,357	3,701	3,310	3,032	1,121	604
Dev Lat Total (m)	1,958	4,245	5,513	5,442	5,722	5,821	5,699	5,862	5,135	5,158	4,666	4,362	3,934	3,286	1,121	604
Detailed Development																
Dev Decline (m)	1,227	1,195	959	959	962	959	822	97	-	-	-	-	-	-	-	-
Dev Xcut (m)	200	1,440	401	1,501	583	1,388	559	2,086	1,057	1,433	1,386	1,524	1,205	1,029	88	10
Dev Muckbay (m)	120	-	735	360	465	420	465	582	535	540	495	477	515	313	120	60
Dev Ore Drive (m)	220	1,611	3,017	1,682	3,712	2,840	3,487	2,748	3,144	2,730	2,599	1,951	1,738	1,770	914	534
Dev Vent Drive (m)	131	-	300	801	-	154	291	304	279	365	156	335	282	175	-	-
Dev Infra (m)	60	-	100	140	-	60	75	45	120	90	30	75	195	-	-	-
Dev Vertical																
Dev Raise Total (m)	336	-	439	934	116	26	456	442	290	226	438	406	650	166	-	-
Raises Room-and-Pillar - ø=2.40 m	180	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Raises Intake and Return - ø=4.10 m	-	-	165	654	116	13	290	221	145	113	320	203	389	83	-	-
Waste																
Waste Mass (t)	147,614	177,494	203,530	453,389	194,690	255,347	209,295	211,606	279,444	153,673	224,928	219,669	248,469	252,883	94,252	20,267
Available Back Fill Mass (t)	-	87,211	202,456	597,082	574,732	501,021	511,973	579,672	569,578	590,573	587,603	611,505	640,295	636,307	657,756	617,595

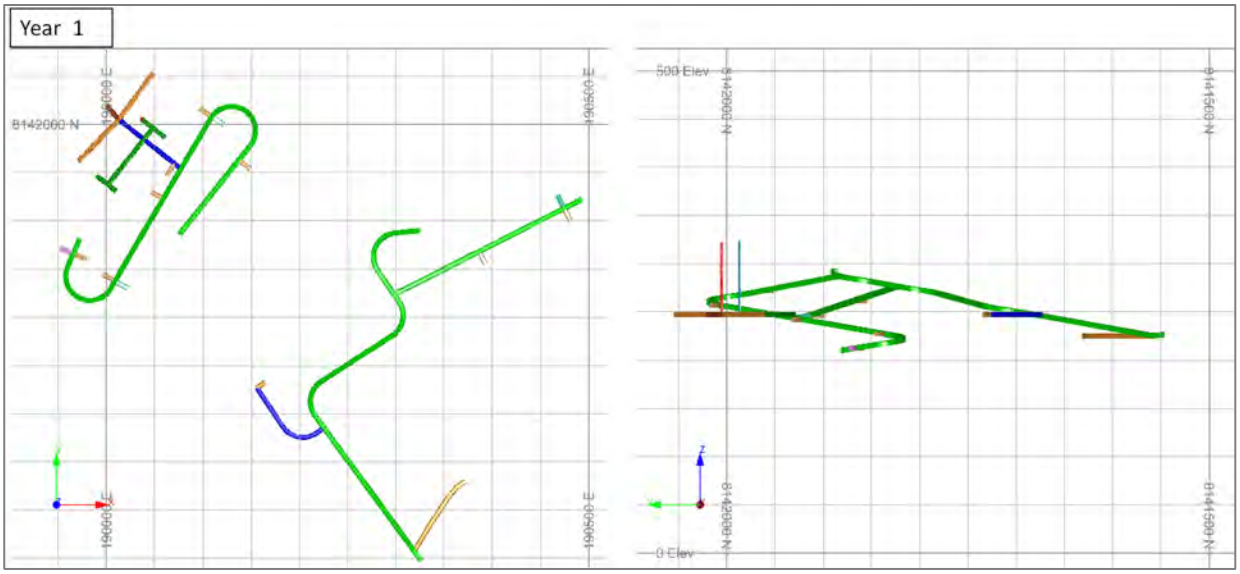


Figure 16-16: Year -2 Mine Sequencing

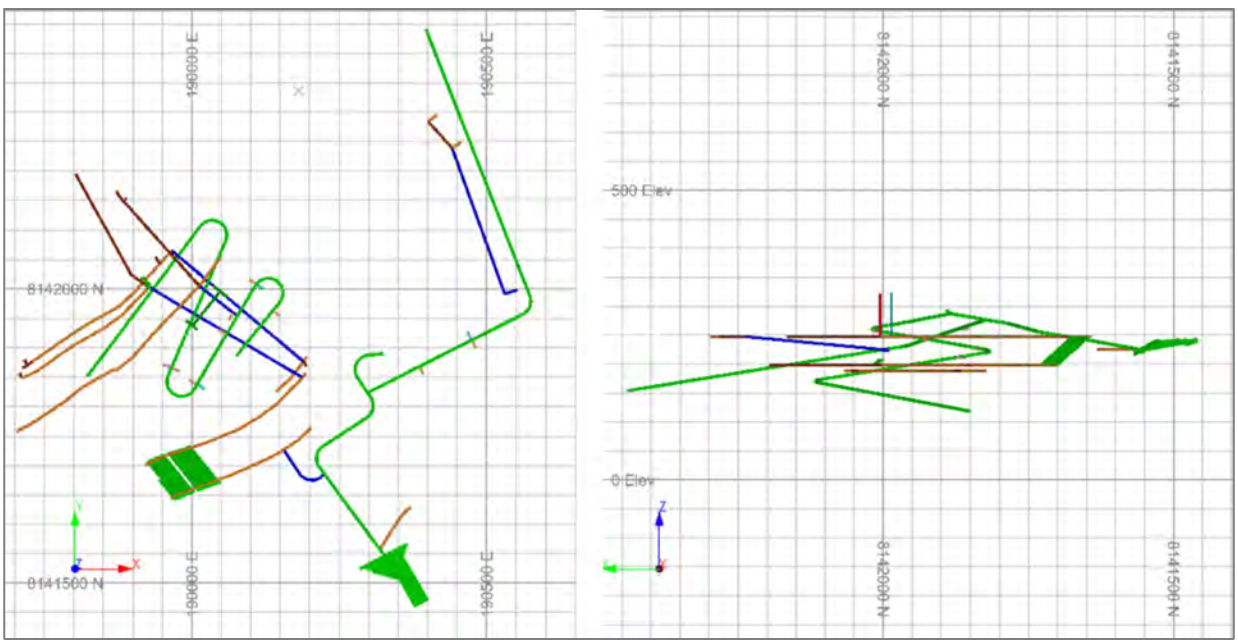


Figure 16-17: Year -1 Mine Sequencing

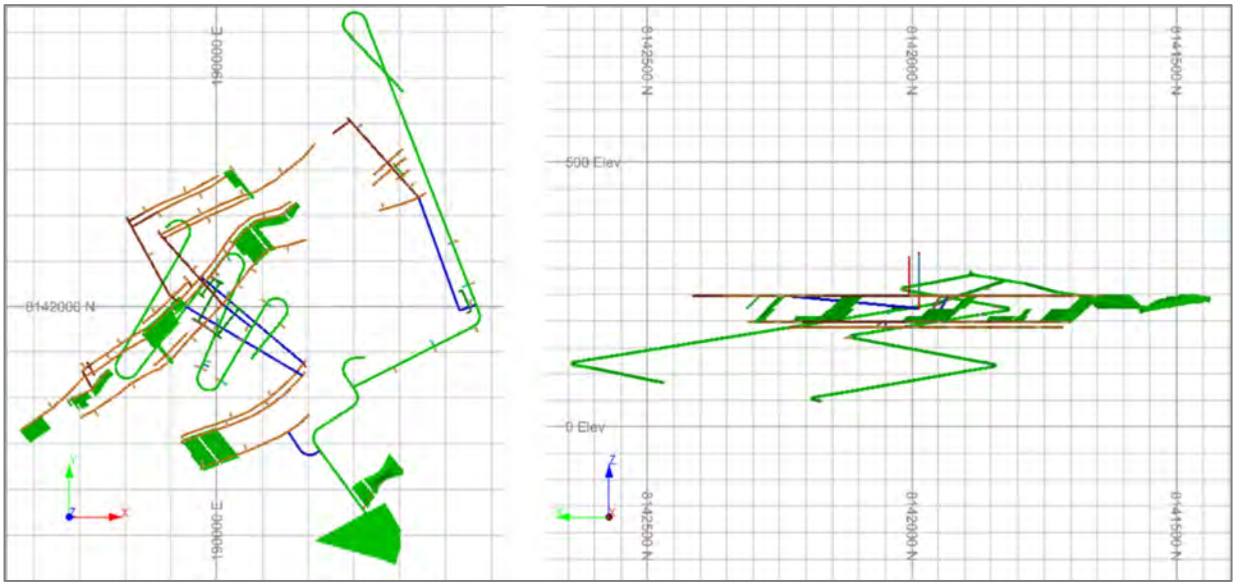


Figure 16-18: Year 1 Mine Sequencing

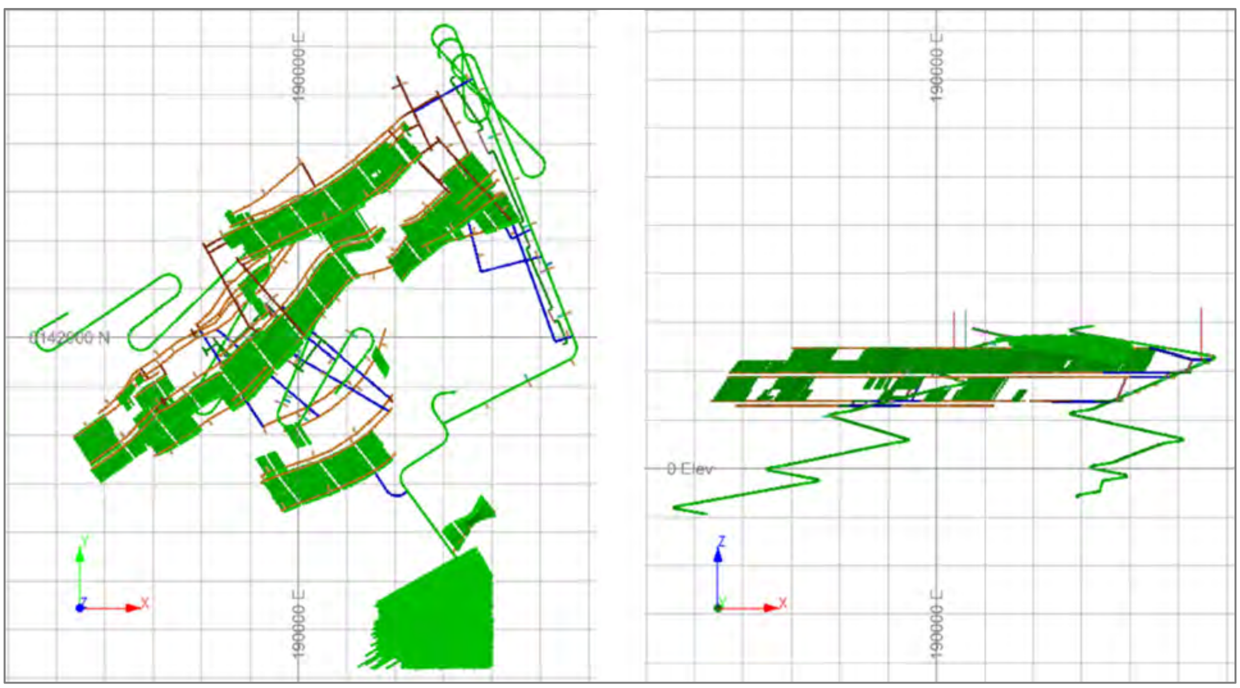


Figure 16-19: Year 2 Mine Sequencing

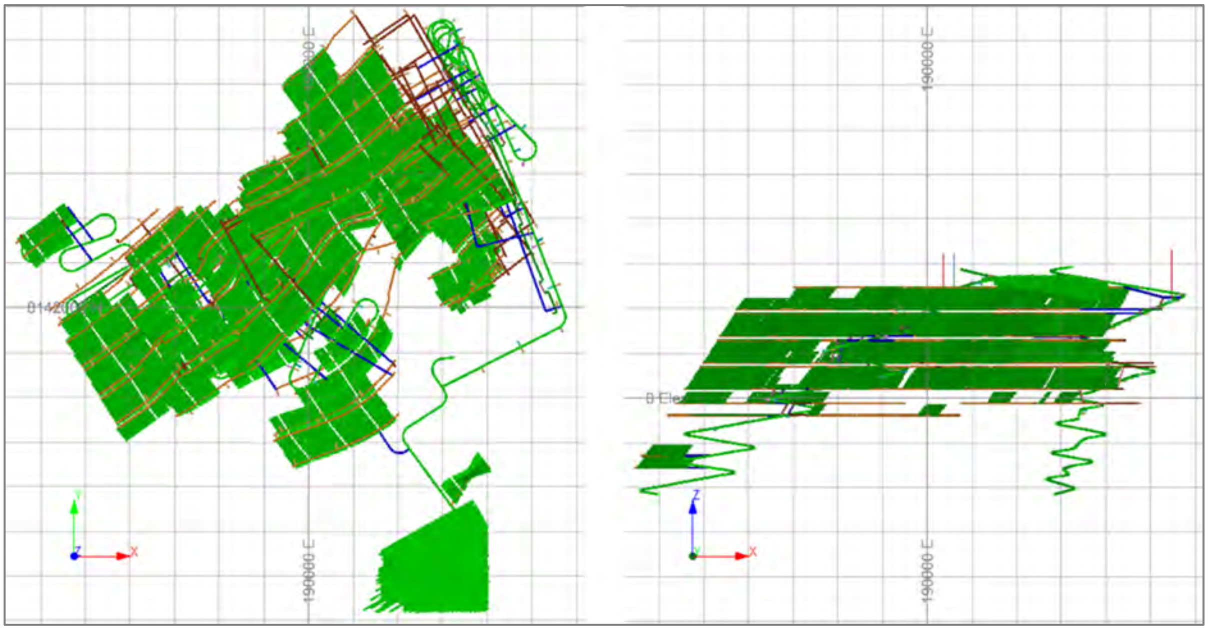


Figure 16-20: Year 7 Mine Sequencing

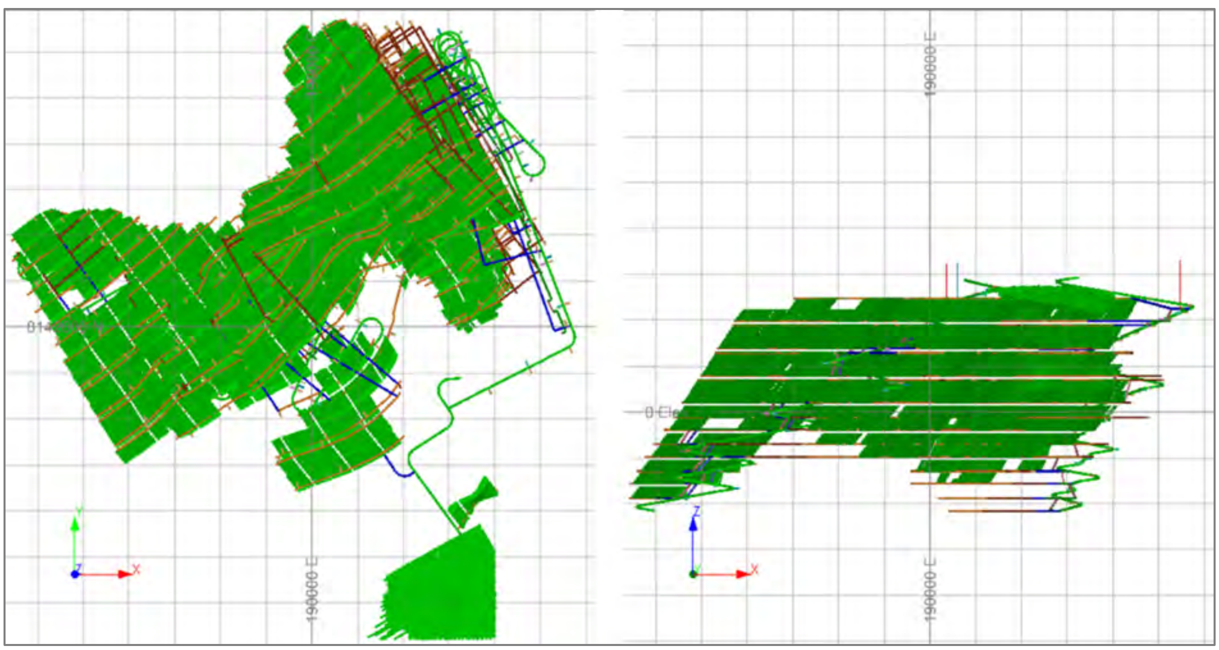


Figure 16-21: Year 12 Mine Sequencing

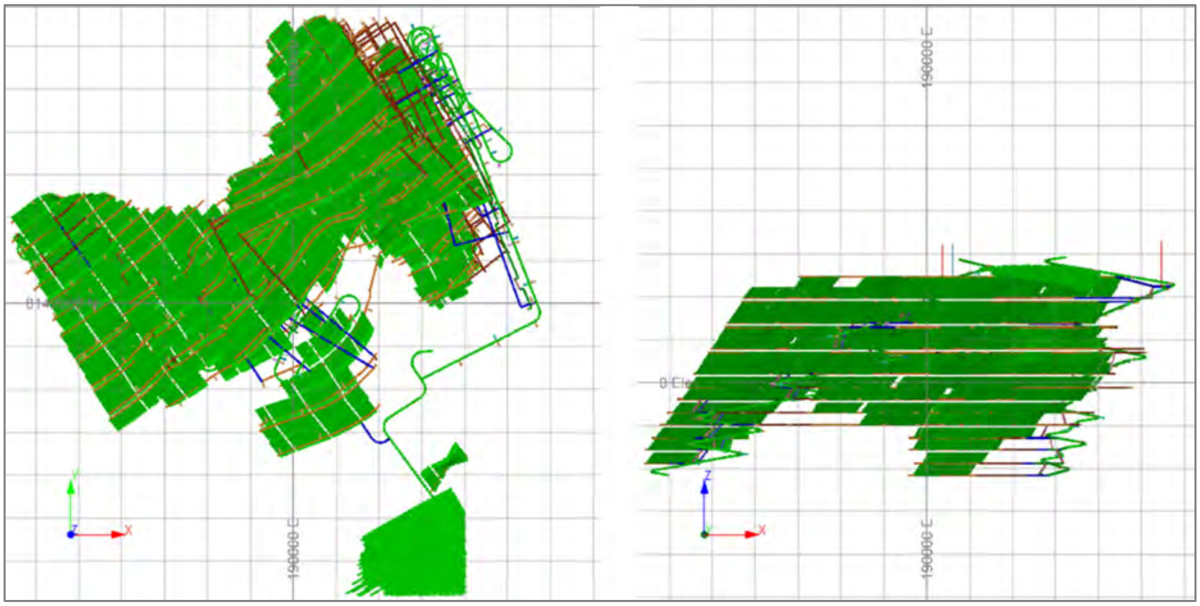


Figure 16-22: Year 14 End of LOM

16.5 Mine Equipment

16.5.1 Mine Production Equipment

Figure 16-9 lists the production equipment selected for the underground mine operation of the Bandeira Project, including their basic specifications, reference models, availability, utilization, and operational efficiency.

Table 16-9: Mine Production Equipment

Equipment	Basic Specification	Reference Model	Availability (%)	Utilization (%)	Op. Efficiency (%)
Truck	45 tonnes	Sandvik TH545i	80	65	83
LHD	15 tonnes	Sandvik LH515i	80	50	83
Longhole Drill	Top hammer 89 mm	Sandvik DL421	80	50	83
Jumbo 2 Boom	22 tonnes op. weight	Sandvik DD321	80	50	83
Cable Bolter	25 tonnes op. weight	Sandvik DS421	80	50	83
Raise Borer	Articulated, mobile, for up to 30 m slot raises	TRB Rhino 100	80	30	83

16.5.2 Drilling Equipment

The equipment used for drilling ore in the stopes will be an electrohydraulic top hammer long hole fan drill capable of drilling vertical and inclined fans and single or parallel long holes up to 54 m deep.

Ore drilling and blasting will be carried out from inside the galleries in the active stope. Blasting is planned to occur after all drilling is completed and all cables installed. The blasted material will be removed from the lower gallery.

The equipment used for drilling the ramps, galleries, and other horizontal openings will be a compact two-boom jumbo with an operational weight of 22 tonnes. The jumbo is capable of face drilling, crosscut drilling, and bolt-hole drilling. The boom provides coverage of 49 m², which is more than enough to cover the required area of 29 m². The equipment is also capable of drilling based on electronic blast fire plan, which represents higher productivity and less exposure. Additionally, the operator's safety cabin is equipped with rollover protective-structures and falling-object protective structures (ROPS/FOPS).

For roof reinforcement, the Project includes a specialized machine capable of installing cable bolts grouted with cement to be used inside the stoping area and for underground openings that require this kind of support. The cable bolter has an operational weight of approximately 25 tonnes and can drill and install bolts up to 25 m long. Both the cement mixer and the steel strand reel are onboard the machine. The hole size is 51 mm in diameter, and the operator's safety cabin has ROPS/FOPS protection.

The articulated mobile raise borer machine is fully mechanized and self-contained, featuring an electro-hydraulic system. It is specially designed for slot raising in drifts measuring at least 4.7 m x 4.7 m and will perform void hole drilling in stoping blasts. Capable of drilling upward or downward, it handles vertical and inclined raises ranging from 660 mm to 1,420 mm in diameter. Equipped with a FOPS/ROPS safety cabin, it incorporates a 290° rotation system, ±30°drilling module rotation, and a ±15° tilting system, all of which contribute to reducing dilution of the free face rings.

Table 16-10 and Table 16-11 summarize the productivity estimates for the fan drill and the cable bolter, respectively.

Table 16-10: Fan Drill Productivity Parameters and Annual Unit Production

	Unit	Production
Fan Drill Productivity (Slots)	m/d	195
	t/m	2.15
	Mt/a	0.15
Fran Drill Productivity (Rings)	m/d	195
	t/m	4.5
	Mt/a	0.32

Table 16-11: Cable Bolter Productivity Parameters and Annual Unit Production

	Unit	Production
Bolt Length	m	10
Cable Bolter Productivity	bolts/d	150
	t/bolt	25
	Mt/a	1.35

The productivity of the jumbo and the slot-raise borer are shown in Table 16-12 and Table 16-13, respectively.

Table 16-12: Jumbo Productivity

	Development (m/month)
Decline	
Multiblast (Years −2 and −1)	90
Single Blast	40
Drives and Infrastructure	40
Jumbo Productivity (m/month)	180

Table 16-13: Slot Raise Borer Productivity Parameters and Annual Unit Production

	Unit	Production
Raise Borer Productivity (Slots)	m/d	15
	m/a	5,400

16.5.3 Loading and Haulage Equipment

Both the blasted ore and the waste from mine development will be loaded by remote-controlled LHD loaders with a capacity of 15-tonne into 45-tonne underground mine trucks.

Table 16-14 and Table 16-15 show the parameters considered for estimating LHD productivity and truck fleet sizing, respectively.

Table 16-14: LHD Productivity Parameters

Scheduled time (h/a)	6,552
Availability (%)	80
Utilization (%)	50
Worked hours (h)	2,621
Efficiency factor (%)	83
Effective time (h/a)	2,175
Cycles per hour	25
Bucket capacity (m^3)	6.0
Bucket capacity (t)	13.12
Fill Factor (%)	80
Productivity (Mt/a)	0.57

A rehandle of 50% of the ore and waste materials has been added to the LHD production requirements.

Table 16-15: Truck Productivity Parameters

Scheduled time (h/a)	6,552
Availability (%)	80
Utilization (%)	65
Worked hours (h)	3,407
Efficiency factor (%)	83
Effective time (h/a)	2,828
Capacity (m^3)	18.0
Average Load (t)	39.4

16.5.4 Auxiliary Equipment

Table 16-16 presents a list of auxiliary equipment planned for the Bandeira Project, including their basic specifications and reference models.

An average availability of 75% was applied to all auxiliary equipment. Their utilizations were calculated based on the estimated hours worked by the fleet and the number of units required.

Table 16-16: Mining Auxiliary Equipment

Auxiliary Mining Equipment		
Scaler	8.5 m vertical boom reach	Normet Scamec 2000 S
Explosive Truck	4 t emulsion carrying capacity	Normet Charmec MF050 D
Scissor Lift	3 t, 3.5 m	Normet Utilift SF330
Shotcrete Remix Truck	4.4 m3	Normet Tornado S2
Shotcrete Spray Truck	up to 27 m3/h (electric operation)	Normet Alpha 30 VC
Fuel & Lub Truck	4,000 l	Normet Multimec SF60 + C350 Cassete
Personnel Carrier	14 persons carrying capacity	Normet Variomec XS 115 PER + C162 Cassete
Maintenance Truck	4 t carrying capacity	Normet Variomec XS 040 Mat + C125 Cassete
Jackleg Drill	34 kg	Tornibras TB303AM+TB300
Stoper Drill	40 kg	Tornibras TB303S
Air Compressor	mobile, diesel, 286 cfm, 10 bar	Atlas Copco XATS 300 Pd
Grader	10 t op. weight	Paus PG 10 HA
Ventilation Fan	110 KW	Howden 4800-VAX-2700 FB 15TG
Exhaustor	800 KW	Howden MVC 2293.00.15 SOV4T ARR8
Dewatering Pump	submersible, 170 m3/h, 73 m maximum height	Atlas Copco WEDA D80H
Diesel Generator	70 KVA	Atlas Copco QAS 70 Pd
Utility Vehycle	1 t, flat deck	Toyota Land Cruiser

16.5.5 Fleet Sizing

Table 16-17 shows the fleet requirements for the Bandeira Project mining operation.

Table 16-17: Mining Equipment Fleet Sizing (Number of Units)

Year	−2	−1	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Truck	1	4	6	10	10	11	12	17	13	13	16	16	16	16	13	14
LHD	1	2	3	4	4	4	4	6	4	4	4	4	4	4	3	3
Longhole Drill	0	1	1	3	3	4	4	4	4	4	4	4	5	5	5	5
Jumbo 2 Boom	2	3	5	5	5	3	3	3	3	3	3	3	2	2	1	1
Cable Bolter	0	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Raise Borer	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Scaler	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Explosives Truck	1	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Scissor Lift	1	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Shotcrete Remix Truck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shotcrete Spray Truck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fuel & Lube Truck	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Personnel Carrier	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Maintenance Truck	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Jackleg Drill	1	1	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Stoper Drill	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Air Compressor	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Grader	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Ventilation Fan	2	9	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Exhauster	2	2	2	3	3	4	4	4	4	4	4	4	4	4	4	4
Dewatering Pump	1	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Diesel Generator	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Utility Vehicle	4	4	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Total	24	39	66	74	74	75	76	83	77	77	80	80	80	80	75	76

16.6 Drilling and Blasting Plan

16.6.1 Longhole Drilling and Blasting

The drilling and blasting plan for the longhole drilling is shown in Table 16-18 and Figure 16-23.

Table 16-18: Longhole Drilling and Blasting Plan

	Unit	Plan
Drill Holes	No.	29
Total Length	m	462
Average Drill-Hole length	m	15.93
Solid Volume	m^3	1,953
Ore Density	m^3/t	2.7
Solid Mass		5,273.1
Mining Recovery	%	90
Spacing	m	2
Fan Mass	t	1,318
Specific Drilling	t/m	5.71
Charge Ratio	kg/m	4.76

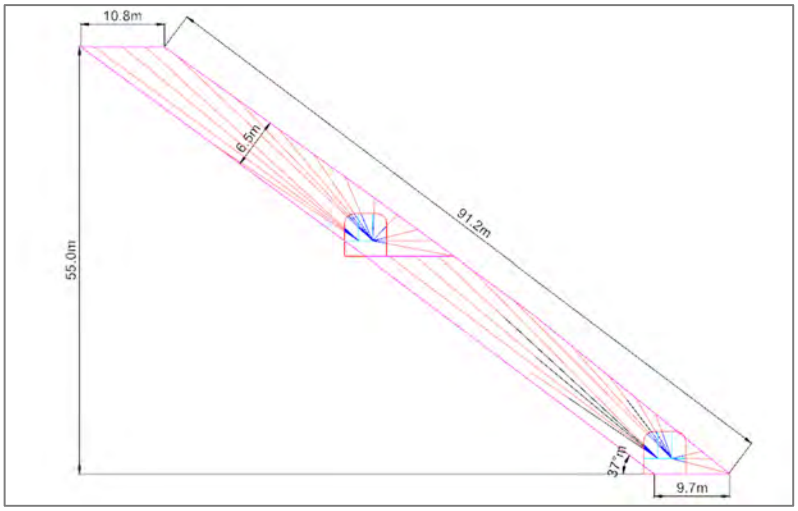


Figure 16-23:Longhole Drilling

16.6.2 Slot-Raise Drilling and Blasting

Table 16-19 presents the slot-raise drilling and blasting plan designed for the Bandeira Project sublevel stoping operation.

Table 16-19: Slot-Raise Drilling and Blasting Plan

	Unit	Slot Raise
TOTAL DRILL HOLES	No.	16
Enlarged 6"	No.	6
Loaded Drill Holes	No.	10
Average Drill-Hole Length	m	38
Enlarged Total Length	m	460
Loaded Total Length	m	383.33
Total Length	m	843.33
Average Dip	º	37
Solid Volume	m³	44.14
Ore Density	m³/t	2.7
Slot Mass	t	119
Specific Drilling	t/m	0.14
Plug	m	0.675
Drill-Hole Diameter	mm	89
Drill-Hole Volume	cm³	2,343
Explosives Density	(g/cm³)	1.5
Drill-Hole Mass	g	3,514
Drill-Hole Mass	kg	3.51
Booster	g	450
Total Booster Mass	g	4500
Total Emulsion	kg	35.14
Total Booster Mass	kg	4.5
Slot Total Mass	kg	39.64
Charge Ratio	g/t	333

16.6.3 Room-and-Pillar

The room-and-pillar drilling and blasting plan is shown in Table 16-20.

Table 16-20: Room-and-Pillar Drilling and Blasting Plan—Technical Parameters

Description	Unit	Parameters
Section area	m²	16.00
Section width	m	4.00
Total Drills holes	No.	29.00
Drill length	m	3.70
Blast yield	%	90.00
Blast advance	m	3.33
Total drilled	m	107.30
Total mass	t	158.24
Specific drill	t/m	1.47
Drill plan index	m/m³	1.81
Drill blast round index	m/m	32
Overbreak	%	10.00

16.6.4 Development

The design of the drilling and blasting plans for the ramp and drives is summarized in Table 16-21 and illustrated in Figure 16-24 and Figure 16-25.

Table 16-21: Development Drilling and Blasting Plan

Description	Unit	Plan
Section area	m²	28.50
Section width	m	5.30
Total Drills holes	No.	51.00
Drill length	m	3.70
Blast yield	%	90.00
Blast advance	m	3.33
Total drilled	m	188.70
Specific drill	t/m	1.55
Drill plan index	m/m³	1.81
Drill blast round index	m/m	57
Productivity	t/h	125.47
Productivity	m/h	81.00
Productivity	drills/h	21.89
Overbreak	%	10.00

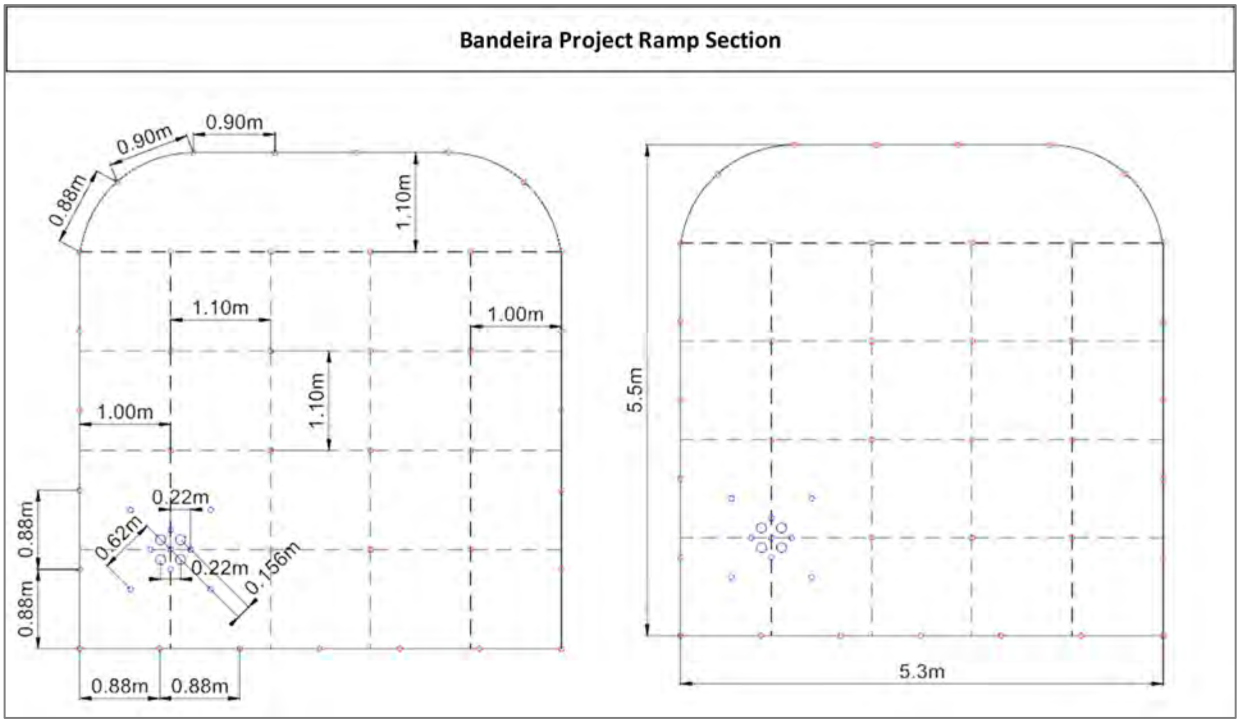


Figure 16-24: Drilling and Blasting Plan for the Ramps

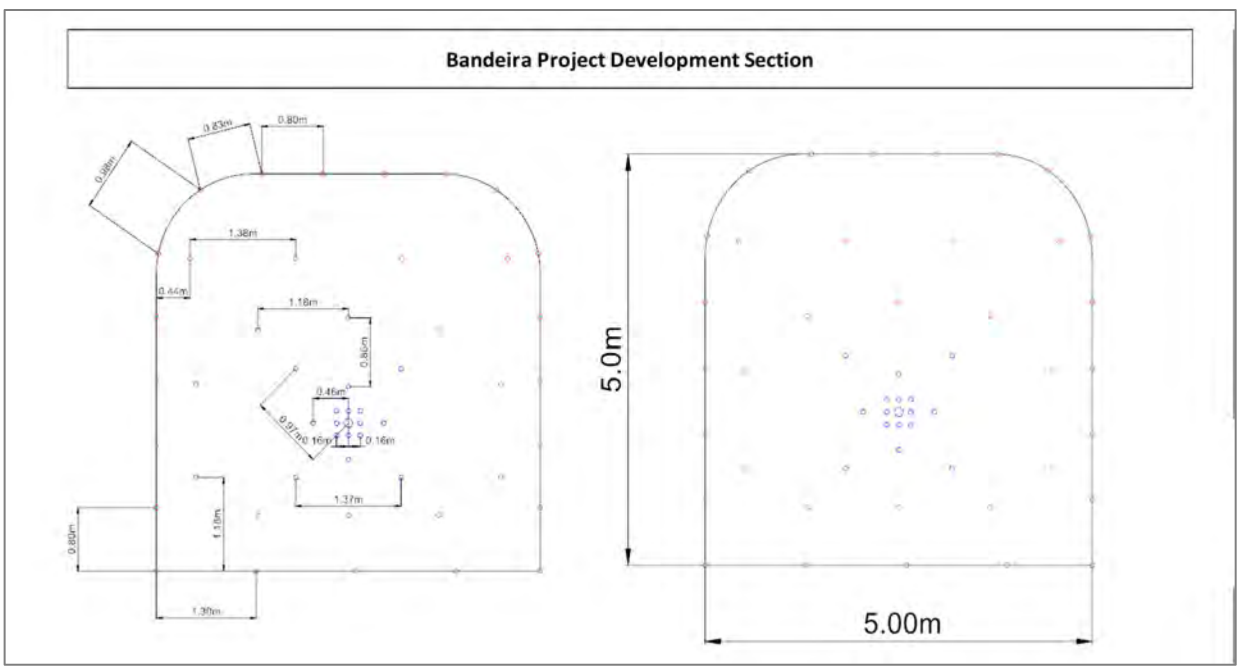


Figure 16-25: Drilling and Blasting Plan for the Drives

16.7 Roof Support

16.7.1 Sublevel Stopes

The design parameters of the cable bolting for the roof supporting of sublevel stopes are listed in Table 16-22.

Table 16-22: Design Parameters of the Roof Support Bolting for the Sublevel Stopes

Description	Unit	Value
Average Length of Stopes	m	4
Number of Galleries per Stope (ascending and descending		2
Typical Stope with Galleries Area	m^2	20
Cabled Area	%	100
Typical Stope Mass	t	2,003
Cabling Burden	m	1.5
Cabling Spacing	m	1.5
Number of Cables per Line		4
Number of Lines		3
Number of Cables per 5.5 m Line		2
Number of Cables per 8.0 m Line		3
Total Number of Cables per 5.5 m Solid		5
Total Number of Cables per 8.0 m Solid		5
Hangingwall/Footwall Cable Length	m	8.0
Brown Cable Length (middle of Gallery)	m	5.5
Total 8.0 m Cabled Length	m	43
Total 5.5 m Cabled Length	m	29
Specific Drilling per 8.0 m Cable	t/m	47
Specific Drilling per 5.5 m	t/m	68
Specific Drilling per Total Cable	t/m	17
Grout Consumption per 10 m Cable	kg	45
Volume of a 10 m Drill Hole	l	20.43
Cement Density	t/m^3	2.20
Volume of an 8 m Drill Hole	l	16.34
Grout Consumption per mm Cable	kg	36.00
Grout Consumption	kg/m	4.50
Total Grout Mass per Stope Solid	kg	192.00
Tonnes per Grout Mass	t	10.43
Volume of a 5.50 m Drill Hole	l	11.24
Grout Consumption per 5.5 m Cable	kg	24.75
Grout Consumption	kg/m	4.50
Total Grout Mass per Stope Solid	kg	132.00
Tonnes per Grout Mass	t	15.17

16.7.2 Room-and-Pillar

Table 16-23 and Table 16-24 list the roof support drilling and cable bolting design parameters for the room-and-pillar mining operation.

Table 16-23: Room-and-Pillar Roof Support Drilling

Description	Unit	Value
Roof Support Drill Pattern	m^2	2.25
Support Area	m^2	14.65
Number of Bolts		7
Bolt Length per Blast Round	m	21
Bolt Length per Blast Metre	m	0.72

Table 16-24: Room-and-Pillar Roof Support Design Parameters

Description	Unit	Value
Steel Mesh		
Length	m	3.05
Width	m	2.13
Grid Dimensions	m	100 x 100
Number of Overlapping Squares		3
Overlapping Squares Distance	m	0.3
Effective Width	m	1.83
Area	m^2	5.58
Steel Mesh Area		
Length	m	3.05
Width	m	7.7
Area	m^2	23.49
Number of Meshes		5
Bolt Drilling		
Burden	m	1.2
Spacing	m	1.2
Area	m^2	1.44
Bolt Length	m	0.91
Number of Drill Holes		16
Rework Factor	%	0
Estimated Number of Drill Holes		16.3
Estimated Drilling	m	14.8
Number of Clips per Mesh		4
Total Number of Clips		20

16.7.3 Development

Roof support drilling and blasting parameters for the development works of Bandeira Project underground mine operation are shown in Table 16-25 and Table 16-26.

Table 16-25: Development and Auxiliary Roof Support Drilling

Description	Unit	Value
Development Roof Support Drilling		
Roof Support Drill Pattern	m^2	2.3
Supported Area	m^2	19.4
Number of Bolts		9.0
Bolt Length	m	3.0
Bolt Length per Blast Round	m	27.0
Bolt Length per Blast Metre	m	8.1
Auxiliary Drilling		
Infrastructure Holes per Blast		6
Hole Length	m	0.8
Total Drilled per Blast Round	m	4.8
Drilled Infrastructure per Blast Metre	m	1.44

Table 16-26: Design Parameters for Roof Supporting of Ramps

Description	Unit	Value
Ramp Roof Support		
Length	m	3.05
Width	m	2.13
Grid Dimensions	m	100 x 100
Number of Overlapping Squares		3
Overlapping Squares Distance	m	0.3
Effective Width	m	1.8
Area	m^2	5.58
Steel Mesh Area		
Length	m	3.05
Width	m	12.7
Area	m^2	38.58
Number of Meshes		7
Bolt Drilling		
Burden	m	1.2
Spacing	m	1.2
Area	m^2	1.44
Bolt Length	m	0.91
Number of Drill Holes		27
Rework Factor	%	0
Estimated Number of Drill Holes		26.8
Estimated Drilling	m	24.4
Number of Clips per Mesh		4
Total Number of Clips		28

16.8 Rock Backfilling

Due to surface area restriction at Bandeira Project for waste disposal, it has been decided at this feasibility study phase that 80% of the waste generated in development operations will be backfilled, if there are available open stopes in the mine.

When the dumping areas above the stopes are opened, an unloading point will be excavated to allow trucks to discharge waste for rock-filling purposes. Additionally, to meet height restrictions in the mine, truck units equipped with dump ejectors will be purchased in Years 1, 4, 6, and 9.

16.9 Mine Services

16.9.1 Ventilation

The mine's main ventilation system will be implemented through mechanical ventilation, consisting of fans and exhaust fans. Its operational principle is to force clean air into the mine and exhaust polluted air to the surface, where it will be discharged, thus creating continuous air exchange and renewal of the underground atmosphere.

The supply of clean air to the underground mine will be achieved through the following pathways:

- Two main ramps:
  - Ramp 1 with a section of 5.3 m x 5.5 m: from Elevation 290 m to Elevation −426 m (deepest level of Ramp 1)
  - Ramp 2 with a section of 5.3 m x 5.5 m: from Elevation 284 m to Elevation −449 m (deepest level of Ramp 2).
- Three intake raises:
  - Intake Raise No. 1 with a section of Ø 2.4 m: from Elevation 326 m (surface) to Elevation 229 m.
  - Intake Raise No. 2 with a section of Ø 4.1 m: from Elevation 330 m (surface) to Elevation 140 m. Bellow this elevation up to −426 m the section changes to a square section of 4.0 x 4.0 m
  - Intake Raise No. 3 with a section of Ø 4.1 m: from Elevation 324 m (surface) to Elevation 245 m. Bellow this elevation up to −249 m the section changes to a square section of —4.0 x 4.0 m.

The air intake raises are designed and calculated to serve as:

- Passages for clean air from the surface to the deepest levels of the mine
- Reducers of air velocity in the main ramps
- Emergency exits, equipped with ladders along their entire length
- Operational infrastructure—service water ducts, drinking water, pumping water, electrical cabling, etc.

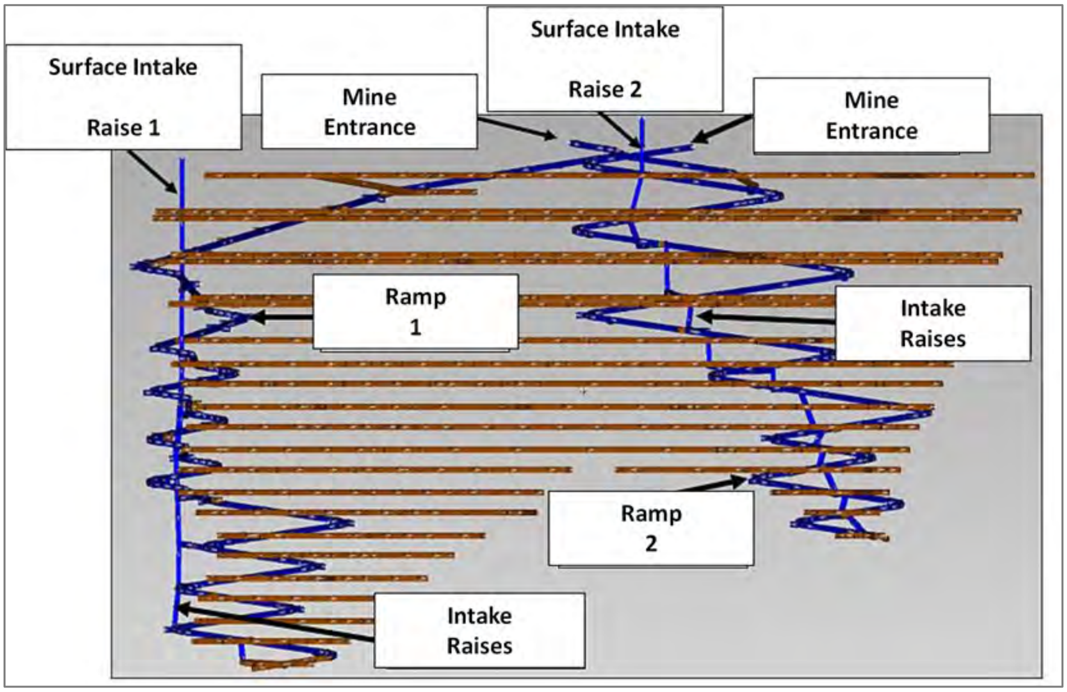


Figure 16-26: Schematic Air Intake Circuit for the Mine

Polluted air exhaust will be conducted upwards through two exhaust raises from the surface to Elevation 221 m. One raise will operate over the production areas of Ramp 1, and the other raise will operate over the production areas of Ramp 2.

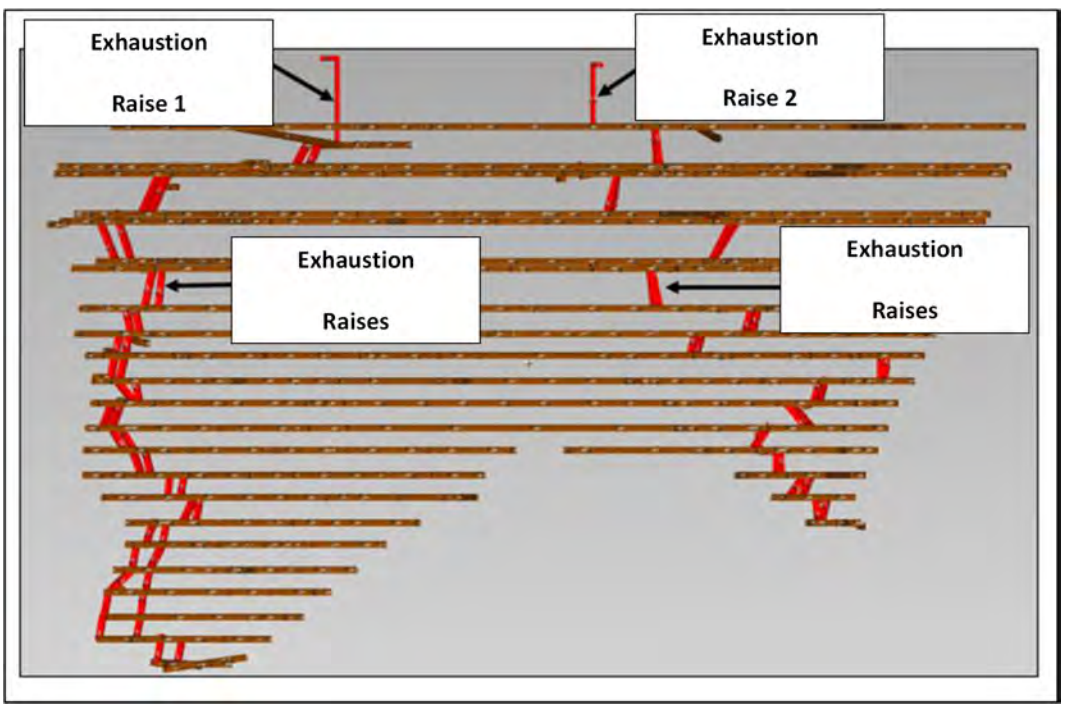


Figure 16-27: Schematic Exhaust Ventilation Circuit for Polluted Air

From Elevation 221 m, four parallel raises will be considered, interconnected at all levels of the mine:

- Two exhaust raises for polluted air acting on the production areas of Ramp 1.
- Two exhaust raises for polluted air acting on the production areas of Ramp 2.

The opening section of the raises are:

- Exhaust Raise No. 1: Ramp 1—section of Ø 4.1 m, from Elevation 330 m (surface) to Elevation 221 m.
- Exhaust Raise No. 2: Ramp 2—section of Ø 4.1 m, from Elevation 322 m (surface) to Elevation 245 m.
- Exhaust raises between levels (four raises), with two raises acting on the production areas of Ramp 1 and two raises acting on the production areas of Ramp 2, with a section of 5.0 m x 5.0 m.

The main exhaust fans to be installed on the surface near raises No. 1 and No. 2 have been calculated and dimensioned to:

- Supply oxygen underground, maintaining tolerance limits at a minimum of 19.5% and <23% by volume
- Ensure continuous air renewal underground
- Effectively dilute all flammable or harmful gases in the underground environment
- Maintain dust, temperature, and relative humidity levels within tolerance limits and suitable for human work
- Be maintained and operated regularly and continuously, as established in regulatory standards NR22.24.

Ventilation of development faces that are not yet connected to the main ventilation system will be provided by secondary fans, also known as auxiliary fans. These fans are designed with capacity to ventilate a working face where diesel combustion engine equipment is in simultaneous use, ensuring supply of breathable air for the operators.

This ventilation system involves installing an auxiliary fan unit in the clean-air intake pathway, such as on the ramp or clean-air intake raise. The fan captures air and blows it to the working face through ventilation ducts made of PVC fabric, with a diameter of 1,300 mm.

After ventilating the development and mining working face, the air will be directed and discharged into the exhaust raises installed in ventilation drives linked to the decline. Blasting occurs at the end of the shift to ensure that no one is inside the mine during this activity. The interval between shifts ranges from 30 to 60 minutes, allowing sufficient time for the air contaminated with gases and dust resulting from detonations to be cleared, ensuring fresh, clean air at the beginning of the next work shift.

