ENVIRONMENTAL IMPACT STUDY

NON-TECHNICAL RESUME

EXPANSION OF THE BARROSO MINE

PARISH OF DORNELAS AND PARISH OF COVAS DO BARROSO /MUNICIPALITY OF BOTICAS

VISA consultores

SAVANNAH

SAVANNAH LITHIUM UNIPESSOAL LDA
A SAVANNAH RESOURCES GROUP COMPANY

April 2021

DISCLAIMER

Please note this is an English translation of the submitted Portuguese document to Agência Portuguesa do Ambiente (APA), readers are advised to view the original documentation available on the APA website.

1. INTRODUCTION

The Environmental Impact Study (EIA) of the expansion project of the Barroso Mine was prepared by VISA Consultores - Consultants in Applied Geology and Environmental Engineering, S.A., for Savannah Lithium, Lda.

The Mining Plan (project) to expand the Barroso Mine, in the Previous Study phase, aims to obtain the Mining Concession of the expansion of the Barroso Mine, pursuant to Law No. 54/2015 of June 22, and Decree Law No. 88/90, of March 16[1], for quartz, feldspar and lithium minerals.

The concession area granted by the Portuguese State (C 100) to Savannah is about 542 ha and is currently in operation as the Barroso Mine (for the use of apllopegmatite). The Barroso Mine currently includes nine mining open pits with a total area of about 27.5 ha, with a total affected area of about 88.36 ha. Thus, Savannah intends to proceed with:

- Expansion of the concession area for the mining of mineral deposits of quartz, feldspar and lithium to about 593 ha.
- Expansion of the mining area to about 70.5 ha, reducing the number of open pits, now being four, but expanding the area subject to mining to at least about 384 ha and a maximum of 476 ha.
- Licensing on an industrial facility for ore processing, for the production of spodumene, quartz and feldspar concentrates.
- Construction of an external access to the Barroso Mine, specifically to the Industrial facility (mill).
- Realization of an access between the East and West area of the Mine.
- Storage of the waste produced, where the waste material (resulting from a pre-selection of the excavated material) and the rejected material (resulting from the treatment in the mill) will be accommodated. These storage zones are classified as an Integrated Waste landform ("IWL").
- Implementation of support facilities: offices, social facilities, warehouses, and workshops.

In addition to the Project (Mining Plan) and the facilities for mineral beneficiation (mill), subject to the environmental impact assessment, an IWL will also be built. This construction will, conform with laws stipulated in Decree-Law No. 151B/2013, of October 31, amended and republished by Decree Law No. 152-B/2017, of December 11 are subject to a previous Environmental Impact Assessment (EIA) procedure:

- the Project of the Barroso Mine which falls within the scope of paragraph 18 of Annex I, which determines the obligation to subject to the Procedure of EIA the Open Pit Mines with an area greater than 25 ha, in this case, its expansion.
- Mill, under point (e) of annex II (2) it is specified that the surface industrial installations for the extraction and treatment of ore with a capacity exceeding 200 000 t/year are subject to the EIA procedure.

The EIA authority is the Portuguese Environment Agency, pursuant to item i) of point (a) and paragraph 1 of Article 8 of Decree-Law No. 151-B/2013, of October 31, amended and republished by Decree Law No. 152 B/2017 of December 11. The granting of mineral deposit Mining for the project subject to The EIA procedure is reached, in accordance with Decree Law No. 88/90, of March 16, by administrative contract with the State, by request, addressed to the Directorate General of Energy and Geology.

[1] Until the entry into force of the supplementary legislation, the regulations approved under the Decree-Law No. 90/90 of 16 March, in all that is not incompatible with the provisions of Law No. 54/2015 of June 22.

2. THE PROPONENT AND THE BARROSO MINE

Savannah Lithium, LDA. is a 100% subsidiary owned by Savannah Resources Plc. (Savannah). Savannah Resources Plc is a company listed on the London Stock Exchange (AIM), focused on the Mining and development of mineral assets, operating projects in various jurisdictions around the world, and is focused on building viable mining operations. Savannah currently has two projects under development: a heavy sands project in partnership with Rio Tinto in Mozambique, where a mining contract was recently awarded; and the Barroso Mine project in Portugal.