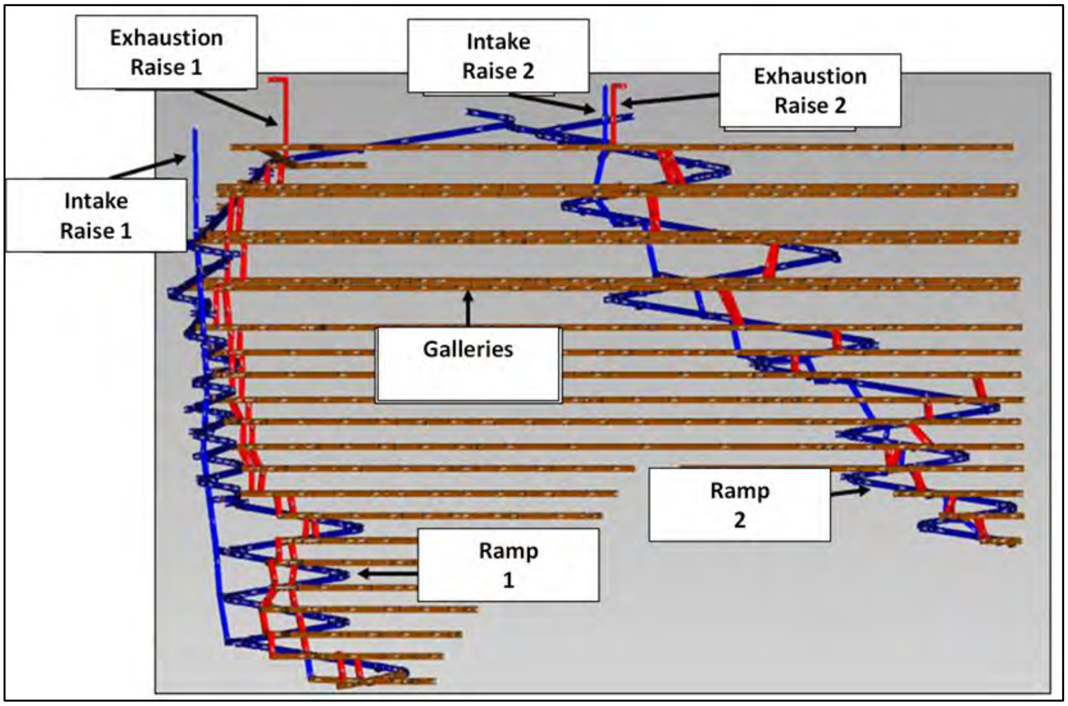


Figure 16-28: Schematic Main Mine Ventilation System

16.9.2 Electric Power

Most of the demand for electrical energy in the underground mine will come from:

- Main and secondary ventilation fans
- Drilling rig machines, explosives loading and scaling equipment
- Dewatering pumps
- Refuge stations
- Air compressors
- Lighting.

The construction of a surface electrical substation with a power capacity of 5000 kVA is planned to exclusively meet the energy demand of the mine. Additionally, underground substations with a capacity of 1000 kVA each will be installed over the Project's lifespan as the mine deepens.

16.9.3 Service Water

Service water for drilling activities and dust control will be supplied from a reservoir on the surface. The clean water will then be distributed inside the mine by gravity through a network constructed of water storage facilities and PVC pipelines. Furthermore, the storage facilities ensure a continuous water supply in case of any issues with the surface reservoir.

The primary water for underground operations will be sourced from either the nearby Piauí Stream or the Jequitinhonha River. Additionally, water collected from accumulation points within the mine will serve as an alternative source. All water will undergo treatment, including sedimentation and solid filtration before being redistributed to work faces via overhead water lines.

16.9.4 Compressed Air

The mine's compressed-air demand will be met by two mobile, diesel air compressors, each with a capacity of 286 ft^3 per minute at 10 bars of pressure. One will be installed on the surface, and the other will be used inside the mine as needed.

16.9.5 Communication

The communication solution for the Bandeira Project underground mine should consist of an integrated system featuring a private LTE telecommunications module in Band 28 for online interconnection of users and peripherals. This system is essentially composed of 7/8" Tech RFX wave-line radiated cables, VHF radios operating within the 136–174 MHz range, repeaters, antennas, fibre-optic cables, and all necessary material and infrastructure for installation and fixing of the components.

Additionally, the system should provide resources for voice communication, dispatch system, micro-seismic control, monitoring of potentially dangerous atmospheric conditions, and positioning tracking for underground mine workers.

16.9.6 Dewatering

Small sumps will be designed between the mine levels. A main water-collection sump will be installed at the bottom of the mine. The water collected in the sump should either be returned for use within the mine or pumped to the surface water treatment station.

16.9.7 Explosives Storage and Handling

The explosives to be used in the underground mining operation will be emulsion, for both development and ore production inside the mine. Tanks for primary explosives will be located on the surface while secondary tanks will be situated underground to provide explosive reserves for up to three days when needed. Additionally, explosives and detonators will be stored in separate facilities, with a magazine on the surface to accommodate blasting accessories.

It is being considered that explosives, accessories, equipment, and blasting services will be supplied by an outsourced supplier.

16.9.8 Fuel Storage and Handling

The on-site diesel-fuel storage will be installed with a supply capacity of approximately one week. Two tanks will be installed within a lined containment berm. Fueling equipment is to be adjacent to the fuel-tank group, and the fueling area will be drained to a containment dike.

16.9.9 Mining Quality Control

For this project, approximately 1,200 samples per month from the mine have been considered. These samples are sourced from productive development faces, drilling for grade control, exploratory drilling, and from samples collected in the sides of the ore drives.

These samples, combined with the mapping of working faces, resource revaluation, estimation and mining monitoring, and reconciliation will aid the mine geology team in quality control and achieving the projected grades. The analysis will focus on the lithium oxide and iron oxide content of the collected samples.

16.10 Mine Personnel

Table 16-27 summarizes the mine personnel requirements for the Bandeira underground project.

Table 16-27: Underground Mine Personnel

	Shifts		Number of	Total	Year															
	Admin	Operational	Positions Per Shift	Positions Count	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Mining Operation																				
Mine Operation Manager	*		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Assistant	*		2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Coordinator	*		4	4	1	2	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Mine OperationEngineer	*		2	2	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Safety Engineer	*		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Trainer	*		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mine Operation Foreman		*	3	12	8	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Technician		*	3	12	4	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Truck Operator		*	Variable	Variable	4	12	16	36	36	40	40	48	48	52	56	60	60	56	56	52
LHD Operator		*	Variable	Variable	4	8	8	16	16	16	16	16	16	16	16	16	16	12	12	12
Drill Operator		*	Variable	Variable	8	24	36	44	44	40	40	44	44	44	44	44	44	44	40	36
Ancillary Equipment Operator		*	Variable	Variable	24	24	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Blaster		*	2	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mine Operation Assistant		*	6	24	12	12	24	24	24	24	24	24	24	24	24	24	24	24	24	24
Technical Services																				
Technical Services Manager	*		1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Assistant	*		1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Coordinator	*		2	2	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mine Geologist	*		3	3	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Mine Planning Engineer	*		2	2	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mine Ventilation Engineer	*		1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Geotechnical Engineer	*		2	2	0	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Supervisor Geociencies	*		3	3	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Quality Control Technician		*	1	4	0	2	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Surveyor	*		2	2	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Geological Surveyor		*	2	8	0	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Technical Services Assistant		*	5	20	2	10	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Mine Equipment Maintenance																				
Mine Eq. Maintenance Manager	*		1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Coordinator	*		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mine Maintenance Engineer	*		2	2	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mine Maintenance Foreman		*	1	4	1	1	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Mechanic		*	/ 12 eq. unit	Variable	8	13	21	25	25	25	25	26	26	26	27	27	27	26	26	25
Electrician		*	/ 20 eq. Unit	Variable	5	8	13	15	15	15	15	16	16	16	16	16	16	16	16	15
Welder		*	1	4	2	2	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Washer	*		2	2	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Tyre Repairman	*		2	2	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Lubeman		*	2	8	4	4	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Mine Maintenance Scheduler	*		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mine Maintenance Controler	*		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mine Maintenance Assistant		*	4	16	8	8	16	16	16	16	16	16	16	16	16	16	16	16	16	16
					109	**187**	**304**	**346**	**346**	**346**	**346**	**360**	**360**	**364**	**369**	**373**	**373**	**364**	**360**	**350**

16.11 Infrastructure

The following structures will be built on the surface as part of the Bandeira Project underground mine:

- Access roads from the underground mine portals to the primary crusher, temporary ore stockpile, and waste rock dump
- Waste rock dump from mine development services, including drainage structures and a sediment-containment dike
- Explosives preparation yard, including an emulsion tank, an accessory magazine, and an office for the outsourced supplier of explosives and blasting services
- Mine administrative facilities, such as technical office, dispatch and communication room, batteries and protective equipment room, and changing room
- Maintenance facilities, including a workshop, warehouse, tire shop, and vehicle and equipment washer
- Fuel facilities
- Service-water tank and treatment station
- Electrical substation.

Figure 16-29 shows the general arrangement of Bandeira's surface infrastructure.

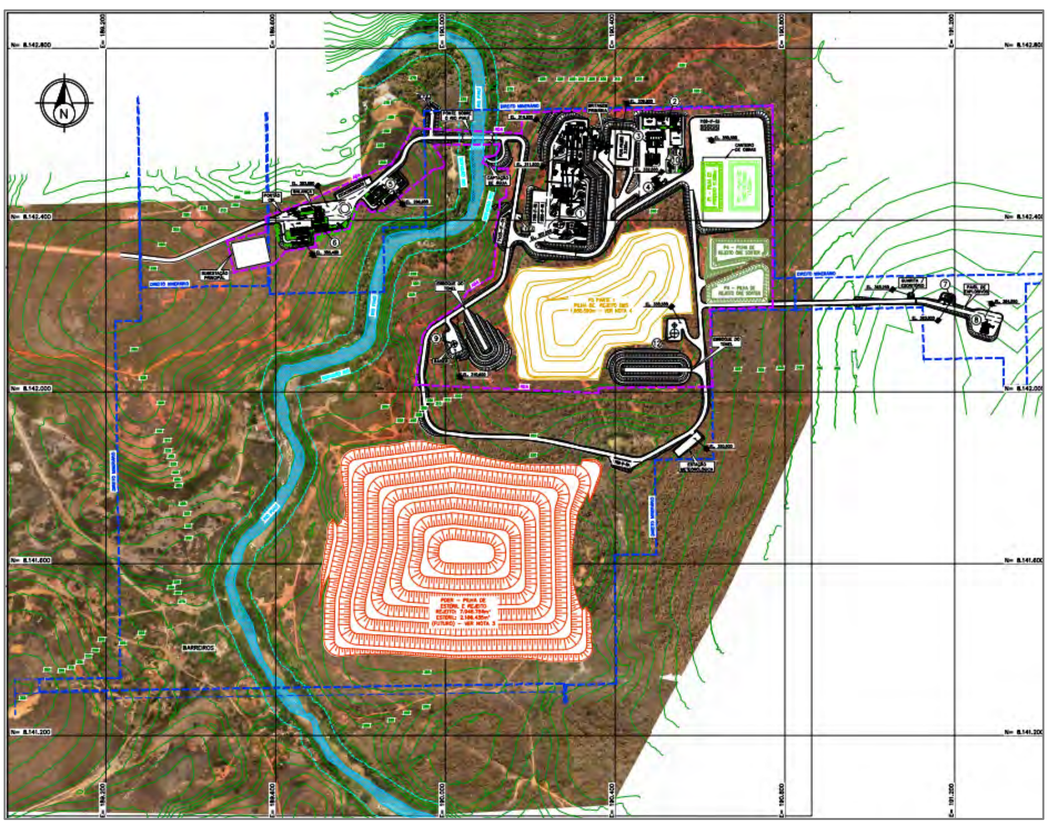


Figure 16-29: Bandeira's Surface Infrastructure

16.12 Safety and Emergency

16.12.1 Safety and Emergency Measures

Escape Ladders

The ventilation raises at the Bandeira Project underground mine will be equipped with ladders to serve as an escape route for the miners.

Escape ladders in underground mines are crucial safety features designed to provide a means of egress for miners in the event of an emergency, such as a fire, gas leak, or other life-threatening situations. These ladders will be strategically installed to facilitate a rapid and safe ascent to the surface or a designated escape route.

Key aspects of escape ladders in the Bandeira mine include:

- Located at some fresh-air ventilation raises that connect different levels of the mine, allowing miners to climb vertically to reach the surface or a safer location.
- Constructed with materials that can withstand the specific environmental conditions of the mine, including corrosion resistance, to prevent deterioration.
- Provided with adequate lighting to ensure visibility, especially in low-light conditions or during power outages.
- Marked with clear and visible signage to guide miners to safety during an emergency.

Miners will receive training on how to use escape ladders, including proper climbing techniques and safety procedures. Regular evacuation drills are conducted to ensure miners are familiar with the location and use of escape ladders.

Refuge Chambers

The installation of refuge chambers at strategic points in the mine is planned for the Bandeira Project mine.

Refuge chambers play a critical role in enhancing the safety of underground mining operations, providing a secure place for miners to seek shelter and await rescue in the face of unexpected and potentially life-threatening events.

These chambers are specifically designed to offer protection from various hazards, such as fires, explosions, gas leaks, or other life-threatening situations that may occur in underground mining operations.

The Bandeira Project underground mine will be provided with refuge chambers with a capacity for 20 people and autonomy of 48 hours, in quantities to shelter all workers during a shift inside the mine. They will be installed strategically so that each worker must travel a maximum of 400 m from the working face.

Key features and aspects of the Bandeira Projects' refuge chambers include:

- Location and accessibility
  - Strategically located throughout the mine to ensure easy access for miners in case of an emergency.
  - Situated along main escape routes, at intersections, or in areas prone to higher risks.
- Design and Construction
  - Constructed to withstand the specific hazards present in the mines, including fire, blast pressure, and potential structural damage.
  - The walls, roof, and floor will be reinforced and insulated to provide a protective barrier against external hazards.
- Air Supply and Ventilation
  - Equipped with a reliable air supply system to ensure a continuous flow of breathable air.
  - Ventilation systems will include air filtration to remove contaminants and maintain air quality within the chamber.
- Communication Systems
  - Such as two-way radios or other devices to enable contact with the surface or other parts of the mine.
- Emergency Supplies
  - Refuge chambers will be stocked with essential supplies, including food rations, potable water, first aid kits, and other items to sustain occupants until rescue or evacuation is possible.
- Temperature Control
  - A temperature control system will be integrated to maintain a comfortable environment within the refuge chamber, as extreme temperatures can be a concern in some mining environments.
- Lighting
  - Adequate lighting will be provided within the chamber to ensure visibility and create a safe environment for occupants.
- Monitoring and Control Systems
  - Equipped with monitoring systems to keep track of the conditions inside and outside the chamber, including gas levels, temperature, and structural integrity.
- Training and Drills
  - Miners will receive training on how to use refuge chambers and participate in regular drills to ensure they are familiar with emergency procedures.
- Regulatory Compliance
  - The design and installation of refuge chambers in the Bandeira Project underground mine will comply with Brazilian industry regulations and safety standards to ensure their effectiveness during emergencies.

16.12.2 Safety and Emergency Response Plan

The safety and emergency response plan developed for the Bandeira Project mine underground facility aims to establish procedures to identify the potential of and respond to accidents and emergency situations, as well as to prevent and reduce the possible diseases, injuries, and environmental impacts that may be associated with them.

The plan applies to the Bandeira Project, including contracted companies, where activities, products, or services performed may incur emergency scenarios with consequences for safety, health, environment, and community. It includes general actions and specific emergency plans to ensure a quick and effective response when an incident occurs.

Responsibilities will be defined when defining the structure and staff, considering at least the following functions:

- General Manager
  - Knows the emergency scenarios of the Project
  - Responds to superiors, the community, employees, and local authorities regarding any emergencies that have occurred, when applicable, acting as a spokesperson or appointing a representative
  - Represents the Bandeira Project to the community, media, and local authorities
  - Ensures the necessary resources for the prevention and combat of emergencies.
- Managers and coordinators
  - Know the emergency scenarios of the unit
  - Ensure the necessary resources for the prevention and combat of emergencies.
  - Indicate the components of the Emergency Brigade (EB) in their area of responsibility
  - Ensure the participation of the EB components in their area of responsibility in training, simulations, and attendance.
- Occupational Safety
  - Ensures that the system of protection and prevention against fire and emergencies is always operational
  - Ensures inspections and tests on the firefighting system (extinguishers, hydrants, water tanks, pipes, pumps, fire vehicles, ambulances, etc.)
  - Supports project managers in the planning phases of new facilities, before any modification or construction, with an emphasis on fire prevention and protection installations
  - Provides rescue and emergency equipment for practical training and emergency responses of the EB
  - Ensures the periodic updating of emergency plans and the list of EB members
  - Guarantees the maintenance of the EB kits for prompt use when necessary
  - Ensures the programming, implementation, and evaluation of emergency simulations

  - Ensures the dissemination of the Plan of Safety and Emergency Response (PSER) to all employees and visitors
  - Defines the annual budget for the operation of the EB.
- Communication Area
  - Advises on the preparation of statements regarding any emergencies that have occurred
  - Trains managers and designated persons to communicate clearly and objectively in relation to emergencies that have occurred
  - Advises and guides the PSER Coordinator, the other groups, as well as the other involved in the emergency, on the institutional communication aspects
  - Keeps the communication team prepared to respond to emergency scenarios
  - Promotes or grants to the media, as appropriate, interviews and press conferences related to emergencies that have occurred
  - Responds to and directs external communication demands, advised by the PSER Coordinator and Legal Department
  - Advises the company of the occurrence in the institutional and external communication spheres
  - Participates, through its representative, in the periodic meetings with the PSER Coordinator
  - Ensures that communications with external PSER agents are only carried out by the official spokesperson defined by the Bandeira Project or the general manager
  - Assists in the alert to the potentially affected population when determined by the PSER
  - Keeps adequate means of communication to notify employees of other shifts of the provisions triggered due to the occurrence
  - Keeps in contact with local or regional clinics and hospitals to remain on standby due to the possibility of receiving injured persons, upon prior agreement established with them
  - Participates, through its representative, in the periodic meetings with the PSER Coordinator
  - Collaborates in preparing reports on the incident or accident.

The Bandeira Project must be adequately prepared to deal with emergency situations and accidents, including:

- Identifying emergency and accident scenarios
- Defining the required preventions to prevent accidents and emergency situations from occurring
- Defining and implementing an emergency response plan
- Training people, including members of the EB, to deal with accidents and emergencies
- Conducting simulated exercises
- Analyzing simulated exercises and real emergency responses
- Modifying, if necessary, procedures.

The following emergency scenarios are defined for the Bandeira Project:

- Fire
- Chemical spill
- Accident involving mobile equipment or traffic
- Accident involving poisonous animals
- Underground mine rockfall
- Explosives accident
- Personal accident
- Electricity-related accident
- Other scenarios according to specific situations.

The resources required for emergency situations or accidents consist of all necessary equipment and materials for the safe and effective handling of emergencies and accidents, such as:

- Hydrant network firefighting systems distributed to cover administrative areas, processing plants, and support areas, designed according to the requirements of the Fire Department of the State of Minas Gerais—CBMG
- Fire extinguishers distributed across administrative areas, processing plants, and support areas
- Siren for audible emergency alert across the Bandeira Project surface area—plant, support areas, administration, entrances
- Automatic systems (sensors) with alarms for detecting heat and smoke in administrative areas, distributed according to CBMG requirements
- Equipping vehicles for emergency response
- Tank truck with a capacity of 20,000 L of water, equipped with tools and equipment
- Communication equipment
- Firefighting equipment
- Ambulance
- Emergency lighting equipment
- First aid medications (painkillers, saline solution, hydrating agents, etc.)
- Bandages, disposable gloves, adhesive tapes, surgical drapes, blankets
- Splints for immobilization
- Rigid stretcher with straps
- Underground mine refuge chambers
- Escape ladders at ventilation raises
- Fire extinguishers in all light vehicles
- Autonomous firefighting systems or fire extinguishers installed in all underground mine equipment.

Members of the Emergency Brigade should be properly trained in:

- Firefighting: analysis, rescue, fire theory, isolation, fire classes, methods of extinguishing fire, approach and confinement, evacuation from smoke-filled enclosed areas, post-emergency recovery
- First aid: immobilization, hemorrhages, cardio-respiratory resuscitation, trauma care, amputation care, burns, poisoning, asphyxiation, wounds, and fractures
- Chemical products leakage and spillage: isolation, containment, and waste handling
- Leakage, fire, and explosion in flammable and combustible liquid installations: isolation, containment, situation analysis, tank cooling, leak containment, firefighting, evacuation.

Simulated emergency response exercises should be conducted monthly per the schedule prepared annually by the Health, Safety, and Environment (HSE) area or EB coordinator, covering identified main scenarios. At the beginning of each year, the schedule will be published for the knowledge of the EB and other stakeholders, with the possibility of revision based on HSE needs and decisions.

After each simulated exercise, the team responsible for conducting the exercise will critically analyze the results using an evaluation form. If any execution flaws or discrepancies in the emergency response plan are identified, corrective measures will be taken to improve the process.

In the event of a real emergency, a nonconformity is opened to correct the generated damages, analyze the cause, and define and implement corrective actions to prevent the recurrence of the same incident.

Any events that could lead to an accident or emergency must be promptly communicated to the HSE Coordination.

The department responsible for receiving emergency communications should have an updated list containing the names, phone numbers, extensions, and so forth, of coordinators, chiefs, leaders, and brigade members for immediate activation if the EB needs to be deployed.

Additionally, there will be a document listing external contacts, including names, addresses, and phone numbers of external support entities that need to be activated during an emergency or simulated exercise.

The receiver of an incident or accident report must promptly locate the brigade coordinator, the responsible person for the area where the incident occurred, and the general manager, and inform them of the incident. The PSER must be put into action.

The EB must evaluate the incident or accident and, if a potential crisis is identified, act in accordance with crisis management standards. Furthermore, for accidents classified with high criticality, the communication of the emergency occurrence must also be forwarded to the company's top management.

The HSE area must have a list with updated names and phone numbers of key external support organizations, such as:

- Fire department
- Police
- Civil defense
- Hospitals.

The HSE Coordination is responsible for defining authorized personnel and their respective substitutes for activating external assistance services when necessary.

16.13 Mine Closure

The closure of an underground mine is a complex and multi-faceted process that involves several key steps.

16.13.1 Pre-Closure Planning

This stage begins before the actual closure. It involves:

- Developing a comprehensive closure plan, outlining the goals of closure, the methods to be used, and the timeline for completion. It also considers environmental and social impacts, as well as financial considerations
- Engaging stakeholders, including government agencies, local communities, and employees. Their input is essential for developing a closure plan that meets everyone's needs
- Securing financial resources in advance, as this may involve setting up a trust fund or obtaining financial guarantees from the mining company.

16.13.2 Decommissioning

Once the mine is no longer operational, the decommissioning process begins, involving:

- Removing equipment and infrastructure, such as things like conveyor belts, ventilation systems, and processing facilities
- Sealing shafts and adits to prevent people and animals from entering, and to control water flow and air quality
- Backfilling mined-out areas to helps to stabilize the ground and prevent subsidence.

16.13.3 Environmental Rehabilitation

This is an important part of the closure process, as it aims to restore the land to a productive state. This may involve:

- Earth movements to shape the land to its original contours or a new, stable configuration
- Planting vegetation to prevent erosion and restore habitat for wildlife
- Treating contaminated water, including filtering, settling, or other techniques to remove pollutants.

16.13.4 Post-Closure Monitoring and Maintenance

Even after the closure process is complete, it is important to monitor the site for potential problems, such as subsidence, water quality issues, or gas emissions. This may involve regular inspections, data collection, and maintenance of any remaining infrastructure.

The specific steps involved in the closure process will vary depending on the type of mine, the geology of the site, and the specific environmental and social conditions. However, the overall goal of mine closure is to leave the land in a safe and stable condition that can be used for other purposes in the future.

17.0 RECOVERY METHODS

The Bandeira Project mineral reserve lies in the Araçuaí–Itinga corridor, in the middle valley of the Jequitinhonha River, Minas Gerais. The Project's objective is to process 1.23 Mt/a of run-of-mine (ROM), with spodumene as the main source of lithium oxide.

This section has the objective of consolidating all network results into a process flowsheet to treat the mineral ore reserve extracted from the mine to produce spodumene concentrate within market specifications.

The spodumene beneficiation plant will consist of several unit operations such as:

- Primary crushing
- Secondary crushing and screening
- Pre-concentration in ore sorter (for shale and feldspar removal)
- Wet screening
- Thickening and filtering of fines (−0.5 mm)
- DMS of the coarse (−19.1 + 7.5 mm)
- DMS of the medium (−7.5 + 0.5 mm)
- Comminution of DMS scavenger concentrates (−19.1 + 0.5 mm) in a crusher
- Cycling, thickening, and filtration of fines (−0.5 mm).

The objective is to produce a concentrate with a lithium oxide content of 5.50% and a ferric oxide content of less than 1%.

Potentially useful tailings will also be generated, such as feldspar, nutrient or fertilizer load (potassium content), and tailings from the DMS circuit as filling material in civil construction (inert and granulometry in narrow and controlled band).

In addition, fine material (−0.50 mm) with lithium content and potential for future use through other concentration processes (such as concentrating spirals and flotation) will be generated and stored.

A block diagram of unit operations and the flowsheet are shown in Figure 17-1 and Figure 17-2.

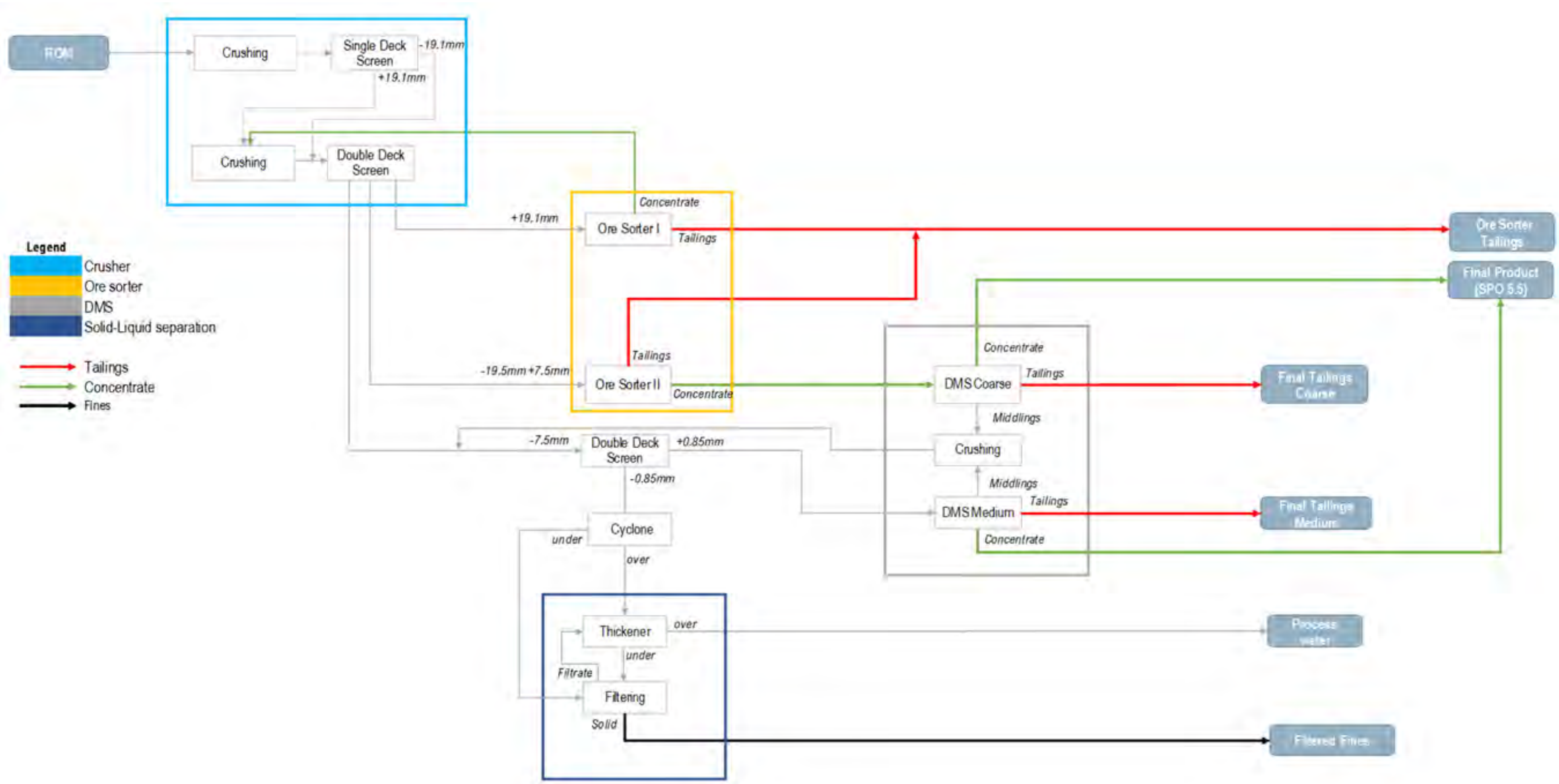


Figure 17-1: Bandeira Project Flowchart

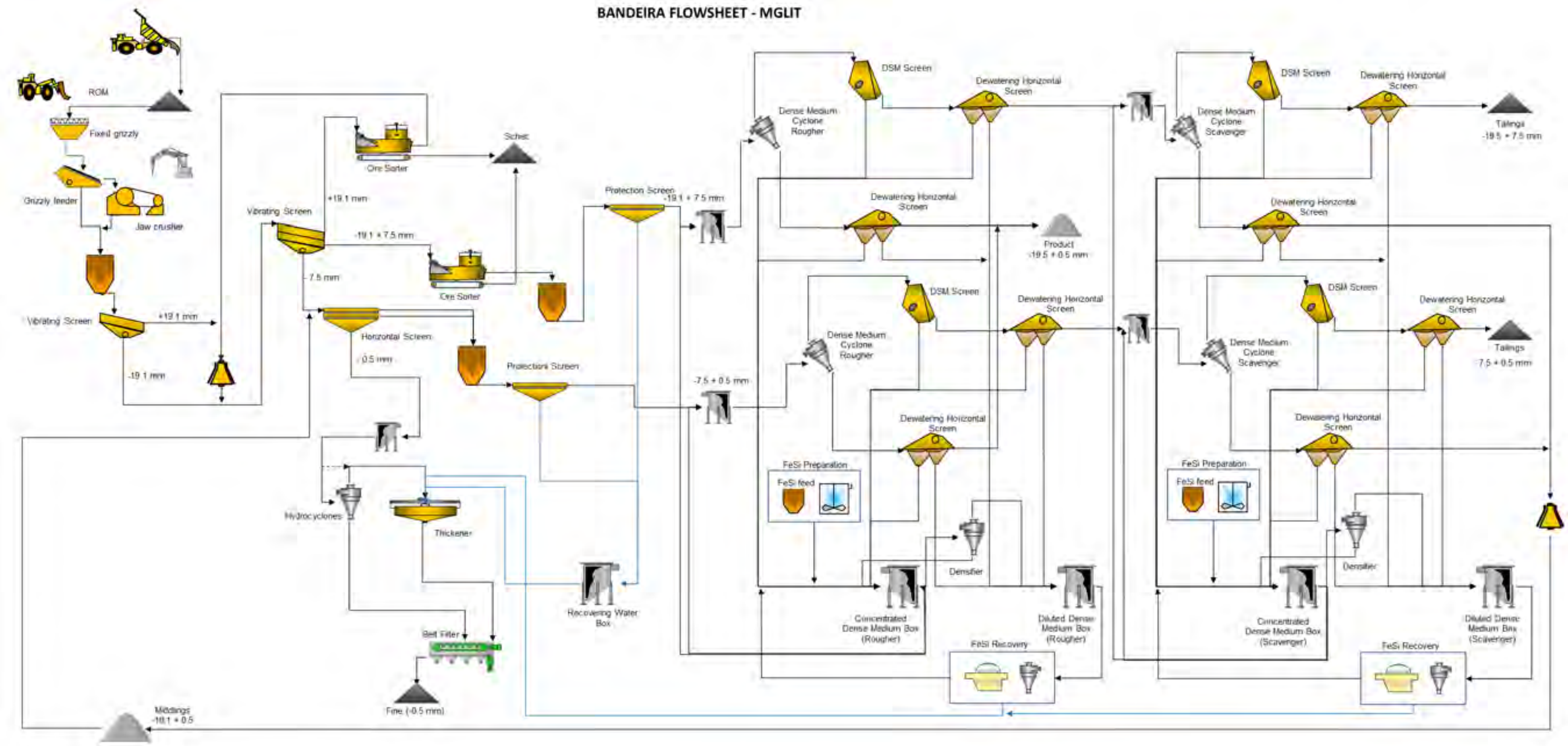


Figure 17-2: Bandeira Project Flowsheet

The beneficiation plant operating regime is given in Table 17-1.

Table 17-1: Operational Parameters

Description	Crushing, Thickening, and Filtration Circuits	DMS Circuits
Production Days per Year	365	
Hours per Day	24	
Days per Week	7	
Hours per Calendar Year	8,760	
Scheduled Operating Time (%)	70.0	85.0
Scheduled Hours per Year	6,132.0	7,446.0
ROM Feed (nominal capacity) (Mt/a)	1.30	
Nominal Hourly Rate of Primary Crushing (t/h)	212.0	
ROM Feed % Moisture	2.0	

The particle size distribution of the ROM is shown in Table 17-2.

Table 17-2: ROM Particle Size Distribution (Cachoeira Mine Reference)

Mesh (mm)	Cumulative Passing (%)
420	100.00
230	89.53
195	79.06
150	68.59
130	58.12
100	47.65
75	39.27
50	35.08
38	28.80
25	24.61
19	19.38
0.85	15.19

The spodumene concentrate (5.50% Li_2O) will be produced from DMS concentration unit. To this end, the crushing products will be separated into three particle-size fractions.

The fine fraction (−0.50 mm) will be cycled, thickened, filtered, and stored for future use in a concentration plant, through the flotation method, for example.

The other two particle size ranges will be defined aiming at an equal distribution of masses, resulting in two similar DMS circuits, one for the coarse fraction (7.5 mm to 19.1 mm) and the other for the finer fraction (0.50 mm to 7.5 mm).

The Project aims to reuse the middlings obtained in the DMS circuits. This material will be crushed and recirculated in the screening.

Table 17-3 shows the mass balance and metallic distribution in relation to lithium oxide for the main flows.

Table 17-3: Average Mass Balance of Mine Life and Metallic Distribution in Relation to Li_2O

Flow	Mass Flow (t/a 000s)	Mass Distribution (%)	Li_2O Content (%)	Li_2O (t/a 000s)	Dist. Li_2O Distribution (%)
ROM	1,228.8	100.00	1.16	14.25	100.00
Schist	183.0	14.49	0.35	0.64	4.53
Filtered fines (−0.50 mm)	248.0	20.18	0.67	1.66	11.74
DMS Concentrate (−19.1 mm +0.50 mm)	178.1	14.49	5.50	9.79	68.86
Coarse DMS Tailings (−19.1 mm +7.5 mm)	225.9	18.38	0.36	0.81	5.64
Medium DMS Tailings (−7.5 mm +0.50 mm)	394.0	32.06	0.34	1.35	9.23

Lithium oxide global mass and metallurgical recoveries of DMS 5.5% concentrate are 14.49% and 68.86%, respectively.

17.1 Primary Crushing

The ore extracted from the underground mine (ROM, top size 420 mm, d50 close to 100 mm) will be stored in a pile with a capacity of 5,200 tonnes, corresponding to 24 h of operation (Figure 17-3).

With front-end loaders, the ROM will be fed into the hopper of the primary crusher, which is equipped with a fixed grate with an opening of 420 mm.

The ROM will be extracted from a vibrating feeder with a grate (75 mm opening) to feed the primary jaw crusher with 80 mm closed-side setting (CSS). The vibrating feeder underflow joins the jaw crusher product.

A metal extraction and detection system and a metallurgical sampling system (sample for the laboratory) will be provided for the primary crushing product that goes via conveyors to feed the product storage silo of the primary crushing plant with 145 m^3, equivalent to one working hour of operation. The sampler will be of the cross-belt type, installed on the belt conveyor. A scale is also planned for monitoring and controlling the production rate of the primary crushing circuit, mounted on the belt conveyor.

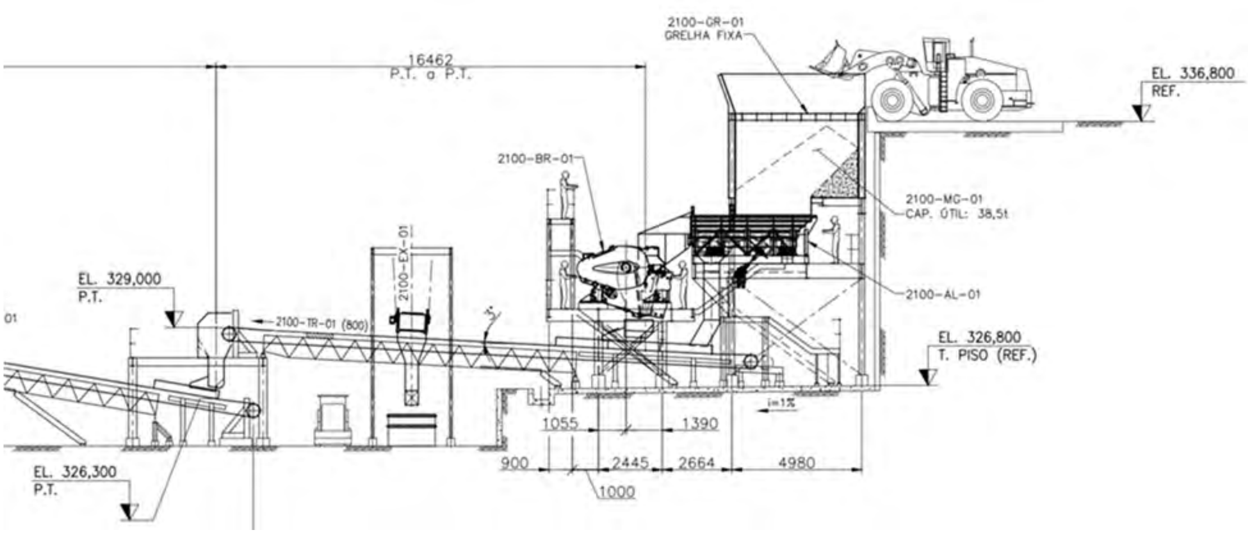


Figure 17-3: Primary Crushing

17.2 Classification (19.1 mm, 7.5 mm, and 0.50 mm), Secondary Crushing, and Ore Sorter Systems

The material stored in the primary crushing feed silo will be extracted with a belt feeder and sent via a conveyor to feed the classification circuit (primary screening), to be carried out on an inclined vibrating screen sized at 19.1 mm.

The underflow feed material (−19.1 mm) goes to the next screening, carried out at 7.5 mm. The retained material (+19.1 mm) goes through belt conveyors to feed the secondary crusher (cone crusher, 20 mm CSS) (Figure 17-4). The crushed material in the secondary crusher joins the primary screen undersize to feed the secondary screening, to be carried out in a double-deck screen (19.1 and 7.5 mm cut). A metal detector is provided to protect the cone crusher.

The material retained on the 19.1 mm screen (material between 43 and 19.1 mm) will feed the plant's first ore sorter, which aims to remove shale and feldspar (about 20% of the mass), which will be stockpiled on a pile. The product from the ore sorter will be routed by conveyors to close the circuit by feeding back into the secondary crusher. The ore sorter system can be bypassed via a reversible feeder/conveyor, directing the material retained in the screen (+19.1 mm) to the conveyor circuit to return it to the secondary crushing.

The material retained in the second deck (−19.1 + 7.5 mm) will go to the second ore sorter system to also remove shale and feldspar (about 20% of the mass), which will be stockpiled, along with the shale removed in the first ore sorter. The stockpile will have an approximate volume of 450 m^3 and an autonomy of approximately one day. The ore sorter product will be forwarded by conveyors to the feed silo of the coarse DMS circuit. The second ore sorter system can also be bypassed with a reversible feeder/conveyor, directing the material to the feed silo of the coarse DMS circuit.

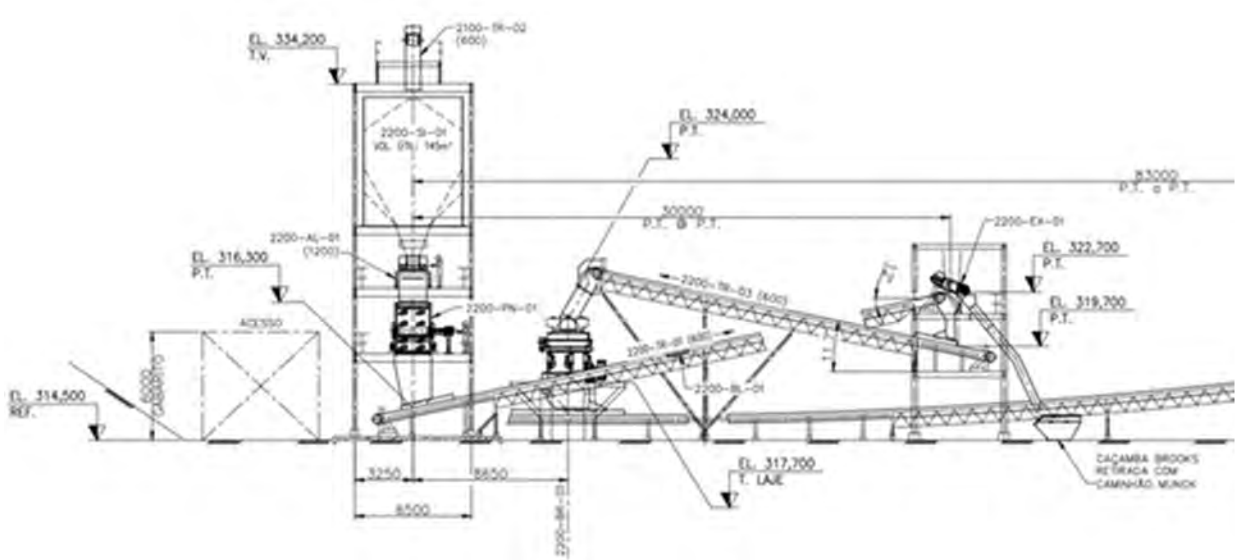


Figure 17-4: Secondary Crushing and Classification

The screening, classification, and secondary crushing circuit will be equipped with scales to control and monitor the production rate. The material from the second deck (−7.5 mm) will go to wet screening (cut in 0.50 mm), which will aim to remove the fines (below 0.50 mm) from the DMS circuit.

The fraction retained in the wet screening (−7.5 + 0.50 mm) will go to the storage silo to feed the DMS medium circuit (−7.5 +0.50 mm). Prior to arrival at their respective silos, the DMS circuit coarse and medium feed streams will be sampled by cross-belt samplers (metallurgical sampling system for generating samples to be analyzed in the laboratory).

17.3 Fines Thickening and Filtration (-0.50 mm)

The fine material (−0.50 mm) will be pumped to feed cyclones to remove the material with a particle size greater than that supported in the thickening (0.25 mm) and to thicken the underflow for filtration (Figure 17-5 and Figure 17-6). A sampling point will be provided to generate a metallurgical sample (pressurized pipe sampler and vezin sampler). The cyclone overflow will feed the thickener (Ø 18 m). The underflow of the thickener, together with the underflow of the cyclones, will feed the filtration.

Filtration will be carried out through a belt filter (area 50 m²). The filter cake with a moisture content of 10% and 0.67% Li_2O will be stacked in a stack with approximately 14 hours of autonomy, corresponding to 450 m^3. The filtrate will be pumped back to the thickener for water recovery.

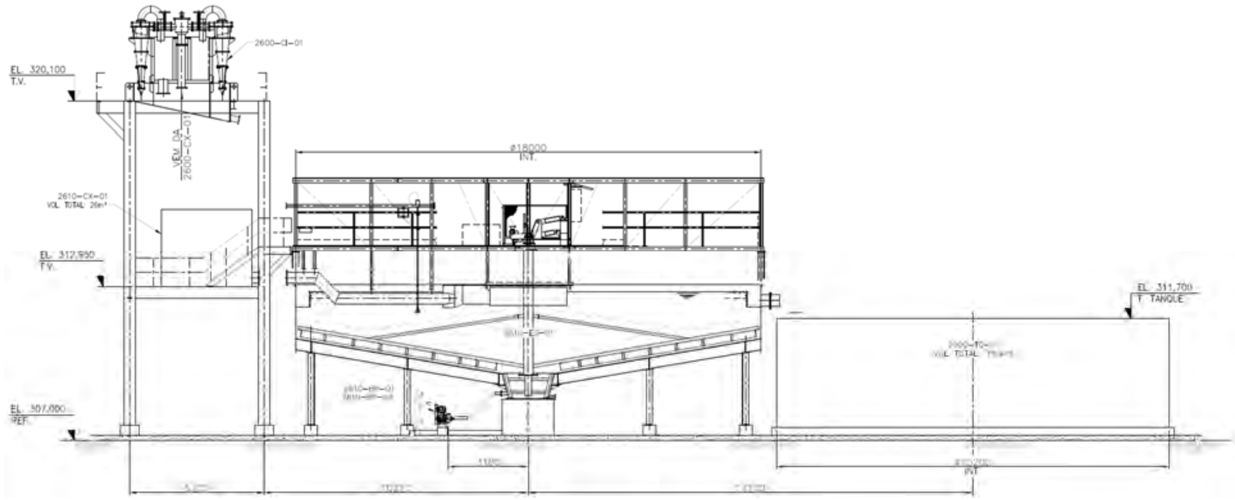


Figure 17-5: Thickening Area

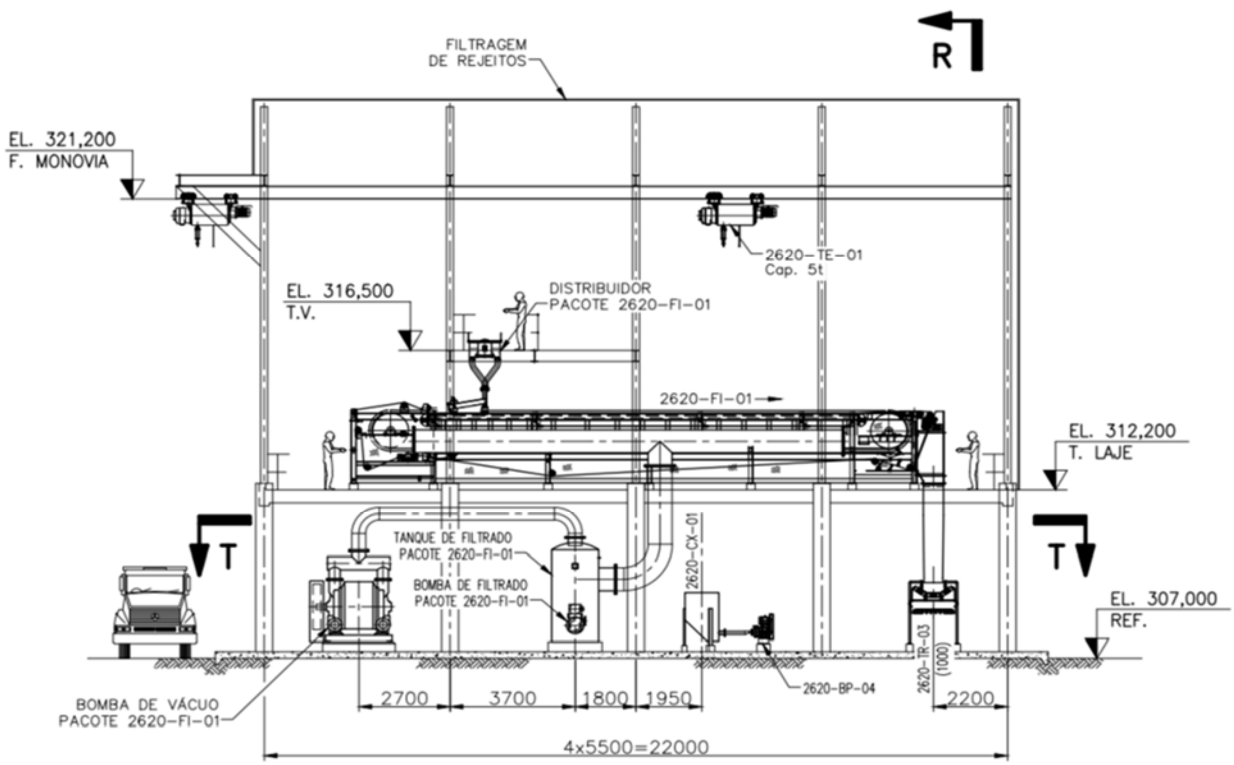


Figure 17-6: Fines Filtration Area

17.4 Coarse DMS Circuit (-19.1 +7.5 mm) and Medium DMS Circuit (-7.5 +0.50 mm)

The coarse- and medium-material storage silos for the DMS circuit feed will have about 145 m^3 of volume, corresponding to around 4.2 and 4.0 hours of autonomy, respectively (Figure 17-7).

The material will be extracted by belt feeders and conveyors to feed horizontal protection screens (with a spray system) that aim to remove fine ore adhering to the surface of the particles that will be processed. The screen fines product will be pumped to the ultrafine removal cyclone. The screen-retained "oversize" will be routed through chutes to feed the solid/dense-media mixing boxes that also receive the dense media (water and FeSi). The ore and dense-media suspension will be pumped to feed the rougher stage to be carried out in dense-media cyclones. Density will be controlled and monitored through density meters. Water addition points will also be provided, as well as densifying cyclones and densifier tubes to adjust the density of the dense media.

For the rougher steps, the dense-media density will be 2.8 g/cm^3. The dense media will be re-fed through a dense-media preparation system composed of a 20 m^3 storage silo, a feeder for extraction, an agitated tank to provide the formation of the suspension of the dense media, and pumps for transfer to the dense-media boxes.

The sunken fractions (higher density) of the rougher steps will exit through the cyclone underflow, being the final concentrate of the dense-media circuits. The cyclone underflows will be conducted to dewatering sieves to remove the dense media. Most of the dense media will exit through the first portion of the screen, which will be routed by gravity to the concentrated dense-media box. In the second portion of the screen, water sprays will be provided to recover the remaining ferrosilicon adhering to the ore particles. This flow will go to boxes of dilute dense media and later to dense-media dense cyclones. The underflow of the densification cyclone will be sent to the concentrated dense-media box and the overflow to the magnetic-drum separator, to recover the ferrosilicon, which will be sent to the concentrated dense-media boxes, passing through demagnetizing pumps. The small portion of non-magnetic and most of the water is pumped into the cycle.

The dewatered concentrates will go to belt conveyors and be stacked with an average moisture content of 4.5% (6% for the medium fraction and 3% for the coarse fraction). The pile will have approximately 450 m^3 of capacity with autonomy of 33 h. The concentrate will have contents of 5.5% Li_2O. Metallurgical sampling will be provided for the concentrates through cross-belt samplers installed on the stacking conveyors. Scales will be provided to monitor production.

The overflows of the dense-media cyclones of the rougher stages will contain the floated material (lower density) and go to static screens and then dewatering screens. In the same way, the ferrosilicon will be recovered and be destined for the boxes of concentrated dense media and dilute dense media. The dewatered materials will then be sent to the mixing boxes with the dense media then pumped to feed the scavenger steps.

The density of the scavenger steps dense media will be 2.7 g/cm^3. Independent systems of dense-media recovery and density adjustment will be provided for each density value—one recovery system to meet the rougher steps and one system to meet the scavenger steps. Each recovery system will contain boxes of concentrated dense media, boxes of dilute dense media, densification cyclones, densifier tubes, low-intensity magnetic-drum separators, degaussers, and handling pumps and pipes.

The scavenger cyclone underflow will be the circuit middlings. In the same way as rougher circuit, they will be dewatered by dewatering screens, and ferrosilicon recovery will occur. The coarse and medium circuit concentrate, with an average moisture content of 4.6%, will be reprocessed in a cone crusher with the aim of increasing the mineral release. The crushed product will be stored in a pile, then taken up by a loader and truck to feed a hopper from the wet-screening feed conveyors (0.50 mm) at a more favourable point. A cross-belt sampler (laboratory sample) and a balance for process monitoring will be provided. The medium stack will have 450 m^3 of capacity, equivalent to five days of operation.

The overflows of the scavenger cyclones will be the final tailings of the DMS circuits. They will also pass through DMS static screens and dewatering screens. The ferrosilicon will be recovered for the dense-media scavenger system.

The tailings will be stacked with moisture content of 3% (DMS coarse tailings) and 6% (DMS medium tailings) in piles of 450 m^3, equivalent to 20 h of autonomy for the DMS coarse tailings and 21 h of autonomy for the DMS medium tailings. The coarse DMS tailings will have a content of 0.36% Li_2O. The medium DMS tailings will have a content of 0.34% Li_2O. Cross-belt samplers (laboratory samples) and scales for production monitoring will be planned.

A compact preparation and dosing system of an auxiliary thickening reagent (flocculant/ and coagulant) will also be provided for dosing in the thickener.

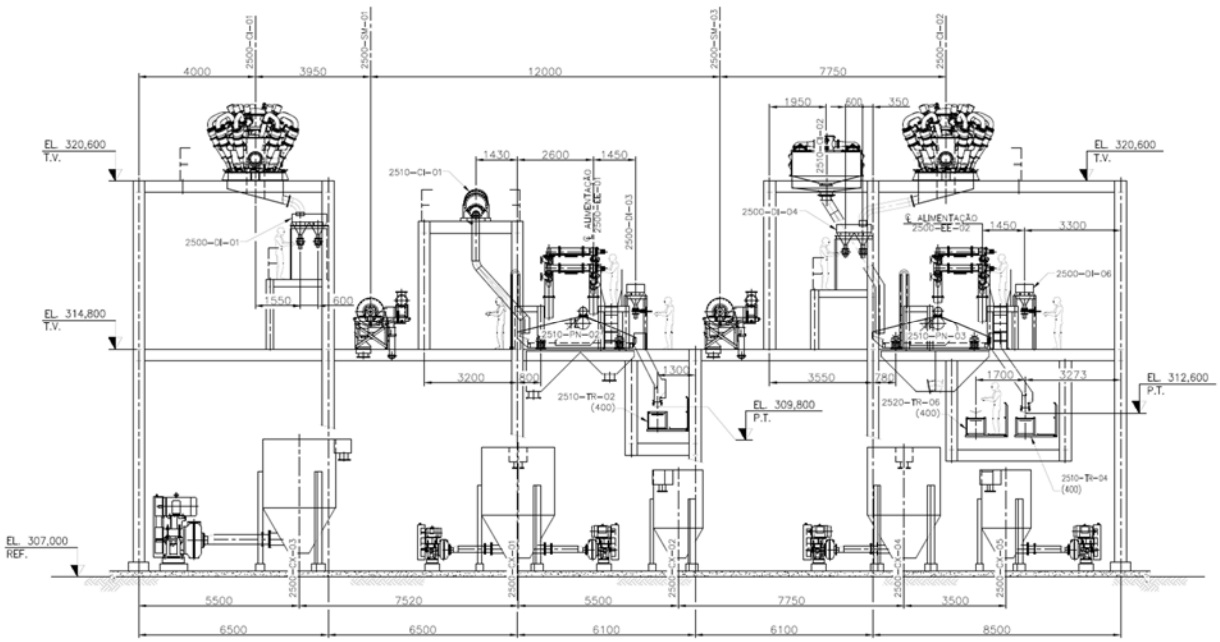


Figure 17-7: DMS Circuit

17.5 Chemical Laboratory

The beneficiation plant will be equipped with a chemical laboratory for preparing and analyzing metallurgical samples from the process, as well as samples from the mine and geology. The laboratory demand is expected to be:

- Mine/geology samples: 1,000/month
- Processing Plant samples: 1,000/month.

Note: 100 samples/month related to environmental control will not be analyzed at the plant's site and must be transported for analysis at a certified laboratory.

The Project laboratory will occupy an area of approximately 30 m by 30 m, and the concept is to house the sample preparation and analysis equipment in modules. The modules will be installed on concrete floors and in a covered area (shed).

Tests, analyses, and preparations to be carried out are as follows:

- Physical preparation for plant, geology, and mine operational control samples: receipt and recording; crushing at P_{75} 2 mm; quartering in Jones or rotary of 150 g aliquot at P_{85} 200 mesh.
- Physical preparation of plant samples for heavy-liquid separation (HLS) tests: receiving and checking; 12.7 mm crushing; 12.7 mm, 9.5 mm, 3.4 mm, 1.7 and 0.5 mm screening; homogenization and quartering in Jones or rotary aliquot for analysis.
- Physical preparation of samples for granulometry: particle-size analysis in different meshes (according to the plant's comminution process).
- Heavy-liquid separation (HLS): HLS tests using separator hoppers or bécher, depending on the particle size of the sample. The monthly quantity foreseen for the HLS tests was 15 samples per month.

Mineralogical analysis is performed using Fourier-transform infrared spectroscopy (FTIR) technology with Bruker Alpha FTIR equipment or similar equipment.

Quantification of the following minerals is planned:

- Spodumene
- Petalite
- Tantalite
- Quartz
- Feldspar
- Mica
- Chlorite.

The percentages obtained in the mineralogical analysis can also be reported for the chemical analysis, which is calculated based on the stoichiometry of the chemical elements in the minerals.

Chemical analysis of lithium and iron is planned by means of sample decomposition through fusion with sodium peroxide, acid dissolution, and reading by atomic absorption spectrometry (AAS).

The estimated consumption of utilities for the laboratory water and electricity is:

- 5,000 L water tank with a flow rate of 5,000 L/d
- 190 kVA availability.

The liquid effluent generated in the laboratory will be neutralized to be treated later by the wastewater treatment plant (WWTP) provided for in the Project.

17.6 Visit to the Project and Companhia Brasileira de Litio Facilities

The QP responsible for the mineral processing area, Ignacy Antoni Lipiec, visited the Project's local facilities and the mining unit of Companhia Brasileira de Litio (CBL) on March 13 and 14, 2024, in the municipalities of Araçuaí and Itinga.

The visit consisted of the following activities:

- Follow-up of a lecture given by MGLIT geologist Anderson Victoria, to present the geological characteristics of the Project's mineral deposit.
- Visit to MGLIT's core sheds to observe the drilling cores in representative ore and overburden boreholes.
- Visit to CBL facilities, including:
  - Mine: descent into the underground mine to observe the operations and the local conditions of stability of the ramps, galleries, and highlights.
  - Mining unit: the processing plant from the primary crushing plant to the product and tailings piles to observe the unit operations, focusing on the concentration stages.
- Area where the Project will be implemented, to observe the local conditions of topography and vegetation.

The MGLIT mineral deposit is adjacent to the CBL mineral deposit, and the processed litiniferous pegmatites contain quartz, feldspar, mica, and spodumene, from which lithium is extracted. CBL's processing plant has a simpler process route, but it is similar to the one foreseen for the Project, which motivated the CBL site visit.

During the QP’s visit, it was reported that they did not face any difficulties in processing the ore. The ROM is received with a content of 1.4%–1.5% Li_2O and 0.8% Fe_2O_3, and after going through the stages of primary crushing, secondary crushing, particle size classification, and concentration by dense media, a lithium concentrate with 5.4%–5.8% Li_2O, and 1.2%–1.3% Fe_2O_3 is obtained.

CBL currently has a new concentration stage using ore sorting, X-ray transmission, and an optical sensor. This ore sorter operation is in the ramp-up phase, and the efficiency gain from the implementation of the equipment cannot yet be measured.

During the visit to the site where the Project will be implemented, the QP observed that the topography is low hills and wide valleys (Figure 17-8). The Project occupies areas on both banks of the Piauí River; an access bridge needs to be built connecting the administrative unit to the processing plant.

Figure 17-8: Visiting the Bandeira Project Site Area

18.0 PROJECT INFRASTRUCTURE

18.1 Plateaus and Accesses

The on-site roads were designed to regulatory standards of the Departamento Nacional de Infraestrutura de Transportes (DNIT) (National Department of Transport Infrastructure).

18.2 Earthworks

To carry out earthmoving, the minimum dimensions for the equipment operation and the minimum widths for maneuvering the largest vehicle that will transit on the site will be observed.

The slope and slope height parameters adopted are listed below:

- Cutting Slopes H = 1.0 V =1.0
- Embankment Slopes H = 1.5 V = 1.0
- Height between Benches 8.0 m
- Slope width 4.0 m
- Slope inclination −5% cut and fill.

In the next phases, the Project may undergo changes depending on the stability studies after the conclusion of the geotechnical studies.

Aiming at integration with the drainage project, minimum slopes, and their direction, will be ensured for the platforms. The direction will be defined to facilitate surface-water flow.

The slope and slope height parameters of the stockpiles indicated in the feasibility study should be confirmed in the next phases of the Project after the execution of the drilling plan, analysis of the geotechnical results, and stability studies carried out for different scenarios of disposition of the products in stockpiles, and may change both in height and inclination. In the absence of study results, general parameters will be adopted, namely:

- Embankments H = 2.0 V = 1.0
- Maximum height between stockpile slopes 8.0 m
- Slope width 10.0 m
- Scope inclination 3.0%.

The pile volumes accord with the studies carried out for the feasibility phase of the Project and were generated by surface difference using Civil 3-D software.

18.3 Administrative Support Facilities

18.3.1 Architectural Concept

The architectural concept adopted for the Project aims to optimize the cost, maintain safety, ensure operability, and reduce the construction time.

The buildings were designed with functionality and spatial optimization in mind, being dimensioned to adequately house all users and equipment necessary for the activities developed in the building, considering the comfort and safety of employees, and always complying with the minimum requirements of the applicable standards.

Determining the construction system was based on the best cost-benefit for the Project and sustainability, maintaining quality, safety, and comfort of the buildings.

For the Project, the container-type construction system was adopted for the administrative support and industrial support facilities. For the restaurant, a mixed construction system will be adopted, where the cooking and support areas will be in a conventional structure, and the other areas will be container-type. This type of construction ensures agility in work execution, reduced waste, in addition to rationalizing the entire construction process. All administrative support buildings have accessibility in accordance with the ABNT standard–NBR 9050–Accessibility to Buildings, Furniture, Spaces and Urban Equipment, prioritizing safety on site according to the activities developed there.

18.3.2 Scope Project

The buildings were defined prioritizing their use and functionality and dimensioned by an informed MGLIT person.

The administrative support facilities were distributed in four plateaus in the industrial plant. Figure 18-1 shows the following list of buildings that are part of the scope of the Project and the plateau to which it was destined:

- Gatehouse
- Concierge
- Uncovered bus stop
- Scale control and shipping
- Central locker room.

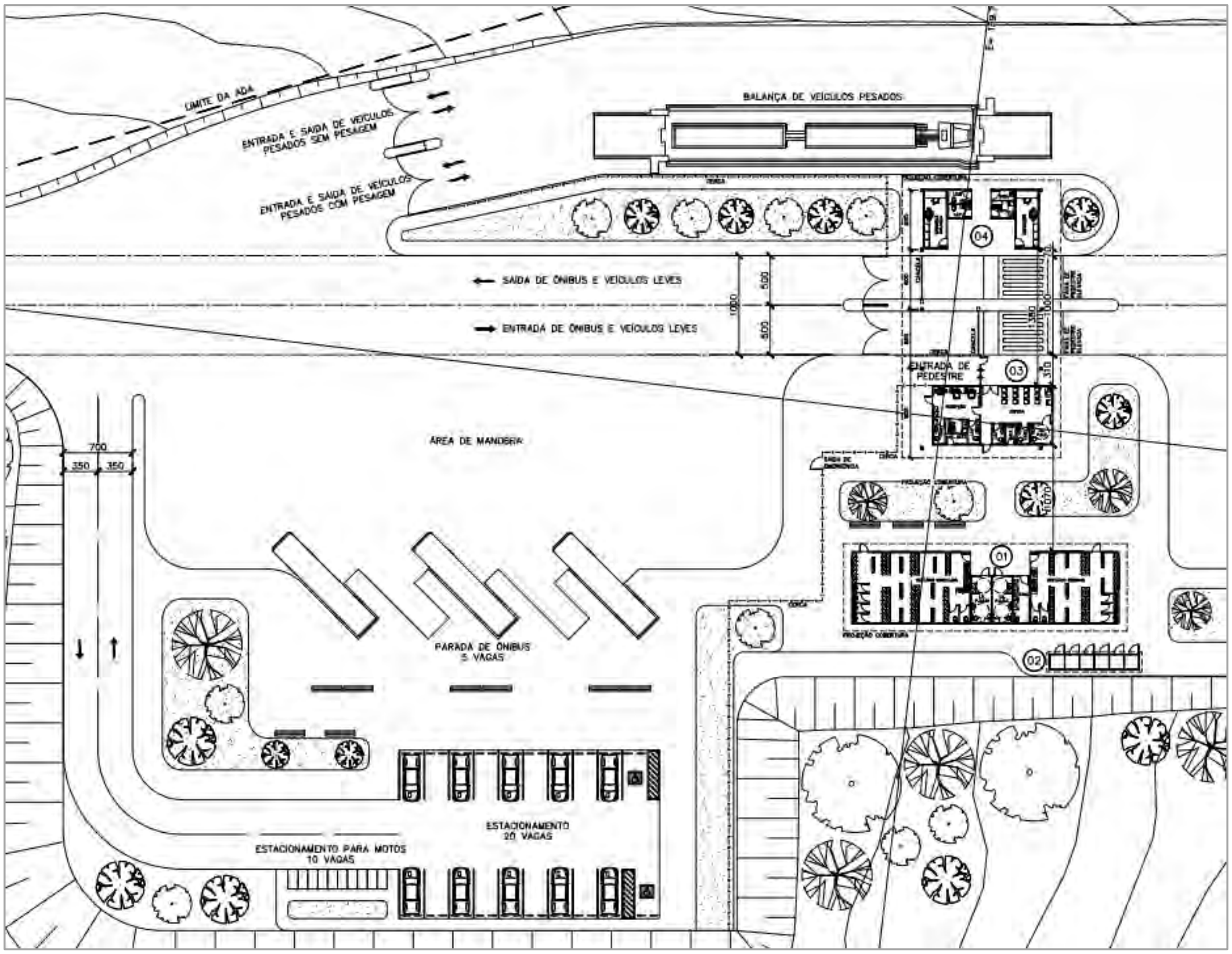


Figure 18-1: Gatehouse Plateau

Administrative Support Plateau

The administrative support plateau comprises the restaurant, and the medical centre and fire brigade, as shown in Figure 18-2.

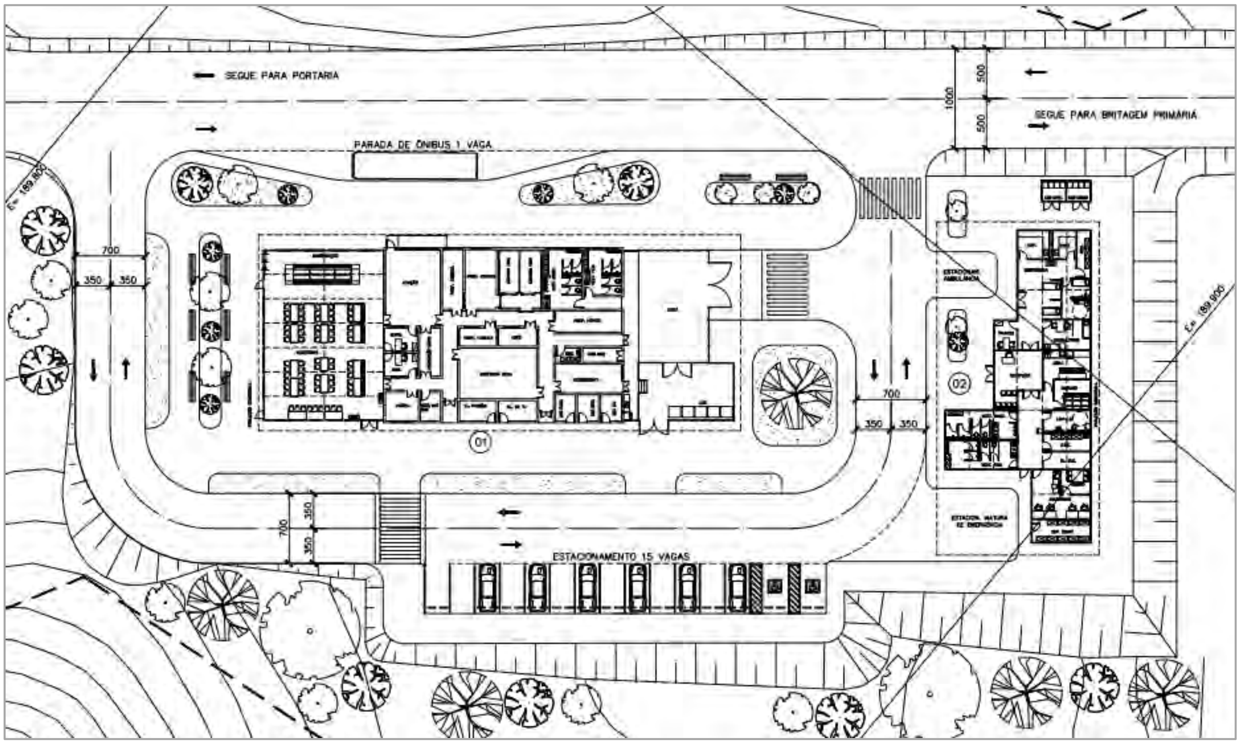


Figure 18-2: Administrative Support Plateau

Laboratory Plateau and Warehouse and Mine Support

As shown in Figure 18-3 the laboratory, warehouse, and mine support plateau comprise the following:

- Mine administrative building
- Dispatch and communication
- Mine's locker room
- Battery room
- Physics and chemistry laboratory
- Intermediate waste deposit (DIR)
- Plant and mine warehouse
- Battery room.

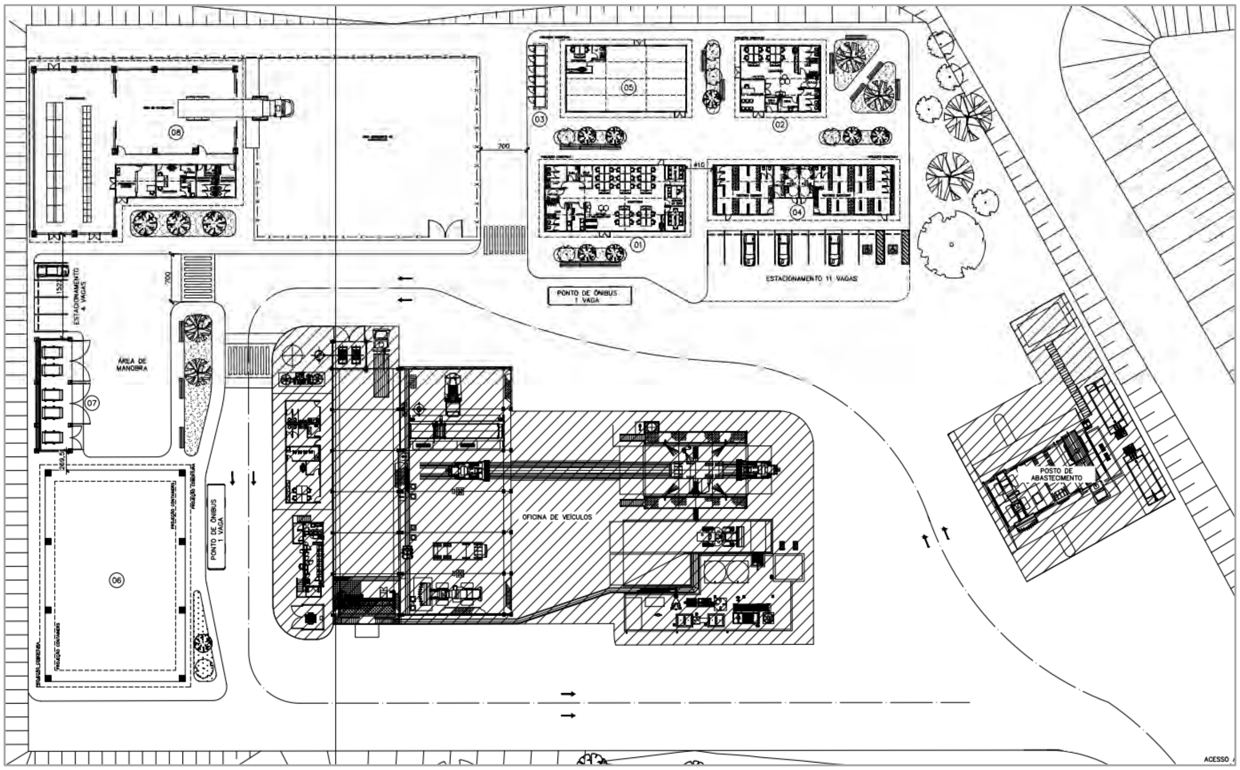


Figure 18-3: Laboratory, Warehouse, and Mine Support Plateau

Explosives Magazine Plateau

As shown in Figure 18-4, the explosives magazine plateau comprises the following:

- Office and sentry box
- Accessory deposit
- Emulsion tanks.

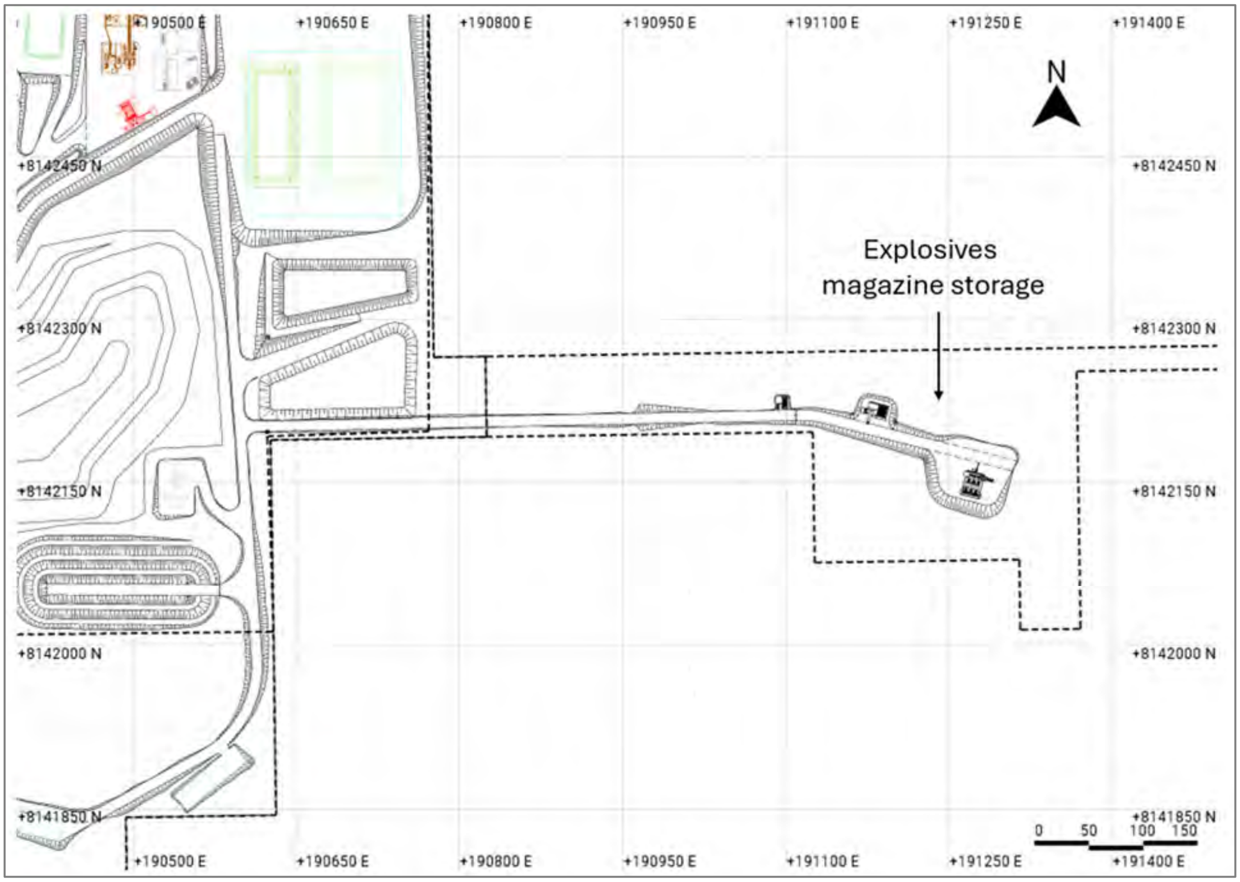


Figure 18-4: Explosives Magazine Plateau

18.3.3 Sizing of Buildings

Mine Administrative Building

- The usable area of the offices considered was at least 7.00 m² per user, including additional administrative areas, such as reception, circulation, meeting rooms, and living area.
- Operational support areas were also considered, such as sanitary facilities, pantry, DML, information technology (IT) room and electrical room.
- Mine administrative building: sized for 29 people.

Laboratory

- The laboratory was designed for 10 people, intended to perform physicochemical analyses of material collected on site.
- The laboratory's construction system consisted of metal containers with a concrete floor and metal tile roof. A free area was foreseen in the concrete floor and metal roof to receive the containers that should compose the laboratory building.
- It has an adjacent area for maneuvering and DIR.

Medical Centre and Fire Brigade

- The medical centre will provide low-complexity outpatient care and will have an emergency care station (2 units), nursing (1 unit), ambulance space (1 unit), and reception (1 person). The support areas will also be considered, consisting of archive area, storage, changing rooms, electrical room/IT, and adequate disposal area (common garbage and infectious waste).
- The fire brigade building will consist of an administrative area with four workstations for brigade members, a storage room for SPCI equipment and a parking space for the emergency vehicle. This building will also house the fire alarm control centre.

Concierge and Scale Control—Dispatch and Bus Stop

- The entrance will consist of a guardhouse where the reception will operate with two workstations, for the identification of visitors and suppliers, as well as employee access control, waiting area, and operational support areas, such as sanitary facilities, pantry, DML, and electrical room.
- The fiscal and shipping cell will be located next to the control of the scale that will be used to weigh the inputs. These areas will be close to the scale and will have one workstation for each.
- The bus stop will be dimensioned for the parking of five buses simultaneously.

Restaurant

- For the restaurant construction, consisting of kitchen and dining areas, accommodates a total meal production for 495 people and 232 people per shift.
- For the sizing of the dining area, it was considered that during the meal period per shift, there will be three meal cycles. In this way, the total staff for the cafeteria of 232 people will be divided by three, so the size of the dining area and cafeteria will serve a maximum of 77 people.
- The premise was adopted that all kitchen equipment will work through electrical induction. This technology provides greater safety, avoiding the risk of fire, burns, and electric shocks.

Central Locker Room

- The proportion of 60% of males and 40% females was adopted for the distribution of the locker rooms.
- The locker rooms, male and female, will have a total of 230 lockers for storing clothing and PPE (total number of people from the industrial unit who will use the locker rooms).
- The showers/toilets/washbasins and urinal area will be sized for a total of 65 people (total number of people per shift who will use the changing rooms).

Mine Locker Room

- The proportion of 60% of males and 40% females was adopted for the distribution of the locker rooms.
- The locker rooms, male and female, will have a total number of 246 lockers for storing clothing and PPE (total number of people from the industrial unit who will use the locker rooms).
- The shower, toilets, washbasins, and urinals area will be sized for a total of 62 people (total number of people per shift who will use the changing rooms).

Warehouse

- Dimensioned to meet the needs of storage of parts for maintenance of the plant and the mine.

Explosives Magazine

- The operation of the explosives magazine will be outsourced.
- There will be no explosives depot/storage in the scope of the Project; explosives will be delivered by truck as needed by the operation.
- The following buildings were considered for the magazine complex: office/sentry box, accessories warehouse and emulsion tanks.

18.3.4 Processing Plant Layout

The Project's master plan is shown in Figure 18-5. The mechanical layout of the processing plant,

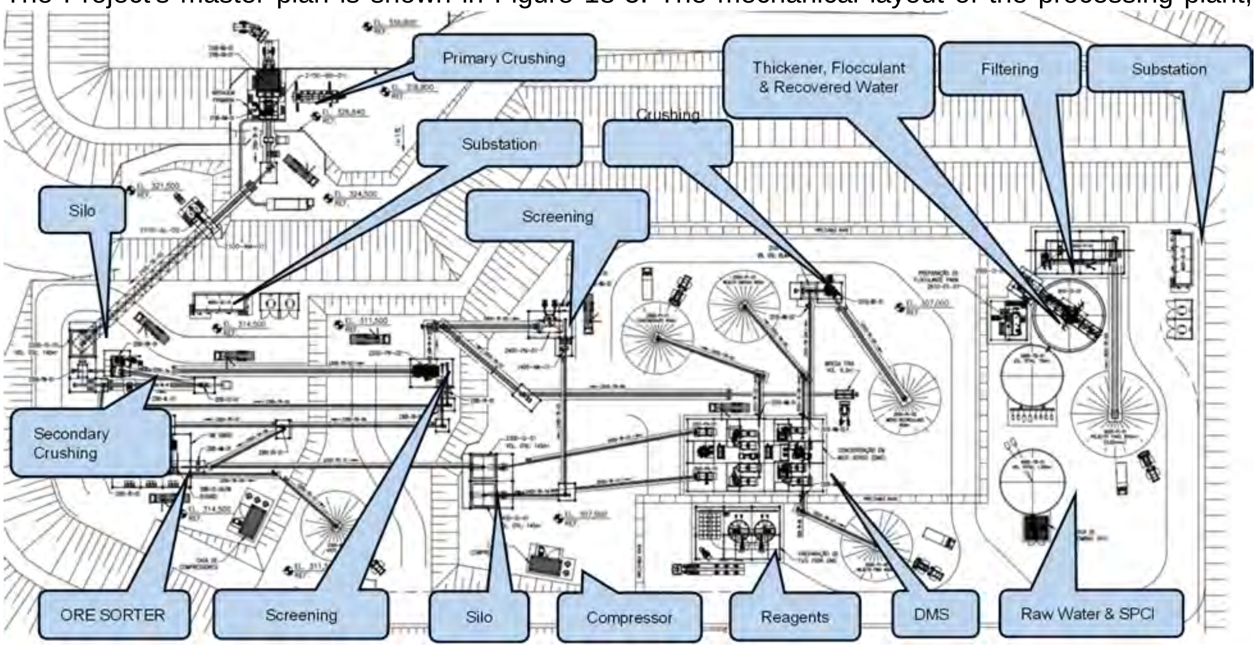


Figure 18-6, was developed adopting normative premises and/or good engineering practices, with the main ones as listed below:

- Use, whenever possible, the unevenness of the natural terrain to minimize structures and equipment powers.
- The industrial buildings and transfer houses were designed without roofs and sidings, except for the reagent and filtration buildings, which have roofs and sidings.
- Minimum access width of 800 mm for people to access the operation and equipment maintenance.
- Minimum access width of 600 mm for the passage of people in areas with restrictions.
- Minimum headroom of 2,200 mm for people to pass through.

- Minimum access width of 4.0 m for vehicle passage.
- Minimum headroom of 5.5 m for vehicle passage.
- Optimization of the structural models of the new installations aiming at the maximum possible reduction of the weight of the steel and concrete structures.
- Provision of adequate access to the operation and maintenance of facilities and equipment by means of stairs, walkways, ramps, walkways, etc.
- Use of concrete floors with drainage channels where it is necessary to dispose of effluents from washing and/or leakage, and to enable adequate cleaning.
- Locations planning for installation of ducts, pipe rack, and electrical trays with their auxiliary structures, such as pipe-racks, pipe-ways, cable-racks, etc.

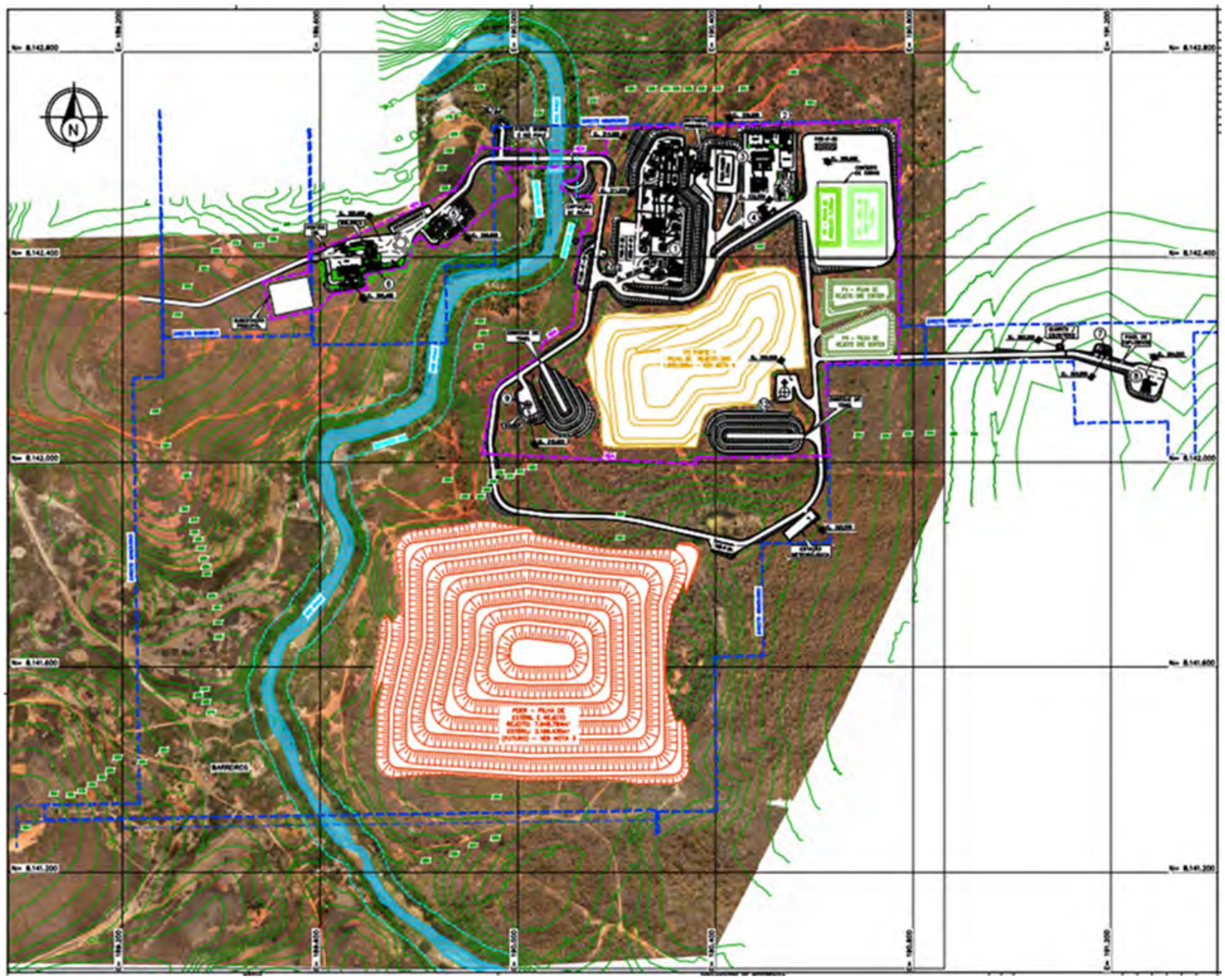


Figure 18-5: Master Plan

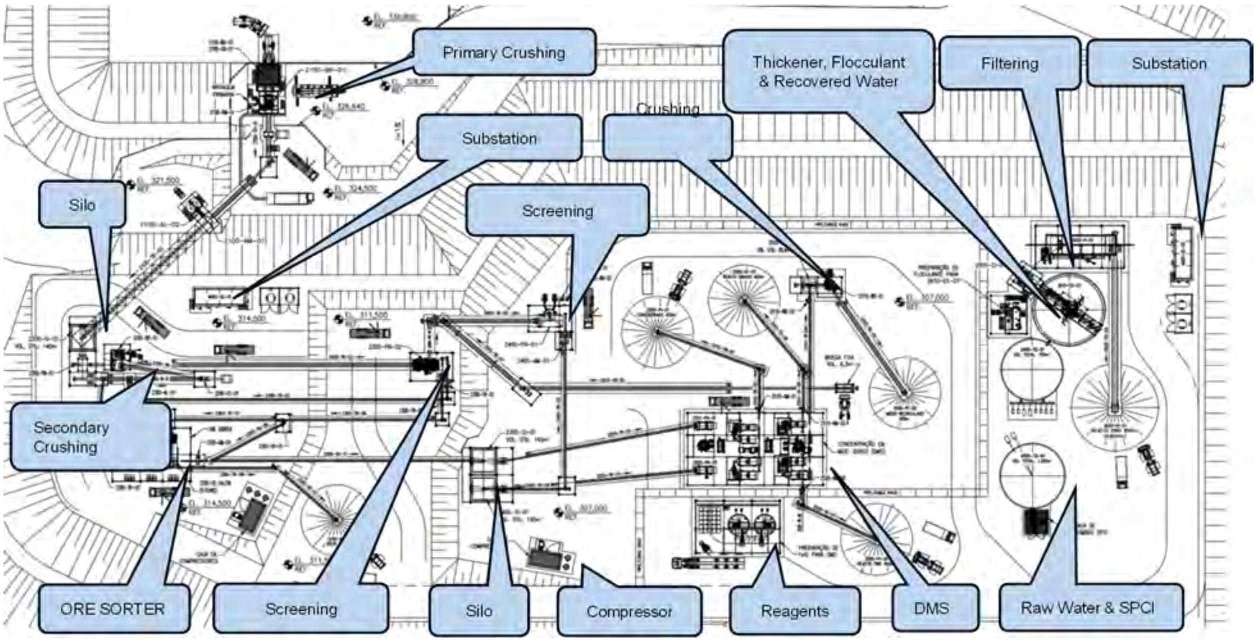


Figure 18-6: General Layout of the Processing Plant

Transfer houses, where possible, have been designed as a simple transfer between belt conveyors, to avoid new buildings and facilitate possible maintenance by mobile equipment, as well as minimizing building costs.

The primary crushing and secondary crushing buildings are designed entirely as metal structures, with the crushers supported independently of the building, to minimize concrete structures and avoid more robust buildings.

18.3.5 Maintenance and Operation

The development of the layout foresaw the use of mobile equipment for equipment maintenance, such as cranes and winch trucks, to minimize permanent installation costs of hoists and overhead cranes. Hoists and overhead cranes are provided only at maintenance points where it is infeasible to use of mobile equipment.

Special attention was given to the maintenance points, so that the layout allows for crane support regions (where applicable) and tow-truck approach regions, as shown in Figure 18-7.

Electric hoists were provided for the operation and handling of reagent bags. All pumps will be maintained by mobile maintenance equipment (hoist trucks, giraffe-type mobile cranes or mobile gantry cranes).

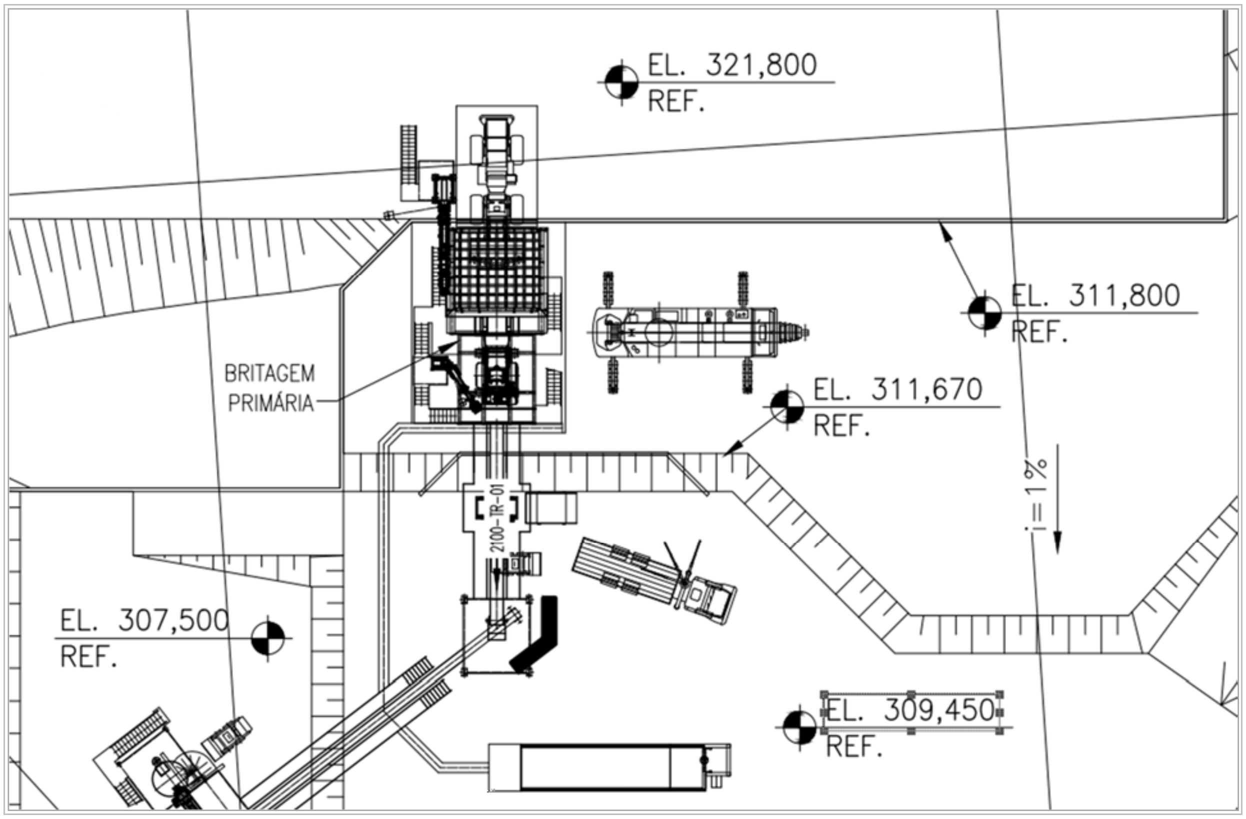


Figure 18-7: Primary Crushing—Crane Patrol and Crane Truck Approach

18.3.6 Platework

All the Project platework (tanks, pulp boxes, and chutes) will be made of carbon steel. The liners will be natural rubber for the pulp equipment and Hardox 500 for the dry material-handling equipment.

Utility Systems

The Project's utilities include the extraction of raw water from the Piauí River, with plans for a secondary water source and pipeline from the Jequitinhonha River, as well as systems for compressed air generation, effluent treatment, and so on.

The utility systems studied for the Project are:

- Raw water extraction—Piauí River and Jequitinhonha River
- Drinking water treatment system
- Sewage treatment system
- Effluent treatment systems
- Process water system recovered from the thickener
- Fire-suppression system
- Compressed-air generation and distribution system.

18.3.7 Raw Water Extraction

Raw water from the Piauí River will be extracted by pumps and destined for the 1,200 m³ new/raw water tank or make-up of the reclaimed water tank, when necessary, with a dedicated reserve for SPCI. Additionally, the Project is pursuing a secondary water source from the Jequitinhonha River, which will require the construction of a pipeline to transport water from the intake point to the site.

18.3.8 Drinking Water Treatment System

The Project will include installing a compact water treatment plant (WTP) with a capacity of 5.0 m³/h, which will meet the drinking water demand of the entire operational staff (495 people).

18.3.9 Sewage Treatment System

The Project will include installing a compact sanitary sewage treatment plant with a capacity of 5.0 m³/h, which will treat the sanitary effluent generated by the entire operational staff.

18.3.10 Oily-Effluent Treatment Plant

A 40.0 m³/h-capacity oily-effluent treatment plant will be installed near the workshop; it will treat the oily effluent generated in the process of washing light and heavy vehicles in the wash bays and washing parts in the workshop.

18.3.11 Industrial Effluent Treatment Plant

A 225.5 m³/h industrial effluent treatment plant will be installed to treat effluent generated during floor cleaning, and general drainage.

18.3.12 Reclaimed Process Water System

The reclaimed water tank (750 m³) will be fed/supplied by the thickener overflow, and the water deficit will be replenished by make-up water from the catchment. Recovered water will be pumped through four networks, which will meet the following consumption needs:

- Treatment water
- Screen sprays
- Service water, thickener sprays, and flushing pulp pipes
- Water for the pulp boxes and for the cyclone chute.

18.3.13 Fire Control System

The fire protection and firefighting system will have a capacity of 30.0 m³/h and will cover the main plateau of the plant. Technical instructions from the Military Fire Brigade of Minas Gerais and applicable ABNT standards were adopted.

18.3.14 Compressed-Air Generation and Distribution System

The compressed air generation, treatment, storage and distribution system will be divided into the plant and workshop areas.

In the plant will be two compressor houses, which will house the compressors, dryers, coalescing filters, and air reservoirs to meet the consumption for instruments, service/cleaning, and process air.

To serve the workshop support structures, lubricated screw compressors with dryers and integrated vessels will be provided—one operational and one spare.

18.4 Metallic Structures

The steel structure buildings foreseen in this Project follow an arrangement defined by the mechanical discipline, according to the premises listed in Section 18.5.

The quantities estimated in this phase of the Project were based on indices defined in the document Project Criteria BAN–0000–43EC–00001 and a database of similar projects developed by AtkinsRéalis.

An uncertainty of 1.20 was considered in the estimation of quantities, a premise also recorded in the design criterion mentioned above.

The materials listed below were considered in the composition of the metallic structure quantities:

- Welded sheets and profiles: ASTM A572 Gr. 50
- W&HP laminated profiles: ASTM A572 Gr. 50
- Perfis L&A laminates: ASTM A36
- Anchor bolts: ASTM A36
- Cold formed profiles: ASTM A1011 Gr. 33
- Checkered flooring sheet: ASTM A36
- Roofing and covering tiles: Trapezoidal galvanized steel sheet H=40 mm, with a thickness of 0.65 mm
- Overhead crane rails: TR57
- Rail clips: Gantrex Boltable Clips
- Other items such as gutters, flashings, guardrails, screws, etc., quantified in miscellanies.

It was considered that the metallic structures of the administrative buildings listed below will be quantified in square metres in the Architectural Quantity Worksheet at this stage of the Project. In the Basic Design stage, with pre-dimensioning of the structures, such items will be quantified in the Steel Structure Quantity Worksheet:

- 4600-SE-01: Substation Traffic Bay
- 4600-SE-02: Substation Traffic Bay

- 4600-SE-03: Substation Traffic Bay
- 4600-SE-04: Substation Traffic Bay
- 4600-SE-05: Substation Traffic Bay
- 5130-ED-01: Mine Administrative Building
- 5140-ED-01: Restaurant4444
- 2100-YY-01: Road Shelter sub o 2100-TR-02
- 2200-ED-01: Primary Screening
- 2200-ED-02: Secondary crushing
- 2200-ED-03: Sucatas Extractor
- 2200-ED-04: Secondary Screening
- 2200-YY-01: Road Shelter sub o 2200-TR-02
- 2300-ED-01: Sorter Hours
- 2300-ED-02: Silo 2300/ 2400
- 2300-YY-01: Road Shelter sub o 2300-TR-11
- 2300-YY-02: Road Shelter sub o 2300-TR-06
- 2300-YY-03: Road Shelter sub o 2300-TR-02
- 2400-ED-01: Tertiary Screening
- 2500-ED-01: DMS (Concentration in Dense Media)
- 2500-ED-02: FeSi Preparation for DMS
- 2510-ED-01: Medium Crushing
- 2510-YY-01: Road Shelter sub o 2510-TR-01
- 2520-YY-01: Road Shelter sub o 2520-TR-01
- 2610-ED-01: Thickener Tower
- 2610-ED-02: Flocculant Building
- 2620-ED-01: Filtration
- 4000-TQ-01: SPCI Tank Pump House
- 4100-ED-01: Compressor House
- 4100-ED-02: Compressor House
- 4200-ED-01: Fuel Filling Station
- 6100-ED-01: Rubber Shop, Workshop and Industrial Support
- 6200-ED-01: Vehicle Washer.

The structures listed below, despite being in metallic structure, will be the scope of the equipment supplier and, therefore, are quantified in the Mechanical Quantity Worksheet:

- 2100-CT-01: Transfer House
- 2300-CT-01: Transfer House

- 2300-CT-02: Transfer House
- 2300-CT-03: Transfer House
- 2300-CT-04: Transfer House
- 2400-CT-01: Transfer House
- 2510-CT-01: Transfer House
- 2510-MG-01: Hopper.

18.5 Concrete

The scope for the reinforced concrete structures was defined by the arrangements of the mechanical and architecture discipline.

The quantities of reinforced concrete foundations and structures were estimated according to similar projects prepared by AtkinsRéalis. To the similar reference projects, multiplying factors were applied to correlate the areas of the structures and the allowable stresses in the soil.

According to document 20240204_Moblan Tech_Report, item 18.8, direct foundations of the footing and radier type were considered. The permissible stress in the soil was adopted between 1.20 and 1.50 kg/cm^2 based on the mining boreholes with lithological profile classification.

In the basic design stage, after receiving the drilling reports, reference drawings (DR) (provided by the client) or load tables provided by the mechanical and steel structures disciplines, the foundations and structures were pre-dimensioned and may undergo changes in dimensions and concept (type of foundation).

The following structures are part of the concrete scope:

- 2510-ED-01: Medium Crushing
- 2100-ED-01: Primary crushing
- 2200-ED-02: Secondary crushing
- 2200-ED-01: Primary Screening
- 2200-ED-04: Secondary Screening
- 2400-ED-01: Tertiary Screening
- 2100-ED-03: Sucatas Extractor
- 2200-ED-03: Sucatas Extractor
- 2300-ED-01: Ore Sorter
- 2300-ED-02: Silos Building
- 2500-ED-01: DMS
- 2620-ED-01: Filtration
- 2610-ED-01: Thickener/Thickener Bridge
- 2500-ED-02: FeSi Preparation for DMS

- 2510-MG-01: Hopper; Conveyors
- 2100-CT-01: Transfer House
- 2300-CT-01: Transfer House
- 2300-CT-02: Transfer House
- 2300-CT-03: Transfer House
- 2300-CT-04: Transfer House
- 2400-CT-01: Transfer House
- 2510-CT-01: Transfer House
- 2100-ED-02: Sampling
- 7100-IF-01: Sump 1
- 7100-IF-02: Sump 2
- 7100-IF-03: Sump 3
- 7100-IF-04: Sump 4
- 4000-TQ-01: Raw Water Tank and SPCI
- 2900-TQ-01: Reclaimed Water Tank
- 2610-EDS-01: Thickener
- 2610-ED-01: Thickener Centre Well
- 6100-ED-01: Workshop and Industrial Support Facilities
- 6100-ED-01: Tire Shop
- 6200-ED-01: Vehicle Wash
- 6000-ST-01: ETEO
- 4200-ED-01: Fuel Filling Station/Fuel Tankage
- 4100-ED-01: Compressor House 1
- 4100-ED-02: Compressor House 2
- 4120-ST-01: SUMMER
- 4110-ST-01: ETA
- 2900-ST-01: WWTP
- 2000-YY-01: Pipe Rack
- 1500-XX-01: Raiser 1
- 1500-XX-02: Raiser 2
- 1000-TQ-01: Mine Water Reservoir 1
- 1000-TQ-02: Mine Water Reservoir 2.

The administrative installations and substations mentioned below are on a direct foundation in a superficial radier. Other structures will be quantified in the quantitative spreadsheets of the Architecture discipline.

- 5130-ED-01: Mine Administrative Building

- 5140-ED-01: Restaurant
- 5150-ED-01: Warehouse
- 5160-ED-01: Concierge/Scale and Shipping, including metal covering over the premises
- 5170-ED-01: Medical Centre/Fire Brigade
- 5180-ED-01: Change Room
- 5700-ED-01: Mine Locker Room
- 5900-ED-01: Mine Dispatch and Communication
- 5950-ED-01: Mine Battery Room
- 6100-ED-02: Workshop Office
- 4600-SE-01: Crushing Substation
- 4600-SE-02: DMS Substation
- 4600-SE-03: Workshops Substation
- 4600-SE-04: Mine Substation
- 4600-SE-05: Exhaust Fans Substation.