Savannah signed a partnership agreement with Slipstream Resources of Australia and other partners in May 2017 to develop Mining works on lithium-bearing pegmatites in the C100 Mina do Barroso concession. It was known that the area contained applopegmatites with spodumene and that it had previously been operated by Saibrais - Areias and Caulinos S.A. and Imerys, S.A., for the production of raw materials for the ceramics industry. In June 2019, Savannah acquired a 25% stake in the project held by Slipstream Resources of Australia and other holders, thus holding 100% of the project.

3. LOCATION AND CHARACTERISTICS OF THE AREA

The concession area (of Mina do Barroso) is located in the parish of Dornelas and in the parish of Covas do Barroso, in the municipality of Boticas. (Figure 1), and (the two alternatives of) the proposed accesses to the Mine in the parish of Canedo and in the parish of Santa Marinha, in the municipality of Ribeira de Pena (Figure 2).

Figure 3 shows the area for the mining of mineral deposits of quartz, feldspar and lithium, in which mining works will be continued and where processing of the mineralization will be carried out. The villages (Figure 4) that are in the surroundings near the Mine are: to the west Vila Grande at 1200 m and Dornelas at 720 m; to the northwest: Vila Pequena at 1800 m, Espertina 1200 m and Antigo at 650 m; to the north: Covas do Barroso at 750 m, Romainho at 200 m and Muro at 400 m; to the Northeast: Alijó at 1300 m and southwest: Lousas at 800 m.

The project's area of intervention is located in the Covas River basin, a tributary of the Tâmega River basin. In physiographic terms, this area presents, in general, steep slopes alternating with small plateaus at altitude, characteristic of the transmontana landscape of Serra do Barroso. The drainage network has high density, and the main watercourses are permanent. The main water lines that occur in the area of intervention and nearby surroundings are the Covas River, the Couto stream, the Corgo do Fojo, and the Corgo dos Lamais.

In terms of current land uses, it is reported that there are three general typologies: forest areas of wild pine which were partially burned in 2011; semi-natural areas, such as riparian galleries that develop discontinuously along permanent water lines and shrubby-type bushes; and agricultural areas, in particular dryland (cereals and fodder), gravity irrigation (grasslands), which are associated with water lines and rural urban agglomerates.

In the concession area of Barroso, granted in 2006, is the active Barroso Mine, focused on NOA, a small open pit, and only for the use of applopegmatite. However, and long before 2006, it is identified at the concession site and near the existence of several[1] Mines, some of tin. The area has a strong history of mining before 2006, where old tin mines were exploited both on and nearby the concession.

In the concession area, the identification of the mineralized bodies and the areas (four open pits) where mineralization will be exploited (in open pit) is in an advanced stage.

Within the mining area, the existing municipal roads and forest roads will be used and, whenever necessary, new roads will be opened.

[1] According to the extract of the geological chart, sheet 6 C, more than two dozen mines can be identified.

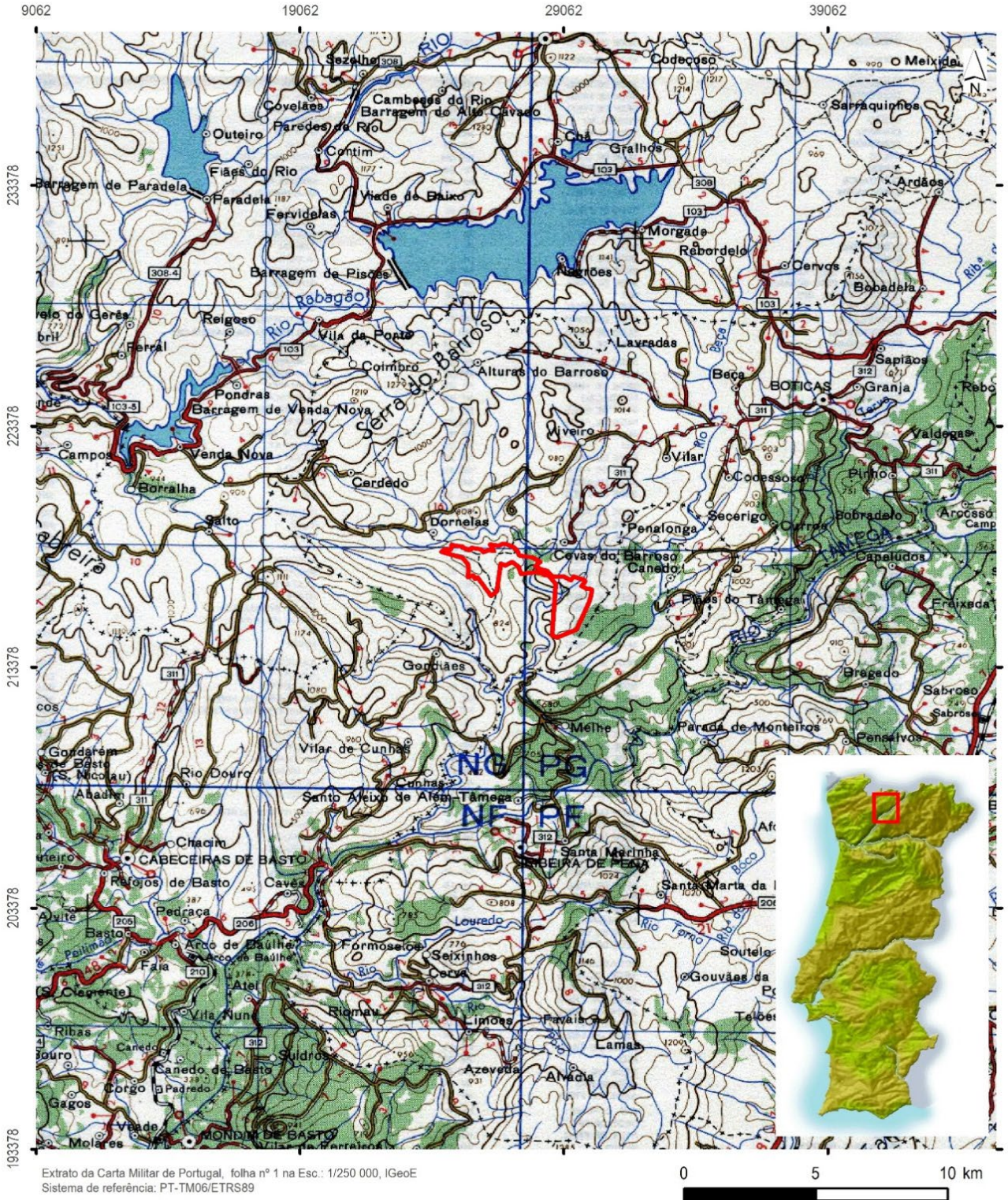


Figure 1 - Location of the Barroso Mine at national and regional level.