Due to the level of engineering completion of this design phase, an engineering provision (design factor) of 20% has been considered.

18.6 Electrical

To provide power to the Bandeira Project, a new 138 kV transmission line will be built. It will emerge from the CEMIG Integrator Substation and be approximately 3 km long.

To implement this project, it will be necessary to build a new main substation, to be fed by the new 138 kV transmission line. The new main substation will lower the voltage from 138 kV to 13.8 kV. A 13.8 kV overhead distribution network will power the secondary substations in e-houses distributed throughout the plant.

The plant will have five secondary substations in an e-house. The secondary substations that will feed the loads from the plant and the mine are listed below:

- 4600-SE-01: Crushing Substation
- 4600-SE-02: DMS Substation
- 4600-SE-03: Workshops Substation
- 4600-SE-04: Mine Substation
- 4600-SE-05: Exhaust Fan Substation.

The plant will demand the energy presented in Table 18-1.

Table 18-1: Power Demand

System Powered	Voltage (kV)	Active Power (kW)	Reactive Power (kVAr)	Apparent Power (kVA)	FP
Main Substation	13.8	8734	2783	9167	0.95

18.7 Instrumentation, Control, and Automation

The Instrumentation, control, and automation project will be developed considering the implementation of a fully automated mining process, with minimal human intervention, based on technologies that allow the best cost-benefit ratio for automated systems.

The control and supervision system will be of the hybrid type, encompassing all control, operation, and supervision activities of the plant. The system will be based on programmable logic controllers (PLC), which will interface and control all process equipment. Control of the plant will be carried out from the dedicated control and operation room, where the plant's operation and engineering stations will be located. Attached to the control room should also be located in the server room for the plant's automation systems.

The control system must have client-server architecture, with the ability to expand and perform online modification of the software and hot modifications of the hardware while ensuring maximum availability of resources for plant operation. The controllers must be interconnected to the plant servers in a redundant network. The interface with the instruments will be carried out through the remote panels, which will be designed according to the communication needs of the process areas.

The plant's instrumentation will be intelligent, with all analog instrumentation interconnected via the industrial network.

18.8 Telecommunications Systems

The telecommunications systems will be subdivided as follows:

- Automation technology (AT) and IT network infrastructure: considers all optical and metallic 9Network infrastructure necessary for communications and interfaces of IT and AT systems, including all racks, servers, radios, switches, patch panel, and other necessary assets.
- Process CCTV: the CCTV system for process monitoring is based on a set of cameras installed in the plant process areas, making the images available via network to the CCTV stations, according to the plant's operational needs.
- Property security: the CCTV system for property security is based on a set of cameras installed throughout the plant's administrative facilities, making the images available via network to security monitors installed in the security room. In addition to the property security CCTV system, the Project will have an access control system, which will enable the control of entry and exit of personnel on the plant premises and access control in controlled or restricted areas.

- Data and telephone network: the data and telephone network system will be responsible for data traffic between the plant's IT equipment, in a fully integrated and secure way, providing high connectivity between all network points. This system will meet all the plant needs, through dedicated applications such as telephone, corporate management systems, email, internet, intranet, and integrated maintenance systems.

18.9 Geotechnical

The geotechnical characterization with the definition of the subsoil stratigraphy was carried out at the beginning of the geological investigation campaign carried out in January 2024, and forwarded to AtkinsReális by MGLIT in March 2024. Twelve geological boreholes were drilled, totalling about 838 m of drilling. The surveys did not follow a regular distribution network, and they were grouped into five distinct zones. The first zone is on the western edge of the area of interest, consisting of two boreholes (ITDD-23-195 and ITDD 23-191). The second zone in the southern region also consists of two boreholes (ITDD-22-209 and ITDD-23-213), the central region with three (ITDD-23-207; ITDD-23-214 and ITDD-23-204), the eastern zone with three (ITDD-22-206, ITDD-22-201 and ITDD-23-205), and the northern zone with two (ITDD-22-208 and ITDD-22-197).

The borehole reports presented the geological description through the classification of the drilled material, indicating their respective thicknesses. There is no quantitative information regarding the standard sampler penetration resistance value (NSPT), torque measurement, RQD index, core recovery percentage or elevation of any water in the borehole. From the interpretation of these soundings, there is a layer of brownish red soil with a sandy clay texture ranging from 3.0 m to 4.68 m thick. Adjacent to this layer is a saprolite ranging from 1.5 m to 21.05 m thick. Finally, a layer of biotite, gray shale, laminated and mottled, whose contact rate with saprolite varies from El. 241.49 m to El. 359.15 m.

No other types of geotechnical investigations were presented that would allow the characterization of the geotechnical behaviour of the soil and rock, either for the performance regarding the load capacity and deformability of the foundation where the structures and pile will be supported, or for the evaluation of the safety regarding the local or global rupture stability of the cut-and-fill slopes. In view of this condition, AtkinsRéalis developed a geotechnical investigation plan, presented in documents 1358-001-0000-4GDI-1000 and BAN-0000-4GES-10000, referring to the geotechnical investigation plan and technical specification.

In view of the lack of geotechnical information to support infrastructure and foundation projects, it was assumed that for permanent slopes cut into existing soils they should be inclined at 1.5H:1V. The slopes of the controlled embankments can be developed with slopes of 2.0H:1.0V. The slopes must be free of stones and blocks larger than 200 mm in diameter, and their moisture content must allow compaction (plus or minus 2% of the optimum moisture content). For foundations, an allowable soil tension on the order of 1.2 kg/cm² will be considered for direct foundations. These parameters should be confirmed from the geotechnical investigation campaign proposed in the AtkinsReális investigation plan 1358-001-0000-4GDI-1000.

Three technical reports were made available—MLF-RT-MGLIT002-2024_PDRP5, MLF-RT-MGLIT003-2024_PDRP5.2, MLF-RT-MGLIT004-2024_PDEP6—and three drawings—MLF-DT-MGLIT002-01-2024, MLF-DT-MGLIT003-01-2024, and MLF-DT-MGLIT004-01-2024—referring to the conceptual design of the P5-Part 1 tailings pile, P5-Part 2 tailings pile, and the P6 waste pile. The documents MLF Geomecânica prepared make recommendations regarding surface drainage, internal drainage, foundation treatment, and analysis of the stability of pile slopes based on the experience of other similar structures implemented in other regions.

In these documents, the evaluation of the foundations from a research campaign carried out in another region was presented, indicating a generic model for the pile foundations consisting of soil/saprolite with a thickness of 20 m, and rock (biotite schist). The geotechnical criteria were based on the designer's experience with other similar structures. However, it indicates a correlation between these structures and the one to be implemented in the Bandeira Project. There is also no record of the characterization of the tailings, and the parameters of this material are presupposed for the stability analyses performed. The Project restricts a geometric arrangement of the pile and a typical section, not presenting any details regarding the deposition plan, internal drainage, surface drainage, foundation treatment, or geotechnical instrumentation, which brings uncertainty in relation to the quantities to be generated; therefore, it is reflected in the CAPEX value estimated to be on the order of ±30%. For the next stage, it is recommended to develop the Project at a detailed level, to make the necessary adjustments in the CAPEX value related to the stockpiles to be implemented in the Bandeira Project.

18.10 Piping

The distribution of utilities and process pipes followed an arrangement defined by the Mechanical discipline, according to the premises listed in Table 18-2. For this phase, pipes above or equal to 4" diameter were considered.

For the process areas, the pipes considered were carbon steel, A.53-GR-B-S, Schedule STD coated in polyurethane, with the characteristics given in Table 18-2.

Table 18-2: Pipe Coating Thickness vs. Diameter Band

Diameter	Coating Thickness
8” A 18”	10 mm
20” A 28”	12 mm
30” A 36”	15 mm
38” A 48”	20 mm

For utilities, such as flushing, make-up, dilution, service water, sealing, process water, raw water, and process/service air, the pipes considered were carbon steel A.53-GR-B-S, Schedule STD and for instrument air were carbon steel pipes A.53-GR-B-S, Schedule STD galvanized.

18.11 Construction

18.11.1 Construction Strategy

The Project Implementation Strategy covers distinct phases and associated activities:

- Phase 1: Basic and detail engineering of areas that does not require additional certified vendor information
- Phase 2: Construction activities of the areas represented by the above approved basic and detailed engineering—after receipt of the construction (installation) license and MGLIT Board approval to proceed
- Phase 3: Construction activities of the areas
- Phase 4: Commissioning and start-up of the areas.

18.11.2 General Objectives

Key Project Drivers are:

- Zero harm to people, the community, and the environment
- Positive impact on surrounding communities
- Maximize Project value for stakeholders
- Achieve on-specification first production according to the Project schedule.

18.11.3 Project Organization

Figure 18-8 shows the project organization chart.

The on-site construction work is to be awarded to experienced contractors as listed below:

- Earthworks
- Civil, architectural, and electro-mechanical construction
- Mine installation
- Transmission line and switchyard contractor
- Fresh water pump station and pipeline contractor
- Commissioning company with the support of construction contractor
- Engineering—AtkinsRéalis
- Procurement Company—AtkinsRéalis
- Construction Management Company—third company with the responsibility for managing of the construction site.

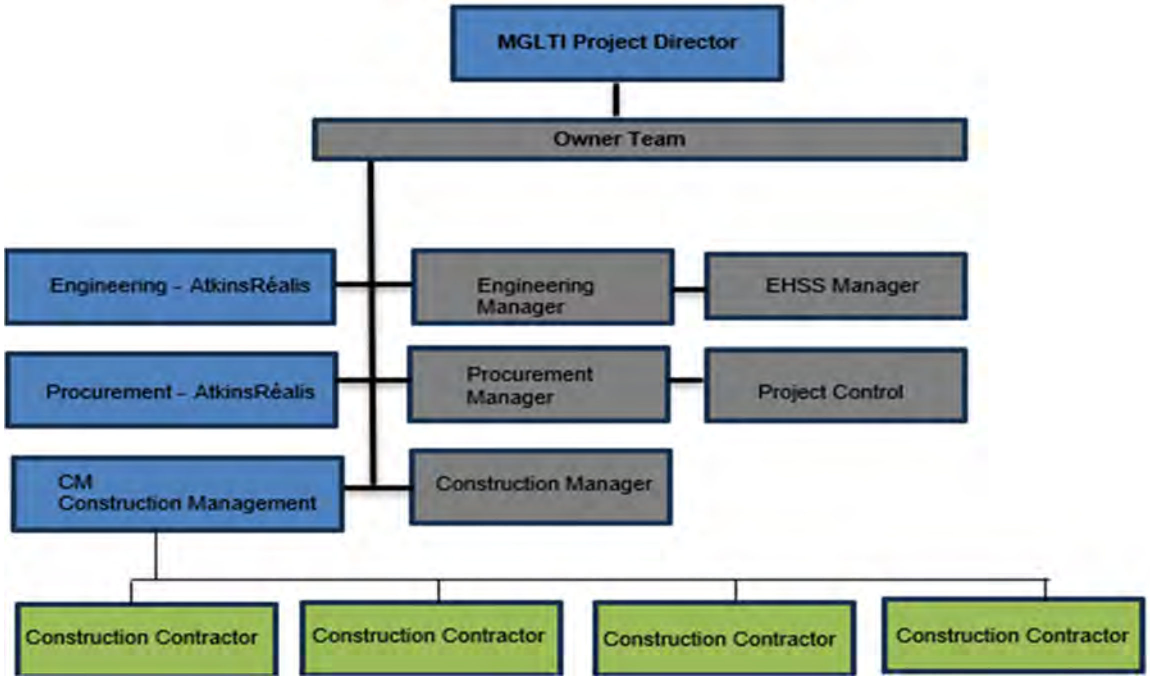


Figure 18-8: Project Organization

18.11.4 Construction Planning and Scheduling

Planning

The Construction Manager (CM) will develop an estimate of the work hours required for site construction activities. Specialized scheduling software will be used to compare planned/budgeted hours vs. spent/burned hours to calculate the earned hours and the associated productivity as per the required reporting matrix.

The monthly update will include hours expended by area and discipline, the status of each activity/document, and the forecast hours to completion.

Scheduling

The Project macro-schedule reflects current Project conditions, which will be updated with the information from the detailed engineering and final construction contractor.

Project Schedule General Basis

The development of the general planning and implementation schedule is based on:

- Current knowledge of the Project
- Prioritization of first production-related activities
- Logical progression linkage by discipline for each WBS activity
- Taking into consideration all required services and material take-off for each area and discipline as developed by engineering.

Assumptions

Assumptions used for defined times (calendar) in the schedule are:

- Working hours considered are from Monday to Friday, with 8-hour shifts.
- All national and state holidays are observed.
- The Project financing approval for Project implementation and issuance of all environmental permits is scheduled for June 30, 2024.
- The basic engineering is scheduled to start in June 2024.
- The earthworks are expected to start in April 2025.
- The transmission line is expected in October 2025.
- The property acquisition for the freshwater pump station and pipeline is scheduled to end in April 2025.
- The expected date for mine production is July 2026 (first production) and sublevel stoping in October 2027.
- The commissioning date is expected to be July 2026.
- The first production is expected in November 2026.
- These calculations include productivity factors.
- Schedule durations for the procurement packages are based on quotes received from the market during the Project FS phase.

Project's Main Milestones

The Project milestones are listed in Table 18-3 and will be updated during the basic and detail phase once the Project implementation start-up is defined.

Table 18-3: Project's Main Milestones

Item	Estimated Date
Financial Investment Decision	June 2024
Field Construction Activities Start	April 2025
Mine Development Start	October 2024
Engineering Start	June 2024
Mine Start (First Production)	July 2026
Transmission Line	October 2025
Mechanical Completion	June 2026
Commissioning Start up	July 2026
First Product	October 2026

Preliminary Schedule

Figure 18-9 shows the preliminary schedule, which will be updated on the next phase with basic engineering.

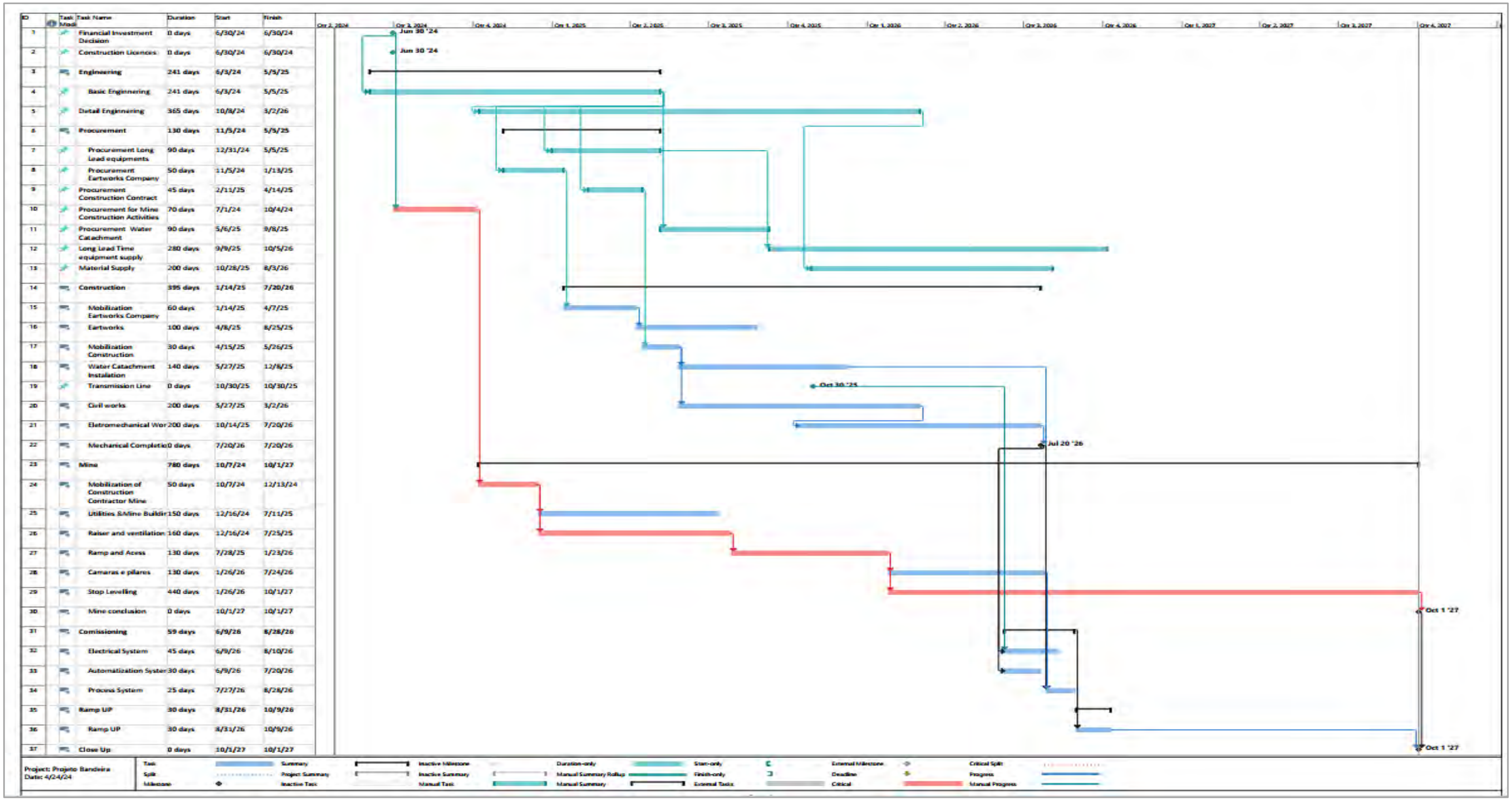


Figure 18-9: Preliminary Schedule

18.11.5 Construction

Construction Strategy

The Project Construction Plan maximizes the utilization of multiple work-fronts in parallel, as much as technically possible, adhering to best-in-class safety practices and maintaining the required quality standards.

The construction strategy is based on several phases, summarized below, driven by the sequence of "issued for construction" information and drawings, which is a function of the availability of certified vendor information for engineering.

In addition, the construction strategy is directly driven by the requirement for first production.

Phase A:

- Temporary earthworks, internal and external access roads
- Temporarily diesel tank
- General site earthworks
- Area for construction contractor and construction manager offices
- Cafeteria, first aid for construction personnel.

Phase B:

- Water catchment
- Mine works
- Civil works
- Electromechanical works.

Phase C:

- Commissioning
- Ramp-up.

Constructability

The constructability plan is based on well-defined Project execution strategies developed during the basic design consolidation phase and is updated during the detailed engineering design phase.

Precast Structures

The use of precast structures will be considered as an alternative to steel structures for pipe racks, warehouse structures, and general housing structures.

Pre-assembly

Pre-assembly will be considered for the following:

- Belt conveyors to be pre-assembled at the construction contractor area
- Steel structures with ladders, platforms, and handrails
- Piping spools and supports—pre-assembly in the site pipe shop.

The pre-assembly opportunities will be identified during the consolidation of the feasibility study engineering design and will be further developed during the detailed engineering phase.

- The administrative area will be installed using pre-assembled containers.
- Modularization.

Modular construction will be used in specific installations, basically in an e-house. Logistics studies will confirm the suitability of modularization based on local transportation conditions.

Construction Facilities/Services

Temporary construction facilities listed below are to be provided in accordance with the Project's technical standards and procedures:

- Warehouses and areas for temporary storage of equipment and materials on site, operated by a specialist contractor and managed by the construction manager.
- Temporary facilities for construction contractors—to be supplied, operated, maintained, and demobilized by the construction manager.
- Area for prefabrication— to be implemented by the electromechanical assembly construction manager.
- Access road—existing road maintained by construction contractor.
- Parking area for personnel transportation vehicles—to be provided by MGLIT.
- Medical facility—the construction contractor will have the responsibility for their own personnel Medical Support Services.
- Temporary (prior to the main Project system being completed) sewage and waste collection shall be the responsibility of the Construction Contractor.

Table 18-4 defines the responsibility for each temporary facility to be implemented in the Project.

Table 18-4: Responsibilities—Temporarily Facilities

Facility	Responsibility	Description
Area Limits, Guard Booth	MGLIT	Fences, access gates, barriers
Work-Site Construction	Construction Contractor	Under each contractor's responsibility
CM/MGLIT Office	MGLIT	MGLIT will contract building and maintenance services
Temporary Power for Construction	Construction Contractor	All contractors will be responsible for temporary power

Facility	Responsibility	Description
Construction Waste (Selection, Deposit, and Disposal)	Construction Contractors	Each contractor will control all waste material until its final disposal
Temporary Sewage and Waste Collection	Construction Contractors	All contractors will be responsible for temporary sewage and the waste's disposal
Contractor Facilities on Site	Construction Contractors	Administrative building, workshop, diesel tank, potable and raw water, medical services, pipe shop
CM Personnel Accommodation and Transportation	CM	All loading installation, including water treatment, swear treatment, potable water - according to Brazilian Law
Loading	Construction Contractors	All loading installation, including water treatment, sewer treatment, potable water - according to Brazilian Law
Installation of Communication Systems	MGLIT	Internet Link with external supplier. Contractors will provide their own installation

Food and Cafeteria Administration

The building and utilities for the cafeteria will be provided by the construction contractor, under MGLIT supervision. An external company with expertise and knowledge in providing food service to large projects will be contracted and provide the food to every contractor—at the expense of each contractor, who will directly negotiate with the external company.

Medical Facilities

The Project Health and Safety Team will manage the pooled medical support services for the MGLIT Project. Contractors will be responsible for their own personnel medical support services.

Site Entrance Gate and Guard Booth

A specialized company will provide the site security services, integrated into the MGLIT site-management system. This company will be responsible for controlling the access of people, vehicles, equipment, and materials, authorizing visitor access, and for performing surveillance of the entire Project area.

Concrete and Aggregate Supply

An on-site concrete batch plant will be established—complete with cement storage silos, with an estimate production capacity of up to 60 m^3/h. Batch plant installation and operation will be the responsibility of the construction contractor, who will also be responsible for supplying all required aggregate. In the next phase, the construction contractor will analyze the capability of the external concrete plant.

Communications

The installation of all communication systems will be MGLIT's responsibility. One ethernet connection will be distributed to each contractor. The construction contractors are responsible for their own internal communications network.

18.11.6 Commissioning

Commissioning Philosophy

The commissioning manager and their team will commence activities in the project office, prior to mobilizing to site when the installation of process equipment has reached the state where inspection and test activities can commence.

Upon mechanical completion of an area or sub-area, pre-operational testing commences. A punch list of minor deficiencies that do not impede pre-operational testing or start-up of the Project is jointly developed and mutually accepted as outstanding work for completion by construction. Each area or sub-area can be divided into systems and subsystems.

All utilities (power, water, compressed, and plant air) are commissioned first, followed by the heap leach area. The commissioning schedule will be updated weekly, and early commissioning opportunities will be looked for continuously.

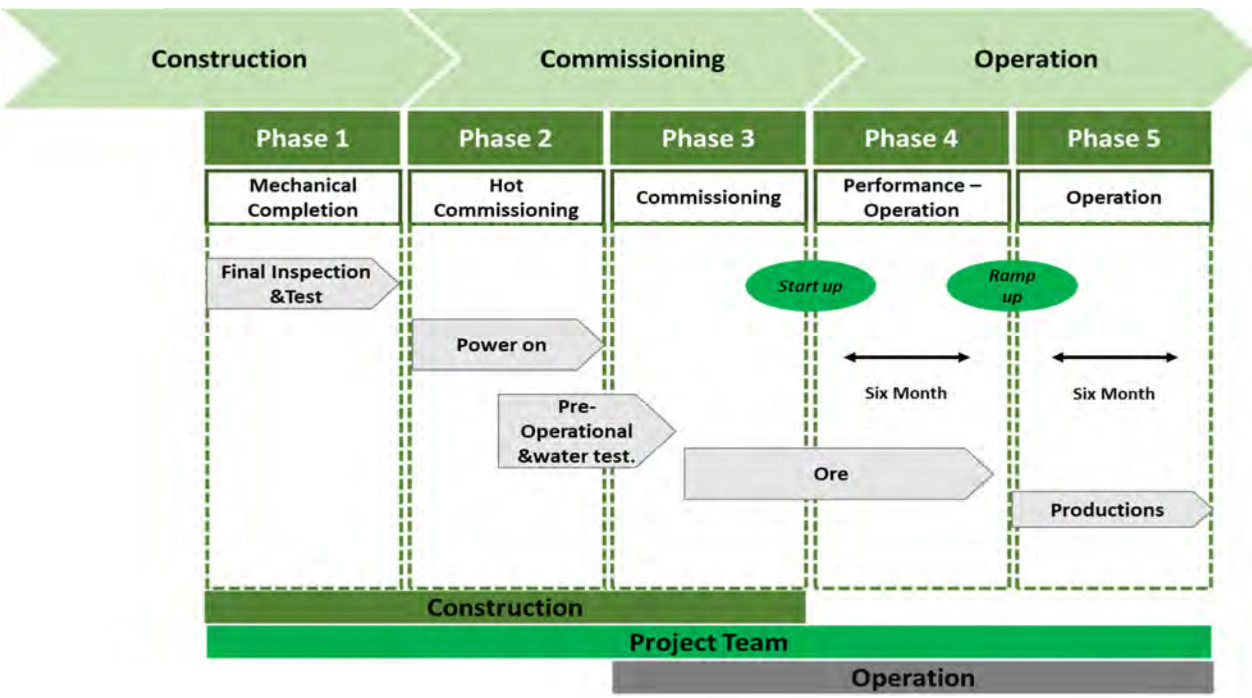


Figure 18-10: Project Commissioning Sequence

18.11.7 Health and Safety for Construction

Concepts for EHSS at Construction

The MGLIT Project and the CM management teams are to define safe work practices and be trained for properly executing their roles in compliance with legislation and with MGLIT corporate guidelines.

The MGLIT Project and all contractor teams will be required to fully engage with people-preservation practices and philosophy and must strive to meet the occupational health and safety goals defined by the Project performance indicators to ensure the intended results are achieved.

Therefore, each contractor will have to provide its Occupational Health and Safety Management Plan, aligned with the applicable requirements, considering when, by whom, and how they will be used on the work daily routine. Each contractor must provide its respective plan, which will be submitted to the CM for approval. The latter will, afterwards, monitor their application and effectiveness, demanding adjustments be made whenever deviations are detected.

18.11.8 Quality

Purpose

The Project Quality Plan will provide construction contractors with the strategies and guidelines for quality control and quality assurance for construction work execution, and the supply of equipment and materials for the implementation phase of the MGLIT.

It will focus on obtaining the best results for intrinsic quality, costs, time, and compliance with health, safety, environment, and social issues (EHSS), as well as the safe handover to operations at the end of execution.

The Project quality management systems will be designed to ensure that the contractual quality clauses included in the contractor contracts are duly met.

During the tendering process, each contractor must submit their Quality Management Plan, inclusive of processes and procedures, that will be applied on site, and the CM will monitor for compliance.

18.11.9 Close-Out

The CM will receive a Complete Works Notification for each construction worked area.

The CM will verify the contractor quality, engineering, construction, and EHSS performance, by doing a final inspection and issuing a final report regarding the status of each CWA.

The report will also list all acceptance exclusions. After the close-out of the exclusions, the CM will sign a provisional acceptance.

18.11.10 Administrative Close-Out

By means of the administrative closeout, all temporary installations and resources used during the Project will be demobilized, and the area will be returned to MGLIT in good physical condition.

All site contractor personnel will be demobilized by each contractor, according to the histogram negotiated with the CM and approved by MGLIT. The same procedure will be applied to equipment and installations.

All spare parts, materials, and equipment that are part of the Project will be handed over to the warehouse, whose coordinator will control this process. All operational material, equipment, and accessories will be handed over to the operations warehouse.

The contractors and subcontractors will present to the CM all Payment Registers according to Brazilian tax laws for municipal, state, and union fees. Moreover, all contractors will present this register to every subcontractor and supplier to testify to the lack of any debt to any subcontractor, supplier, or the government.

18.11.11 Procurement

To achieve the desired accuracy of CAPEX according to AACE Class 3, 25 packages were selected, identified as the main equipment packages, to obtain estimated quotations in the market (Table 18-5). A vendor list has been prepared with a minimum of three and a maximum of six bidders per package.

Table 18-5: Procurement

Item	Package No.	Package Name	No. of Bidders Invited	No. of Proposals Received
1	PK-001	Vibrating feeder	5	3
2	PK-002	Samplers	6	3
3	PK-003	Slurry pump	4	3
4	PK-004	Cone crusher (secondary and medium)	6	6
5	PK-005	Jaw crusher	4	4
6	PK-006	Container—inst. adm.	5	2
7	PK-007	Magnetic separator/degausser	4	3
8	PK-008	Thickener	4	4
9	PK-009	Filter belt	5	3
10	PK-010	Hydrocyclones	3	2
11	PK-011	Laboratory	3	1
12	PK-012	Ore sorter	2	2
13	PK-013	Classification and protection vibrating screens	6	5
14	PK-014	DMS circuit dewatering static screens	4	2
15	PK-015	Hydraulic rock breaker	6	2
16	PK-016	Flocculant preparation system	5	2
17	PK-017	Conveyors and belt feeder	6	3
18	PK-018	Dense media system	6	1
19	PK-019	Overhead power distribution network	3	1
20	PK-020	Electrocentres—medium and low voltage	3	2
21	PK-021	Sub underground	3	2
22	PK-022	Underground distribution network	1	1
23	PK-023	Switchgear	6	1
24	PK-024	Transformer 138/13,8 kW	3	2
25	PK-025	Equipment rental	3	1
		Average =	4.24	2.44

The technical and commercial proposals were requested from the market, applying the ATRL procedures inherent to the procurement activities, on a competitive and auditable basis.

The technical proposals were forwarded to engineering to perform the technical compliance analysis. The commercial proposals were equalized, and the best commercial proposal technically approved in each package was recommended for CAPEX.

A comparative price map (bid tab) was prepared—document no. BAN-0000-50BS-00001_Rev0—presenting the result of the technical/commercial equalizations and the recommendations for application in CAPEX of each package.

18.12 Bandeira 1 Waste Dump and Tailing Storage Facilities

This section presents the executive project of the Bandeira waste rock and tailings Dump 1, north of the future access ramp entrance to the ore body, belonging to MGLIT.

The Project follows the guidelines set forth in ABNT NBR 13029 of July 2017, Mining—Preparation and presentation of waste disposal dump project, and ABNT NBR 13028 of November 2017, Mining—Preparation and presentation of tailings dam project, sediment containment, and water storage—Requirements, along with other mining-related standards and decrees.

The Project's objective is to dispose of the materials from underground mining and ore treatment tailings in a controlled and orderly manner. Therefore, the dump must remain stable, ensuring the safety of people, equipment, and the environment, becoming a secure structure integrated with the environment.

The waste materials generated during mining, which are inert, consist of blocks of biotite schist from Class III/IV masses from surface portions and blocks of Class II masses from deeper portions, as well as coarse rejects from the concentration plant.

The site for disposal is south of the concentration plant.

18.12.1 Reference Documents

The following documents and topographic plans were provided by MGLIT and used in the work:

- Mechanical Master Plan—BAN-2000-45D1-10000 - dated 06/05/2024
- Topographic plan without date—executed by MGLIT
- Conceptual project—Tailings Dump P5 - Part 1 - Bandeira Project, elaborated by MLF Geomechanics, dated 23/04/2024
- Projeto Bandeira—Pilha De Estéril E Rejeito Bandeira 1 - Projeto Executivo - Maio/2024 elaborated by Itaaçu Geologia e Engenharia.

18.12.2 Geotechnical Aspects

The foundation rocks of the Waste Dump 1 exhibit altered characteristics with medium resistance (Class V/III), which can extend up to approximately 26.0 m. Beyond this depth, the mass becomes Class II, as described in the sterilization boreholes conducted on site.

Standard penetration test (SPT) boreholes carried out in adjacent areas consistently yielded SPT values above seven blows within the first m, indicating excellent foundation conditions for the implementation of waste rock dumps.

The soil cover ranges from a few centimetres to up to 26.0 m deep, mainly due to the dry climate and intense rainfall, which can reach up to 200 mm in a few hours.

The boreholes also did not encounter the water table, indicating that the rocks have low permeability and that there are no springs in the region.

No signs of landslides, creep, or other forms of instability were observed on the slopes.

18.12.3 Investigations in the Area

To characterize the study area, sampling campaigns and laboratory tests were scheduled. Two samples, both deformed and undisturbed, were collected in the field for laboratory testing.

This study used information from neighboring areas that are in an advanced stage of implementing waste rock and tailings dumps, and they do not exhibit any abnormalities in their operation.

18.12.4 Main Features

The samples generally showed well-graded characteristics, but with average percentages of coarse-grained materials (coarse sand and gravel). Sandy materials predominate in the samples, with minimal amounts of clayey materials.

The clay fraction exhibits behaviour typical of low-compressibility inorganic clay (CL), indicating that the soil is not prone to settlement. The clay portion was classified as having low activity, characteristic of soil with low colloidal activity, with kaolinite as the main clay mineral. Kaolinite has low expansion capacity, thus indicating no structural instability.

18.12.5 Seismic Risk

The Brazilian technical standard ABNT NBR 15421—Design of Structures Resistant to Earthquakes—Procedure (2006) regulates seismic effects on buildings in Brazil.

Waste Dump 1, being situated in the central portion of a tectonic plate, far from its edges, is expected to experience low-frequency and low-magnitude seismic activity.

NBR 15421 divides Brazil into five seismic zones (Figure 18-11), with the majority in Zone 0, characterized by very low seismic danger, with horizontal accelerations of 0.025 g.

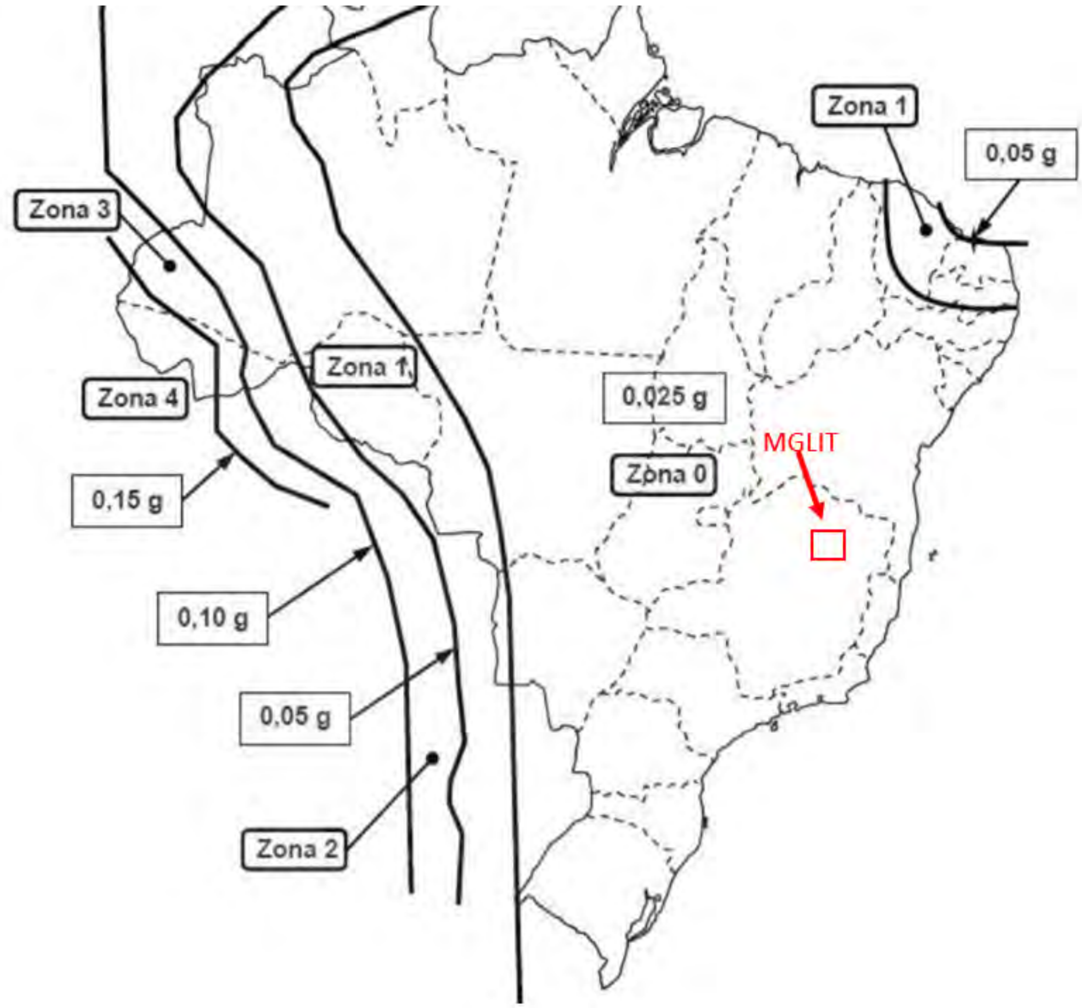
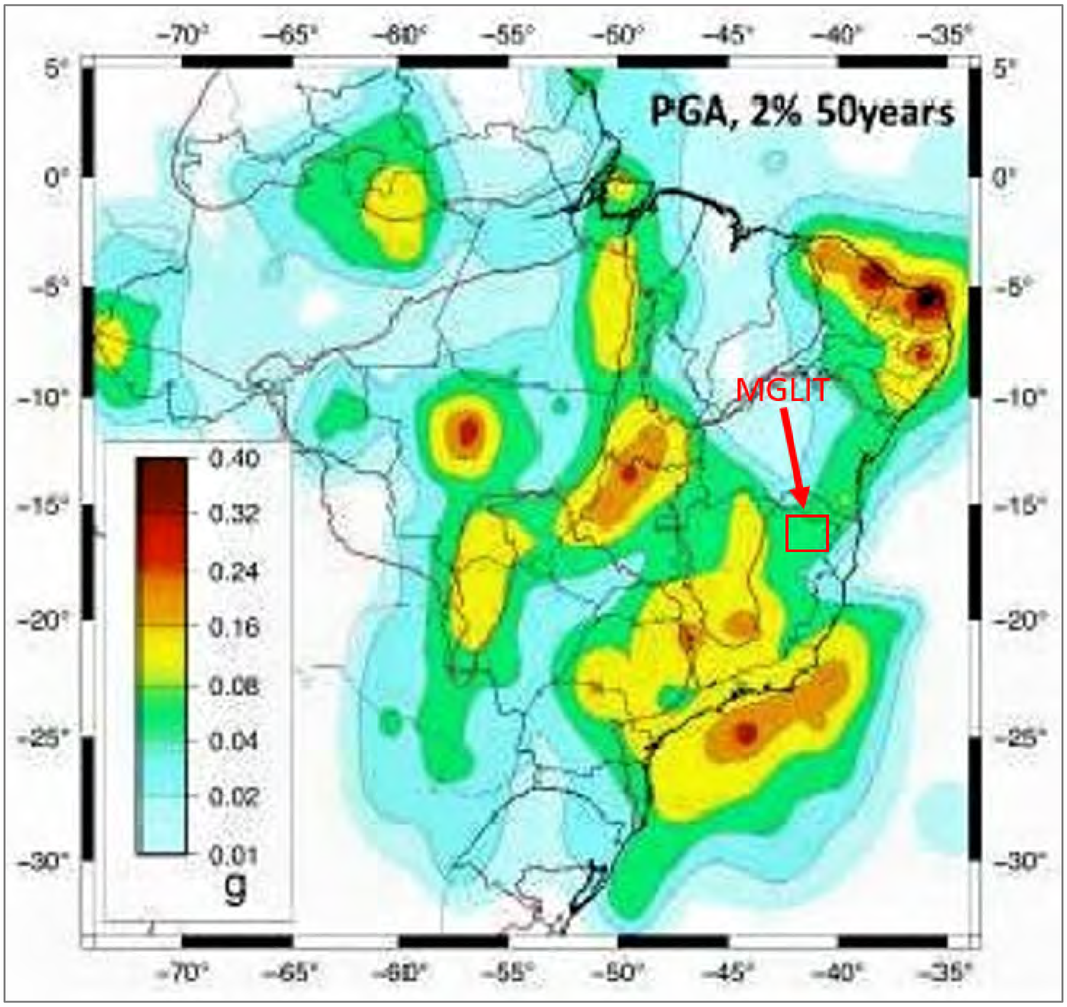


Figure 18-11: Seismic Zones of NBR 15421

Figure 18-12 gives a more conservative prediction. It contemplates a PGA with a probability of exceedance of 2% in 50 years, which is equivalent to a return period T = 2,475 years.



Note: Peak Ground Acceleration (PGA) in rock, for probabilities of 2% exceedance in 50 years, to a period of 2,475 years.
Source: Assumpção et al. (2016).

Figure 18-12: Seismic Hazard Maps for Peak Acceleration

Although the use of a value for the vertical seismic coefficient (kv) is a widely accepted concept. Seed and Martin (1966) and Duncan and Wright (2005) suggest adopting a vertical seismic coefficient equal to 0, under the assumption that the movement of shear seismic waves is vertical. In contrast, Papadimitriou et al. (2014) stress that vertical acceleration values in regions of low seismic activity can be considered negligible or of little relevance.

Therefore, the maximum horizontal acceleration identified in Figure 18-12 was 0.04 g.

18.12.6 Cleaning and Treatment of the Foundation

The recommended treatment involves clearing vegetation, removing stumps, and cleaning the superficial vegetative layer. The vegetative layer can be reused to cover the final slopes of the dump.

18.12.7 Internal Drainage and Superficial Drainage

The hydrological and hydraulic studies are detailed in the next subsection. For internal drainage (bottom drains), as specified in ABNT NBR 13 029, bottom drains will not be necessary, because the lower layer of the dump, constructed with the rockfill itself, will function as the bottom drain. These drains will collect and convey excess water resulting from precipitation, infiltration water, and springs away from the foundation area, as well as preventing water levels to rise within the dump, which can generate additional pore pressure beyond those caused by foundation loading.

Regarding surface drainage, the drainage devices for the berms are included in the hydrological and hydraulic study report.

18.12.8 Geometric Design

The geometric design was developed based on the topographic data provided by MGLIT, aiming to accommodate the necessary volumes in appropriate geometry, and designed infrastructure, for rapid integration with the environment.

The berms were designed to function as conduits for rainwater, despite the initial high permeability of the embankment. Longitudinally, they should have a slope of 1%. This slope allows water to flow towards the water exits, even in the event of settlement due to block rearrangement. Transversely, the berms should have a slope of 5% towards the toe of the upper slope. The main geometric parameters considered for the design are listed in Table 18-6.

Table 18-6: Geometric Parameters of Dump 1

Maximum Height (m)	40
Base and Crest Elevation (m)	340–380
Maximum Seat Height (m)	20
Minimum Width of Shoulders (m)	10
Angle Between Berms (°)	1V:1,3H–37.6º
General Angle (°)	1V:1,8H–29º
Longitudinal Slope (%)	1%
Cross Slope (%)	5%
Occupied Area (ha)	9.80 ha
Available volume (Millions of m^3)	1.96

Figure 18-13 presents the arrangement of the waste and tailings design.

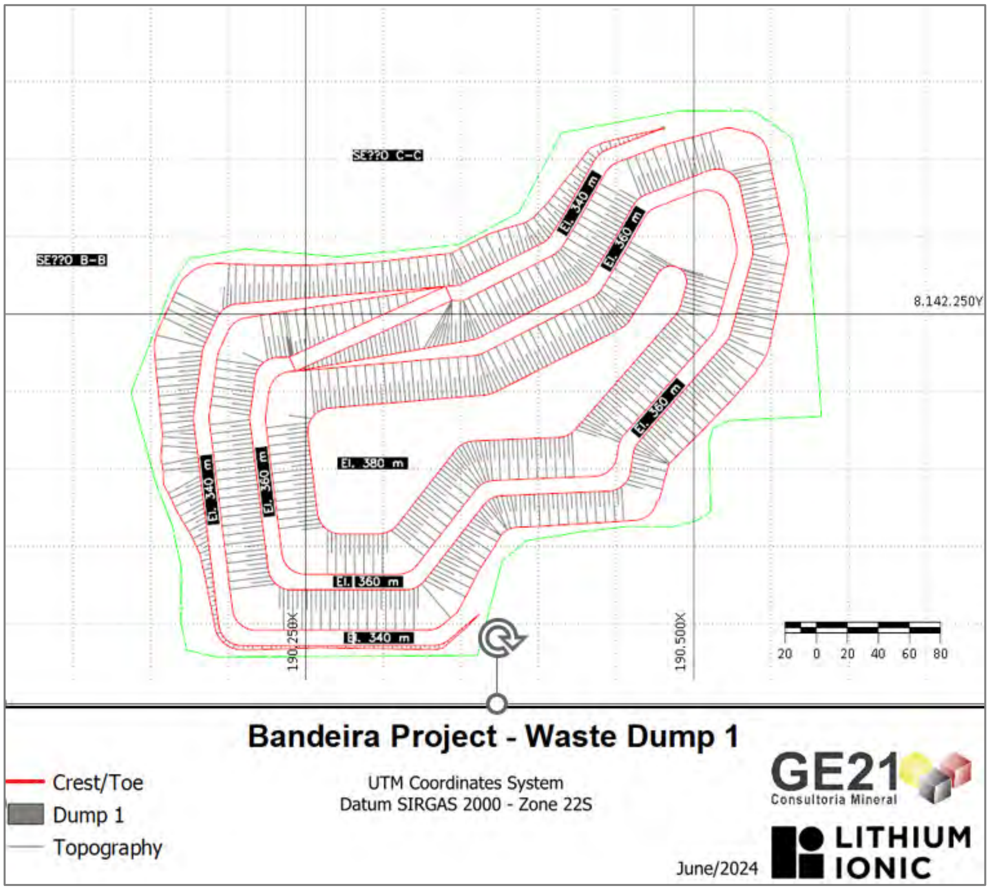


Figure 18-13: Waste Dump 1 Section

18.12.9 Stack Formation Sequence

The dump will be constructed in an ascending manner, following the indicated sequencing and according to the volumes made available monthly. Due to its "wedding cake" geometry, it can be initiated at any position, prioritizing the one with the shortest transport distance or the best transport average. The practice is to start with the lower portion, where bottom drains with sound rock will be installed.

When disposing of waste rock in a tip dump, the naturally formed angle of repose ranges from 37° to 42° for rockfill, depending on the size of the blocks. As the blocks are made of sound rock, it will not be possible to alter the material's angle of repose, resulting in the slope face with the angle of block arrangement. After reaching the toe of the slope, it will be ready to be revegetated using hydroseeding or another method considered more convenient, as shown in Figure 18-14.

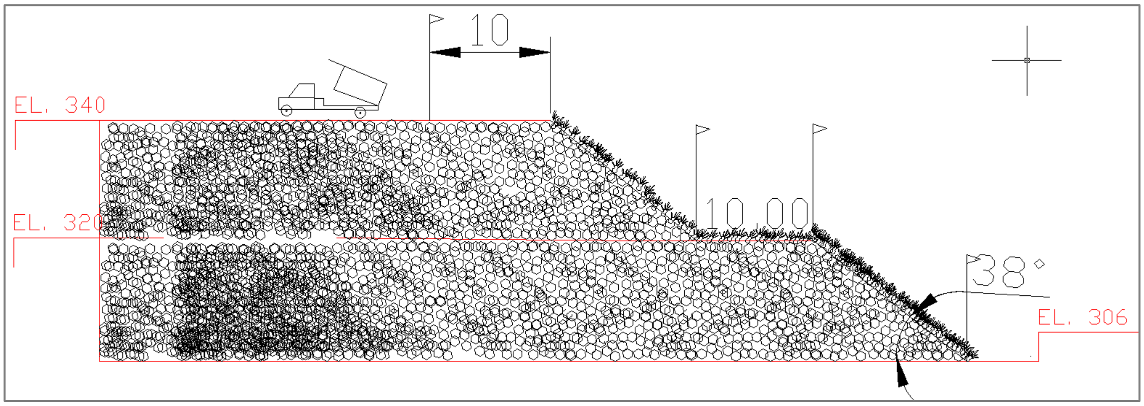


Figure 18-14: Geometries for the Formation of the Bank Edge

The construction sequence of the benches should be executed according to the procedures outlined in Figure 18-15 and Figure 18-16.

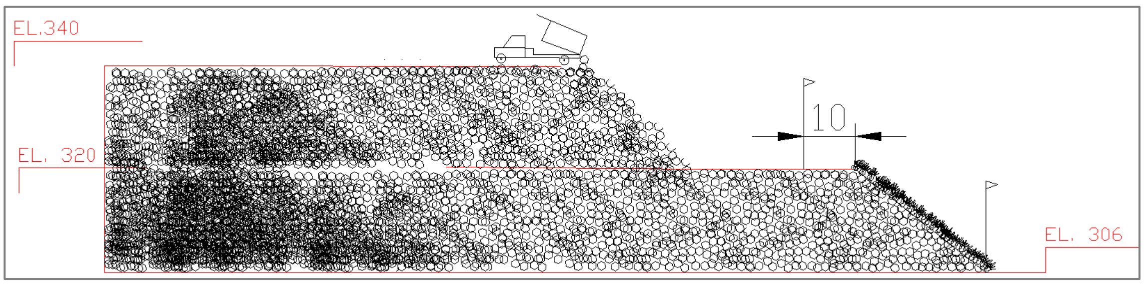


Figure 18-15: Reached at El. 320 m Mark A Line of Flags 10 m from the Crest, which will be the Edge of Bank 320

Mark with the first line of flags the limit of disposal by tipping at the edge of the embankment, with the blocks remaining at their angle of repose, for example, in Figure 18-16.

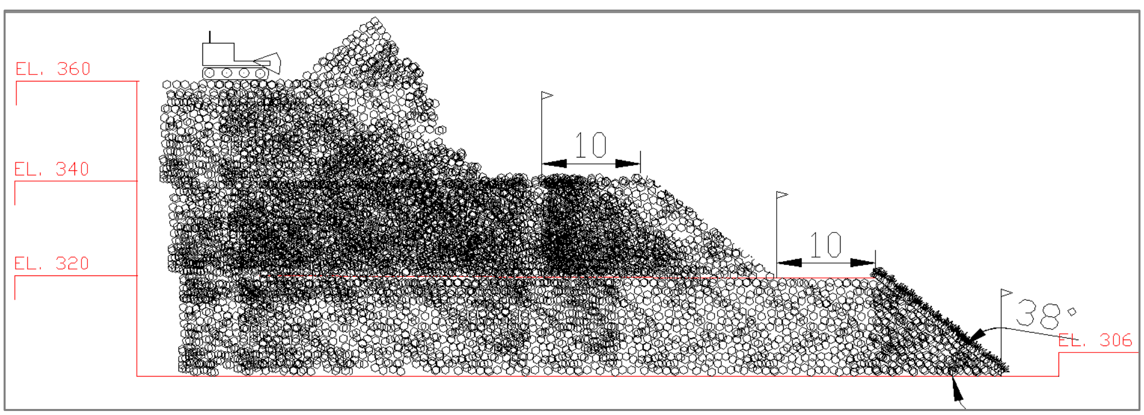


Figure 18-16: Construction Sequence of the Benches. Once the Position of the Berm Is Reached, Mark the Next Berm Again, Until the Dump is Complete

The planting for surface protection and drainage of the lower bench should always commence once it is completed.

The first stage of work will include:

- Clearing all vegetation of medium and large size
- Removing low-consistency materials such as vegetal soils, organic clays, and plastics, if present
- Constructing the sump
- Commencing block disposition for constructing the bottom drain.

The second stage will consist of:

- Disposing waste rock
- Continuing construction of the bottom drains
- Constructing peripheral drainage channels.

The third stage will consist of:

- Completing waste rock disposition
- Revegetating
- Installing instrumentation.

18.12.10 Stability Analysis

A stability analysis section was prepared, passing through the highest points of the embankment, considering the hypothesis of any type of failure. The Slide program was used, employing the simplified Bishop Method, GLE, and Spencer methods, with resistance parameters typically used in rockfill waste rock dumps.

For the foundation, the resistance parameters from CIU triaxial tests conducted in neighbouring regions of the Bandeira Project were adopted, which will be adjusted subsequently by laboratory tests being conducted for the area. The adopted geotechnical parameters are listed in Table 18-7.

Table 18-7: Geotechnical Parameters

Materials	γ (kN/m^3)	C' (kPa)	Φ (graus)
Fill 1 (Barren Rock Fill)	19	1	40
Fill 2 (Coarse Waste)	20	10	37
Foundation 1 (Shale Saprolite)	16.9	9.6	26.9
Foundation 2 (Biotite Shale)	21	50	34

As the dump is composed of blocks, a simulation was not conducted with the water level positioned at half the height of the dump because there will be no loss of internal drainage, as the dump will drain naturally. The simulation was conducted with seismic risk, as outlined in Section 5.

The evaluation of safety factors follows the guidelines outlined in ABNT NBR 13029 of July 2017, Mining—Preparation and Presentation Of Waste Disposal Dump Project, as well as other related standards and decrees, and international practices, as shown in Table 18-8 and Table 18-9.

Table 18-8: ABNT—NBR 13029-2017—Mining—Preparation and Presentation of Waste Disposal in Dump Project

Rupture	Condition	Security Factor
General Slope	Normal Phreatic Surface	1.5
General Slope	Critical Phreatic Surface	1.3
Slope between Berms	Predominantly Soil Face	1.5
Slope between Berms	Predominantly Rock Face	1.3

Table 18-9: Waste Tank Stability Acceptance Criteria

Consequence	Confidence	Static Analysis		Pseudo-Static Analysis	Maximum Acceptable Voltage (%)
		Minimal Security Factor	Maximum Probability of Failure	Minimal Security Factor	
Low	Low	1.3–1.4	10–15	1.05–1.1	≤1
	Moderate	1.2–1.3	15–25	1.0–1.05	≤1.5
	High	1.1–1.2	25–40	1.0	≤2
Moderate	Low	1.4–1.5	2.5–5	1.1–1.15	≤0.75
	Moderate	1.3–1.4	5–10	1.05–1.1	≤1
	High	1.2–1.3	10–15	1.0–1.05	≤1.5
High	Low	≤ 1.5	≥1	1.15	≤0.5
	Moderate	1.4–1.5	1–2.5	1.1–1.16	≤0.75
	High	1.3–1.4	2.5–5	1.05–1.1	≤1

Source: Hawley & Cunning (2017).

The results obtained are summarized in Table 18-10 and in Figure 18-17 and Figure 18-18.

Table 18-10: Results of Stability Analyses

Section	FOS Minimal	FOS Pseudo-Static
BB	1.26/1.43	0.61/1.12

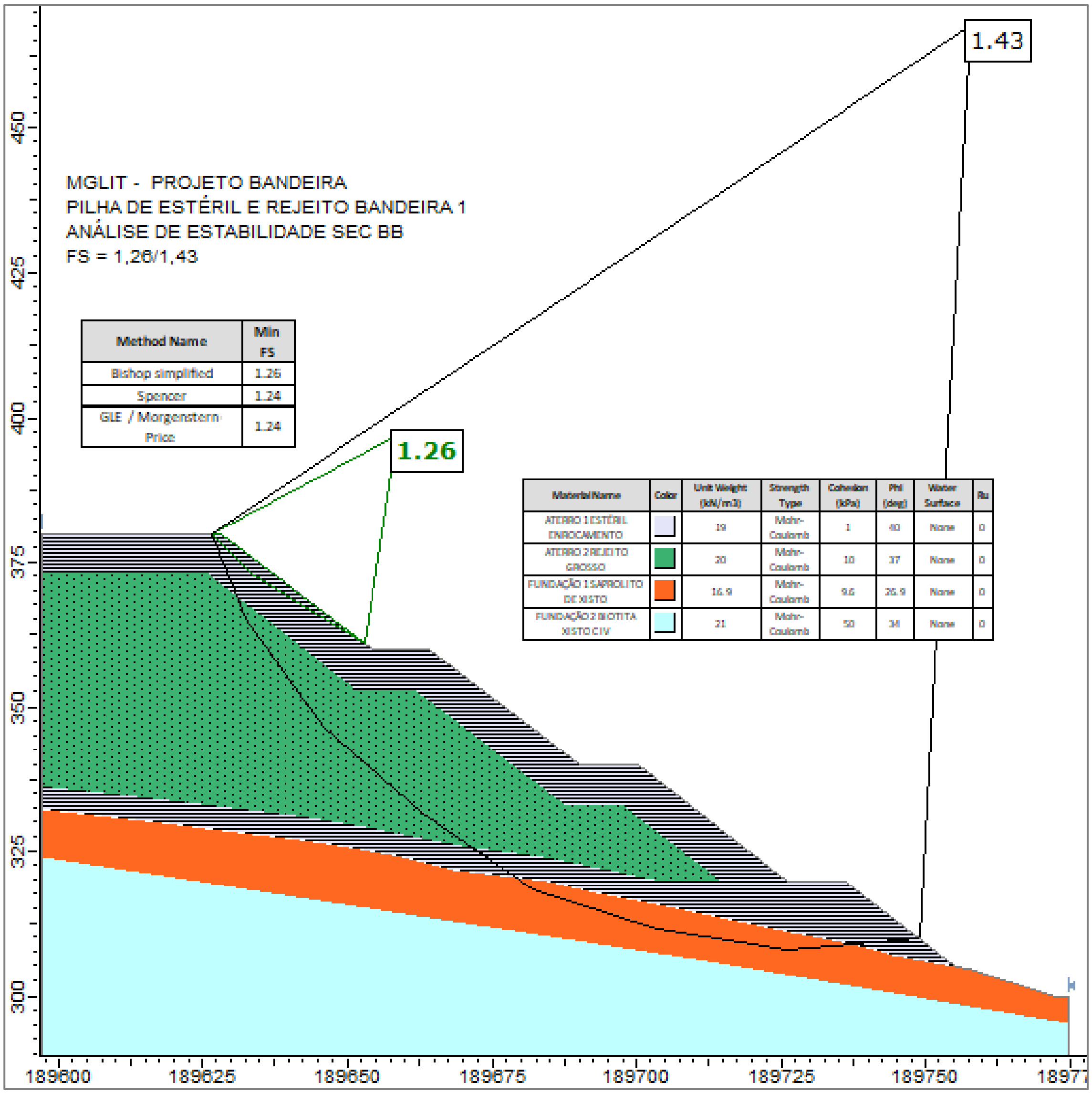


Figure 18-17: Stability Analysis of Section BB, FOS = 1.26/1.43

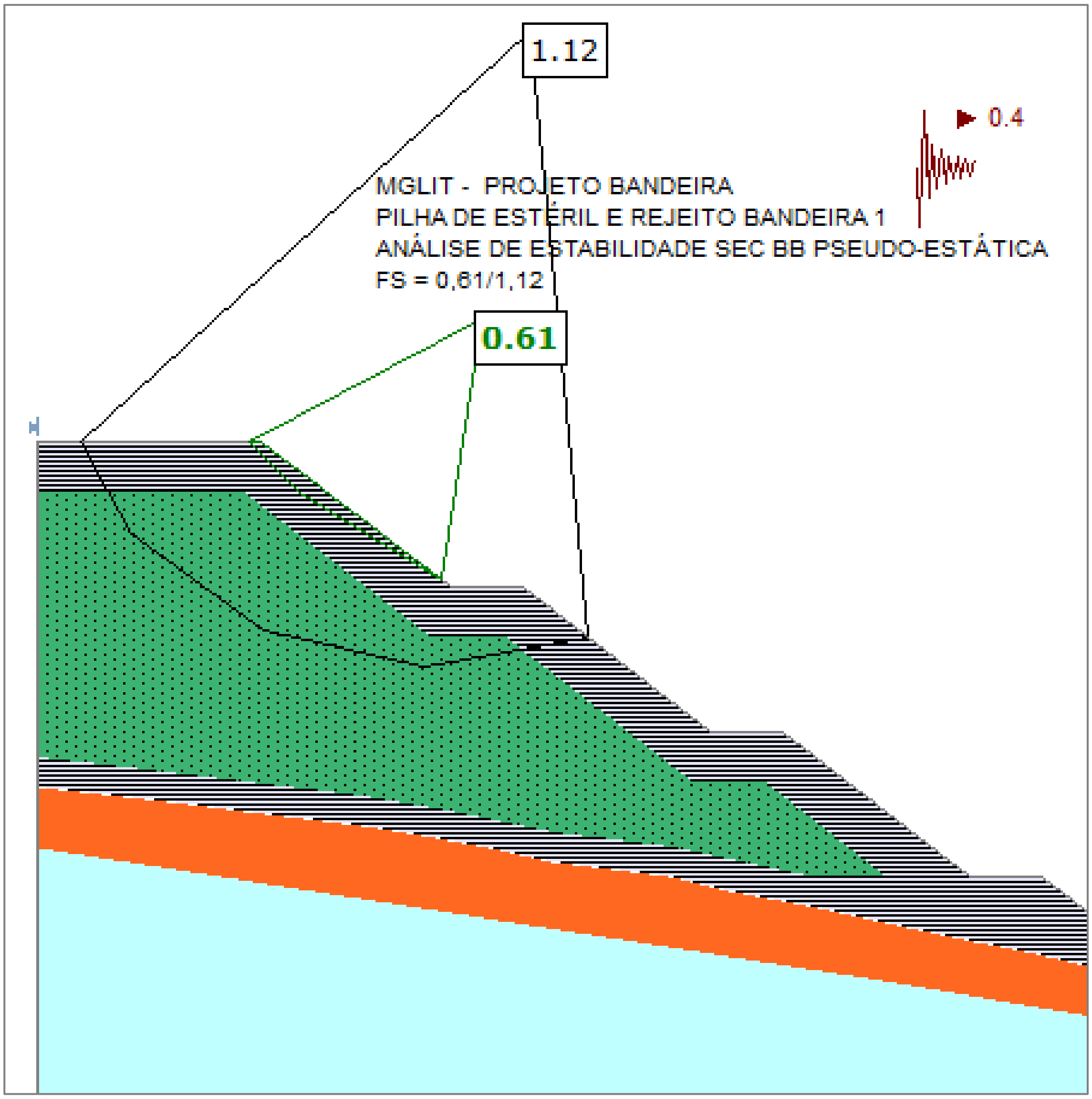


Figure 18-18: Stability Analysis of Section BB Seismic Load, FOS = 0.61/1.12

The results indicate that the safety factors are in accordance with the factors typically adopted for similar structures, which are considered safe when the safety factor exceeds the values presented in Table 18-8 and Table 18-9.

With a seismic loading of 0.04 g, the safety factors remain above the stipulated value of FOS = 1.10.

The safety factors found for the theoretical rupture surface passing close to the slope face and presenting results with FOS <1.3 are a function of the software, which assumes that materials without cohesion, only with friction angle, tend to roll off the slope face, without considering the interlocking of the blocks that prevent rolling. The increases in resistance due to compaction and rearrangement resulting from self-weight over the life of the deposit are not quantified, as they are difficult to quantify but do exist.

18.12.11 Instrumentation

Instrumentation sections have been designed to monitor potential deformations, verify the efficiency of the internal drainage system, and, if necessary, provide corrective measures. These sections include water level indicators if needed, although water level rises are not expected since the dump is inherently draining.

Biweekly visual inspections are recommended during the dry season, with the frequency adjusted in case of rainfall, especially in drainage channels and water level indicators (WLI).

18.12.12 Sediment Containment Ponds

As the dump will be formed by blocks, which do not generate sediments, the structure for containing fines will have a relatively low capacity, as described in the hydrological and hydraulic study.

18.12.13 CAPEX

For CAPEX purposes, a temporary structure was considered for depositing waste material from the opening of the portal and subsequent material excavated for the initial ramp opening. The total CAPEX was estimated at $514,270, as presented in Table 18-11.

Table 18-11: CAPEX Estimate for Waste Dump

Structure	Dimensions				Unit Cost ($/m³)	Total Costs ($)
	Length (m)	Width (m)	Depth (m)	Volume (m³)		
C1	287.35	2.00	1.50	862.05	14.56	12.554
C2	173.93	2.00	1.50	521.79	19.42	10.132
C3	202.23	2.00	1.50	606.69	19.42	11.780
Subtotal						34.466
Structure	Volume (m³)				Unit Cost ($/m³)	Total Cost ($)
Wet Pond	10.770.00				35.00	376.950
Subtotal						411.416
Contingency 25%						102.854
Total						514.270

All waste disposals will be done using the mining equipment already sized for mining, transportation, and the spreading operation, and there will be no construction of a sediment-containment dam (usually the largest expenditure of waste rock dumps). Thus, for the sequence of construction of the waste disposal and drainage structures, sustaining for the implementation of the dumps is not considered.

18.12.14 Description of the Designed Drainage System

Project Description of the Surface Drainage System—Dump 1

The proposed surface drainage system for Dump 1 includes a surface water management and sediment-containment system. The surface water management system consists of peripheral channels around the dumps, which collect surface runoff from the projected area of the dumps and direct it to the draining heaps to be installed at the lowest points of the valleys.

Approximately 93% of the surface flow from the drainage area of Dump 1 will be collected and directed to channels CP-01 and CP-02, which will discharge upstream of the draining heap to be executed at the northwest end of the dump. The effluent flow from this draining heap will be discharged into a valley that drains to the right bank of the Piauí River.

The remaining surface flow produced in the drainage area of Dump 1 will be collected and directed to Channels CP-03 and CP-04, which will discharge upstream of the draining heap to be executed at the southeast end of the dump. The effluent flow from this draining heap will be discharged into an unnamed tributary on the right bank of the Piauí River.

Table 18-12 shows the arrangement of the surface drainage and sediment containment system designed for Dump 1, while typical cross-sections of the hydraulic devices are illustrated in Figure 18-19. The synthesis of the geometric characteristics of the surface drainage devices designed for Dump 1 can be found below.

Table 18-12: Geometric Characteristics of Designed Surface Drainage Devices—Dump 1

Structure	Description	Minimum Dimensions (m)	D50 (mm)
CT-01 Top Channel	Trapezoidal section excavated in soil and/or dump. Rockfill covering, with a minimum thickness equal to twice the D50 of the block. Transition is composed of 20 cm of granular material and non-woven polyester geotextile blanket. Needled, with tensile strength of 21kN/m (type Bidim RT 21 - former OP40). In sections with a steep slope, equal to or greater than 5%, concrete must be applied.	(0,5 x 0,5) m 1V:1,5H	200
CT-02 Top Channel		(0,5 x 0,5) m 1V:1,5H	200
CP-01 Peripherical Channel		(1,0 x 1,0) m 1V:1,5H	400
CP-02 Peripherical Channel		(1,0 x 1,0) m 1V:1,5H	400
CP-03 Peripherical Channel		(0,5 x 0,5) m 1V:1,5H	200
CP-04 Peripherical Channel		(0,5 x 0,5) m 1V:1,5H	200
DA-01 Water Fall		(1,0 x 0,5) m 1V:1,5H	400
DA-02 Water Fall		(1,0 x 0,5) m 1V:1,5H	400

Notes: CP = Canal Periférico (peripheral channel); DA = Descida de água (dropping water); CT = Canal de topo (top channel).

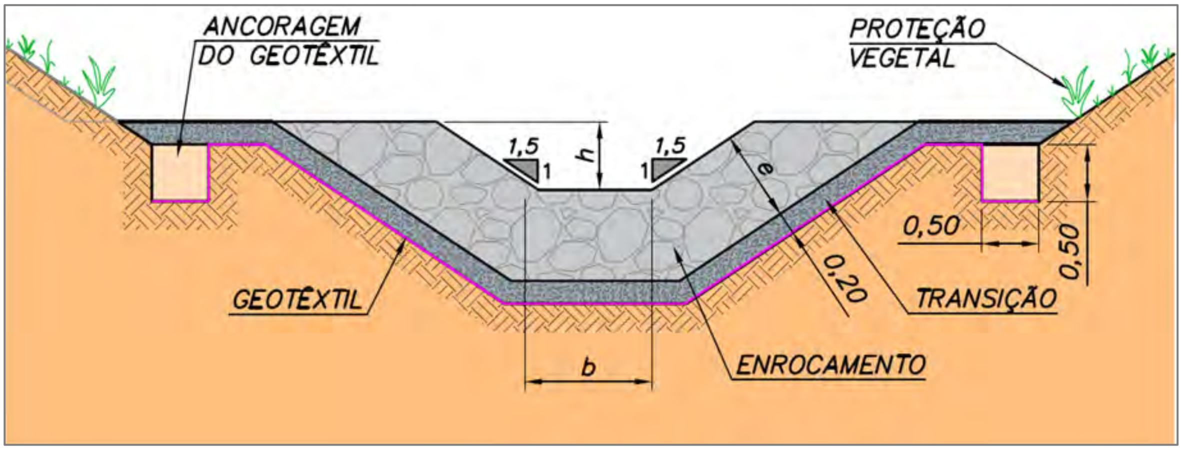


Figure 18-19: Typical Section of Hydraulic Devices Consisting of a Trapezoidal Channel with Rockfill Lining

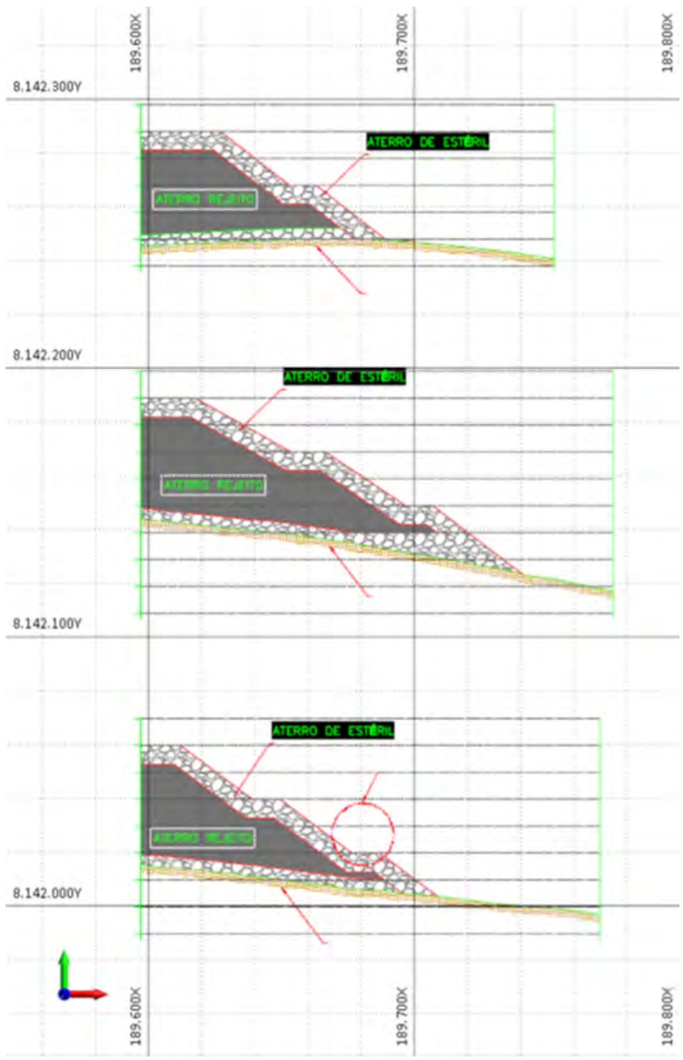


Figure 18-20: Waste Dump 1 Section—Arrangement

Sediment Containment Pond System Project Description

The arrangement of the surface drainage and sediment containment system designed for Dump 1 is presented. The containment of coarse sediments will be carried out through draining heaps, with a maximum height of 2 m, to be constructed at the northwest and southeast ends of the dump. It is recommended that at least two draining heaps be constructed at each end. The first heap should be positioned at least 5 m downstream from the foot of the dump, and the second, at least 5 m downstream from the foot of the upstream heap.

There should be no water accumulation upstream of the draining heaps. If it occurs, the geotextile on the upstream face should be replaced, as it may be clogged. Cleaning the area upstream of the draining heaps should be performed regularly, always after rainy periods or when the accumulated sediments reach a height of 1 m.

Figure 18-21 presents the typical section of the draining heaps.

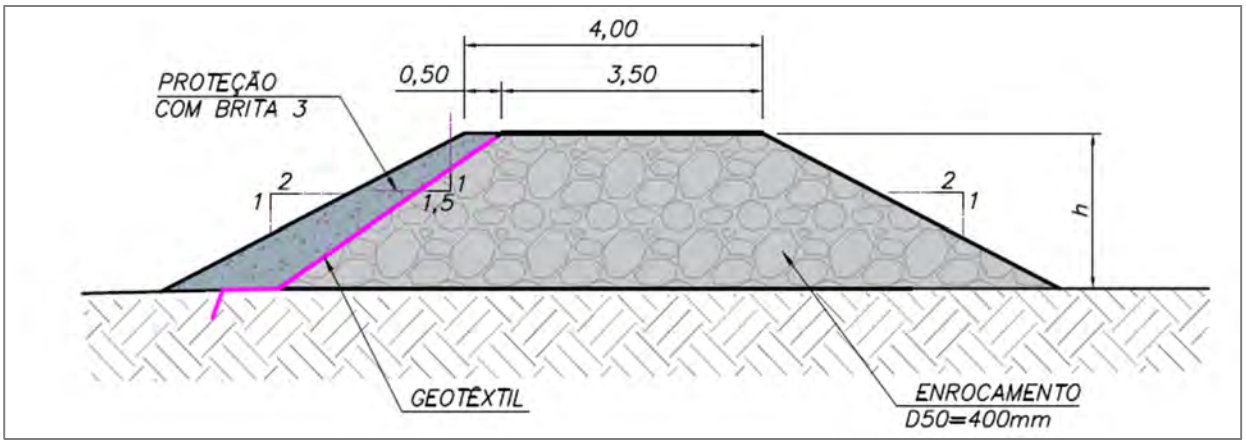


Figure 18-21: Typical Drainage

18.12.15 Description of the Bottom Drainage System Project

The proposed bottom drainage system for Dump 1 consists of two rockfill drains to be installed in the existing valleys beneath the projection of the dump. These drains are intended to collect the percolated flows from the waste material to be deposited, thereby preventing the formation of saturation points within the dump body and ensuring the geotechnical safety of the structure. The designed drains will discharge into the dump's surface drainage system (Channels CP-01 and CP-02).

The arrangement of the bottom drainage system designed for Dump 1 is shown in Figure 18-22, while the typical cross-sections of the drains Figure 18-23, and the typical longitudinal section of the toe drain. A summary of the geometric characteristics of the bottom drainage device is presented in Table 18-13.

Table 18-13: Summary of Geometric Characteristics of the Designed Bottom Drainage Device

Structure	Drainage Section Dimensions (m)		
	Base (Smaller)	Base (Higher)	Height
DF-01	0.5	2.0	0.5
DF-02	0.5	2.0	0.5

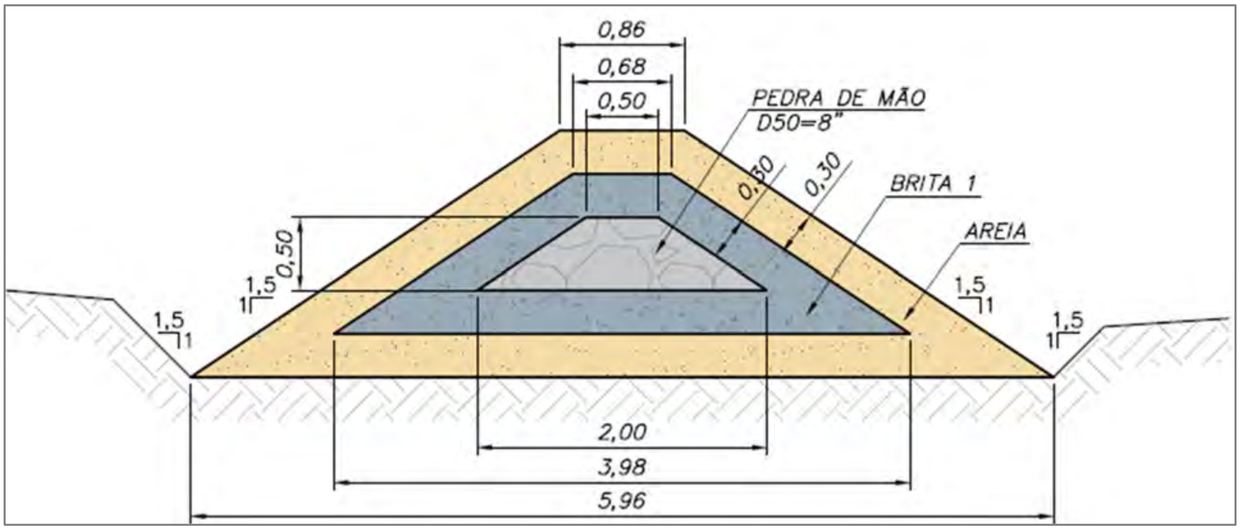


Figure 18-22: Typical Bottom Drain Device Cross Section

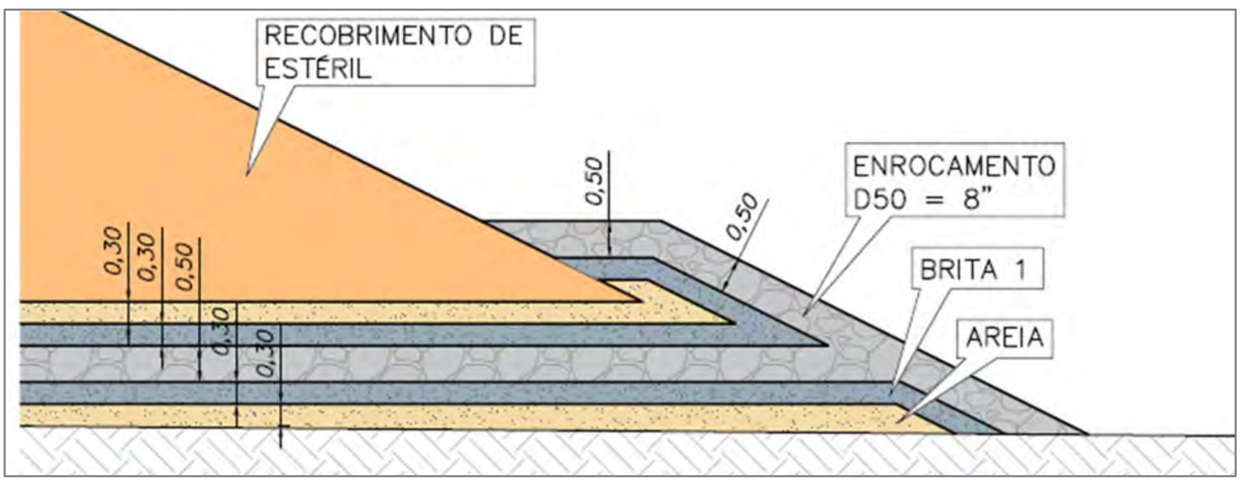


Figure 18-23: Typical Foot Drain Section

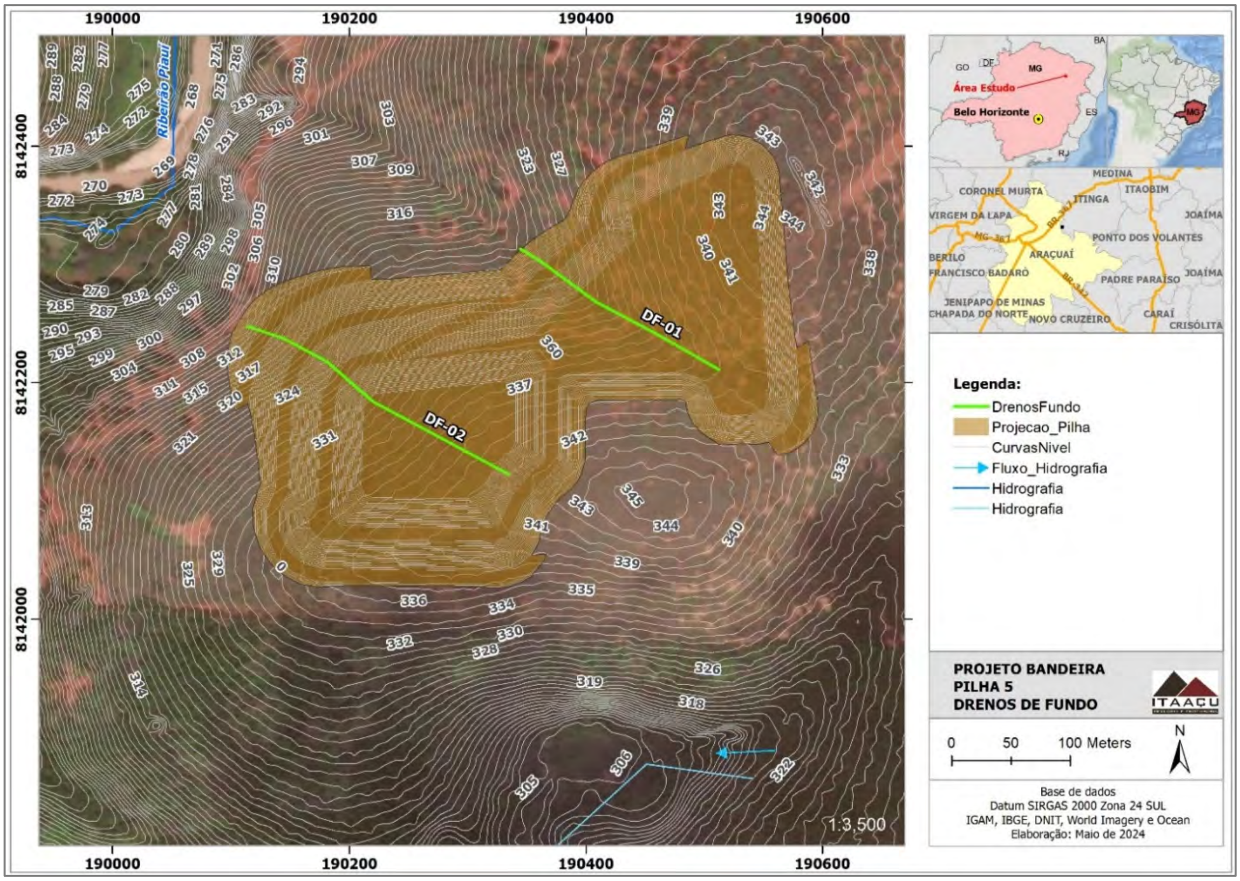


Figure 18-24: Typical Foot Drain Section

Tailings Dump 2

In addition to Dump 1, there are plans for Dump 2, which will be constructed exclusively using tailings from the concentration plant, with construction initiated after stacking in Dump 1 is completed.

Table 18-14 presents the geometric parameters of Dump 2.

Table 18-14: Geometric Parameters of Dump 2

Maximum Height (m)	120
Base and Crest Elevation (m)	309–429
Maximum Seat Height (m)	20
Minimum Width of Shoulders (m)	10
Angle Between Berms (°)	1V:1.3H–37.6°
General Angle (°)	1V:1.8H–29°
Longitudinal Slope (%)	1
Cross Slope (%)	5
Occupied Area (ha)	28.10
Available Volume (Mm^3)	11.03

The selected deposition site comprises an area with an average slope of approximately 17%. The foundation is characterized by the presence of weathered rock at greater depth and soil alteration in the shallower portion (residual soil) up to about 20 m.

The dump will be shaped on natural terrain, covering an approximate total area of 10.45 ha and with a final accumulation capacity of 2,270 km^3. The deposited material will be tailings consisting of sandy material.

The construction method will be the same as described for Dump 1, as well as the general premises for the design of the internal and external drainage systems of the dump.

Figure 18-25 presents the Dump 2 design, and Figure 18-26 presents vertical sections of Dump 2.

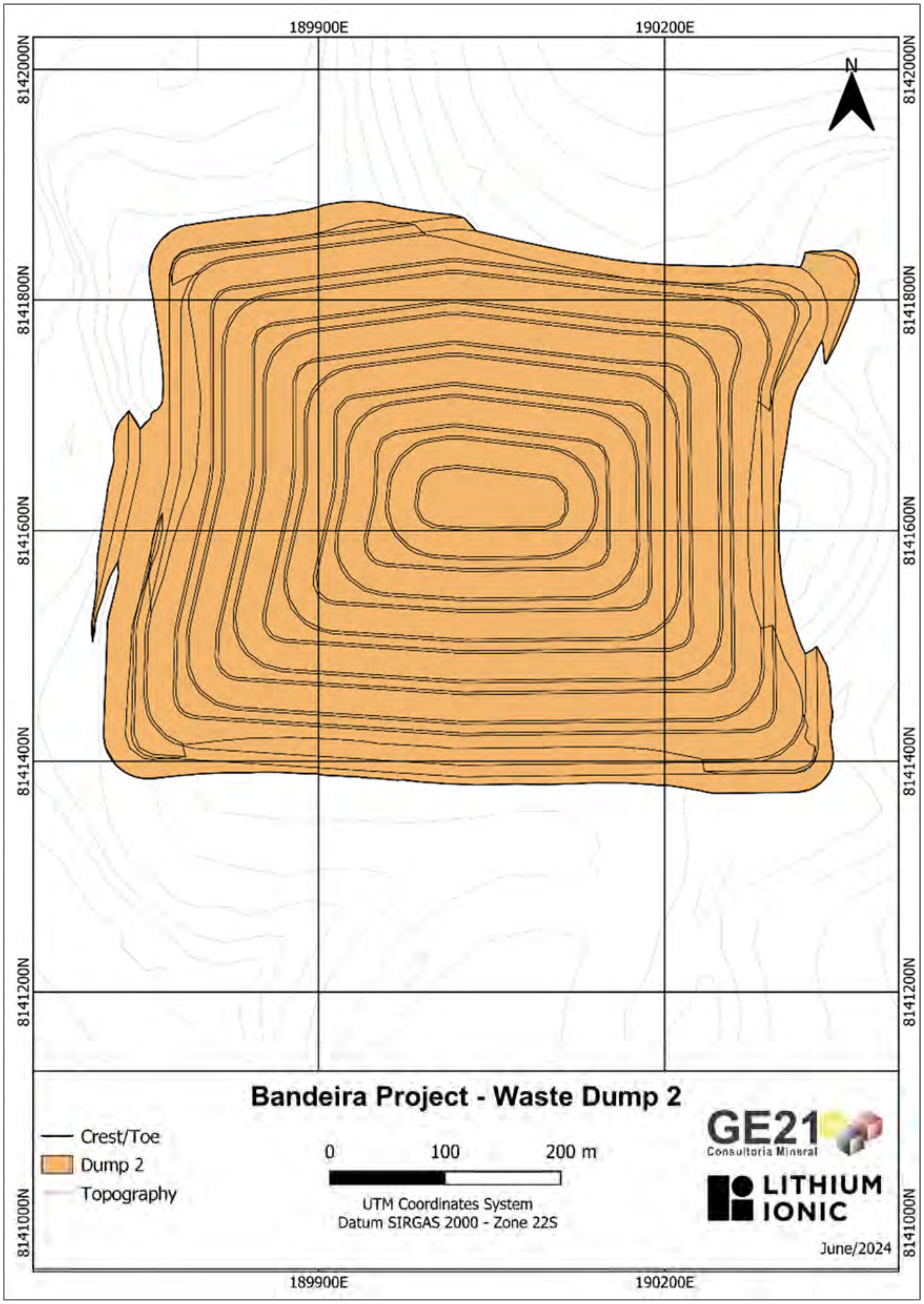


Figure 18-25: Dump 2 Design (Plan View)

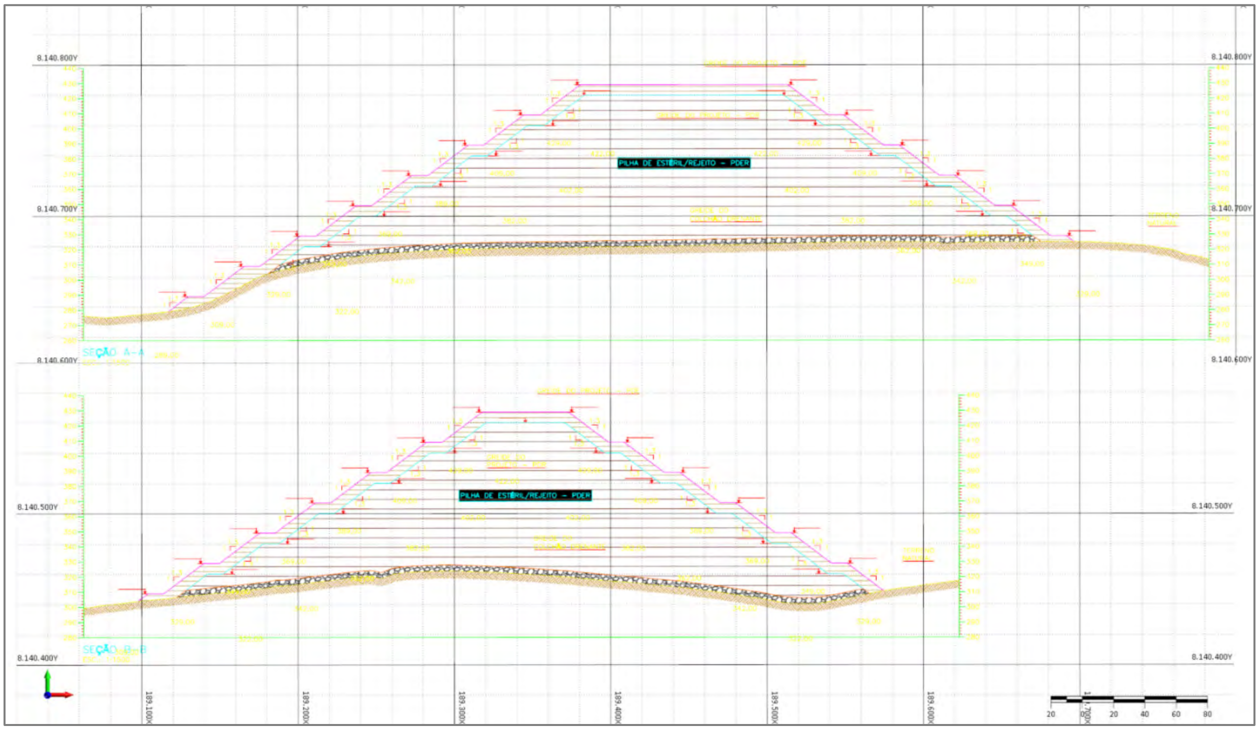


Figure 18-26: Vertical Sections, Dump 2

18.13 Waste Dumps—Conclusions and Recommendations

The safety levels found are in accordance with those recommended for structures of this type, ensuring the safety of the dump even under severe precipitation conditions and rising water level.

The vegetative residues resulting from the foundation cleaning can be used for revegetating the initial benches of the dump.

19.0 MARKET STUDIES AND CONTRACTS

Lithium Ionic has used the services of Fastmarkets, a leading independent lithium industry consultancy expert, to provide a basis for the long-term price forecast. Fastmarkets is a cross-commodity price reporting agency (PRA) in the metals and mining, new generation energy, agriculture, and forest products markets.

19.1 Macroeconomic Outlook and Lithium

While Covid-19 pandemic in 2020, Russia's invasion of Ukraine in 2022, and the inflation-driven dip in 2022–2023 had severely affected global economic growth, the current drivers both of battery demand and battery raw material supply override the general macroeconomic fluctuations.

Fastmarkets' September 2023 updated macroeconomic outlook predicts global economic growth (measured by real GDP, purchasing power parity) reaching 2.6% in 2023 before rising to 3.2% in 2024 and 3.3% in 2025. The expected higher overall global economic growth has the potential to boost consumer demand for batteries, especially for non-electric vehicle (EV) products such as Energy Storage Systems (ESS) and power tools. This higher demand could pose a positive risk to the demand side.

Global policies that could affect macroeconomic factors supporting the lithium market are key. These policies relate to energy transition and energy storage, as well as the electrification of transport (land, maritime, and aviation). Policies enacted since 2021 include the U.S. *Inflation Reduction Act* (IRA), the E.U. Green Deal, the Canadian Critical Minerals Strategy, and India's FAME II Strategy.

The disconnect between the lithium market and macroeconomic growth means that lower-than-expected economic growth should not affect Fastmarkets' forecast for lithium demand. Despite economic challenges, EV demand for lithium is expected to stay strong due to several factors:

- In the coming years, affluent buyers with higher disposable income will mainly purchase EVs.
- Government policies and subsidies will continue to encourage the purchase of EVs over internal-combustion engine (ICE) vehicles. The U.S. IRA will make smaller EVs more affordable for less-affluent buyers.
- Waiting lists for EVs are extending current demand into the future.
- High gasoline prices mean EVs are more price-competitive than ICE vehicles over normal ownership timescales.

19.2 Lithium Demand—Historical and Forecast

More countries and regional bodies are committing to transport decarbonization targets, particularly in nascent emerging markets. In 2023, EV sales tripled in Thailand, Brazil, and Malaysia. Falling battery and EV prices are enabling producers, particularly in China, to increase EV affordability. Residential and commercial energy storage products will quickly gain in popularity, with consumers and businesses seeking to decrease carbon emissions.

EVs are becoming increasingly common, and more than 400 new EV models will be introduced in 2024, offering greater choice to consumers. The increasing demand has led to higher profitability to providers of EV and ESS products, encouraging innovation and investment in the industry. With renewable energy accounting for a greater portion of electricity grids, batteries are required to store excess generation.

19.3 Lithium Demand Increased at a Compound Annual Growth Rate of 23% between 2016 and 2022

Lithium demand grew significantly due to EV lithium-ion battery needs, rising from 35,000 tonnes in 2016 to over 420,000 tonnes in 2022, surpassing industrial uses by 2020.

Industrial demand increased by 7% between 2016 and 2019 to 127,000 tonnes. Demand suffered in 2020 due to the global pandemic, decreasing by 15% year on year before recovering to 124,000 tonnes in 2021.

Fastmarkets forecasts demand from battery electric vehicles (BEV) to increase at a compound annual growth rate (CAGR) of 10% to 1.35 Mt of lithium carbonate equivalent (LCE) in 2034, up from 498,000 tonnes of LCE in 2024. Demand for lithium-ion batteries from battery-swapping terminals, energy storage systems, consumer electronics, power tools, telecoms, and data are expected to add an additional 754,000 tonnes of LCE by 2034. Lithium-ion batteries are forecast to contribute 97% of total lithium demand by 2030.

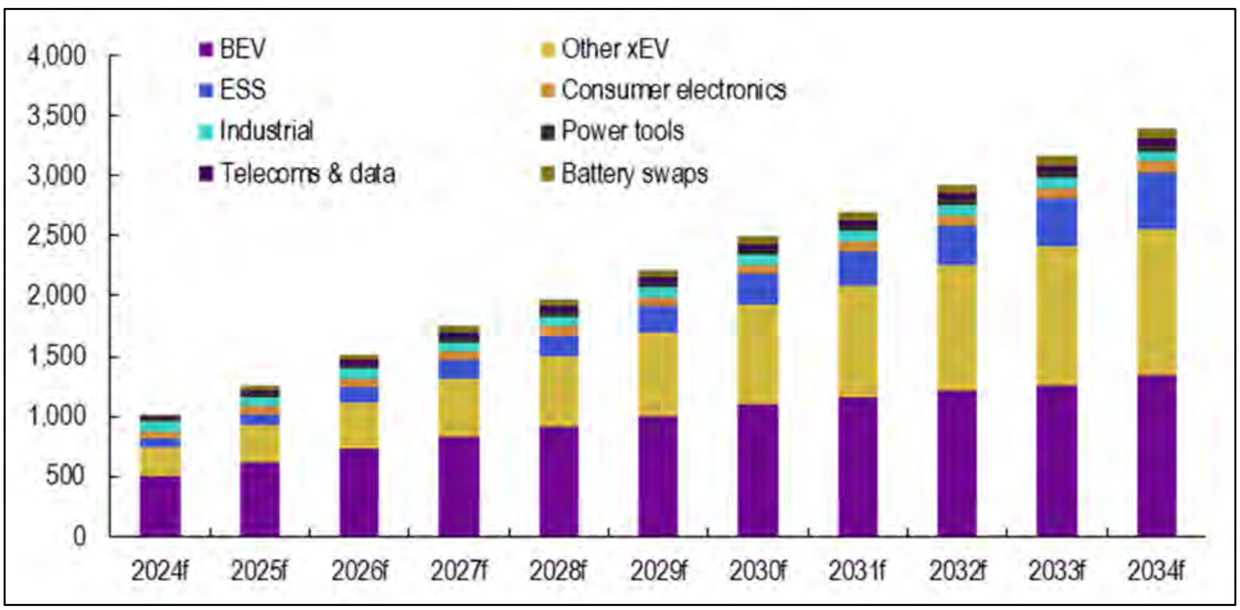


Figure 19-1: Lithium Demand Forecast—Tonnes (000s) LCE

19.4 Lithium Supply—Historical and Forecast

Supply increased at a CAGR of 27% between 2016 and 2023, responding to the positive demand outlook from the nascent EV industry. Most growth was driven by Australia, Chile, and China.

The oversupply forced some producers to halt operations between 2018 and 2020. Supply decreased by 12,000 tonnes in 2020 due to production cuts, lower demand, and COVID-19 exigencies such as social distancing.

Supply recovered in 2021, increasing by 36% year on year, thanks to post-pandemic stimulus measures and an increasingly positive long-term demand outlook. This resulted in a 437% price increase from the start of the year 2021, which incentivized supply expansions. The robust growth persisted into 2022, with supply rising by approximately 41% year over year, followed by an estimated increase of 35% in 2023.

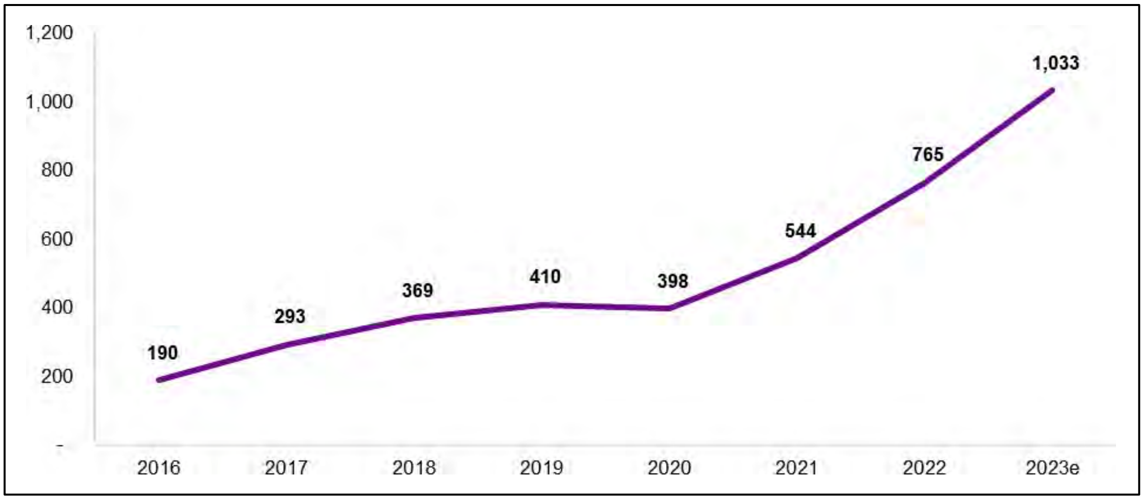


Figure 19-2: Global Lithium Supply 2016-2023—Tonnes (000s) LCE

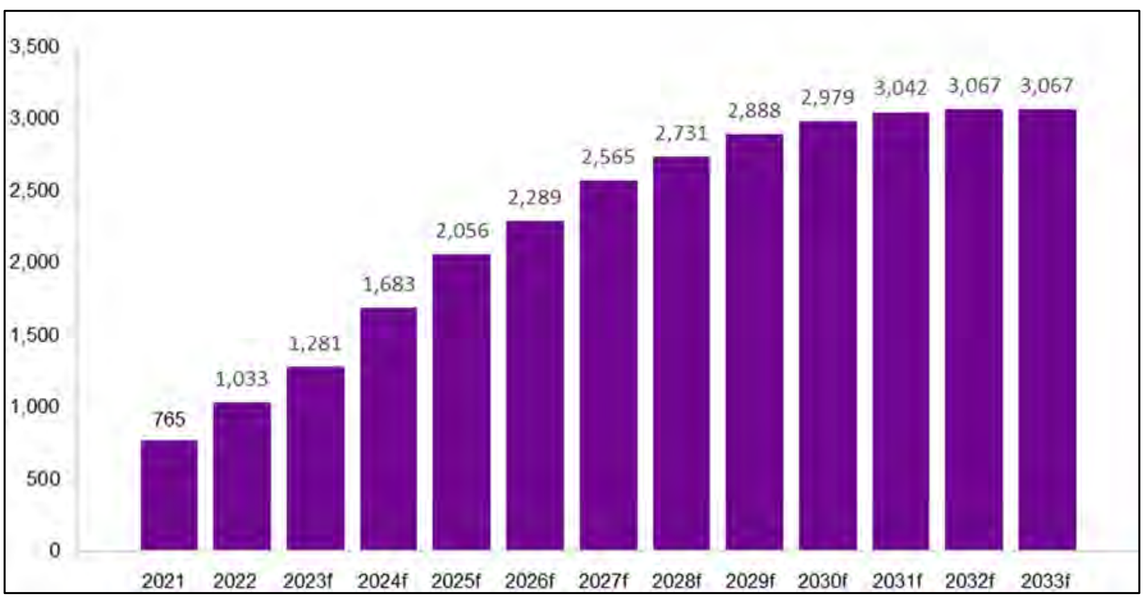


Figure 19-3: Lithium Mine Supply—Tonnes (000s) LCE

In 2023, 94% of global lithium supply came from just four countries: Australia, Chile, Argentina, and China. Supply is diversifying, with new operations coming online in Africa, Brazil, Canada, Europe, and the U.S. within the outlook period. We think China will be the largest single producer globally in 2033, accounting for 28% of supply, followed by Chile and Argentina at a combined 25%, and Australia at 23%.

There is a disconnect between regions of supply and regions of consumption. China has done well to utilize domestic resources, building downstream refining capacity and investing in upstream resources. The main regions for lithium demand outside of China are Europe and the U.S., which we forecast to be the two smallest producing regions in 2033, accounting for 3% and 4% of global supply, respectively, compared with 21% and 24% of demand.