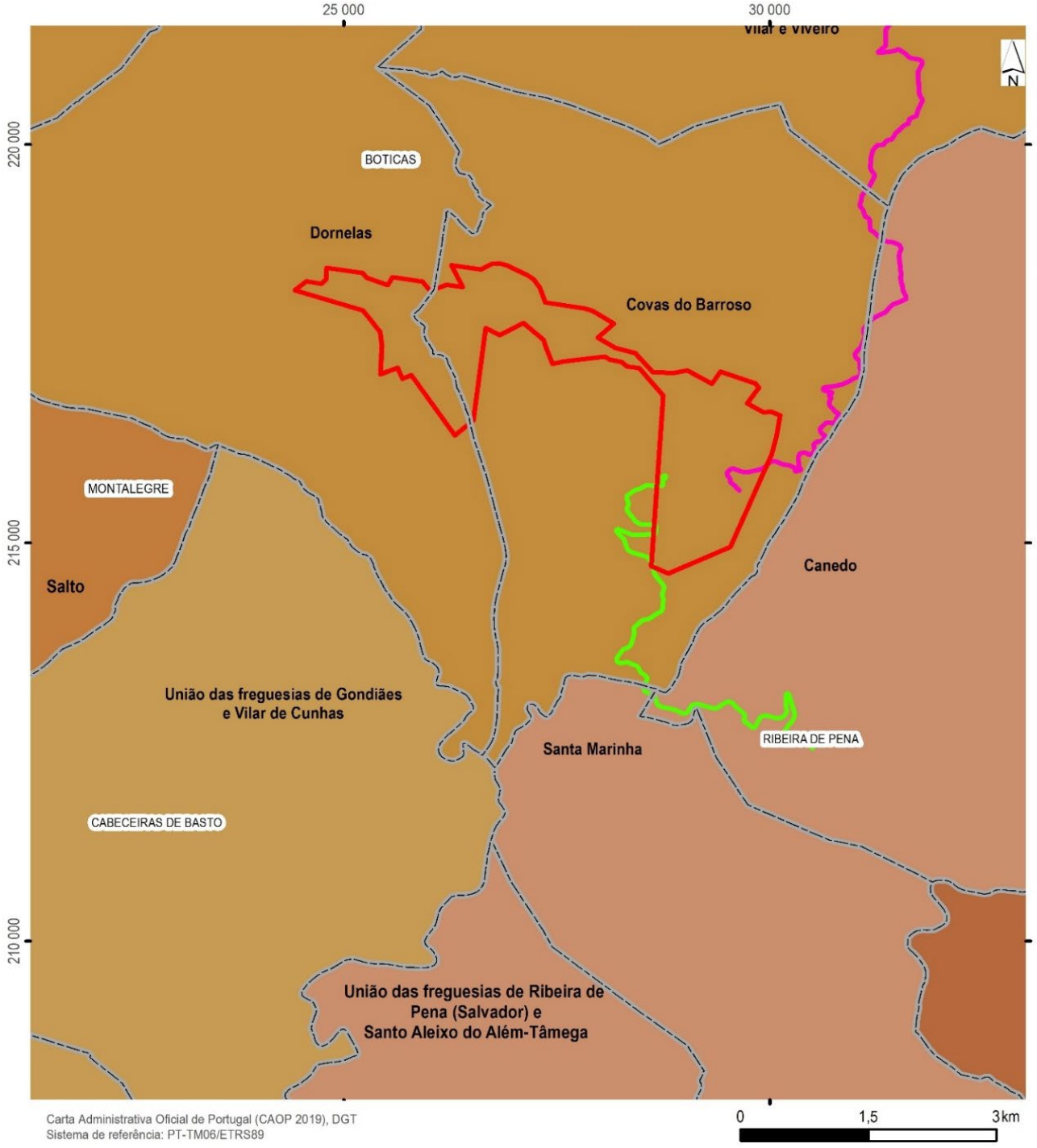


Figure 2 – Administrative location of the Barroso Mine.

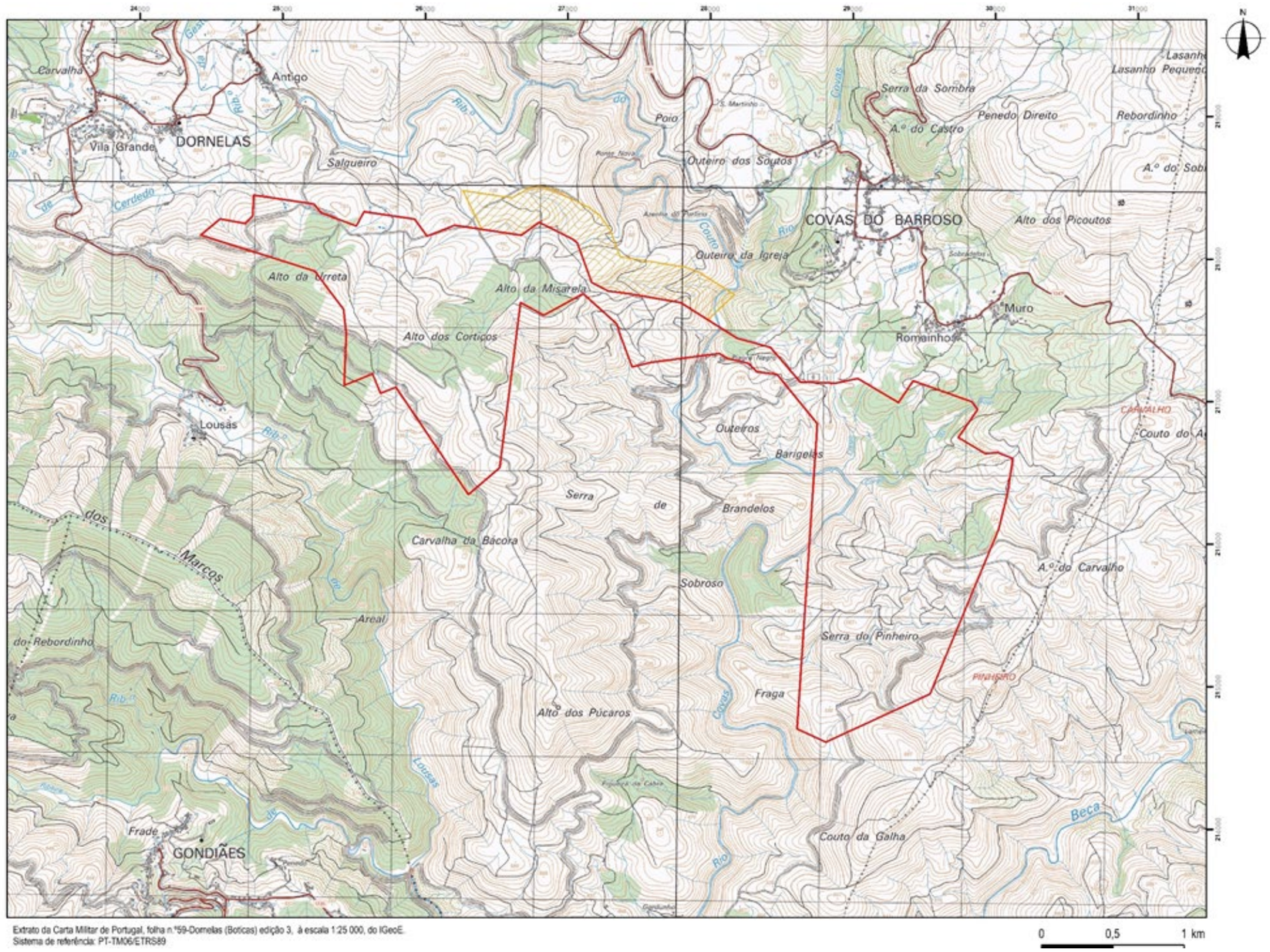
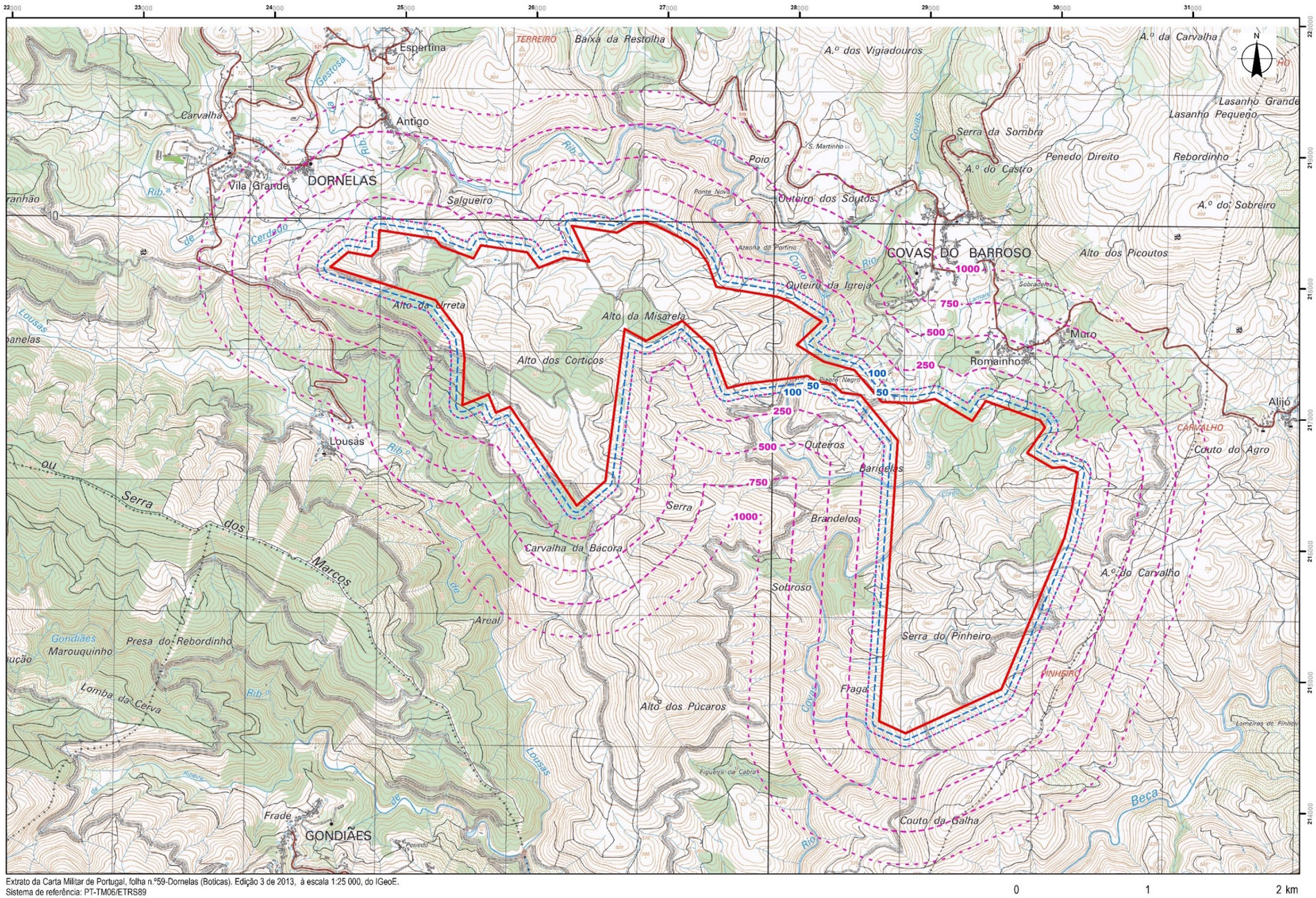