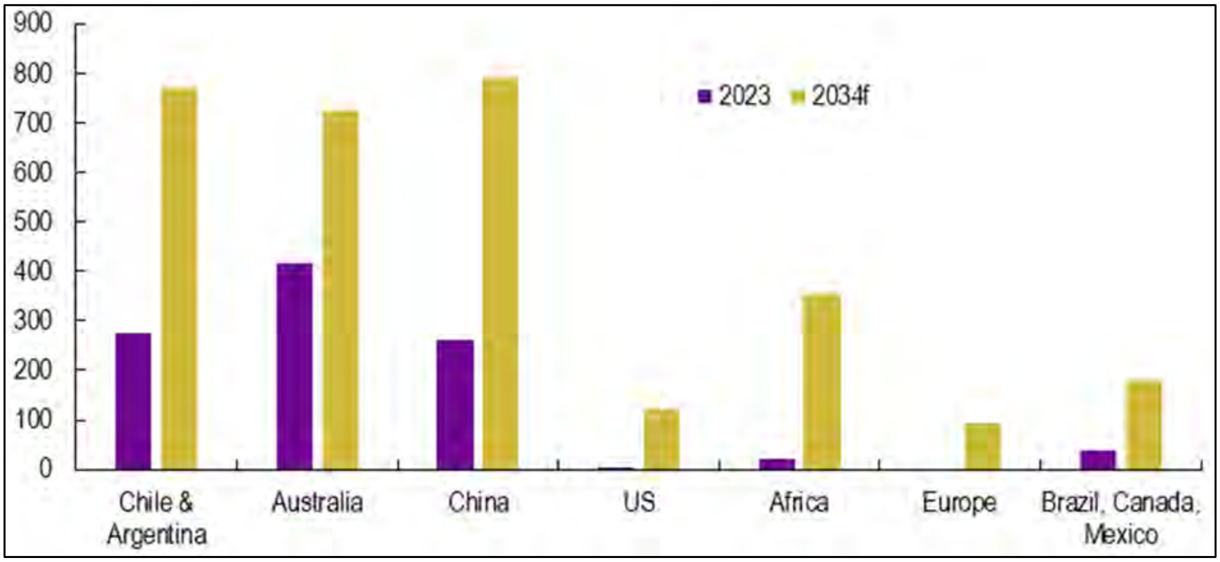


Figure 19-4: Geographical Spread of Mine Supply—Tonnes (000s) LCE

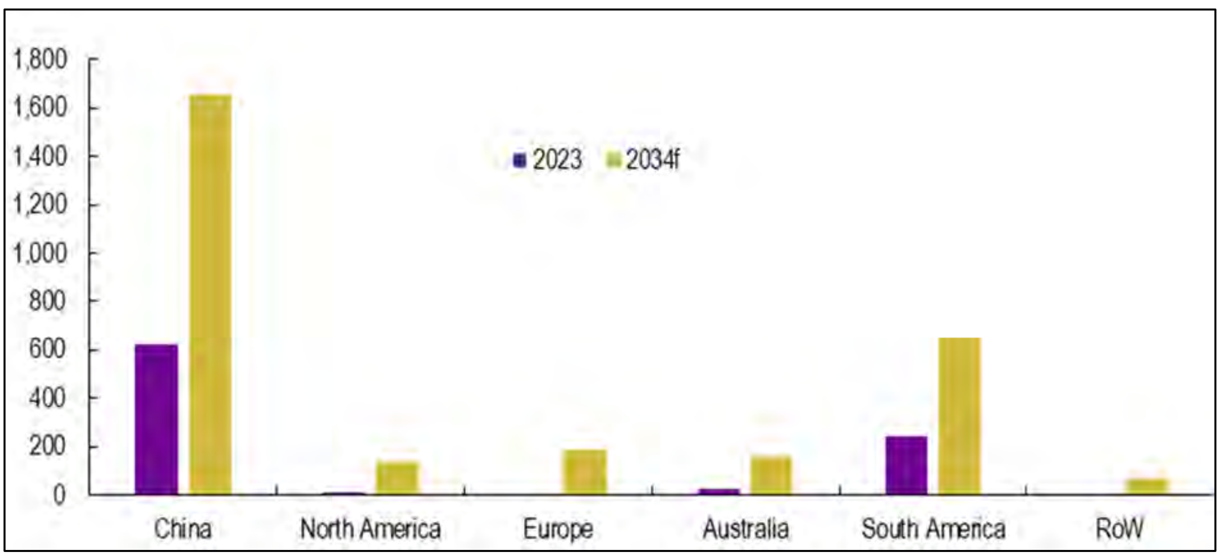


Figure 19-5: Geographical Spread of Lithium Processing Production—Tonnes (000s) LCE

19.5 Lithium Price Forecast

Prices for lithium salt and spodumene fell sharply in 2023 from the unsustainable levels of 2022, when lithium salt averaged more than $70/kg and spodumene more than $6,000/t.

The combination of a significant producer response, exacerbated by the fast-tracking of lepidolite production in China and the shipping of direct-shipped ore (DSO) material from Africa, and weaker-than-expected demand led to the price correction. Elevated prices naturally stabilize themselves over time. Prices have continued to fall in the first quarter of 2024 and are now range-bound around $14/kg to $15/kg for lithium salts and around $850/t for spodumene. For spodumene, these levels are still relatively high compared with the low prices seen in the bear market of 2020, when prices briefly fell to $375/t.

With the 2021–2022 market froth gone; we expect prices to stabilize at current levels for the next few years. Fastmarkets believes that the current price environment will increase the difficulty of accessing funding, which has the potential to sow the seeds for another price cycle. Considering this, we expect prices to see a notable increase at the back end of the decade and into the 2030s, as the price will need to incentivize a supply response.

We forecast that hydroxide, carbonate, and spodumene prices will average $18.9/kg, $18.30/kg, and $1,450/t, respectively, between 2024 and 2030.

Fastmarkets still expects ongoing volatility in the global lithium market, driven by restocking and destocking cycles, as well as periods of surplus supply followed by supply disruptions and supply deficits later in the decade.

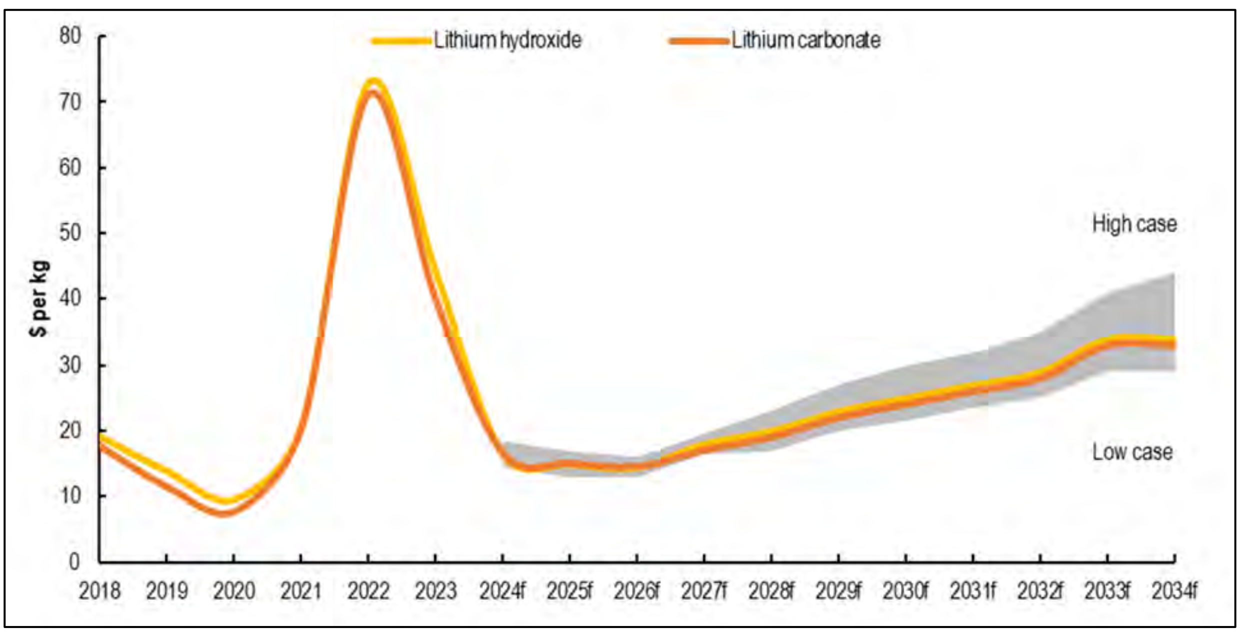


Figure 19-6: Lithium Price Forecast 2024–2034

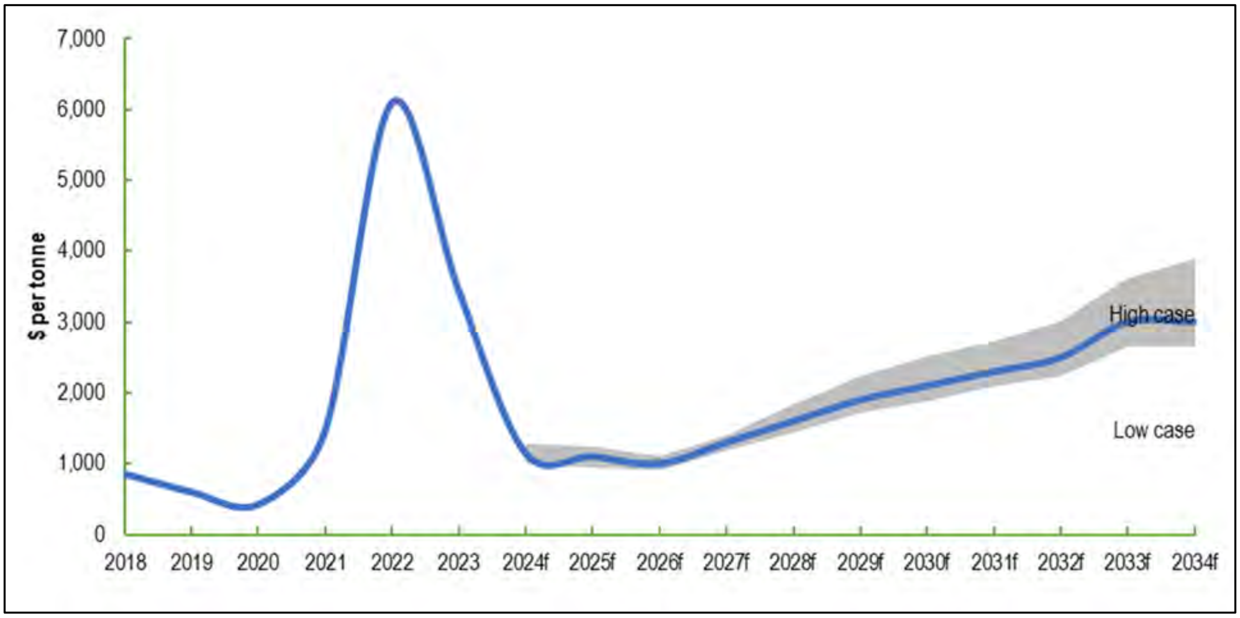


Figure 19-7: Spodumene Price Forecast 2024–2034

19.6 Qualified Person's Comment

The QP reviewed the Fastmarkets report, agreed with the content, and did not find any significant factors or risks.

20.0 ENVIRONMENTAL STUDIES, PERMITTING, AND COMMUNITY IMPACTS

This section presents the findings from the Project's environmental and socio-economic assessment. The analysis adheres to the relevant federal, state, and municipal legislation concerning environmental factors, including water; liquid effluents; flora; fauna; noise; natural, cultural, historical, and archaeological heritage; environmental education; as well as Indigenous and Quilombola territories and traditional populations. Conducted as part of the mandatory environmental licensing process for mineral extraction activities in Brazil, this assessment complies with federal decree No. 99.274/90, which regulates federal law No. 6,938/81 and establishes the Brazilian National Environmental Policy. The information presented here is sourced from public data and information provided by MGLIT.

20.1 Brazilian Mining Regulatory Framework

Mining in Brazil is governed predominantly by the Brazilian Federal Constitution (1988) and the Brazilian Mining Code. These legal and regulatory frameworks impose numerous obligations on mining companies, including the responsible exploitation of mineral deposits, ensuring the health and safety of workers and local communities, and implementing environmental protection and remediation measures.

Mining activities within Brazil are regulated by the Ministry of Mines and Energy (MME) and the National Mining Agency (ANM). The MME is responsible for formulating and coordinating Brazilian public policies regarding mineral resources and energy production, and has jurisdiction over government agencies and federal public companies responsible for executing such policies, such as the oil and gas industry, mining projects, and other energy sectors.

Associated with the MME, the ANM is a federal agency responsible for monitoring, analyzing, and promoting the performance of Brazil's mineral economy, awarding rights for the exploration and development of mineral resources, and planning and inspecting mineral exploration and extraction activities in the country. According to the Federal Constitution, surface property rights are distinct from mineral rights. This means that mineral rights belong exclusively to the Brazilian federal government, which oversees mineral exploration and mining activities in Brazil. The Brazilian Mining Code currently establishes different regimes for regulating mineral exploration and mining activities in Brazil, which may vary according to mineral type and project size. The Mining Code regulations applicable to the Bandeira Lithium Project are exploration authorization, mining concessions, and mining licenses.

For mining activities, entities must prove they hold the rights and authorization to exploit the intended mineral substance. The rights for mineral extraction are granted by the ANM since the mineral resources are considered Union property and are, therefore, pursuant to Article 20, IX of the Federal Constitution (1988). MGLIT holds the mining rights within the exploration area, as formalized in the mining process ANM: 832.439/2009.

20.1.1 Land Access and Occupation

The surface rights owner is legally required to grant access to mineral rights holders for conducting mineral exploration and mining activities. If a holder of mineral rights or mining concession does not own the surface land where mineral interests or mining-related infrastructure is situated, they can obtain access or occupy the land through mining easements granted by the ANM under the Brazilian Mining Code or can choose to enforce their access rights through Brazilian courts.

Mineral rights holders must compensate the surface rights owner for surface access and use, and indemnify them for any property damage. The fee amount can be negotiated between the parties within parameters set by the Mining Code, with subsequent notification to the ANM about said agreement. However, if no agreement is reached, entities, after obtaining exploration authorization or a mining concession, can petition a court to determine the indemnification amounts.

The Area Directly Affected (ADA) by the Bandeira Project covers three rural properties in the municipality of Araçuaí, Minas Gerais. MGLIT has a private instrument of assignment of rights with Valitar Participações S.A. (Valitar), owner of the Brejos, Piauí Boa Vista Part 1 and Part 2 farms, to conduct mining activities on its properties.

20.1.2 Legal Reserve

The Brazilian Forest Code sets forth that on rural properties, a minimum percentage of the local vegetation must be preserved as Legal Reserve (RL). This requirement promotes the sustainable use of natural resources, the conservation of biodiversity, and the protection of native fauna and flora.

The Project is situated in a rural area. It thus falls under Article 12 of Law 12.651/2012—Forest Code, which mandates the preservation of the Legal Reserve (RL), ensuring the conservation of at least 20% of the property area. The Legal Reserve must be registered with the appropriate environmental agency via the Rural Environmental Registry (CAR).

The properties targeted for future mining activity—Brejos, Piauí Boa Vista Part 1, and Part 2 farms—comprise a Legal Reserve (RL) as required by Law No. 12,651 (May 2012). Valitar Participações S.A. owns all three farms, registered in the Rural Environmental Registry (CAR) as a single property, complying fully with legal requirements. Notably, the designated RL areas of these properties do not overlap with the Project's Area of Direct Influence (ADA).

20.2 Mine Closure

In Brazil, under Federal Decree No. 97.632/1989, mineral extraction projects must submit a Degraded Area Recovery Plan with the Environmental Impact Study and Environmental Impact Report (collectively EIA) during the environmental licensing process. Therefore, the environmental restoration of areas degraded by mineral exploitation should be planned from the outset. Mining companies must present their Approved Economic Plan (PAE) to ANM to receive a mining concession. These studies must address the reclamation and decommissioning of the mined areas, describing the measures to be implemented throughout the mining process to prevent severe degradation and minimize environmental impacts. Mining companies must regularly update the mining decommissioning plan to align with project developments. The MME grants approval for mine closure when the applicant can prove compliance with the decommissioning plan, particularly with environmental condition requirements.

The recovery of degraded areas involves actions to restore ecological balance and reintegrate altered environments into their natural landscape. This process aims to rectify human-induced alterations, such as those resulting from ore extraction, in accordance with legal mandates for mandatory re-vegetation. The conceptual strategy proposed for the Project's degraded areas focuses on facilitating ecological succession to expedite the establishment of native vegetation, aiming to seamlessly reintegrate these rehabilitated areas into their surrounding environment.

The Conceptual Mine Closure Plan outlines activities aimed at minimizing impacts during the Project's closure phase. Its primary goal is establishing guidelines and corporate criteria for closure activities approved by the ANM and the Minas Gerais Department of Environment and Sustainable Development (SEMAD). These activities ensure technical and financial conditions for mine closure, transitioning to post-closure status, and determining future land use. NeoAgro Ambiental's (2023) Conceptual Mine Closure Plan for the Bandeira Project incorporates final pile configurations with properly sloped sides to ensure the effective execution of the closure strategy. The plan includes a meticulously designed drainage network to control surface water and promote vegetation growth on slope faces. These measures mitigate the visual impact of mining activities and significantly reduce erosive effects.

Direct mine closure cost items were estimated, as summarized in Table 20-1.

Table 20-1: Bandeira's Mine Closure Activities and Cost Estimate

Description	Cost Estimate ($ M)
1. Preparation of a Detailed Mine Close Plan	0.17
2. Removal of Equipment and Underground Structures	0.25
3. Removal of Mine Structures on Surface (Office, Workshop, Washer, Tyre Shop, Explosives Preparation Yard)	0.65
4. Restoration and Revegetation of Land Surface	0.95
5. Stabilization and Revegetation of Remnants Waste Piles	0.34
6. Closure and Sealing of All Mine Openings (Portal, Decline, Ventilation Raise)	0.20
7. Monitoring of Structure Stabilization Conditions, Surface and Underground Water Quality, and Mine Effluents	0.28
Total	2.83

20.2.1 Environmental Licensing and Approval

The Brazilian Federal Constitution establishes the division of powers between the federal, state, and municipal governments to issue environmental laws and regulations. While the Brazilian federal government has the authority to issue environmental regulations, each state is legally allowed to develop and implement specific regulations governing environmental licensing procedures under its jurisdiction. Municipal governments may only issue regulations regarding matters of local interest or as a supplement to federal or state laws.

According to Brazilian law, any construction, installation, expansion, or operation of an establishment or activity that utilizes environmental resources, causes or may cause pollution, or has the potential to degrade the environment must undergo a prior licensing process. The National Environmental Council (CONAMA) regulates the environmental licensing process. CONAMA Resolution No. 237/1997 establishes the types of authorizations, procedures, and criteria for environmental licensing, which occurs in a three-stage permitting process:

- The Preliminary License (LP) certifies the environmental viability of the proposed activities in terms of their design and location. It is the most critical part of the process and requires environmental baseline studies, community engagement, public hearings, and the preparation of an EIA.
- The Installation License (LI) allows for the proposed project's construction, installation, and commissioning.
- The Operating License (LO) authorizes the project to operate after it has been constructed, commissioned, and inspected to ensure it complies with the Preliminary License, Installation License, and any other applicable permits.

The responsibility for the Environmental Regularization of the Bandeira Project lies with Minas Gerais, as established by Law No. 6,938/81 and CONAMA Resolution No. 237/97. The Secretariat of Environment and Sustainable Development of Minas Gerais, an agency under the State Government, is tasked with evaluating the licensing process. This agency has the authority to plan, propose, and coordinate integrated environmental management within the state to preserve ecosystems and promote sustainable development, as mandated by Law No. 11,903 (September 1995).

For the Bandeira Lithium Project, the submission of the Environmental Control Report (RCA) was required for the environmental licensing process. The RCA is a supporting document accompanying the application for the preliminary license or the combined preliminary license and concomitant installation, which does not require an EIA. The RCA evaluates the project's characteristics and the socio-environmental conditions of its location to identify and assess the possible impacts that the intended activity may cause. The supporting Environmental Control Plan (PCA) details the environmental plans and programs proposed to mitigate or minimize the impacts identified in the RCA.

Once the technical, locational, and environmental feasibility is confirmed through the Environmental Control Report (RCA), the environmental agencies can issue a preliminary license to confirm the project's feasibility. MGLIT, a private legal entity registered with the National Register of Legal Entities/Ministry of Finance under No. 31.931.255/0003-63, plans to operate in the mining sector (lithium and its by-products) via the Bandeira Project.

The environmental licensing process for the Bandeira Project was formalized with SEMAD on November 20, 2023, under the number 2023.07.01.003.0000498, comprising the RCA and the PCA, and is in the technical analysis stage by the agency.

According to COPAM Normative Resolution No. 217 (December 2017), the Project's activities fall within the following codes:

- Tailings/waste pile of ornamental and casing rocks, pegmatites, gems and non-metallic minerals (A-05-04-6): 20.67 ha usable area, medium polluting/degrading potential, large size, Class 04
- Underground mining of pegmatites and buds (A-01-01-5): Gross production >787,800 m³/a, medium polluting/degrading potential, large size, Class 04

- Mineral Treatment Unit (UTM), with wet treatment (A-05-02-0): installed capacity of ≤1,300,000 t/a, considerable polluting/degrading potential, medium size, Class 05

- Retail stations, filling stations, refuelling points, retail system installations, floating fuel stations and aviation fuel retail stations (F-06-01-7): storage capacity ≤14.9 m³, activity classified as non-passable—Class 02.

In addition, as outlined in COPAM Normative Resolution No. 217:

Considering the new matrix for setting the environmental licensing modality in Minas Gerais, by the criteria established by COPAM Normative Resolution No. 217, of December 6, 2017, to be evaluated according to the class of the enterprise, calculated based on the size/polluting potential of the enterprise/activity combined with the weight of the enterprise/activity, to be evaluated based on the locational criteria is for the Bandeira Project. A large-scale project, Class 5, where it focuses on the locational criterion of suppression of native vegetation and in a planned location in an area of high or very high degree of potential for the occurrence of cavities, according to official data from CECAV-ICMBio, whose assigned weight results in a concomitant environmental license modality, That is, the prior and concomitant installation will be granted, thus attesting to the environmental locational feasibility and referred implementation authorization concomitantly. (GE21, June/2024)

The environmental licensing process for the Bandeira Project—Environmental Licensing System Request No. 2023.07.01.003.0000498—is associated with a request for environmental intervention in an area of the Atlantic Forest Biome, specifically the phytophysiognomy of a Seasonal Deciduous Forest (FED) in the early stage of regeneration, as indicated by Electronic Information Licensing System SEI No.: 2090.01.0008281/2023-66.

Requests were also made for permissions to cross the Piauí River under No. 2090.01.0008237/2023-90 and to withdraw surface water at a rate of 110 m^3/hour under No. 2090.01.0008240/2023-09. These requests were formalized within the environmental licensing of the Bandeira Project, which includes the withdrawal of water from the Piauí River. Water use limits are evaluated by the Minas Gerais Institute of Water Management (IGAM). The approved volume of water withdrawal of 110 m^3/hour is sufficient to meet the Project's maximum demand, which has an expected average consumption of 47 m^3/h. IGAM granted the water extraction permit for a period of 10 years, documented as No. 1401880/2024, on April 25, 2024.

Within the scope of municipal consents, in November 2023, the Bandeira Project received certificates of regularity from the municipalities of Araçuaí and Itinga regarding the use and occupation of municipal land. With the first stage of the formalization process complete, and all required documents submitted to the environmental agency, the only remaining steps are the technical and legal analysis of the administrative process.

Regarding the deadlines for the process analysis, the timeline for the LP (Preliminary License), LI (Installation License), and LO (Operating License) stages is established by CONAMA Resolution No. 237/1997. According to Article 14, the environmental agency typically takes about six months to review the MGLIT Project; however, as outlined in Article 14 below:

It should be noted that, based on the particularities of each project or criterion to be defined by the licensing body, other institutions may also be involved in the licensing, such as the National Institute of Historical and Artistic Heritage (IPHAN) and the Minas Gerais State Institute of Historical and Artistic Heritage (IEPHA), among others. These requests are confirmed by the wording established by Article 26 of State Decree No. 47,383, of March 2, 2018, which establishes the relationship between environmental licensing and the of the intervening agencies. (CONAMA Resolution No. 237/1997, Article 14)

Obtaining IPHAN's consent is in progress, No. 01514.001028/2023-31.

20.3 Relevant Socio-Environmental Aspects

Based on the verified content, including procedural control documents and environmental studies (RCA & PCA) conducted by the specialized consulting firm Neo Ambiental, MGLIT presents a summary of the environmental assessments used to determine the project's feasibility.

Locational factors are considered non-impacting under the current criteria outlined in Deliberação Normativa (DN) 217/17, which serves as the basis for environmental licensing purposes. Within the context of restrictive environmental factors, particularly concerning the biotic environment, because the Bandeira Project is a mining enterprise deemed of public utility, it is permitted to conduct vegetation suppression in the early stage of regeneration within the Atlantic Forest, intervention in Permanent Preservation Areas (APP), and the removal of protected species as stipulated by the environmental intervention process and corresponding compensatory measures mandated by current legislation.

Based on the Brazilian Forest Code (Law 12.651 of May 25, 2012) and the Mineral Forest Law (State Law 20.922, of 10/16/13), specific protected environmental areas, including Permanent Preservation Areas (APPs), require prior government authorization for the suppression of vegetation or interference with natural habitats. However, CONAMA Resolution No. 369 of 2006 provides exceptions for cases of public utility, social interest, or low environmental impact, allowing for intervention or vegetation suppression in APPs.

Regarding the suppression of protected tree species, according to Article 70, II of Law No. 12,651/2012, any tree may be declared protected due to its location, rarity, physical attributes, or condition of seed carrier. It is important to note that in cases where it is necessary to carry out works, plans, activities, or projects of public utility or social interest, suppression may be allowed, subject to prior authorization from the government.

The general rule is that the entity preserves the vegetation located in APPs, as indicated in Article 9 (CONAMA 369/2006), and the intervention in this area must be authorized by the competent environmental agency, as established by CONAMA Resolution No. 369/2006. In this context, State Decree No. 47,749/2019 outlines the authorization procedures for environmental interventions within the State of Minas Gerais. The decree allows for the authorization of interventions in Permanent Preservation Areas (APPs) in cases of public utility or social interest, provided that no feasible technical or locational alternatives exist and compensation measures are implemented as required.

To obtain authorization for intervention in APPs, the entity must submit an application, along with an Environmental Intervention Project plan and a Planting Project plan for native or fostered forests, as outlined in Joint Resolution SEMAD/ State Forestry Institute (IEF) No. 1,914/2013. MGLIT has adhered to all technical requirements and studies submitted to the environmental agency for review under process No. 2090.01.0008281/2023-66.

After reviewing the request for environmental intervention, the applicable environmental agency, SEMAD or FEAM, will decide on the applicable compensatory measures and mitigating measures required to grant the authorization under the terms of SEMAD/IEF Joint Resolution No. 3,102/2021.

Mining enterprises that require the removal of native vegetation must submit a request to the Environmental Compensation Management of the IEF to initiate a process for compensating the removal of native vegetation necessary for mining activities, as stipulated by State Law No. 20,922 of 2013, Article 75.

Mining activities, including extraction, processing, and tailings waste pilings, are subject to environmental licensing under DN217. In addition, the right to withdraw surface water must be granted by applicable authorities, which can impose restrictions on project development. To account for these restrictions, specialized environmental studies are required. MGLIT has fulfilled the necessary requirements of the National Water Resource Policy under Federal Law No. 9,433/1997.

MGLIT submitted to the environmental agency the Location Statement, in accordance with Article 27 of State Law No. 21,972/2016, which states that the Project does not cause a social impact on Indigenous land, on Quilombola land, on cultural property safeguarded in a municipal environmental protection area, in a conservation unit and its buffer zone, or in any area where there is a need relocate existing populations.

Notwithstanding, in compliance with Article 26 of State Decree No. 47,383 of March 2, 2018, which defines the relationship between environmental licensing and the opinions of intervening agencies, it is noted that MGLIT filed the petition for the Impact Assessment Project on Archaeological Heritage in the Area of Influence of the Bandeira Project, with the National Historical Heritage Institute – IPHAN, via SEI No. 1514.001028/2023-31. After conducting the field surveys, the Archaeological Heritage Impact Assessment Report (RAIPA) was filed on April 24, 2024, and the Impact Assessment Report on Intangible Heritage (RAIPI) was filed on March 22, 2024. Both are awaiting IPHAN's evaluation for the issuance of an opinion on the Project.

According to the National System of Nature Conservation Units (SNUC) Law No. 9,985 of July 18, 2000, Conservation Units (UC) correspond to “a territorial space and its environmental resources, including jurisdictional waters, with relevant natural characteristics, legally established by the Government, with conservation objectives and defined limits, under a special administration regime, to which adequate safeguards of protection apply.” It is important to note that the project's location is not within any government-designated area created and protected for conservation purposes.

Additionally, it is noteworthy that the results of speleological research conducted by NeoAgro Ambiental (2023) indicate there are no cavities, caves, grottoes, or shelters within the granite massifs in the area of the Bandeira Project or within 250 m of its boundaries.

Regarding the socioeconomic environment, Bandeira Project has obtained the Declarations of Conformity issued by the Secretaries of Environment of the Municipalities of Araçuaí and Itinga, Minas Gerais, attesting that the location and type of enterprise comply with the legislation applicable to the use and occupation of the land, in accordance with the provisions of Art. 10, Paragraph 1 of CONAMA Resolution No. 237/97.

MGLIT holds the mining rights for the exploration area, as formalized under the mining process ANM: 832.439/2009. Therefore, the entity complies with SISEMA Service Instruction No. 01/2018 provisions. As previously mentioned, the Valitar-owned farms have a Legal Reserve (RL), and their boundaries do not overlap with the future Project area. Valitar is part of the same group as MGLIT, with which the Private Instrument of Assignment of Rights and Other Covenants was executed. Notably, there are no residents on the rural properties where the Project will be implemented or on adjacent properties. The nearest community to the project site is the Barreiros community.

Therefore, MGLIT has fully complied with the technical studies and legal regulations relevant to the project, demonstrating its environmental locational feasibility.

20.4 Summary of Socio-Environmental Conditions

20.4.1 Regional Landscape Conditions

The Bandeira Project area is part of the Salinas Formation (CPRM, 2008; NeoAgro Ambiental, 2023), composed of fine mica-quartz schist, mottled, with frequent andalusite, cordierite, white/muscovite mica, and tourmaline. Ore mineralization presents a banded structure from centimetres to metres—intercalations of calcium-silicate rock and quartz-mica shale (CPRM, 2010). The Project area lies in the Metasediment/Metavolcanic Hydrogeological Domain (fissural) (NeoAgro Ambiental, 2023).

The Hydrogeological Domain of Metasediments–Metavolcanic is characterized as discontinuous and of limited regional extent. It is locally composed of rocks belonging to the Salinas Formation, which present predominant secondary fracture permoporosity. In this aquifer type, discontinuity planes associated with the existing schistosities favour water accumulation. However, this aquifer is classified as unproductive, where the water flow of wells can vary between 1 m^3/h and 5 m^3/h (CPRM, 2010).

The Bandeira Project area has relief predominantly composed of degraded flattened surfaces. The slope varies between 0º and 5º, and topographic amplitude varies from 10 m to 30 m (CPRM, 2009).

The Project's Area of Direct Influence (ADA) includes remnants of native vegetation alongside areas devoid of vegetation. Some areas were previously used as cattle pasture, which often intensifies soil erosion through trampling. However, on-site inspections did not identify excessive soil erosion. Therefore, the ground cover variability at the Project site is characterized as having low susceptibility to erosion (NeoAgro Ambiental, 2023).

The Project is situated within the Jequitinhonha River Basin, specifically in the sub-basin of the Piauí River, a tributary of the Jequitinhonha River. Given the semi-arid climate of the region, the Piauí River is the sole perennial watercourse, exhibiting characteristics of intermittency and ephemerality (NeoAgro Ambiental, 2023).

The climate in the Project region is classified as Aw according to the Köppen classification, characterized as continental-dry and hot, with an average temperature during the coldest month above 18°C and maximum temperatures averaging around 34°C. This results in two distinct seasons: a dry winter and a humid summer.

The average annual rainfall in the Jequitinhonha Valley region is below 1,000 mm; however, in the municipalities of Itinga and Itaobim, it is below 700 mm (PLANVALE, 1994). The average relative humidity is 75%, with evapotranspiration around 1,450 mm and an annual water deficit of about 700 mm.

The rural properties to be occupied by Project implementation share the same physiographic context, predominantly characterized by Seasonal Deciduous Forest—Submontane EDF phytophysiognomies. These properties fall within the jurisdiction of Federal Law No. 11,428/2006 and Decree No. 6,660/2008, which regulate the use and conservation of native vegetation within the Atlantic Forest biome. In the Project's Area of Direct Influence (ADA), the predominant land use is livestock farming, specifically cattle. The presence of ruderal herbaceous species, shrubs, and isolated trees has been confirmed in these areas. It is important to note that buildings are integrated into these established rural areas. These consolidated areas have pre-existing anthropic occupation as of July 22, 2008, regulated under State Decree No. 47,749/19 (NeoAgro Ambiental, 2023). Currently, the remaining native vegetation on the site comprises mostly disconnected forest fragments, with the predominant phytophysiognomy being Seasonal Deciduous Forest—FED (NeoAgro Ambiental, 2023).

The Barreiros community is situated on the south bank of the Piauí River, approximately 1.5 km from the proposed industrial unit site. It consists of around 166 residents from 60 families who primarily sustain themselves through subsistence agriculture and livestock farming. The environmental study for project implementation covers a border zone between the municipalities of Araçuaí and Itinga, divided by the Piauí River. This area lies within the Northeast macro-region of Minas Gerais, in the Middle and Lower forks of the Jequitinhonha River.

Studies conducted in the Bandeira Project area indicate that it has been anthropogenically disturbed due to previous agricultural activities and contains small patches of natural vegetation in various stages of regeneration.

20.4.2 Local Fauna

The faunal survey was based on bibliographic data, reports from local residents, and primary surveys carried out by biologists from Ekob Environmental Consulting. The primary surveys were carried out in accordance with IBAMA Normative Instruction No. 146/2007 and were conducted without collecting, capturing, or transporting specimens (i.e., only sightings, photographs, or hearing animal vocalizations).

The majority of species identified in the studies exhibit broad geographic distributions and low sensitivity to anthropogenic interference, indicating a high level of disturbance in natural environments. However, certain higher taxa with specific ecological requirements and mammalian species facing conservation challenges were also identified. The ichthyofauna recorded includes species of lesser concern; however, species inhabiting small watercourses are typically highly sensitive to changes in water quality (Ekob Environmental Consulting, 2023, as cited in NeoAgro Ambiental, 2023).

The taxa identified to have the most significant conservation challenges were predominantly medium and large carnivorous mammals, namely *Puma concolor* (puma), *Leopardus pardalis* (ocelot), *Lycalopex vetulus* (field fox), *Chrysocyon brachyurus* (wolf), and *Herpailurus yagouaroundi* (Moorish cat). The other groups surveyed—avifauna, herpetofauna, and ichthyofauna—did not present heightened conservation concerns (NeoAgro Ambiental, 2023).

Given the local environmental conditions, the likely species inhabiting the region, identified through primary records, indicate significant ecological disturbance and simplification of fauna communities in the sampled areas. This outcome was expected due to the study area's proximity to the Barreiros community, ongoing mineral exploration in the neighbouring regions, and the intensity of rural activities surrounding the Project area.

The studies indicate that the sampled faunal species exhibit a wide geographical distribution. Given the project's location, the study area harbours species typical of the Atlantic Forest, Cerrado, and Caatinga biomes, thereby enhancing local biodiversity and conservation potential. However, the remaining forest fragments in the study area are significantly affected by human activities such as logging and livestock grazing, resulting in habitat fragmentation and a decline in forest species biodiversity. Nevertheless, the biodiversity within the project area holds considerable regional significance in maintaining ecosystems capable of supporting diverse faunal populations. Preserving forest remnants, maintaining landscape structure, and ensuring water body quality can foster faunal biodiversity in the region.

20.4.3 Local and Directly Affected Communities

The Bandeira Project, currently in the economic feasibility phase, aims to implement and operate within the territorial limits of Araçuaí/MG and Itinga/MG. This phase focuses on exploring and developing projects within the lithium mineral sector and its by-products. The project is expected to benefit Araçuaí and Itinga economically by generating employment and boosting the service sector. The Brazilian Institute of Geography and Statistics (IBGE) found that Araçuaí had a population of 34,297 in 2022. The GDP per capita in 2020 was R$13,441.04. In 2010, 59.83% of the population aged 18 and over was economically active. Companhia de Saneamento de Minas Gerais (COPASA) is responsible for sanitation, and Centrais Eletricas de Minas Gerais (CEMIG) for electricity. The education system is predominantly public, with 32 elementary schools, nine high schools, and 13 kindergartens staffed with 549 teachers (NeoAgro Ambiental, 2023).

In 2010, Itinga had 14,407 inhabitants. The GDP per capita in 2020 was R$8,393.59, with public administration representing 52%. In 2010, 56.65% of the population aged 18 and over was economically active. Itinga has water and sewage infrastructure, with the subsidiary COPASA (COPANOR) responsible for water supply until 2040. The Municipal Health Department manages health, and education is primarily public, with 20 elementary schools, four high schools, and an enrollment rate of 96.8% for children aged 6 to 14. Cultural heritage includes architectural structures and religious movable property (NeoAgro Ambiental, 2023).

Near the Bandeira Project ADA are two rural communities: Barreiros and Fazenda Velha. Both are in the rural area of the municipality of Araçuaí. It should be noted that there are no residents in the rural property where the Project will be implemented or in the adjacent properties (NeoAgro Ambiental, 2023).

Barreiros is located 424 m from the Bandeira Project site, where plans include constructing a bridge to facilitate the movement of workers, transport of mining output, and disposal of waste in designated waste piles (NeoAgro Ambiental, 2023).

For most of Fazenda Velha's population, retirement and government social programs are the primary sources of income. Other economic activities include agriculture and livestock, but most production is small-scale, only for personal consumption.

20.5 Analysis of the Assessment of Socio-Environmental Impacts and Respective Mitigating Actions

Federal Law No. 6,938/81 established the National Environmental Policy, which includes provisions for assessing environmental impacts and licensing activities that have the potential to degrade the environment (Article 225, paragraph I, item IV). It requires “the installation of a work or activity potentially causing significant degradation of the environment, preliminary environmental impact study, which will be publicized” (GE21, June 2024.)

The direct impacts on the physical environment identified include industrial waste generation, sanitary issues, spills of oil and petroleum derivatives, effluents of Class I and II solid waste, soil and water contamination, alterations in rainwater drainage patterns, initiation of erosive processes, noise, visual landscape impacts, and increased vehicle traffic on nearby roads (NeoAgro Ambiental, 2023).

To control and mitigate this impact, MGLIT will propose guidelines through environmental control programs, such as the execution of the Solid and Liquid Waste Management Program, the Erosion and Effluent Processing Control Program, the Surface Water Quality Monitoring Program, and the Air and Noise Quality Maintenance Program.

Water quality management will include an evaluation of the potential generation of acid drainage from mine waste and DMS tailings. This assessment will help determine the appropriate disposal methods for these materials and whether soil sealing is necessary. Static tests for acid generation potential will be conducted by SGS Geosol, a specialized laboratory in Vespasiano, Minas Gerais.

The Degraded Areas Recovery Plan, presented in the PCA, proposes measures for rehabilitating degraded areas. This includes actions such as planting and soil regeneration, which will be carried out throughout the project's lifespan.

The Bandeira Project aims to optimize water usage to enhance the environmental sustainability of its operations. A management plan will be implemented to maximize water recirculation and reuse. The engineering plan outlined in this Technical Report includes the selection of the most suitable equipment for solid–liquid separation, such as dewatering cyclones, thickeners for decanting solids, and filtration systems, to minimize unnecessary water loss. It is estimated that 90% of the water withdrawn from the source will be recirculated.

The waste material extracted from the mine will be deposited in pre-evaluated areas chosen based on specific engineering requirements that predetermined the suitability and safety of slope and pile stability. Three location alternatives were assessed to determine the optimal location. Additionally, deposition in voids within the mine will be maximized to reduce surface impact. The tailings from the

DMS concentration unit are deposited in separate piles distinct from general waste piles. There are plans to donate these materials to municipalities or use them in civil construction. However, the current project plan involves depositing all tailings in designated piles within the project area until interest in recycling and reuse purposes is expressed and feasibility is determined.

Regarding impacts on the biotic environment, it is crucial to note that the areas designated for the mining project installation have already been significantly affected by longstanding anthropogenic activities, such as neighbouring mineral exploration and proximity to the Barreiros community. Moreover, the construction phase of the Bandeira Project and its associated environmental impacts necessitate vegetation suppression in specific areas to facilitate further project development.

The current environmental conditions in the area are conducive to project installation. The local flora and fauna have been shaped by longstanding anthropogenic activities, resulting in resilient faunal populations and vegetation in the early stages of regeneration. However, activities such as vegetation suppression and noise generation from machinery and equipment will disturb the local fauna and may lead to habitat loss for terrestrial species. This could potentially impact less-mobile specimens during the initial clearing phases in the area. Vegetation suppression activities will be supervised by a team of biologists tasked with conducting proper surveys and, when necessary, rescuing animals before implementing habitat-altering actions. The Fauna Monitoring Program will be conducted throughout the installation and operation stage of the Project. It will provide and track key biodiversity indicators to allow for better evaluation of Project impacts on local fauna.

Concerning the impact on biodiversity reduction, the Project will implement forest compensation measures alongside actions specified in the Recovery Plan for Degraded Areas and the Maintenance and Conservation Program for Permanent Preservation Areas and Legal Reserves (RL).

In terms of socioeconomic impacts, the municipalities of Araçuaí and Itinga will benefit from tax revenues such as Financial Compensation for Mineral Exploration (CFEM), alongside economic growth through job creation and the development of local labour and suppliers. The Bandeira Project is committed to prioritizing local employment and services, and investing in training the local workforce, aiming to foster economic growth and income enhancement opportunities within the Project's area of influence. However, socio-cultural conflicts may arise, linked to heightened population expectations, pressure on infrastructure, landscape changes, and concerns such as atmospheric emissions, dust, and noise. To manage and mitigate these impacts, alongside environmental quality monitoring programs, the Social Communication Program includes planned actions to foster interaction with local communities.

Based on the comprehensive environmental assessment conducted, it is concluded that the Project is environmentally feasible. The thorough evaluation indicates that while potential negative impacts associated with the Project exist, these can be effectively minimized or mitigated through appropriate measures and mitigation strategies. The findings highlight the feasibility of implementing the Project in a manner that ensures environmental sustainability, balancing development objectives with the preservation and protection of the natural surroundings.

20.6 Community and Government Relations in the Environment, Social, and Governance Context

The Jequitinhonha Valley boasts profound cultural significance for the people of Minas Gerais, renowned for its biodiversity and community dynamics. Moreover, in recent years, the valley has emerged as a significant contributor to the energy transition, with abundant mineral resources such as lithium, cesium, rubidium, tantalum, niobium, rare earth elements, and graphite. This natural wealth holds unique potential to catalyze rapid development within the municipalities, underscoring its pivotal role in regional advancement. The Bandeira Project was designated as a state priority for social and economic development through a Memorandum of Understanding (MOU) signed on July 17, 2023, by His Excellency Governor Romeu Zema and MGLIT President Mr. Helio Diniz. This agreement grants the Bandeira Project priority status in internal state agency assessments aimed at expediting the licensing process for its implementation.

MGLIT acknowledges the significance of all stakeholders—including individuals, entities, communities, authorities, and associations—in contributing to the success of this project, fostering economic growth, knowledge, and the development of the Jequitinhonha Valley region. Future economic contributions will be substantial, specifically through royalties paid under the CFEM framework, set at 2% of gross revenue from product sales. These royalties are allocated to federal, state, and local governments, ensuring equitable distribution of economic benefits.

Effective and transparent communication is crucial for fostering positive relationships with all project stakeholders, showcasing MGLIT's dedication to transparency and respect in project planning and operations. To further this commitment, an on-site ESG Analyst will work closely with senior management to oversee and implement Environmental, Social, and Governance projects, ensuring the sustainable development of our operations.

21.0 CAPITAL AND OPERATING COSTS

21.1 Basis of Estimates

Capital (CAPEX) and operating cost (OPEX) estimates were developed to support the Bandeira Project's feasibility study. These estimates are calculated within a range of −20% to +30%.

The base date of the estimates is the second quarter (Q2) 2024, with a reference exchange rate of US$1 = R$5.07.

These estimates are based on the feasibility-study conceptual sizing of the main mine, process, mechanical, and electrical equipment, which were costed through consultations with traditional market suppliers. Three quotations per package were obtained. The engineering team prepared an Avaliação de Conformidade Técnica (ACT) (Technical Conformity Assessment), and the value to be adopted is defined based on the average of the three quotations.

For steel structures, boilermaking, piping, concrete, and architecture, the preliminary design and issuance of quantity sheets (materials take-offs [MTO]) were also carried out. The items were priced through a recently updated monetary database.

For the infrastructure, the volumes of cut and fill, vegetation suppression, and primary coating were estimated and priced based on the Tucuman proposal that MGLIT received, and a recent database.

Other items (instrumentation, automation, electrical materials, and smaller-diameter piping) were estimated from similar installations and benchmarking, applying an appropriate estimate factor in each case.

21.1.1 Estimate Price Source

AtkinsRéalis and MGLIT prepared cost estimates for process and mechanical equipment, design criteria, process flowchart, mass balance, descriptive process sheets, master layout/plan, conveyor belt calculation sheets, general earthmoving plan, quantity sheets for the disciplines of metal structures, boiler making, and piping. The sources of costs are presented in Table 21-1.

Table 21-1: Sources of Direct and Indirect Cost Estimates

Description	Responsibility	Source
Mine Equipment Supply	AtkinsRéalis	Supplier—Market Quotes
Process, Mechanical and Electrical Equipment Supply	AtkinsRéalis	Supplier—Market Quotes
Equipment Installation—Process and Mechanical	AtkinsRéalis	Database
Supply and Installation of Structural Steel, Platework and Piping >4"	AtkinsRéalis	Database
Supply and Installation of Electrical, Piping <4", and Instrumentation and Telecom Equipment	AtkinsRéalis	Factored
Civil	AtkinsRéalis	Database
Production Support Infrastructure	AtkinsRéalis	Database
Infrastructure	AtkinsRéalis	Quotes—Database

Description	Responsibility	Source
Freight	AtkinsRéalis	Factored
Mobilization—Demobilization—Camp	AtkinsRéalis	Factored
Spares	AtkinsRéalis	Factored
Erection Supervision	AtkinsRéalis	Factored
Commissioning	AtkinsRéalis	Factored
QA / QC	AtkinsRéalis	Factored
Pre-OPEX—Mine	AtkinsRéalis	Estimated
Pre-OPEX—Plant	AtkinsRéalis	Factored
Topography	AtkinsRéalis	Factored
EPCM	AtkinsRéalis	Factored
Owner´s Team	MGLIT	Estimated
Insurance / Risk	AtkinsRéalis/MGLIT	Factored
Contingency	AtkinsRéalis/MGLIT	Factored

21.2 Work Breakdown Structure

Costs were classified according to the Project's work breakdown structure (WBS) (Table 21-2).

Table 21-2: CAPEX and OPEX Classification

Area	Description
00	General
10	Underground Mines
20	Beneficiation Plant
30	Disposition Dry
40	Utilities
50	Administrative
60	Workshops
70	Infrastructure
80	Temporary Construction

21.3 Estimate Plan

AtkinsRéalis developed costing for the infrastructure, mine development, and beneficiation plant, where the main process steps are crushing, ore sorting, classification, DMS, fines filtration, and all general infrastructure for administrative and operational support of the facilities.

The prices adopted in the estimate preserved the source currencies; conversion rates from U.S. dollars and Euros to Brazilian reals are given in Table 21-3.

Table 21-3: U.S. Dollar and Euro Conversion Rates

Currency	Conversion Rate
$	US$1.00 = R$5.07
€	€1.00 = R$5.48

21.4 Capital Cost

21.4.1 Capital Cost Estimation

A CAPEX summary is presented in Table 21-4. The total Project CAPEX is estimated at $266.1 million.

This value considers the Owner's Costs budget, a contingency of 15%, and pre-OPEXs, in addition to the reduction of $13.07 million referring to the financing of the main initial mine equipment, to be paid in the first two years by CAPEX and after by SUSEX during the operation. The owner’s costs include a team dedicated to following project development, environmental costs, social project costs, and hired services.

The amount of Social Integration Program (PIS), Contribution to Social Security Financing (COFINS), and Taxes on Operations Relating to the Circulation of Goods and on the Provision of Interstate and Intermunicipal Transport and Communication Services (ICMS) tax credits to be recovered, totalling $18.8 million.

Table 21-4: Capital Cost Summary

	Total ($ M)
Direct Cost	190.0
Indirect Cost	89.2
Equipment Financing	(13.1)
Total	**266.1**

Sustaining capital was estimated at $84.1 million to cover mine and plant equipment reinvestments during the LOM, including tailings disposal. End-of-life mine closure was estimated at $2.8 million.

Table 21-5: Capital Cost by Area and Sub-Area

Area	Description	Cost ($)
00	GENERAL	93,816,956
0000	General	93,816,956
05	MINE	70,408,546
0000	General	70,408,546
10	WATER CATCHMENT SYSTEM, MINE WATER RESERVOIR, RAISE AND SUBSTATIONS	6,985,217
1000	General	6,912,608
1500	Ventilation	72,609
20	BENEFICIATION PLANT	60,670,713
2000	General	9,982,233

Area	Description	Cost ($)
2100	Primary crushing	4,413,596
2200	Secondary crushing and screening	5,707,031
2300	Ore sorter	10,328,564
2400	Fine screening	3,120,471
2500	DMS (general)	8,267,712
2510	Coarse DMS concentration	6,485,479
2520	Medium DMS concentration	3,168,326
2600	Solid-liquid separation	583,339
2610	Fines thickening	2,793,811
2620	Fines filtration	3,428,166
2700	Flocculant	214,965
2900	Water recovery	2,177,021
30	DRY STACKING	-
40	UTILITIES	19,895,358
4000	Raw-water tank	1,282,132
4045	Electrical Substation	2,495,813
4100	Compressor house	430,590
4110	Water Treatment Plant	187,629
4120	Sewage Treatment Plant	285,712
4140	Fire Protection Systems	392,971
4200	Fuel station	292,402
4600	Substations	14,528,108
50	ADMINISTRATION	7,086,158
5000	General	343,290
5110	Laboratory	2,726,362
5130	Administrative mine buildings	246,740
5140	Restaurant	988,844
5150	Warehouse	803,611
5160	Entrance gate and reception	671,305
5170	Medical post and fire brigade	362,945
5180	Dressing room	224,372
5200	Explosive and detonators magazine	139,099
5700	Lockers, mine	224,372
5900	Dispatch area, mine	143,043
5950	Battery room, mine	212,175
60	WORKSHOPS	2,246,867
6000	Oily Effluent Treatment Plant	84,016
6100	Office	1,741,749
6200	Vehicle wash station	421,102
70	INFRASTRUCTURE	17,657,344
7000	General	14,973,730
7100	Sumps	2,393,428
7200	Intermediary stockpiles	290,186
80	TEMPORARY CONSTRUCTION	392,810
8300	Fences	392,810
	Subtotal	279,159,968
	Export Credit Agency Cross-Border Loan During CAPEX Phase	(13,067,940)
	Total	266,092,027

21.4.2 Financial Operation—ECA Cross-Border Loan (SANDVIK)

Supplier SANDVIK (BRA) offered a proposal for foreign currency financing from a foreign partner bank, guaranteed by EKN (Swedish Export Credit Agency). The financing will be in 60 installments, with pre-fixed interest for the mine's main equipment. For CAPEX, disbursements are foreseen for the following years—Year −2, 12 installments; Year −1, 12 installments; Year 1, 6 installments—totalling 30 installments totalling $13 million. The remaining 30 installments will occur in: Year 1, 6 installments; Year 2, 12 installments; and Year 3, 12 installments.

21.4.3 Summary of Main Quantities

Table 21-6 presents the main quantities for each area of investment estimation.

Table 21-6: Summary of Quantities

Area	References	Unit	Quantity
Mine (Equipment and Infrastructure)			
Infrastructure—Bulk Earthworks	cut-and-fill	m³	1,020,080.00
Concrete	volume	m³	8,290.64
Piping	pipes	m	5,484.00
Instrumentation—Telecom and IT	instruments		Index
Electrical Equipment	equipment		8
Electrical Material	cables	m	Index
Overhead Cables	length	km	3.70
Platework	weight	t	817.81
Structural Steel	weight	t	1,465.40

21.4.4 Contingency

The contingency used in this Technical Report was estimated at 15% for the mine and the plant. A total of $13.07 million related to the financial transaction with Sandvik was excluded from the basis of calculation of the mine contingency.

21.4.5 Taxes

To estimate the cost used in this Technical Report, the incidence of the usual taxes was considered, such as the federal-level Social Integration Program and Social Security Financing Contribution (PIS/COFINS), Tax on Industrialized Products (IPI), Additional Charge for Renewal of the Merchant Navy (AFRMM), and Tax on Financial Transactions (IOF); the state-level Tax on the Circulation of Goods and Services (ICMS) and Difference Between Internal and Interstate Rates (DIFAL) of ICMS; and the municipal-level Tax on Services of Any Nature (ISSQN).

21.4.6 Exclusions

The following expense items were not included in the CAPEX estimate:

- Those incurred by the owner to date
- Any related to obtaining licenses, or any others related to regulatory agencies
- Those related to the closure at the end of the useful life of the facilities
- Light vehicles for industrial and administrative support facilities
- Those related to obtaining funds from the venture, if necessary
- Entrepreneur's implementation overhead
- Those related to any impact on the shortening or lengthening of the implementation period
- Possible exchange-rate variations
- Escalation
- Technological characterization
- Specialized consultancies
- Impacts on costs intended to cover any type of risk.

21.4.7 Mine Capital Cost Estimation

The initial and sustaining mining CAPEX considered for the Project mine operations are as follows:

- Purchase of production equipment by financial loan supplied by the manufacturer bank—truck, LHD loader, longhole drill, two-arm jumbo, cable bolter, slot raise borer
- Purchase of auxiliary mine equipment—scaler, explosives truck, lifting platform, fuel and lubrication truck, personnel transport truck, maintenance truck, jackleg drill, stoper drill, air compressor, motor grader, ventilation fans, exhaust fans, dewatering pump, diesel generator and utility vehicle
- Mine equipment maintenance facilities—workshop, warehouse, equipment washer, tire repair shop
- Mine buildings—office, dispatch and communication room, battery and security equipment room, changing room
- Surface infrastructure—vegetation removal, access roads, water tank, electrical substation, preparation of waste dumps and temporary ore stockpiles, sedimentation dikes
- Systems, hardware and software—mine management, communication, topography, geology and mine planning
- Underground infrastructure—box cut, decline, ventilation system, electrical substation
- Purchase of service materials and accessories—roof support, ventilation, water, electrical, compressed air
- Pre-production.

CAPEX is summarized in Table 21-7. The breakdown of initial and sustaining mining CAPEX is shown in Table 21-8.

Table 21-7: Summary of Initial and Sustaining Mining Capital ($ million)

Year	Mine Equip. Purchase	ECA Supported Cross-Border Loan	Spare Parts Purchase[2]	Mine Equip. Maintenance Facilities	Mine Buildings[3]	Surface Mine Infrastructure[3]	Systems, Hardware & Software	Underground Mine Infrastructure	Ventilation System	BOXCUT Constructioin Contractor	Service Materials & Accessories	Mine Closure[4]	Decline CAPEX Cost[5]	Pre-Operation CAPEX Cost[6]	Total
-2	1.37	1.56	0.45	0.31	0	0	1.20	0.87	0.45	4.68	0.25	0	6.14	3.15	20.41
-1	5.89	5.13	1.69	0.46	0	0	1.20	1.44	0.51	0	0.38	0	5.98	5.13	27.81
1	5.60	5.18	0	0	0	0	0	0	0.11	0	0	0	2.40	0	13.29
2	11.63	4.07	0	0	0	0	0	0	0	0	0	0	0	0	15.70
3	0	4.07	0	0	0	0.04	0	0.47	0.20	0	0	0	0	0	4.78
4	3.72	3.23	0	0	0	0.04	0	0.47	0	0	0	0	0	0	7.47
5	2.05	1.03	0	0	0	0	0	0	0.20	0	0	0	0	0	3.27
6	10.42	0	0	0	0	0.04	0	0.47	0	0	0	0	0	0	10.93
7	0	0	0	0	0	0.04	0	0.47	0	0	0	0	0	0	0.51
8	1.22	0	0	0	0	0	0	0	0	0	0	0	0	0	1.22
9	7.13	0	0	0	0	0.04	0	0.47	0	0	0	0	0	0	7.64
10	3.53	0	0	0	0	0.04	0	0.47	0	0	0	0	0	0	4.05
11	7.26	0	0	0	0	0	0	0	0	0	0	0	0	0	7.26
12	1.04	0	0	0	0	0.04	0	0.47	0	0	0	0	0	0	1.55
13	3.54	0	0	0	0	0.04	0	0.47	0	0	0	0	0	0	4.05
14	1.87	0	0	0	0	0	0	0	0	0	0	0	0	0	1.87
15	0	0	0	0	0	0	0	0	0	0	0	2.83	0	0	2.83
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	66.27	24.27	2.14	0.77	0.00	0.32	2.40	6.07	1.47	4.68	0.63	2.83	14.52	8.28	134.64

Notes: [1]Disbursement for the purchase of mine equipment considered in the year the equipment went into operation.
[2]8% of the mine equipment purchase in the pre-production period.
[3]All values referred to this item are calculated and considered in SNC Surface CAPEX.
[4]Outsourced services at the end of mine operation.
[5]The operational costs during the first three years from decline's opening were categorized as CAPEX. The calculation costs associated with them were displayed in the Total OPEX tab.
[6]The Operational costs during the first tow years from primary development and raiseboring were categorized as CAPEX. The calculation costs associated with them were displayed in the Total OPEX tab.

Table 21-8: Breakdown of Initial and Sustaining Mining Capital Costs ($ million)

Other CAPEX	Year																
	−2	−1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Mine Equipment Maintenance Facilities	0.31	0.46	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Workshop	0.19	0.29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Warehouse	0.07	0.11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Equipment Washing Facilities	0.02	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tire Repair Shop	0.01	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other	0.02	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Initial & Sustainable Surface Infrastructure	-	-	-	-	0.04	0.04	-	0.04	0.04		0.04	0.04	-	0.04	0.04	-	-
Vegetation Removal	-	-	-	-	0.00	0.00	-	0.00	0.00		0.00	0.00	-	0.00	0.00	-	-
Access Road	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Tank	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Electrical Substation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Waste Dump & Stockpile Preparation	-	-	-	-	0.01	0.01	-	0.01	0.01		0.01	0.01	-	0.01	0.01	-	-
Sediment Pond	-	-	-	-	0.01	0.01	-	0.01	0.01		0.01	0.01	-	0.01	0.01	-	-
Other	-	-	-	-	0.02	0.02	-	0.02	0.02		0.02	0.02	-	0.02	0.02	-	-
System, Hardware & Software	1.20	1.20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mine Management	0.49	0.49	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Communication	0.28	0.28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Survey	0.08	0.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Geology & Mine Planning	0.16	0.16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other	0.20	0.20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Initial & Sustainable Underground Infrastructure	0.87	1.44			0.47	0.47		0.47	0.47		0.47	0.47		0.47	0.47		
Portal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ramp	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Electrical Substations	0.63	0.69	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumping Station	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refuge Chamber	-	0.38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Emergency Exists	0.04	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Safety Equipment	-	0.19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Robotic Bit Sharpener	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other	0.14	0.14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ventilation System	0.45	0.51	0.11		0.20	-	0.20	-	-	-	-	-	-	-	-	-	-
Ventilation Ducts	0.05	0.11	0.11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Exhaust Ducts	0.20	0.20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Exhaust Control Panel	0.16	0.16	-	0.16	0.16	-	-	-	-	-	-	-	-	-	-	-	-
Monitoring Sensors	0.02	0.02	-	-	0.02	-	0.02	-	-	-	-	-	-	-	-	-	-
Other	0.02	0.02	-	-	0.02	-	0.02	-	-	-	-	-	-	-	-	-	-
Box Cut 1 & 2	4.68	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Contractors Service	4.68	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Service Materials & Accessories	0.25	0.38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Roof Support	0.08	0.13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ventilation	0.02	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Service Water	0.11	0.18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Electrical	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Compressed Air	0.03	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Other CAPEX	Year																
	−2	−1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Mine Closure*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Detailed Mine Closure Plan Preparation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.83
Equipment & Underground Structure Removal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.17
Surface Mine Structures Removal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.25
Land Restoration & Revegetation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.65
Remnants Stabilization & Revegetation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.95
All Mine Entrances Closure & Sealing	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.20
Structure Stabilization Monitoring	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.28
Surface & Underground Water Condition	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

21.5 Operating Costs

21.5.1 Operating Cost Summary

The mine OPEX estimate includes the operation of the underground mine; the processing plant estimate includes the operation of a crushing circuit, two-stage screening, and DMS circuits (two-stage for the coarse and medium material fractions).

The OPEX for operation and maintenance labour, energy, consumables, fuel, and indirect and administrative charges associated with the processing plant were considered (Table 21-9).

Table 21-9: Sources of Direct and Indirect Operating Costs

Description	ROM ($/t)
Underground Mine	36.70
Plant and Tailing Handling	24.63
General and Administrative Sales (SG&A)	3.00
Total	64.33

21.5.2 Detailed Operational Cost

The breakdown of the OPEX is presented in Table 21-10, without the tax considerations that are described in Section 22.

Table 21-10: Operating Cost Breakdown

	ROM ($/t)	(SPO) ($/t)
Mine Subtotal	36.70	253.50
Labour	11.70	80.73
Diesel	1.93	13.34
Electrical Power	1.95	13.49
Consumables	15.97	110.20

	ROM ($/t)	(SPO) ($/t)
Services and Maintenance	2.80	19.35
Others	2.38	16.40
Plant	24.63	170.01
Labour	9.54	65.81
Electrical Power	1.44	9.92
Consumables	0.82	5.63
Maintenance	1.33	9.15
Services	9.28	64.03
Others	2.24	15.46
SG&A	3.00	20.70
Total	64.33	444.21
Transport		112.56
CIF Cost, Shangai		556.70

Note: SPO = Spodumene.

21.5.3 Labour

Labour costs were defined based on the estimated headcount (Table 21-11 and Table 21-12) and average wage values.

Table 21-11: Mine Headcount

Year	−2	−1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Mining Operation																	
Mine Operation Manager	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Assistant	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0
Coordinator	1	2	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0
Mine Operation Engineer	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1
Safety Engineer	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Trainer	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Mine Operation Supervisor	8	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	0
Technician	4	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	1
Truck Operator	4	16	24	40	40	44	48	68	52	52	64	64	64	64	52	56	0
LHD Operator	4	8	12	16	16	16	16	24	16	16	16	16	16	16	12	12	0
Drill Operator	8	24	36	44	44	40	40	40	40	40	40	40	40	40	36	36	0
Ancillary Equipment Operator	24	24	60	60	60	60	60	60	60	60	60	60	60	60	60	60	2
Blaster	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Mine Operation Assistant	12	12	24	24	24	24	24	24	24	24	24	24	24	24	24	24	0
Technical Services																	
Technical Services Manager	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Assistant	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Coordinator	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0
Mine Geologist	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	0

Year	−2	−1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Mine Planning Engineer	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0
Mine Ventilation Engineer	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Geotechnical Engineer	0	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0
Supervisor Geosciences	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	0
Quality Control Technician	0	2	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0
Surveyor	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0
Geological Surveyor	0	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	0
Technical Services Assistant	2	10	20	20	20	20	20	20	20	20	20	20	20	20	20	20	0
Mine Equipment Maintenance																	
Mine Eq. Maintenance Manager	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Coordinator	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Mine Maintenance Engineer	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0
Mine Maintenance Foreman	1	1	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0
Mechanic	8	13	22	25	25	25	26	28	26	26	27	27	27	27	25	26	2
Electrician	5	8	14	15	15	15	16	17	16	16	16	16	16	16	15	16	2
Welder	2	2	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0
Washer	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0
Tire Repairer	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0
Luber	4	4	8	8	8	8	8	8	8	8	8	8	8	8	8	8	0
Mine Maintenance Scheduler	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Mine Maintenance Controller	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Mine Maintenance Assistant	8	8	16	16	16	16	16	16	16	16	16	16	16	16	16	16	0
	109	191	318	350	350	350	356	387	360	360	373	373	373	373	350	356	12

Table 21-12: Plant Headcount

Level		Quantity
1	Aux Operation	
	Auxiliary	80
	Helper	9
	Subtotal	89
2	Operation	
	Helper	67
	Technician	71
	Warehouse	8
	Tire Shop	4
	Welder	4
	Toolmaker	4
	Lubricator	4
	Electrician	8
	Mech Maintenance	12
	Subtotal	182

Level		Quantity
3	Coordination	
	Health	4
	Security	4
	Environmental	6
	Finance	4
	Logistics	3
	Procurement	4
	Contracts	3
	Taxation	2
	Community	4
	Subtotal	34
4	Managerial	
	Engineer	12
	Administrator	11
	Subtotal	23
5	Executive	
	Manager	7
	Director	1
	Subtotal	8
Total Headcount		336

21.5.4 Plant Consumables

Consumable costs were defined based on consumption and unit values (Table 21-13).

Table 21-13: Consumables

Description	Unit	Price
Flocculant	R$/kg	26.62
Ferrosilicon	R$/kg	11.60
Annual Consumption		
Flocculant	kg/a	5,690
Ferrosilicon		
DMS (Coarse)	kg/a	217,051
DMS (Medium)	kg/a	208,488

The price of ferrosilicon was obtained through consultation in the international market—estimated to be R$11.64/kg. This results in an ore-feed unit cost of $0.73/t after considering the tax incidence and tax benefits applicable to the imported item under the drawback regime.

The price of the flocculant was obtained from the AtkinsRéalis database.

21.5.5 Power

CEMIG provided the cost of electricity. It presented a unit value of R$296.76/MWh (off-peak hours) and R$465.84/MWh for peak hours. The Project considered purchasing energy in the free market for R$269/MWh and plus other fees brings the free-market cost estimate to R$320/MWh.

Table 21-14 shows the plant and mine estimated consumption.

Table 21-14: Plant and Mine Estimated Consumption

Area	Description	kWh	kWh/a
4600-SE-01	Crushing substation	1031	6325002
4600-SE-02	DMS substation	2388	17784356
4600-SE-03	Workshops substation	611	3749013
Unit 6	Administrative area	39	125582
4600-SE-04	Mine substation	2255	13825361
4600-SE-05	Ventilation substation	2409	14773599
Total			56582912

21.5.6 Plant Maintenance

Plant maintenance cost is estimated at 5% of the mechanical equipment cost.

21.5.7 Plant Services

For the laboratory services, an SGS proposal was used for the cost of implementation and operation. In addition to this cost, MGLIT estimated what it would cost to cover environmental samples.

The cost of leasing plant equipment was taken from a Minax proposal that included 5% for mobilization and demobilization expenses. The proposal considers equipment operation for 8 hours per day, except for two front-wheel loaders and the truncated dump trucks that will operate for 16 hours or 24 hours per day (Table 21-15).

Table 21-15: Equipment Leasing Cost

Equipment	Model	Quantity	Hourly Cost (R$/h)	Monthly Unit Value (R$/month)	Total Annual Value (R$/a)	Function
Front Wheel Loader	CAT 966	1	867.15	379,759.67	4,557,116.05	Concentrate piles operation, (2 shifts)
Front Wheel Loader	CAT 966	1	867.15	520,290.00	6,243,480.00	Concentrate piles operation, (3 shifts)
Front Wheel Loader	CAT 966	1	867.15	173,430.00	2,081,160.00	Plant feeding from the regularization pile or the temporary ore storage pile on the primary crushing plateau. (1 shift)
Grader	140 K	1	746.21	149,242.00	1,790,904.00	Roads and surface accesses maintenance. Rented 6 months/year (1 shift)
Tanker Truck	8 x 4 18.000 L	1	524.41	104,882.00	1,258,584.00	Roads and surface accesses wetting. (1 turn)
Truncated Dump Truck	Scania G410	3	640.35	280,434.88	10,095,655.64	Waste transport, products, tailings, (2 shifts)
Backhoe	Cat 416F	1	551.49	110,298.00	1,323,576.00	(1 shift)
Crawler Tractor	D8	1	1434.80	286,960.00	3,443,520.00	Drystacking (1 Shift)

Equipment	Model	Quantity	Hourly Cost (R$/h)	Monthly Unit Value (R$/month)	Total Annual Value (R$/a)	Function
Winch Truck	Mercedez Benz Actros 2646/33 6 x 4 + Munck 15 t	2	640.35	128,070.00	3,073,680.00	General Maintenance (1 shift)
Ambulance	Fiat Ducato	1		50,000.00	600,000.00	Emergency ambulance. (1 shift)
Forklift	Hyster 170 HD Diesel 7.5 t	1		16,006.07	192,072.84	Workshop spare parts handing (1 shift)
Mobile Crane on Tires	Grove RT540E – 35 t	1	518.23	103,646.00	1,243,752.00	General maintenance (1 shift)
Lighting Tower		3		25,.268.76	909,675.24	Waste rock and rejects stockpile (1 shift)
Double Cab Pickup Truck 4x4	Chevrolet S10	4		33,145.74	1,590,995.40	Mine (1 shift)
Pickup Truck	Toro	4		33,145.74	1,590,995.40	Plant (1 shift)
Scissor Lift	Telescopic Lifter 1200SJP	1	518.23	103,646,.00	1,243,752.00	General maintenance (1 shift)
Subtotal (R$/Year)					41,238,918.58	
Total (R$/Year) % Accredited Operator + mobilization/demobilization (5%)					43,300,864.50	

The outsourced services were estimated at 10% of the labour cost.

For other non-dimensioned costs, a 10% was estimated on top of the plant's other OPEX values.

21.5.8 Mine Operating Cost Estimate

The following are the Project OPEX items estimated for the mining operations:

- Main production and auxiliary mine equipment—diesel, electricity, lubricants, greases and filters, tires, maintenance, undercarriage, and wear parts
- Labour for mine management, mine operation, technical services, and maintenance of equipment
- Explosives, accessories, and outsourced blasting equipment and services
- Roof support
- Drilling of ventilation shafts using raise borers through outsourced operations
- Maintenance of mine equipment maintenance facilities—workshop, warehouse, equipment washer, and tire repair
- Maintenance of mine buildings—office, dispatch and communication room, battery and safety equipment room, locker room, and core shed
- Maintenance of surface mine structures—entry and portal, waste piles and temporary ore stockpile, access roads, water tank, electrical substation, and sedimentation ponds
- Maintenance of underground structures and mine services—ventilation, service water, electrical, compressed air
- Mine quality control—chemical and physical laboratory analysis
- Exploration drilling
- Maintenance of software, hardware, and mine operation management systems, communication, topography, geology, and mine planning
- Revegetation and environmental recovery services for mine structures.

Table 21-16 summarizes the Project's annual mining operating costs and Table 21-17 the Project's average annual mining operating costs. The mining operating cost distribution is shown in Figure 21-1.

Table 21-16: Summary of Bandeira's Annual Mining Operating Costs (US$ million)

Year	-2	4	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total
Mine Equipment	1.14	3.21	5.08	7.97	7.87	8.39	8.84	11.61	9.02	9.38	10.49	10.44	10.65	10.80	8.95	9.43	-	133.27
Labour	4.29	8.01	12.69	13.89	13.89	13.85	14.07	15.18	14.20	14.20	14.64	14.64	14.64	14.64	13.79	14.01	0.47	211.10
Blasting	1.75	4.35	6.33	9.57	9.20	9.27	9.37	10.13	9.83	10.05	9.92	10.09	10.27	10.07	9.75	9.76	-	139.71
Roof Support	0.51	1.27	1.97	2.77	1.80	2.11	2.10	2.10	1.98	2.03	1.98	2.02	2.05	1.98	1.84	1.83	-	30.34
Drilling Wear Parts	0.32	1.37	2.48	6.00	5.66	6.46	6.57	7.34	7.10	7.32	7.23	7.44	7.67	7.52	7.39	7.44	-	95.31
Outsourced Raise Boring	1.91	1.61	0.20	3.58	0.71	1.31	0.76	0.74	0.96	0.57	1.89	0.58	1.84	0.86	0.21	-	-	17.73
Other Costs	-	0.44	1.58	2.47	2.36	2.78	2.82	3.07	3.03	3.10	3.10	3.19	3.29	3.27	3.35	3.40	-	41.25
Decline Cost Transferred to CAPEX	6.14	5.98	2.40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.52
Pre-operation Cost Transferred to CAPEX	3.15	5.13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.28
Total	0.63	9.15	28.38	47.13	42.38	44.87	44.77	50.16	46.13	46.67	49.25	48.39	50.42	49.15	45.28	45.86	0.47	649.09

Table 21-17: Average Annual Mining Operating Costs

	Operating Costs
Average Annual Mine Operating Costs ($ million)	
Mine Equipment	8.06
Labour	12.43
Blasting	8.35
Roof Support	1.79
Drilling Wear Parts	5.85
Outsourced Raise Boring	1.09
Other Costs	8.06
Total	45.62
Unit Mine Operating Cost ($/dry tonne)	
Plant feed	36.73

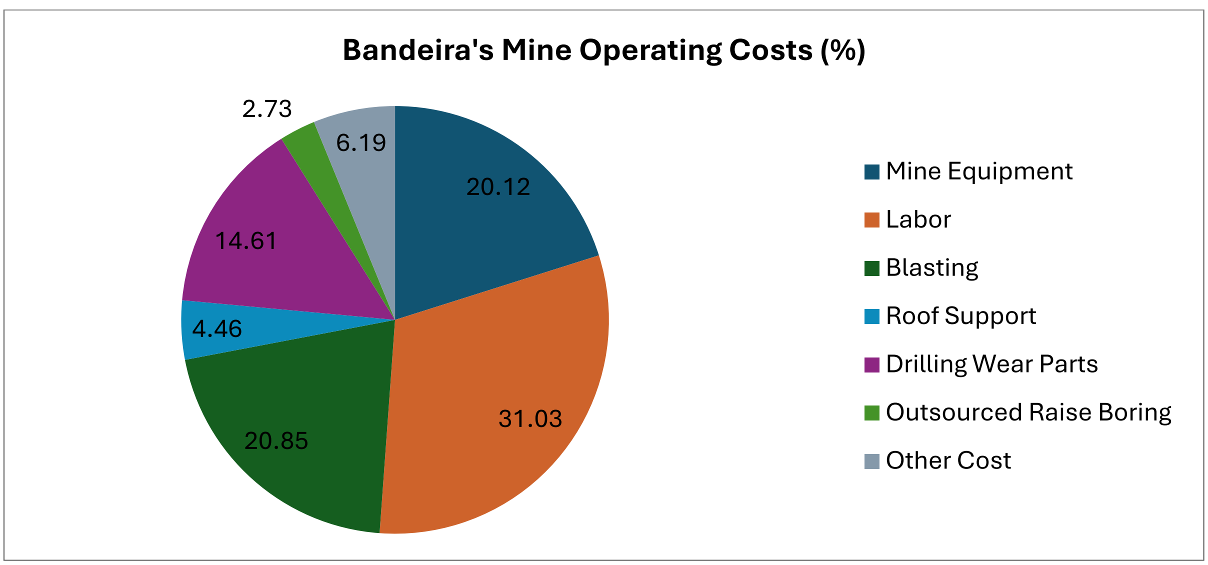


Figure 21-1: Percentage Breakdown of Project Mining Operating Cost

22.0 ECONOMIC ANALYSIS

Section 22 was written by L&M Assessoria Empresarial (L&M Advisory); the information and opinions contained herein are those of L&M Advisory.

This section summarizes the results of the economic analysis for the Bandeira Project Feasibility Study. The economics presented do not reflect the updated Mineral Resource presented in Section 14 of this Technical Report. It reflects the Mineral Resource and Mineral Reserve from the feasibility study with an effective date of November 11, 2023.

The economic analysis of the Project was completed by L&M Advisory, based on information provided by AtkinsRéalis, drawn these files:

- General CAPEX: BAN-0000-33KB-10000_Rev_1_20240510_RevLM11_Polly.xlsx
- OPEX Plant: BAN-0000-33KC-10000_Rev_2_OPEX_A.xlsx.

These are responsible for the mine and processing plant, production schedule, capital and operating costs for the mine, processing plant, infrastructure and logistics. The model was informed by an independent market study providing a price forecast for spodumene concentrate. L&M Advisory oversaw the estimation of tax impacts on the Project, including revenue, operating costs, capital expenditures and profits. The tax rates used are all according to Brazilian tax legislation; as well as the applicable tax benefits to be negotiated with the Minas Gerais State Government.

The main tool used for the analyses is an Excel-based discounted cash-flow model developed by L&M Advisory. The purpose of this model is to assess the key economic metrics and to identify and assess the key value drivers of the Project. From a technical/operational point of view it is a high-level model focused on detailed tax implications and resulting Project economics appropriate for this phase of the Project's development.

22.1 Main Assumptions and Parameters

The following sections outline the main assumptions used for this economic analysis.

22.1.1 Production

The annual production rate varies from year to year and is based on a design capacity of 1.3 Mt/a of ore feed. The expected LOM is 14 years, including ramp-up and -down. The average SPO concentrate at 5.50% Li_2O is estimated to be 178 kt/a.

Section 22.4 summarizes the annual feed to the plant with the respective mineral grades, masses of ore and waste mined, metallurgical recoveries, and plant production.

22.1.2 Initial Capital Cost

The initial after-tax capital cost is $279.2 million, including an allowance for contingencies of $33.7 million, equivalent to 13.7% of the total initial CAPEX. The capital cost expenditure disbursement schedule is shown in Table 22-1.

Table 22-1: Initial CAPEX ($ million)

Year	CIF + Non-Recoverable Taxes	Recoverable Taxes	Total
−2	59.1	4.2	63.4
−1	151.1	10.8	161.9
1	50.3	3.6	53.9
Total CAPEX	260.5	18.6	279.2
Mining Equipment Financing Net Cash Flow	-	-	13.1
Total Disbursement CAPEX Phase			266.1

For the Project's development phase (CAPEX phase), MGLIT has adopted the option of financing some of the main mining equipment. The financing should be guaranteed by EKN (Swedish Export Credit Agency), under the conditions and terms presented by SANDVIK, a potential supplier of such equipment, through its banking partner.

The cash flow projections for the drawdown and repayment of the financing are presented in Table 22-2. The positive balance related to financing provides a reduction in the total disbursement during the CAPEX phase by $13.1 million to a net value of $266.1 million.

Table 22-2: Mining Equipment Financing ($ million)

Year	CAPEX Phase			Operations Phase	Total Financing Cash Flow
	Drawdown	Financing Repayment	Total CAPEX Phase	Financing Repayment	
−2	4.2	(1.0)	3.2	0.0	3.2
−1	11.0	(3.8)	7.3	0.0	7.3
1	5.1	(2.5)	2.6	(2.5)	0.1
2	0.0	0.0	0.0	(5.0)	(5.0)
3	0.0	0.0	0.0	(5.0)	(5.0)
4	0.0	0.0	0.0	(4.0)	(4.0)
5	0.0	0.0	0.0	(1.3)	(1.3)
	20.4	(7.3)	13.1	(17.8)	(4.7)

22.1.3 Sustaining Capital and Mine Closure

The total capital expenditure during operation is estimated at $84.2 million. The supporting capital, which includes replacement or refurbishment of mining mobile equipment, equipment for the processing plant, and other infrastructure, amounts to $81.4 million.

The total estimated mine closure costs amount to $2.8 million, and is planned to be spent in Year 15, starting immediately after commercial production shuts down.

The sustaining capital annual schedule and mine closure costs, including recoverable and non-recoverable taxes, are detailed in Table 22-3.

Table 22-3: Sustaining Capital and Mine Closure ($ M)

Year	Sustaining Capital CIF + Non-Recoverable Taxes	Recoverable Taxes	Total Sustaining Capital	Mine Closure Costs	Total Sustaining Capital + Mine Closure Costs
2	14.3	2.5	16.8	0.0	16.8
3	2.3	0.6	3.0	0.0	3.0
4	5.2	1.2	6.4	0.0	6.4
5	2.4	0.8	3.2	0.0	3.2
6	8.6	1.5	10.1	0.0	10.1
7	2.0	0.6	2.6	0.0	2.6
8	3.8	0.9	4.7	0.0	4.7
9	5.7	1.3	7.0	0.0	7.0
10	6.1	1.3	7.4	0.0	7.4
11	7.5	1.5	8.9	0.0	8.9
12	2.6	0.7	3.3	0.0	3.3
13	4.4	1.0	5.4	0.0	5.4
14	1.9	0.7	2.6	0.0	2.6
15	0.0	0.0	0.0	2.8	2.8
Total	67.0	14.4	81.4	2.8	84.2

22.1.4 Operating Costs, SPO Logistics, and Other Costs

The average LOM OPEX for the Project is $64.33/t of ore feed to plant. The annual average of all operating costs amounts to $79.0 million. The summary of the operating costs by activity showing percent contribution in totals is presented in Table 22-4.

Table 22-4: OPEX

Activity	LOM Annual Average ($ M)	Unit LOM Cost ($/t of ROM)	Part %
Mining	45.1	36.70	57.0
Processing	30.2	24.63	38.3
SG&A	3.7	3.00	4.7
Total OPEX	79.0	64.33	100.0

The unitary cost for the transport of the SPO concentrate from the plant site to Shanghai port is $112.56/t. The details of the logistics costs are presented in Table 22-5. The annual average of all logistics costs amounts to $20.0 million.

Table 22-5: SPO Logistics Costs

	LOM Annual Average ($ M)	Unit LOM Cost ($/t of SPO Conc.)	%
Transport Plant—Ilhéus	7.64	42.43	37.7
Logistic Operation	1.44	7.78	6.9
Port Costs	0.44	2.35	2.1
Transport Ilhéus—Shanghai	10.73	60.00	53.3
Total SPO Logistics Costs	20.25	112.56	100.0

In addition to OPEX and SPO logistics, items grouped as other costs include royalties to landowners, equivalent to 1% of the gross revenue, and TFRM (Taxa de Controle, Monitoramento e Fiscalização das Atividades de Pesquisa, Lavra, Exploração e Aproveitamento de Recursos Minerários), a fee due to the Minas Gerais State Government. The annual average of other costs amounts to $2.9 million, equivalent to $3.81/t of ore feed to the plant.

The detailed, year-by-year LOM projections of total cost and unit cost per ton of ore by activity are discussed in Section 22.4.

22.1.5 Revenue

The projections of gross revenue are based on the quantity of SPO concentrate to be sold at the price forecasted for the Project's life period. The prices are expressed in real dollars for 2024 based on CIF Shanghai. Logistics cost for the product transport from the MGLIT site to the Port of Shanghai is based on the logistics study carried out by AtkinsRéalis and allocated as an SPO logistics cost.

Table 22-6 shows yearly prices for the SPO concentrate to be produced by MGLIT (5.5% Li_2O), based on CIF Shanghai. The methodology adopted for the price forecast, as well as the complete forecast, is detailed in Section 19.

Table 22-6: SPO Concentrate Sale Price (CIF Shanghai)

Project Year	Concentrate 5.5% Li_2O ($/t)
1	1,122.9
2	1,329.2
3	1,604.2
4	1,833.3
5	2,016.7
6	2,200.0
7	2,520.8
8	2,750.0
9	2,750.0
10	2,750.0
11	2,750.0
12	2,750.0
13	2,750.0
14	2,750.0

The annual average gross revenue during the production period is $416.6 million. A royalty on sales is due to the government (CFEM) at the rate of 2.0%.

The net revenue, after deducting CFEM, averages $408.3 million during the same period. The CFEM taxation is detailed in Section 22.2.6.

22.1.6 Taxation

The tax analysis for the Bandeira Project takes into consideration current tax laws applied to capital costs, operating costs, SPO concentrate sales, and profits. This work was developed from the identification and analysis of the basic taxes applicable to the various activities of the Project and respective tax benefits provided for each tax as legislated, whether at the federal, state, or municipal level.

The relevant taxes included in the analysis are summarized in Table 22-7.

Table 22-7: List of Taxes

Federal Level	
II	Importation Tax
IPI	Tax on industrialized products
IRPJ	Corporate income tax
CSLL	Social contribution on net income
COFINS	Contribution to social security financing
PIS	Social integration program
CFEM	Financial compensation for the exploration of mineral resources
AFRMM	Additional to freight for merchant marine renewal
IOF	Financial operation tax
State Level—MG	
ICMS	Tax on operations relating to the circulation of goods and on the provision of interstate and intermunicipal transport and communication services
DIFAL	Supplement related to the ICMS rate differential
TFRM	Control, monitoring and inspection fee for research, mining, exploration, and use of mining resources activities
Municipal Level	
ISSQN	Tax on services of any nature

Taxes on Spodumene Concentrate Sales

Federal-Level Taxes: PIS, COFINS, and IPI

SPO concentrate is classified as NT, that is, not taxed by the IPI (TIPI—Incidence table over IPI by NCM 2530.90.10).

ICMS: 100.0% for Sales Outside Brazil (Exports)

The ICMS law of Minas Gerais follows the legislation applied since 1988 and its subsequent amendments. For sales outside Brazil (exports) there will be no ICMS levy. The legislation of Minas Gerais ensures the maintenance of all ICMS credits on the purchase of equipment, inputs, and electricity.

CFEM Royalty

Royalty paid to the federal government—Financial Compensation for the Exploration of Mineral Resources (CFEM).

For the SPO concentrate, the applicable CFEM rate is 2%. CFEM is calculated based on sales revenue.

Taxes on CAPEX and OPEX

Tax analysis on the CAPEX and OPEX was developed using the cost estimates prepared by AtkinsRéalis. Tax classification requires very detailed work, based on the General Rules of the Common External Tariff (TEC) of Mercosul (Southern Common Market) and on the Industrialized Products Tax Table (TIPI), as defined in legislation. Basic incidence of taxes at federal, state, and municipal levels was applied, as well as tax benefits provided-for by legislation, considering the activity and location of the Project. Taxation on the CAPEX and OPEX estimates, on Project revenue and profits, including applicable tax benefits, was updated according to 2024 tax legislation.

Taxes on Profits

Brazilian corporate income tax (IRPJ)—is a federal tax charged on the net taxable income. It applies at a basic rate of 15% and a surplus of 0% on the annual income, totaling a 25% load. IRPJ payable may be reduced if the company obtains a benefit from SUDENE.

Social contribution on net profits (CSLL)—is applied on a similar calculation basis as defined for the corporate income tax. The applicable rate of CSLL is 9% on net income.

SUDENE Incentives

The Project is considered eligible for the tax incentive granted by the Superintendence of the Development of the Northeast (SUDENE). This incentive implies a reduction of 75% of the IRPJ due by the Project for ten years of production, as it is a new investment and is in one of the Municipalities of the State of Minas Gerais benefited by the SUDENE Tax Incentives Law. This is the case in the Municipality of Araçuaí Vale do Jequitinhonha.

Two 10-year periods of 75% reduction in income tax payable were considered in this study. The first period awarded is expected to start in Year 1, during the last year of the ramp-up phase of the Project, and end in Year 10. A second ten-year benefit period, if granted, would be based on the modernization of the plant, expected to take place early in Year 10 and remain in place until the end of the mine's life in Year 14.

22.1.7 Evaluation Base Date and Others

The evaluation base dated is the beginning of Year −2. All financial modelling and analysis work is based in real terms as of 2024, using real, ungeared, discount rate the economic model projections exclude any Project debt financing but include equipment financing. The Project funding is assumed to be through equity for the purposes of this report.

Economic projections are reported in 2024 U.S. dollars utilizing a base-case exchange rate of BRL/USD = 5.07. This exchange rate was utilized for the initial capital estimation, as well as the long-term rate during operation of the mine including operating costs, sustaining capital and mine closure costs. Project economics at a range of exchange rates (±20%) are assessed as part of Project sensitivity analysis in item 22.4.1.

The base-case exchange rate of BRL/USD = 5.07 is within the range of historical actual rates over the past two years as shown in Figure 22-1. The forecast exchange rate adopted is in accordance with the median of the forecasts for the period 2024 to 2027 of the top five Brazilian independent market analysts listed in the *Banco Central do Brasil* weekly publication, *Focus Market Readout*.

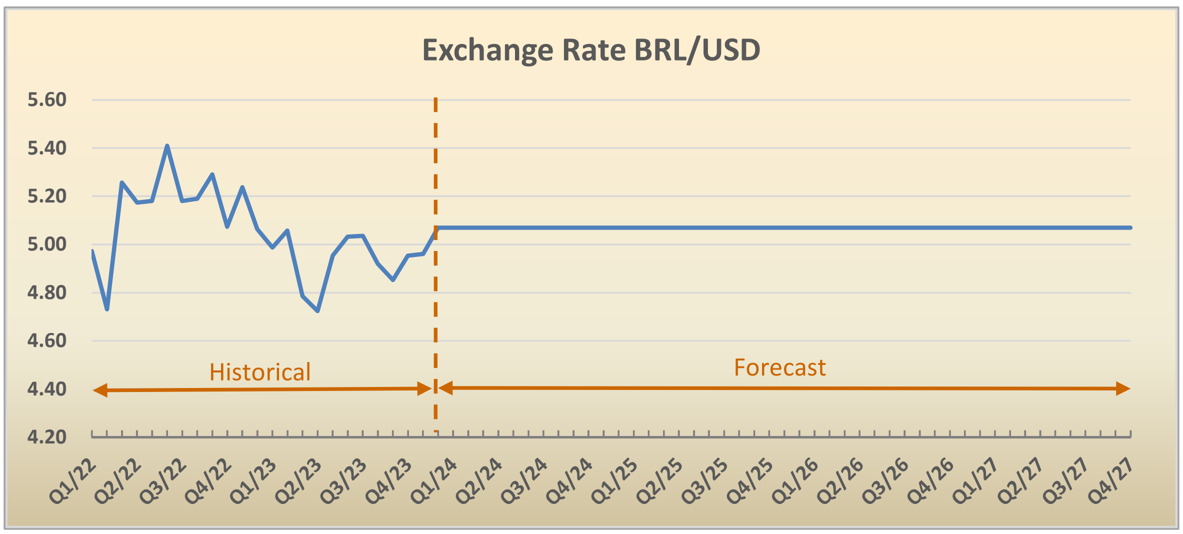


Figure 22-1: Exchange Rate BRL/USD

22.1.8 Cash Flow Analysis

The Project's estimated post-tax, unlevered net present value (NPV) is $1,308.8 million using a discount rate of 8.0%. The post-tax, unlevered internal rate of return (IRR) is 40.3% and the average annual earnings before interest, taxes, depreciation, and amortization (EBITDA) is $304.6 million. The total undiscounted free cash flow generated over the life of the Project is $3,223.4 million, and the payback period after the start-up of the operations is 3.4 years (41 months). Table 22-8 summarizes the financial results.

Based on the assumptions used in this Technical Report, the Project is economically viable, given the significantly positive NPV and IRR as compared to the discount rate adopted.

Table 22-8: Financial Results Summary

Financial Analysis	Unit	Post-Tax
NPV at 8%	$ M	1,308.8
Payback[1]	year	3.4
IRR	%	40.3
Profitability Ratio	%	544.7
EBITDA[2]	$ M	304.6
Total Cash Flow	$ M	3,223.4

Notes: [1] Undiscounted, after start-up.
[2] Annual average.

22.2 Sensitivity Analysis

The sensitivity analysis shows the impact of adjusting key input variables on the Project's NPV and IRR.

In assessing the sensitivity of the Project returns, each of these inputs is varied independently of the others. Scenarios combining beneficial or adverse variations simultaneously in two or more variables will have a more marked effect on the economics of the Project than will the individual variations considered. The sensitivity analysis has been conducted assuming no change to the mine plan or schedule.

Section 22.2.1 shows sensitivity analyses of the Project´s NPV and IRR to key input variables. In Section 22.2.2, a sensitivity analysis showing the Project's NPV in a range of discount rates between 6% to 10% is presented.

22.2.1 Sensitivity Analysis to Key Input Variables—After Tax, Unlevered NPV, and IRR

As with most mining operations, the Project cash flow is sensitive not only to commodity prices. The DCFM therefore was varied in a range of ±20% for the key input variables, as follows:

- SPO Concentrate price
- CAPEX
- OPEX
- Exchange rate BRL/USD.

Table 22-9 and Figure 22-2 present the results of the sensitivity analysis for the Project's NPV on an after-tax unlevered basis, and for each of the critical variables. NPV results are reported at a discount rate of 8%. Table 22-10 and Figure 22-3 present the same for the IRR. As can be seen, the Project's returns are highly sensitive to the SPO concentrate sales price and exchange rate and, to a lesser extent, to operating costs and capital expenditures.

Table 22-9: Sensitivity for Post-Tax NPV at 8%

Δ%	Concentrate PRICE (Ref. 5.5% Li_2O)		Exchange Rate		OPEX		Initial CAPEX	
(%)	$/t (CIF Shanghai)	NPV at 8% ($ M)	BRL/USD	NPV at 8% ($ M)	Total ($/t Ore)	NPV at 8% ($ M)	($ M)	NPV at 8% ($ M)
20	2,770.2	1,752.4	6.08	1,422.7	77.17	1,162.8	334.7	1,265.1
15	2,654.7	1,641.5	5.83	1,397.9	73.96	1,199.8	320.7	1,276.0
10	2,539.3	1,530.6	5.58	1,370.9	70.74	1,236.3	306.8	1,286.9
5	2,423.9	1,419.7	5.32	1,341.3	67.52	1,272.6	292.8	1,297.7
0	2,308.5	1,308.6	5.07	1,308.6	64.31	1,308.6	278.9	1,308.6
−5	2,193.0	1,197.5	4.82	1,272.5	61.09	1,344.4	264.9	1,319.5
−10	2,077.6	1,086.3	4.56	1,232.3	57.88	1,379.7	251.0	1,330.3
−15	1,962.2	974.9	4.31	1,187.4	54.66	1,414.9	237.0	1,341.1
−20	1,846.8	863.5	4.06	1,136.6	51.45	1,449.7	223.1	1,351.9

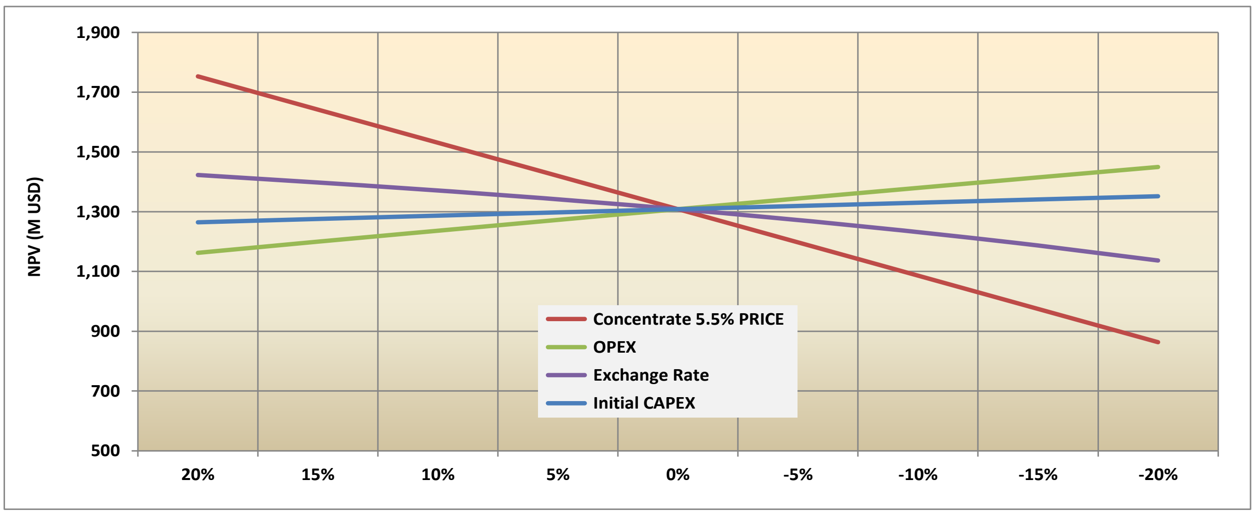


Figure 22-2: Sensitivity for Post-Tax NPV at 8%

Table 22-10: Sensitivity Post-Tax IRR

Δ%	Concentrate 5.5% PRICE		Exchange Rate		OPEX		Initial CAPEX	
(%)	$/t (CIF Shanghai)	IRR (%)	BRL/USD	IRR (%)	Total $/t Ore	IRR (%)	($ M)	IRR (%)
20	2,770.2	48.7	6.08	45.7	77.17	36.1	334.7	36.2
15	2,654.7	46.7	5.83	44.4	73.96	37.2	320.7	37.1
10	2,539.3	44.6	5.58	43.1	70.74	38.2	306.8	38.1
5	2,423.9	42.5	5.32	41.8	67.52	39.3	292.8	39.2
0	2,308.5	40.3	5.07	40.3	64.31	40.3	278.9	40.3
−5	2,193.0	38.1	4.82	38.8	61.09	41.4	264.9	41.6
−10	2,077.6	35.8	4.56	37.2	57.88	42.4	251.0	42.9
−15	1,962.2	33.5	4.31	35.5	54.66	43.4	237.0	44.3
−20	1,846.8	31.1	4.06	33.6	51.45	44.4	223.1	45.8

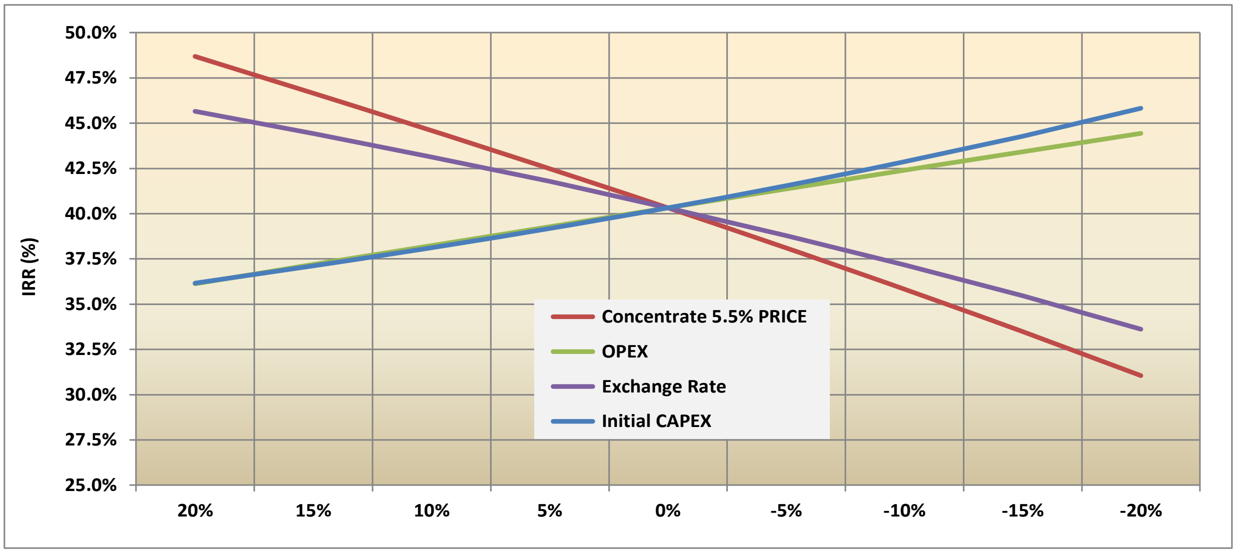


Figure 22-3: Sensitivity for Post-Tax IRR

22.2.2 Sensitivity Analysis—NPV x Discount Rate

Table 22-11 and Figure 22-4 present a sensitivity analysis showing the Project's NPV in a range of discount rates between 6% and 10%.

Table 22-11: Sensitivity for Post-Tax, Unlevered NPV x Discount Rate

Discount Rate	
%	NPV ($ M)
6.0	1,627.3
6.5	1,540.4
7.0	1,458.6
7.5	1,381.4
8.0	1,308.6
8.5	1,239.9
9.0	1,175.1
9.5	1,113.9
10.0	1,056.1

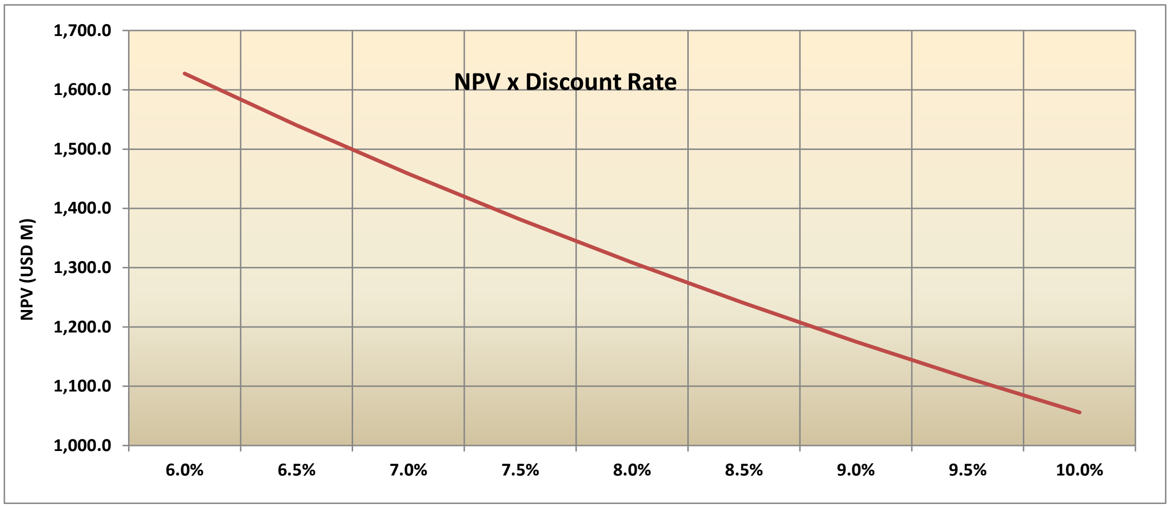


Figure 22-4: Sensitivity Post-Tax, Unlevered NPV x Discount Rate

22.3 Financial Projections

Table 22-12 to Table 22-15 present the production flow, annual projections, profit and loss statement, and Project free cash flow, respectively.

Table 22-12: Annual Projections, Production Flow

	Unit	Total LOM	Year														
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Mining																	
ROM	t 000s	17,203	830.2	1,240.5	1,300.9	1,112.0	1,178.3	1,265.6	1,287.7	1,268.9	1,257.5	1,275.9	1,305.1	1,279.3	1,302.7	1,298.6	-
Li_2O Grade in ROM	%	1.16	1.08	1.12	0.99	1.08	1.17	1.14	1.18	1.17	1.11	1.19	1.20	1.22	1.22	1.29	-
Processing																	
Met. Recovery SPO Conc.	%	68.9	68.9	68.9	68.9	68.9	68.9	68.9	68.9	68.9	68.9	68.9	68.9	68.9	68.9	68.9	0.0
Total SPO Conc. 5.5%	t 000s	2,492.8	112.5	173.9	161.2	150.4	172.6	180.6	190.2	185.9	174.8	190.1	196.1	195.4	199.0	210.2	-
Logistics																	
Output to Shanghai	t 000s	2,492.8	112.5	173.9	161.2	150.4	172.6	1806	1902	185.9	174.8	190.1	196.1	195.4	199.0	210.2	-
SPO Conc. 5.5%	t 000s	2,492.8	112.5	173.9	161.2	150.4	172.6	180.6	190.2	185.9	174.8	190.1	196.1	195.4	199.0	210.2	-

Table 22-13: Annual Projections: OPEX, SPO Logistics and Other Costs

Annual Projections		Project Year->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
OPEX, SPO LOGISTICS AND OTHER COSTS		**Total LOM**															
OPEX																	
Annual costs	(000USD)	**1,106.3**	68.9	79.5	75.0	76.6	77.3	83.0	79.4	79.8	82.1	81.4	83.5	82.1	78.6	79.1	0.0
Mining	"	**631.9**	37.2	45.5	40.7	43.4	43.7	49.0	45.2	45.7	48.1	47.2	49.2	48.0	44.3	44.8	0.0
Processing	"	**422.8**	29.2	30.2	30.4	29.9	30.1	30.3	30.3	30.3	30.3	30.3	30.4	30.3	30.4	30.4	0.0
G&A	"	**51.6**	2.5	3.7	3.9	3.3	3.5	3.8	3.9	3.8	3.8	3.8	3.9	3.8	3.9	3.9	0.0
Unit Costs	(USD/t ROM)	**64.31**	82.97	64.05	57.63	68.92	65.60	65.62	61.66	62.88	65.31	63.77	64.01	64.19	60.33	60.91	0.00
Mining	"	**36.73**	44.76	36.68	31.29	39.02	37.07	38.68	35.09	36.01	38.24	37.01	37.73	37.49	34.01	34.53	0.00
Processing	"	**24.58**	35.21	24.37	23.35	26.90	25.52	23.93	23.56	23.87	24.07	23.76	23.28	23.70	23.32	23.38	0.00
G&A	"	**3.00**	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	0.00
SPO LOGISTICS COSTS																	
Annual costs	(000USD)	**280.4**	12.6	19.6	18.1	16.9	19.4	20.3	21.4	20.9	19.7	21.4	22.1	22.0	22.4	23.6	0.0
Unit Costs	(USD/t ROM)	**16.30**	15.23	15.77	13.94	15.21	16.47	16.05	16.62	16.47	15.63	16.76	16.90	17.18	17.18	18.20	0.00
	(USD/t SPO Conc.)	**112.47**	112.47	112.47	112.47	112.47	112.47	112.47	112.47	112.47	112.47	112.47	112.47	112.47	112.47	112.47	0.00
OTHER COSTS																	
Annual costs	(000USD)	**65.5**	1.6	2.8	3.1	3.2	4.0	4.5	5.3	5.6	5.3	5.8	5.9	5.9	6.0	6.3	0.0
Royalties	"	**58.3**	1.3	2.3	2.6	2.8	3.5	4.0	4.8	5.1	4.8	5.2	5.4	5.4	5.5	5.8	0.0
TRFM	"	**7.2**	0.3	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.0
Unit Costs	(USD/t ROM)	**3.81**	1.94	2.28	2.40	2.90	3.37	3.56	4.14	4.44	4.24	4.51	4.55	4.62	4.62	4.87	0.00
Royalties	"	**3.39**	1.52	1.86	1.99	2.48	2.95	3.14	3.72	4.03	3.82	4.10	4.13	4.20	4.20	4.45	0.00
TRFM	"	**0.42**	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.00
TOTAL OPEX, SPO LOGISTICS & OTHER COSTS		**1,452.2**	83.1	101.8	96.2	96.8	100.7	107.9	106.1	106.3	107.1	108.5	111.5	110.0	107.0	109.1	0.0

Table 22-14: Profit and Loss Statement

Annual Projections		Project Year->	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
PRODUCTION SUMMARY																			
ROM	(000t)	**17,203.1**	-	-	830.2	1,240.5	1,300.9	1,112.0	1,178.3	1,265.6	1,287.7	1,268.9	1,257.5	1,275.9	1,305.1	1,279.3	1,302.7	1,298.6	-
Li2O grade in ROM	(%)	**1.16%**	0.00%	0.00%	1.08%	1.12%	0.99%	1.08%	1.17%	1.14%	1.18%	1.17%	1.11%	1.19%	1.20%	1.22%	1.22%	1.29%	0.00%
Metallurgical Recovery																			
Li2O concentrate 5.5%	(%)	**68.9%**	0.0%	0.0%	68.9%	68.9%	68.9%	68.9%	68.9%	68.9%	68.9%	68.9%	68.9%	68.9%	68.9%	68.9%	68.9%	68.9%	0.0%
Total Products delivered		**2,492.8**	-	-	112.5	173.9	161.2	150.4	172.6	180.6	190.2	185.9	174.8	190.1	196.1	195.4	199.0	210.2	-
Li2O concentrate 5.5%	(000t)	**2,492.8**	-	-	112.5	173.9	161.2	150.4	172.6	180.6	190.2	185.9	174.8	190.1	196.1	195.4	199.0	210.2	-
PROFIT & LOSS																			
GROSS REVENUE	(000USD)	**5,833.0**	**0.0**	**0.0**	**126.3**	**231.2**	**258.7**	**275.7**	**348.1**	**397.4**	**479.5**	**511.2**	**480.6**	**522.7**	**539.2**	**537.4**	**547.2**	**577.9**	**0.0**
Li2O concentrate 5.5%	(000USD)	**5,833.0**	0.0	0.0	126.3	231.2	258.7	275.7	348.1	397.4	479.5	511.2	480.6	522.7	539.2	537.4	547.2	577.9	0.0
Sales volume	(000t)	**2,492.8**	0.0	0.0	112.5	173.9	161.2	150.4	172.6	180.6	190.2	185.9	174.8	190.1	196.1	195.4	199.0	210.2	0.0
Concentrate Price	(USD/t)	**2,339.9**	0.0	0.0	1,122.9	1,329.2	1,604.2	1,833.3	2,016.7	2,200.0	2,520.8	2,750.0	2,750.0	2,750.0	2,750.0	2,750.0	2,750.0	2,750.0	0.0
(-) Deductions	(000USD)	**(116.7)**	**0.0**	**0.0**	**(2.5)**	**(4.6)**	**(5.2)**	**(5.5)**	**(7.0)**	**(7.9)**	**(9.6)**	**(10.2)**	**(9.6)**	**(10.5)**	**(10.8)**	**(10.7)**	**(10.9)**	**(11.6)**	**0.0**
CFEM	"	**(116.7)**	0.0	0.0	(2.5)	(4.6)	(5.2)	(5.5)	(7.0)	(7.9)	(9.6)	(10.2)	(9.6)	(10.5)	(10.8)	(10.7)	(10.9)	(11.6)	0.0
(=) Net Revenue	(000USD)	**5,716.3**	**0.0**	**0.0**	**123.7**	**226.6**	**253.5**	**270.1**	**341.1**	**389.4**	**470.0**	**500.9**	**471.0**	**512.3**	**528.4**	**526.6**	**536.2**	**566.4**	**0.0**
(-) OPERATING COSTS	(000USD)	**(1,452.2)**	**0.0**	**0.0**	**(83.1)**	**(101.8)**	**(96.2)**	**(96.8)**	**(100.7)**	**(107.9)**	**(106.1)**	**(106.3)**	**(107.1)**	**(108.5)**	**(111.5)**	**(110.0)**	**(107.0)**	**(109.1)**	**0.0**
OPEX	"	**(1,106.3)**	0.0	0.0	(68.9)	(79.5)	(75.0)	(76.6)	(77.3)	(83.0)	(79.4)	(79.8)	(82.1)	(81.4)	(83.5)	(82.1)	(78.6)	(79.1)	0.0
SPO Logistics	"	**(280.4)**	0.0	0.0	(12.6)	(19.6)	(18.1)	(16.9)	(19.4)	(20.3)	(21.4)	(20.9)	(19.7)	(21.4)	(22.1)	(22.0)	(22.4)	(23.6)	0.0
Other Costs	"	**(65.5)**	0.0	0.0	(1.6)	(2.8)	(3.1)	(3.2)	(4.0)	(4.5)	(5.3)	(5.6)	(5.3)	(5.8)	(5.9)	(5.9)	(6.0)	(6.3)	0.0
(=) EBITDA	(000USD)	**4,264.2**	**0.0**	**0.0**	**40.6**	**124.7**	**157.3**	**173.4**	**240.4**	**281.6**	**363.8**	**394.6**	**363.9**	**403.8**	**416.9**	**416.6**	**429.3**	**457.3**	**0.0**
EBITDA Margin	*(%)*	***76.8%***	-	-	*32.2%*	*53.9%*	*60.8%*	*62.9%*	*69.1%*	*70.9%*	*75.9%*	*77.2%*	*75.7%*	*77.2%*	*77.3%*	*77.5%*	*78.4%*	*79.1%*	-
(-) Depreciation	(000USD)	**(327.0)**	**0.0**	**0.0**	**(66.0)**	**(72.9)**	**(39.0)**	**(22.6)**	**(22.6)**	**(9.2)**	**(8.7)**	**(6.6)**	**(8.4)**	**(9.3)**	**(10.7)**	**(8.9)**	**(7.0)**	**(32.2)**	**(2.8)**
(=) EBIT		**3,937.1**	**0.0**	**0.0**	**(25.4)**	**51.8**	**118.2**	**150.8**	**217.9**	**272.4**	**355.2**	**388.0**	**355.5**	**394.4**	**406.2**	**407.7**	**422.2**	**425.1**	**(2.8)**
(-) Corporate Tax Payable	(000USD)	**(597.4)**	**0.0**	**0.0**	**0.0**	**(5.5)**	**(13.1)**	**(23.0)**	**(33.2)**	**(41.5)**	**(54.2)**	**(59.2)**	**(54.2)**	**(60.2)**	**(61.9)**	**(62.2)**	**(64.4)**	**(64.8)**	**0.0**
IRPJ	"	**(979.4)**	0.0	0.0	0.0	(9.1)	(21.5)	(37.7)	(54.5)	(68.1)	(88.8)	(97.0)	(88.9)	(98.6)	(101.6)	(101.9)	(105.6)	(106.3)	0.0
CSLL	"	**(352.6)**	0.0	0.0	0.0	(3.3)	(7.7)	(13.6)	(19.6)	(24.5)	(32.0)	(34.9)	(32.0)	(35.5)	(36.6)	(36.7)	(38.0)	(38.3)	0.0
SUDENE Benefit	"	**734.5**	0.0	0.0	0.0	6.8	16.1	28.3	40.8	51.1	66.6	72.8	66.7	74.0	76.2	76.4	79.2	79.7	0.0
(=) Net Profit After Taxes		**3,339.7**	**0.0**	**0.0**	**(25.4)**	**46.3**	**105.1**	**127.8**	**184.6**	**230.9**	**301.0**	**328.9**	**301.3**	**334.3**	**344.3**	**345.5**	**357.8**	**360.3**	**(2.8)**

Table 22-15: Project Free Cash Flow

Annual Projections		**Project Year->**	**-2**	**-1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
Net Profit After Taxes		**3,339.7**	**0.0**	**0.0**	**(25.4)**	**46.3**	**105.1**	**127.8**	**184.6**	**230.9**	**301.0**	**328.9**	**301.3**	**334.3**	**344.3**	**345.5**	**357.8**	**360.3**	**(2.8)**
(+) Depreciation	(000USD)	**327.0**	**0.0**	**0.0**	**66.0**	**72.9**	**39.0**	**22.6**	**22.6**	**9.2**	**8.7**	**6.6**	**8.4**	**9.3**	**10.7**	**8.9**	**7.0**	**32.2**	**2.8**
(-) TOTAL CAPEX	(000USD)	**(363.3)**	**(63.4)**	**(161.9)**	**(53.9)**	**(16.8)**	**(3.0)**	**(6.4)**	**(3.2)**	**(10.1)**	**(2.6)**	**(4.7)**	**(7.0)**	**(7.4)**	**(8.9)**	**(3.3)**	**(5.4)**	**(2.6)**	**(2.8)**
Total Initial Capex	"	**(279.2)**	**(63.4)**	**(161.9)**	**(53.9)**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Initial CAPEX cost	"	**(260.5)**	(59.1)	(151.1)	(50.3)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recoverable taxes	"	**(18.6)**	(4.2)	(10.8)	(3.6)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sustaining Capital	"	**(81.4)**	**0.0**	**0.0**	**0.0**	**(16.8)**	**(3.0)**	**(6.4)**	**(3.2)**	**(10.1)**	**(2.6)**	**(4.7)**	**(7.0)**	**(7.4)**	**(8.9)**	**(3.3)**	**(5.4)**	**(2.6)**	**0.0**
Sustaining Capital cost	"	**(67.0)**	0.0	0.0	0.0	(14.3)	(2.3)	(5.2)	(2.4)	(8.6)	(2.0)	(3.8)	(5.7)	(6.1)	(7.5)	(2.6)	(4.4)	(1.9)	0.0
Recoverable Taxes	"	**(14.4)**	0.0	0.0	0.0	(2.5)	(0.6)	(1.2)	(0.8)	(1.5)	(0.6)	(0.9)	(1.3)	(1.3)	(1.5)	(0.7)	(1.0)	(0.7)	0.0
Mine Closure	"	**(2.8)**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	(2.8)
Mine Closure cost	"	**(2.8)**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	(2.8)
Recoverable Taxes	"	**0.0**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(+) ECA EQUIPMENT FINANCING	(000USD)	**(4.0)**	**3.2**	**7.3**	**0.3**	**(4.8)**	**(4.9)**	**(3.9)**	**(1.2)**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
CAPEX phase	"	**13.1**	**3.2**	**7.3**	**2.6**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Drawdown	"	**20.4**	4.2	11.0	5.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Financing Repayment		**(7.3)**	(1.0)	(3.8)	(2.5)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Operations phase		**(17.8)**	0.0	0.0	(2.5)	(5.0)	(5.0)	(4.0)	(1.3)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Financing Repayment	"	**(17.8)**	0.0	0.0	(2.5)	(5.0)	(5.0)	(4.0)	(1.3)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Financing Expenses Tax Shield		**0.7**	0.0	0.0	0.2	0.2	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(-/+) WORKING CAPITAL MOVEMENTS	"	**0.0**	**(0.6)**	**(9.0)**	**(17.5)**	**(25.4)**	**(7.0)**	**(4.1)**	**(17.8)**	**(11.9)**	**(20.4)**	**(7.8)**	**7.6**	**(10.4)**	**(4.0)**	**0.4**	**(2.6)**	**(7.6)**	**138.2**
Working Capital			**0.0**	**0.0**	**30.3**	**56.4**	**63.0**	**67.3**	**85.2**	**97.5**	**117.6**	**125.4**	**118.0**	**128.3**	**132.5**	**132.0**	**134.2**	**141.9**	**0.0**
Receivables			0.0	0.0	31.1	57.0	63.8	68.0	85.8	98.0	118.2	126.0	118.5	128.9	133.0	132.5	134.9	142.5	0.0
Inventories			0.0	0.0	1.5	1.9	1.7	1.8	1.8	2.0	1.9	1.9	2.0	1.9	2.0	2.0	1.8	1.8	0.0
Payables			0.0	0.0	(2.4)	(2.5)	(2.5)	(2.5)	(2.5)	(2.5)	(2.5)	(2.5)	(2.5)	(2.5)	(2.5)	(2.5)	(2.5)	(2.5)	0.0
ROM stockplile movement		**0.0**	(0.6)	(9.0)	9.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(+/-) Recoverable Taxes Cash Flow and Off	(000USD)	**(76.0)**	**0.0**	**0.4**	**(1.0)**	**(5.5)**	**2.6**	**(3.0)**	**(6.5)**	**(7.1)**	**(6.8)**	**(7.0)**	**(7.0)**	**(6.9)**	**(6.9)**	**(7.4)**	**(6.8)**	**(7.1)**	**0.0**
Recoverable taxes payable on OPEX		**(193.7)**	**0.0**	**0.0**	**(9.9)**	**(13.0)**	**(12.6)**	**(13.2)**	**(13.5)**	**(15.1)**	**(14.0)**	**(14.3)**	**(14.6)**	**(14.8)**	**(15.1)**	**(15.0)**	**(14.2)**	**(14.4)**	**0.0**
PIS/COFINS		**(82.1)**	0.0	0.0	(4.4)	(5.6)	(5.4)	(5.6)	(5.7)	(6.3)	(5.9)	(6.0)	(6.2)	(6.2)	(6.3)	(6.3)	(6.0)	(6.1)	0.0
ICMS		**(52.6)**	0.0	0.0	(2.5)	(3.5)	(3.3)	(3.6)	(3.6)	(4.2)	(3.8)	(3.9)	(4.1)	(4.1)	(4.2)	(4.1)	(3.8)	(3.9)	0.0
PIS/COFINS credits offset		**105.3**	**0.0**	**0.0**	**8.0**	**6.7**	**14.3**	**9.3**	**6.1**	**7.2**	**6.4**	**6.5**	**6.8**	**7.0**	**7.4**	**6.7**	**6.5**	**6.4**	**0.0**
Against corporate taxes payable		**81.7**	0.0	0.0	0.0	5.5	13.1	8.1	4.9	6.0	5.2	5.3	5.6	5.8	6.2	5.5	5.3	5.2	0.0
Against other federal taxes payable		**23.6**	0.0	0.0	8.0	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	0.0
ICMS credits sale		**12.3**	**0.0**	**0.4**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**	**0.0**
(=) FREE CASH FLOW	(000USD)	**3,223.4**	(60.8)	(163.2)	(31.6)	66.7	132.0	133.0	178.5	211.0	279.9	315.9	303.3	318.9	335.1	344.1	350.1	375.2	135.3
Accumulated Free Cash Flow	(000USD)		(60.8)	(224.0)	(255.6)	(188.9)	(56.9)	76.1	254.6	465.6	745.5	1,061.4	1,364.7	1,683.6	2,018.7	2,362.8	2,712.9	3,088.1	3,223.4
Avg. Number of periods			0.50	1.50	2.50	3.50	4.50	5.50	6.50	7.50	8.50	9.50	10.50	11.50	12.50	13.50	14.50	15.50	16.50
Discount factor @8% p.y.			0.0	0.0	1.0	1.0	1.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Discounted Free Cash Flow	(000USD)	**1,308.8**	(58.5)	(145.4)	(26.0)	51.0	93.3	87.1	108.2	118.4	145.5	152.1	135.2	131.6	128.1	121.8	114.7	113.8	38.0
Nbr of Payback periods	(years)	**3.4**	0.0	0.0	1.0	1.0	1.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Internal Rate of Return (IRR)	(% p.y.)	**40.3%**																	
PRE-TAX CASH FLOW		**3,820.8**	(60.8)	(163.2)	(31.6)	72.3	145.1	156.0	211.7	252.5	334.1	375.1	357.5	379.0	397.1	406.3	414.4	440.0	135.3
Discounted Pre-Tax Cash Flow @8% p.y.		**1,572.9**	(58.5)	(145.4)	(26.0)	55.2	102.6	102.2	128.4	141.8	173.7	180.6	159.3	156.4	151.7	143.8	135.8	133.5	38.0

23.0 ADJACENT PROPERTIES

The Araçuaí Pegmatitic District, in the northeastern sector of the Brazil's Eastern Pegmatitic Province, covers the region of the Minas Gerais municipalities of Salinas, Araçuaí, and Capelinha, to the west, and Itinga and Caraí, to the east. In this district, Brazil's largest lithium producer, hundreds of pegmatites occur, including litiniferous pegmatites, gemological pegmatites, and pegmatites producing ceramic minerals and ornamental rocks, many of which have been exploited by mineral exploration and mining companies, and prospectors, for more than a century.

The Bandeira lithium ore deposit, under ANM mining right 832439/2009, is adjacent to the spodumene-bearing pegmatite minerals of CBL's Cachoeira mine, and the Barreiro, Murial, and Lavra do Meio deposits of Sigma Lithium Corporation.

24.0 OTHER RELEVANT INFORMATION

24.1 Cooperation Agreement with the Government of Minas Gerais

On July 19, 2023, the Minas Gerais government and MGLIT signed a cooperation agreement, an MOU, to prioritize and speed requests with state government secretariats and agencies regarding lithium ore exploration and deployment projects in MGLIT's Jequitinhonha Valley (Lithium Ionic, 2023, July 19).

24.2 Electric Power Connection Agreement

On October 31, 2023, MGLIT signed a contract with Centrais Elétricas de Minas Gerais (CEMIG) to connect electricity to the Bandeira Project. The Project foresees the construction of the 138 kV transmission line and a substation to connect to the industrial unit's distribution substation. The substation is expected to be energized by October 1, 2025 (Lithium Ionic, 2023, October 13).

24.3 Lithium Decree of 1997

The lithium decree was created on December 4, 1997, benefiting Brazilian companies that explore and produce lithium compounds in Brazil. The decree ensures their priority in the national market.

Decrees No. 4,338, dated August 19, 2002, No. 5,473 dated June 21, 2005, and No. 10,577 dated December 14, 2020, renewed the objective of maintaining the Brazilian lithium market for domestic producers.

On July 5, 2022, through Decree No. 11,120, the Brazilian market was opened for import and export for lithium ores and minerals and their compounds.

25.0 INTERPRETATION AND CONCLUSIONS

This Technical Report outlines the requirements and needs for operating an underground mine equipped with two ramps, and a spodumene DMS concentration plant that produces 5.50% Li_2O concentrate as part of the Bandeira Project. The design production capacity of the plant is 1.3 Mt/a of ore. The report describes all the infrastructure necessary for removing ore from the mine, and its processing, including producing concentrate within the technical specifications for supply to the international market. The LOM mining plan defined an ore mass of 17.2 Mt with an average grade of 1.16% Li_2O after operational dilution, to be mined over 14 years of operation. All production of spodumene concentrate is expected to be exported through the port of Ilhéus to downstream lithium chemical compound conversion facilities in China, North America, and the European Union.

25.1 Geology and Mineral Resources

Mineral Resources are estimated in this Technical Report, limited to the areas outlined using the mining rights polygon, which comprises the Bandeira Property and the Reasonable Prospect for Eventual Economic Extraction—RPE3.

The Bandeira database contains 10,298 assays, comprising 247 assays from trenches and 10,051 assay intervals from drill holes.

Advanced technology was employed in the Bandeira Project, with a set of solid-grade shells for estimation domains created using a 0.3% Li_2O (%) threshold. These interpretations were then transformed into a series of implicit 3-D models aligned with the dominant strike directions of 235° and 140°. Additionally, weathering modelling was performed, considering the information provided in the core logs. The model was built from implicit modelling using Leapfrog Edge 2024.1.3 software.

Based on the structural analysis results, the ordinary kriging (OK) estimation method was used on the Li_2O% and density variables.

The mathematical and geostatistical criterion for classifying the resource was based on the following:

- The Measured Mineral Resource classification referenced the 50 m of the average Euclidean distance to sample (AvgD) used in OK estimation with a minimum of seven composites in at least three different drill holes.
- The Indicated Mineral Resource classification referenced the 100 m of the AvgD used in OK with a minimum of seven composites in at least three different drill holes.
- The Inferred Mineral Resource classification contains all remaining estimated blocks.

The Mineral Resource estimate is limited to the area delimited by the polygon of the ANM mining rights 832.439/2009, 831.116/2016 and 831117/2016, that makes up the Bandeira Project and the Reasonable Prospect for Eventual Economic Extraction—RPE3.

The Bandeira Mineral Resource estimates are summarized in Table 25-1.

Table 25-1: Bandeira Mineral Resource Estimate (0.5% Li_2O Cut-Off)

Deposit/Cut-Off Grade	Category	Resource (Mt)	Grade % Li_2O	Contained LCE (kt)
Bandeira (0.5% cut-off)	Measured	3.36	1.38	115
	Indicated	23.91	1.33	786
	Measured + Indicated	27.27	1.34	901
	Inferred	18.55	1.34	615

Source: GE21, 2025.
Notes:

- The Mineral Resource estimates effective date is November 20, 2024.
- Carlos J. E. Silva (MAIG #7868) prepared the Mineral Resource estimate using CIM (2014).
- The report meets the Canadian Securities Administrators' NI 43-101 requirements.
- Mineral Resources are not Mineral Reserves and have no economic viability. There is no certainty that any portion of the Mineral Resource will be converted into a Mineral Reserve.
- Figures are rounded to appropriate levels of precision, and discrepancies may occur due to rounding.
- The spodumene pegmatite domains were modelled using composites with Li_2O grades exceeding 0.3%.
- Grade estimation was conducted using OK within Leapfrog Edge 2024.1.3 software.
- The Mineral Resource estimate is confined to the Lithium Ionic Bandeira mining right (ANM) and includes only fresh rock domains.
- The Mineral Resource estimate was restricted by interpreting suitable-grade shells using a 0.5% Li2O cut-off for underground resources.
- Inferred Mineral Resources are conceptual in nature and can only form the basis for economic analyses with further drilling and evaluation.
- The Mineral Resource estimate may be materially affected by environmental, legal, tax, sociopolitical, permitting, title, marketing, and other relevant factors.

25.2 Industrial Plant

The process flowchart developed for the Bandeira Project is based on the usual practice of utilizing DMS to produce spodumene concentrate and has been used as a reference at the CBL operation in the Jequitinhonha Valley for more than 30 years.

Metallurgical tests performed with core samples from geological boreholes resulted in spodumene concentrates that comply with the minimum specifications of 5.50% Li_2O and a maximum of 1.00% Fe_2O_3, with a metallurgical recovery of 68.86%.

The simple process flowchart includes two-stage crushing, screen classification, pre-concentration by ore sorter, DMS concentration of two crushed streams (−19.1 +0.5 mm) and (−7.5 +0.5 mm), and dewatering of the fine rejects below 0.5 mm.

The process design criteria are well supported, with multiple rounds of bench- and pilot-scale testwork complete with mineralogy for understanding the deposit. This was done on composite and individual samples to de-risk deposit variability. The selected process flowsheet is demonstrated by adjacent operations, and the low complexity presents a low-risk and low-cost solution to processing ore from the Bandeira deposit.

25.3 Infrastructure

The infrastructure required to keep the industrial unit in operation with the necessary utilities, services, and accesses comprises the main and secondary substations, unpaved roads kept in good condition, administrative buildings, restaurant, industrial kitchen, medical clinic, warehouse, maintenance building, mine office, compressed-air distribution networks, fire pipeline, and drinking and process water.

25.4 Water Management

Water drawn from the Piauí and Jequitinhonha Rivers will be received directly in the water treatment unit tank and will be of sufficient quantity for the operation of all the units that make up the Project industrial plant. Rainwater runoff within the industrial areas will be directed through channels and pipes to tanks that will take it to the Piauí River. All surface mine-affected contact water is collected and treated prior to discharge at permitted discharge points.

25.5 Underground Mine

The Bandeira underground mine will be accessed by two ramps, which together should have a maximum mining capacity of 1.3 Mt/a of ore out of a calculated reserve of 17.2 Mt, with an average grade of 1.16% Li_2O after the planned dilution of 21%. In the northern part of the mine, the mining process to be adopted is sublevel stoping, and in the southeastern part, the process will be room-and-pillar stoping. The southeast body is expected to operate only for the first four years of the mine's operation. All ore from the mine will be extracted by blasting, and transported from the mine to the plant using 45-tonne trucks

The selected mining method and respective design will be suitable for this deposit and is demonstrated by adjacent operations with a long operating history. The room-and-pillar operation will provide adequate ore supply to support the ramp-up of the plant and sublevel stope portion of the mine until the site ramps up to full production by Year 2.

25.6 Geotechnical and Hydrogeology

These are two important components for the design and operation of the underground mine. In this feasibility study, conceptual studies were carried out by companies specializing in these disciplines: MLF (Mauri Ferreira, which provides technical consultancy to CBL), provided geotechnical support while MDGEO hydrogeology support. The design inputs provided were utilized in the underground mine design to ensure safety and operability.

25.7 Mineral Reserves Estimate and Mining Methods

The estimated Mineral Reserves for the Bandeira Project underground mine is deemed adequate and sufficient to support the proposed Project production rate.

AtkinsRéalis concludes that the Bandeira Project's mine component is well developed and aligns with all international requirements for mine studies at the feasibility study level.

25.8 Environment

The environmental licensing process was filed with the Minas Gerais Department of Environment’s Unidades Regionais de Regularização Ambiental (URA) (Regional Environmental Regularization Unit) on November 20, 2023. On January 26, 2024, MGLIT received notification from the responsible body that the documentation filed met the requirements and that the analysis of the process was beginning.

25.9 Capital Cost Estimate

The estimated CAPEX was developed using the concept of the American Association Cost Estimation (AACE) Class III for an underground mine equipped with two ramps and an industrial spodumene concentration unit. The contingencies adopted for the mine and plant were 15%. The total estimated cost is $266.1 million, with an assumed accuracy of −20 to +30% (Table 25-2).

Table 25-2: AACE Class III Capital Cost Estimate

Discipline	Vendor/Supplier ($ M)	Services ($ M)	Total ($ M)
Direct Cost	111.4	78.5	190.0
Mine (Major Equipment)	22.9	-	22.9
Mine (Auxiliary Equipment)	19.3	2.2	21.5
Mine (Opening of the Shaft and Mine Ramp)	-	19.2	19.2
Mechanical Equipment	28.0	4.6	32.6
Platework	6.2	3.1	9.3
Architecture	2.4	3.8	6.3
Infrastructure	-	23.2	23.2
Concrete	-	9.6	9.6
Piping	2.1	2.2	4.2
Instrumentation and Telecommunication	3.7	1.1	4.7
Electrical Equipment	10.5	1.2	11.7
Electrical Material	4.0	2.4	6.5
Underground Cables (Turnkey—Package 22)	3.6	-	3.6
Overhead Lines	-	0.4	0.4
Structural Steel	7.0	5.0	12.0
Waste Pile—MGLIT	-	0.5	0.5
Waste Pile—ATKINS	-	-	-
Water Intake—Rio Jequitinhonha (Lump-Sum—Piping, Pumping, etc.)	1.8	-	1.8
Indirect Cost	1.7	87.5	89.2
Pre-Operational Mine	-	8.3	8.3
Pre-Operational Plant	-	2.5	2.5
Indirect Costs	-	4.0	4.0
Commissioning and Performance Tests	-	0.8	0.8
Spares	1.7	-	1.7
Expediting and Inspection	-	0.3	0.3
Topography	-	3.7	3.7
Owners Cost	-	5.8	5.8
Engineering, Procurement and Construction Management	-	26.6	26.6
Indirect Field Cost	-	1.3	1.3
Assembly Supervision	-	0.6	0.6
Contingency Mine	-	6.9	6.9
Contingency Plant	-	26.8	26.8
Sub-Total	113.1	166.1	279.2
ECA Main Mine Equipment Financing during CAPEX Phase			
Drawdown	20.4	-	20.4
Financing Repayment	7.3	-	7.3
Total (Net Effect)	(13.1)	-	(13.1)
Total	100.0	166.1	266.1

25.10 Operating Cost Estimate

The underground mine and industrial spodumene concentration unit OPEX is shown in Table 25-3, with a maximum processing capacity of 1.3 Mt/a of lithium ore. To produce 1.23 Mt/a of ore from the mine and 178 kt/a of SPO with a lithium oxide grade of 5.5%, the production cost of the mine and plant are calculated at $36.70/t and $24.63/t of ore (ROM), respectively. Also added is $3.00/t of ore for general and administrative (G&A) sales cost, totalling $64.33/t.

Table 25-3: Estimated Cost of Production

	$/t ROM	$/t SPO
Mine	36.70	253.50
Labour	11.70	80.73
Diesel	1.93	13.34
Electrical Power	1.95	13.49
Consumables	15.97	110.20
Services & Maintenance	2.80	19.35
Others	2.38	16.40
Plant	24.63	170.01
Labour	9.54	65.81
Electrical Power	1.44	9.92
Consumables	0.82	5.63
Maintenance	1.33	9.15
Services	9.28	64.03
Others	2.24	15.46
G&A Sales	3.00	20.70
Total	64.33	444.14
Transport ($/t of SPO Concentrate)		112.56
CIF cost, Shanghai		556.70

25.11 Risk Assessment—HAZID Identification

A risk assessment has been conducted, and the risks identified are as follows:

- Possible negative impact on the price of lithium due to, for example, economic slowdown, or decrease in lithium consumption
- Availability of skilled labour in the region
- Any unforeseen environmental or social restrictions
- Unforeseen exaggerated increases in the main costs of the operation, such as personnel, fuel, or electricity.

25.12 Opportunities

Some opportunities were identified for operational and financial improvement of the Bandeira Project:

- Commercialization of ore sorter tailings as remineralized rock for use as fertilizer, or additive for the ceramic industry
- Optimizing and reducing operating costs, such as using photovoltaic electricity owned by the company or outsourced
- Increasing mine automation to reduce costs
- Producing mineral by-products with the process tailings and fines for sale.

26.0 RECOMMENDATIONS

26.1 Work Required to Increase Confidence in the Resource

26.1.1 Geology and Mineral Resource Estimate

GE21 proposes the following recommendations for the continuous improvement of the Mineral Resource estimate:

- A 50 m x 50 m infill-drilling program in the domain of the Indicated resource classification to focus on improving resource delineation
- A 100 m x 100 m infill-drilling program in the domain of the Inferred resource classification to focus on resource delineation improvement
- A density campaign to measure the density of drill-hole cores by drying the samples in an oven and waterproofing them, comparing the results with the methodology used in the current project procedure to check whether there is a bias in the results
- An on-site density survey in the weathered zone
- A detail geotechnical analysis, including a geotechnically-oriented diamond drilling campaign, logging, and sampling collecting for tensile, compressive, and shear strength tests
- Perform supplementary geotechnical investigations of planned infrastructure sites, including waste pile areas; additional geochemical tests (ARD); large-scale waste rock and tailings co-disposal stockpile field test
- Hydrological and hydrogeological studies for subsequent Project phases.

26.1.2 Mineral Reserves Estimate and Mining Methods

The following activities related to the mine area be carried out during the development of the next engineering phase:

- Update the Mineral Reserve estimate and mine plan to reflect the updated Mineral Resource estimate presented in Section 14 of this updated Technical Report.
- Conduct a dilution study in the mine to determine the optimal block size and confirm the value of diluted content in the model.
- Detail the sequential mining plans on a monthly or quarterly basis for the first three years of project operation.
- Perform large-diameter geotechnical drilling to collect sufficient material for tests that require larger volumes of material.
- Conduct hydrogeological investigations, including monitoring with the installation of piezometers and INAs; a network of streamflow monitoring in watercourses; and aquifer tests in underground instruments to estimate hydrodynamic parameters and gain a better understanding of water flow behaviour.

- Evaluate the feasibility of a mechanical stabilization method for the surface of the decline, using geocells or geogrids.
- Elaborate a trade-off study for the mine entrance between boxcut and tunnelling.

26.2 Project Infrastructure

26.2.1 Bridge Over the Piauí River

Start the construction of the bridge over the Piauí River in the dry season of 2025 to improve access to construction and laydown areas during the site development phase.

26.2.2 Jequitinhonha River Water Pipeline Project

Execute the water collection and pumping from the Jequitinhonha River for the Project, as an alternative to the collection of the Piauí River.

26.3 Process

26.3.1 Fine Fraction (<0.5 mm) Processing Alternatives

- Continue to evaluate alternatives for processing the fines to increase spodumene recovery with the use of flotation, spiral, or gravity concentrator.
- Perform pilot plant testwork crushing the DMS middlings and refeeding them on the rougher DMS stage to evaluate the metallurgical recovery gains.

26.4 Environmental Feasibility Assessment

The environmental feasibility of the Bandeira Project was assessed in accordance with Brazil's National Environmental Policy (Federal Law No. 6,938/81) and the environmental licensing framework established by Federal Decree No. 99,274/90 and CONAMA Resolution No. 237/97. In Minas Gerais, licensing is overseen by SEMAD, under COPAM Normative Resolution 217/2017, which defines procedures for Class 5 projects such as Bandeira.

MGLIT is pursuing a Concomitant Environmental License (LAC2), which consolidates the Preliminary License (LP), Installation License (LI), and Operating License (LO) into a single process, ensuring comprehensive environmental assessment while streamlining approvals. As part of this process, MGLIT has submitted the required documents and applications, such as the Environmental Control Report (RCA), Environmental Control Plan (PCA), applications for vegetation suppression in Permanent Preservation Areas (APP), surface water extraction, and infrastructure crossings.

The Bandeira Project is situated within the Atlantic Forest biome, specifically in an area characterized by a Seasonal Deciduous Forest at an initial successional stage. While this context requires careful environmental management, it does not necessitate a full Environmental Impact Assessment (EIA) under Law No. 11.428/2006.

To support the environmental licensing process, MGLIT engaged Neo Agroambiental to conduct socio-environmental studies and prepare the Environmental Control Report (RCA) and the Environmental Control Plan (PCA). These studies addressed key aspects, including land use, biodiversity, water resources, socioeconomics, and potential environmental impacts associated with the project. To ensure compliance and mitigate environmental impacts, a comprehensive set of control and monitoring programs were developed under the PCA, including:

- Atmospheric Emissions Control and Monitoring Program
- Program to Control and Monitor Noise and Vibration Levels
- Solid Waste Management Program (PGRS)
- Erosion Control Program
- Revegetation and Drainage Systems Program for Tailings/Waste Piles
- Surface Water Quality Monitoring Program
- Program for the Maintenance and Conservation of Permanent Preservation Areas (APP) and Legal Reserves
- Fauna Monitoring Program
- Vegetation Suppression Control Program
- Recovery Plan for Degraded Areas (PRAD)
- Program to Prioritize and Professionally Train Local Labour and Suppliers
- Accident Prevention and Public Health Program, including:
    - Occupational Safety Engineering Program
    - Risk Management Program (RMP)
    - Occupational Health Medical Control Program (PCMSO)
- Social Communication Program (PCS)
- Environmental Management and Supervision Plan.

To further support environmental feasibility and maintain compliance, the following recommendations and ongoing initiatives are prioritized:

- Advance the Free, Prior, and Informed Consent (FPIC) process: Although the project is located outside designated Quilombola territories, in light of evolving state-level recommendations and in alignment with ILO Convention 169, MGLIT plans to proactively engage in FPIC discussions with a local Quilombola community to ensure their perspectives are considered and respected.
- Engage with IPHAN to clarify the need for Cultural Heritage Management Plans, addressing any cultural heritage considerations proactively.
- Continue active community engagement through the Social Communication Program (PCS), fostering transparency and maintaining strong relationships with local stakeholders.
- Maintain proactive dialogue with environmental agencies and intervening bodies to address any additional technical requirements and expedite licensing approvals.

- Ensure the full implementation of PCA programs during project execution, focusing on mitigation, monitoring, and compliance with applicable regulations.
- Comply with all environmental and social monitoring and reporting obligations as required by future licensing terms, ensuring adherence to regulations throughout project development and operation.

Prioritize social initiatives, including local workforce training and hiring regional suppliers, to maximize socio-economic benefits for the community.

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28.0 CERTIFICATE OF AUTHORS

28.1 Bernardo Horta de Cerqueira Viana, MBA, FAIG

I, Bernardo Horta de Cerqueira Viana, Geologist, MBA, as an author of this report titled *Bandeira Lithium Project, National Instrument (NI 43-101) Technical Report Mineral Resource Estimate Update, Araçuaí–Itinga, Minas Gerais, Brazil*, with an effective date of November 20, 2024 (this “Technical Report”) prepared for Lithium Ionic, do hereby certify that:

1. I am a Geologist, with a business address at GE21 Consultoria Mineral, 12th Floor, 3130, Afonso Pena Avenue, CEP 30.130-910, Belo Horizonte, Minas Gerais, Brazil.
2. I am a graduate of the Federal University of Minas Gerais (UFMG, 2001), and I am registered with the Regional Council of Engineering and Agronomy (83150/D) in the state of Minas Gerais. I am a Fellow of the Australian Institute of Geoscientists (FAIG) (# 3709). I have been the CEO of GE21 Mineral Consulting Group (www.grupoge21.com.br) since 2015.
3. I have practiced my profession for 22 years since the beginning of my degree.
4. I have read the definition of “qualified person” set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
5. I have not visited the Bandeira Project site.
6. I am responsible for Sections 19, 20, and parts of Sections 1, 25, and 26 of this Technical Report.
7. I am independent of the Issuer applying the test set out in Section 1.5 of NI 43-101.
8. I have had no prior involvement with the property that is the subject of this Technical Report.
9. I have read NI 43-101, and this Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.
10. At the effective date of this Technical Report, to the best of my knowledge, information, and belief, this Technical Report contains all scientific and technical information that is required to be disclosed to make this Technical Report not misleading.
11. I have read the News Release dated May 6, 2025, and confirm it is a fair and accurate summary of my sections of this Technical Report.
12. I consent to the filing of this Technical Report with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public, of this Technical Report.

Dated this 6th day of June 2025, at Toronto, Ontario, Canada.

Original Signed and Sealed

Bernardo Horta de Cerqueira Viana, MBA, FAIG
CEO of GE21 Group
Geologist

28.2 Carlos José Evangelista Silva, MSc, AIG

I, Carlos José Evangelista Silva, MSc, AIG, as an author of this report titled *Bandeira Lithium Project, National Instrument (NI 43-101) Technical Report Mineral Resource Estimate Update, Araçuaí–Itinga, Minas Gerais, Brazil*, with an effective date of November 20, 2024 (this "Technical Report") prepared for Lithium Ionic, do hereby certify that:

1. I am a Geologist, with a business address at GE21 Consultoria Mineral, 12th floor, 3130 Afonso Pena Ave, Belo Horizonte, Brazil.
2. I am a graduate of the Federal University of Minas Gerais (UFMG) in Belo Horizonte, Brazil (January 26, 2026), and have a Master's degree in engineering in Mineral Technology from the Postgraduate Program in Mining, Metallurgical and Materials Engineering (PPGE3M) at the Federal University of Rio Grande do Sul, Brazil (March 3, 2020). I have been a Fellow of the Australian Institute of Geoscientists #7868 since 2021.
3. I have practiced my profession for 18 years since my graduation.
4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
5. I visited the Bandeira Project from September 13 to 14, December 13 of 2023 and November 26 and 27, 2024.
6. I am responsible for Sections 4, 6 to 12, 14, 23, and parts of Sections 1, 25, and 26 of this Technical Report.
7. I am independent of the Issuer, applying the test set out in Section 1.5 of NI 43-101.
8. I have had no prior involvement with the property that is the subject of this Technical Report.
9. I have read NI 43-101, and this Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.
10. At the effective date of this Technical Report, to the best of my knowledge, information, and belief, this Technical Report contains all scientific and technical information that is required to be disclosed to make this Technical Report not misleading.
11. I have read the News Release dated May 6, 2025, and confirm it is a fair and accurate summary of my sections of this Technical Report.
12. I consent to the filing of this Technical Report with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public, of this Technical Report.

Dated this 6th day of June 2025, at Toronto, Ontario, Canada.

Original Signed and Sealed

Carlos José Evangelista Silva, MSc, AIG, Geologist
GE21 Consultoria Mineral

28.3 Ignacy Antoni Lipiec, P.Eng.

I, Ignacy Antoni Lipiec, P.Eng., Bachelor of Applied Science and Mining & Mineral Process Engineering, as an author of this report titled *Bandeira Lithium Project, National Instrument (NI 43-101) Technical Report Mineral Resource Estimate Update, Araçuaí–Itinga, Minas Gerais, Brazil*, with an effective date of November 20, 2024 (this “Technical Report”) prepared for Lithium Ionic, do hereby certify that:

1. I am the Chief Technology Officer, Minerals & Metals, with AtkinsRéalis, with a business address at 745 Thurlow Street, Vancouver, British Columbia, Canada, V6E 0C5.
2. I am a graduate of the University of British Columbia, Vancouver (1985) with a Bachelor of Applied Science and Mining & Mineral Process Engineering, and I am registered with the Professional Engineers of Ontario (100076251).
3. I have practiced my profession for 40 years since my graduation.
4. I have read the definition of “qualified person” set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
5. I recently visited the Bandeira Project from March 13 to 14, 2024.
6. I am responsible for Sections 2, 3, 5, 13, 17, 18 (except 18.12, 18.13), 21 (except 21.4.2, 21.4.5, 21.4.7, 21.5.7, 21.5.8), 24, and parts of Sections 1, 25, and 26 of this Technical Report.
7. I am independent of the Issuer applying the test set out in Section 1.5 of NI 43-101.
8. I have had no prior involvement with the property that is the subject of this Technical Report.
9. I have read NI 43-101, and this Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.
10. At the effective date of this Technical Report, to the best of my knowledge, information, and belief, this Technical Report contains all scientific and technical information that is required to be disclosed to make this Technical Report not misleading.
11. I have read the News Release dated May 29, 2024, and confirm it is a fair and accurate summary of my sections of this Technical Report.
12. I consent to the filing of this Technical Report with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public, of this Technical Report.

Dated this 6th day of June 2025, at Toronto, Ontario, Canada.

Original Signed and Sealed

Ignacy Antoni Lipiec, P.Eng.
Chief Technology Officer, Minerals & Metals

28.4 João Augusto Hilário de Souza, B.A.Sc., MBA

I, João Augusto Hilário de Souza, B.A.Sc., MBA, (MAIG) #4084, as an author of this report titled *Bandeira Lithium Project, National Instrument (NI 43-101) Technical Report Mineral Resource Estimate Update, Araçuaí–Itinga, Minas Gerais, Brazil*, with an effective date of November 20, 2024 (the "Technical Report") prepared for Lithium Ionic, do hereby certify that:

1. I am a senior Mining Engineer and Associate Consultant at L&M Assessoria S.S. Ltda., with a business address at Rua Senhora das Graças, 99/1002, Belo Horizonte, MG, Brasil, CEP 30.310-130.
2. I am a graduate in Mining Engineering at the Federal University of Minas Gerais (UFMG), in Belo Horizonte, Brazil; Geostats Specialization at the Federal University of Ouro Preto (UFOP), Brazil, and MBA in Mining at the University of São Paulo (USP), Registered as Mining Engineer in the Conselho Regional de Engenharia e Agronomia (Crea – MG 16.917 and National–140610073-0) in the state of Minas Gerais. I have been a member of the Australian Institute of Geoscientists (AIG) since July 8, 2009, and of the Sociedade Mineira dos Engenheiros (SME) since June 13, 1977.
3. I have practiced my profession for more than 40 years since my graduation.
4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
5. I have visited the Bandeira Project from January 17 to 19, 2024.
6. I am responsible for Section 22 and parts of Sections 1, 25, and 26 of this Technical Report.
7. I am independent of the Issuer, applying the test set out in Section 1.5 of NI 43-101.
8. I have had no prior involvement with the property that is the subject of this Technical Report.
9. I have read NI 43-101, and this Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.
10. At the effective date of this Technical Report, to the best of my knowledge, information, and belief, this Technical Report contains all scientific and technical information that is required to be disclosed to make this Technical Report not misleading.
11. I have read the News Release dated May 6, 2025, and confirm it is a fair and accurate summary of my sections of this Technical Report.
12. I consent to the filing of this Technical Report with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public, of this Technical Report.

Dated this 6th day of June 2025, at Toronto, Ontario, Canada.

Original Signed and Sealed

João Augusto Hilario de Souza, B.A.Sc., MBA
Associate Consultant, Mining Engineer

28.5 Porfirio Cabaleiro Rodriguez, BSc, FAIG

I, Porfirio Cabaleiro Rodriguez, P.Eng., BSc., FAIG, as an author of this report titled *Bandeira Lithium Project, National Instrument (NI 43-101) Technical Report Mineral Resource Estimate Update, Araçuaí–Itinga, Minas Gerais, Brazil*, with an effective date of November 20, 2024 (this "Technical Report") prepared for Lithium Ionic, do hereby certify that:

1. I am a Technical Director of GE21 Consultoria Mineral, with a business address at 12th floor, 3130, Afonso Pena Avenue, CEP 30.130-190, Belo Horizonte, Brazil.
2. I am a graduate in Mining Engineering at the Federal University of Minas Gerais (UFMG), in Belo Horizonte, Brazil, and I am a Fellow of Australian Institute of Geoscientists #3708, since 2008.
3. I have practiced my profession for 46 years since my graduation.
4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
5. I have not visited the Bandeira Project site.
6. I am responsible for Sections 18.12 and 18.13 of this Technical Report.
7. I am independent of the Issuer, applying the test set out in Section 1.5 of NI 43-101.
8. I have had no prior involvement with the property that is the subject of this Technical Report.
9. I have read NI 43-101, and this Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.
10. At the effective date of this Technical Report, to the best of my knowledge, information, and belief, this Technical Report contains all scientific and technical information that is required to be disclosed to make this Technical Report not misleading.
11. I have read the News Release dated May 6, 2025, and confirm it is a fair and accurate summary of my sections of this Technical Report.
12. I consent to the filing of this Technical Report with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public, of this Technical Report.

Dated this 6th day of June 2025, at Toronto, Ontario, Canada.

Original Signed and Sealed

Porfirio Cabaleiro Rodriguez, BSc, FAIG
GE21 Consultoria Mineral
Technical Director, Mining Engineer

28.6 Rubens José de Mendonça, P.Eng., MAusIMM

I, Rubens José de Mendonça, P.Eng., MAusIMM, as an author of this report titled *Bandeira Lithium Project, National Instrument (NI 43-101) Technical Report Mineral Resource Estimate Update, Araçuaí–Itinga, Minas Gerais, Brazil*, with an effective date of November 20, 2024 (the "Technical Report") prepared for Lithium Ionic, do hereby certify that:

1. I am a Principal Consultant at Planminas—Projetos e Consultoria em Mineração Ltda, with a business address at Rua Sebastião Fabiano Dias 37 / 401–Bairro Belvedere, Belo Horizonte MG State, Brazil.
2. I am a graduate of the Federal University of Minas Gerais in 1980 with a Bachelor's degree in mining engineering, and I am a Registered Professional Engineer (# CREA-MG 25.791/D). I have been a member of AusIMM since 2006, and a Chartered Professional (CP-Mining) since 2015.
3. I have practiced my profession for 44 years since my graduation.
4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
5. I have visited the Bandeira Project from March 13 to 14, 2024.
6. I am responsible for Sections 15, 16, 21.4, and 21.5 (except 21.4.2, 21.4.5, 21.4.7, 21.5.7, and 21.5.8), and parts of Sections 1, 25, and 26 of this Technical Report.
7. I am independent of the Issuer, applying the test set out in Section 1.5 of NI 43-101.
8. I have had no prior involvement with the property that is the subject of this Technical Report.
9. I have read NI 43-101, and this Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.
10. At the effective date of this Technical Report, to the best of my knowledge, information, and belief, this Technical Report contains all scientific and technical information that is required to be disclosed to make this Technical Report not misleading.
11. I have read the News Release Dated May 6, 2025, and confirm it is a fair and accurate summary of my sections of this Technical Report.
12. I consent to the filing of this Technical Report with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public, of this Technical Report.

Dated this 6th day of June 2025, at Toronto, Ontario, Canada.

Original Signed and Sealed

Rubens José de Mendonça, P.Eng. MAusIMM
Planminas—Projetos e Consultoria em Mineração Ltda
CP-Mining, Mining Engineer