Figure 3 – Location of the area and proposal to expand the concession of Mining of the Barroso Mine.



Extrato da Carta Militar de Portugal, folha n.º59-Dornelas (Boticas). Edição 3 de 2013, à escala 1:25 000, do IGeoE.
Sistema de referência: PT-TM06/ETRS89

Mining concession boundary

Figure 4 – Distance to the villages surrounding the Barroso Mine.

Pursuant to article 2(a) of Decree-Law No. 151-B/2013 of October 31, amended and republished by Decree-Law No. 152-B/2017 of December 11, sensitive areas are considered:

> *"i) Protected areas, classified under Decree-Law No. 142/2008of July 24;* (ii) Natura 2000 sites, special conservation areas and special protection areas, classified in accordance with Decree-Law No. 140/99of 24 April under Directives No. 79/409/EEC, the Council, of 2 April 1979 on the conservation of wild birds and 92/43/EEC of the Council of 21st May 1992 on the preservation of natural habitats and wild fauna and flora; (iii) areas for the protection of real estate classified or in the process of classification, defined in accordance with Law No 107/2001of 8 September."

The National System of Classified Areas (SNAC), structured by Decree-Law No. 142/2008 of July 24, amended and republished by Decree-Law No. 242/2015, of October 15, in addition to including the National Network of Protected Areas (RNAP), the classified areas that are part of the Natura 2000 Network, also includes areas classified under international commitments made by the Portuguese State, namely Important Bird Areas (IBA), *Ramsar sites* and areas of the Biosphere Reserve Network, and have included them in this analysis.

Although the proposed area for the Barroso Mine does not integrate into any ecologically sensitive area, according to the laws mentioned, it is important to note the classified areas closest to the Mining concession area, which are: Gerês/Xurês Cross-Border Biosphere Reserve, located about 2 km to the west; Site of Community Interest Alvão/Marão (PTCON0003), located about 9 km south; Important Zone for Birds Mountains of Alvão and Marão (PT049), located about 9 km south; Peneda-Gerês National Park, located about 16 km northwest; Serra do Gerês Special Protection Zone (PTZPE0002), located about 20 km northwest; and the Important Zone for Birds Serras da Peneda and Geres (PT002), located about 20 km northwest.

The area proposed for the Barroso Mine also does not intersect any sensitive areas, still according to the laws mentioned, it is important to mention the classification of the Barroso region, specifically, the designation of Boticas and Montalegre, as a GIAHS *(Globally Important Agricultural Heritage System)*[1] site. That is, classified as world agricultural heritage, by FAO (Food and Agriculture Organization), the Food and Agriculture Organization of the United Nations[2].

4. BACKGROUND, OBJECTIVE AND JUSTIFICATION OF THE PROJECT

The Barroso Mine concession area is located in the Barroso Alvão Applopegmatitic Field, in the parishes of Dornelas and Covas do Barroso, municipality of Boticas, south of the village of Covas do Barroso.

In 2001 the Portuguese Government Assigned to Saibrais – Areias e Caulinos ('Saibrais'), S.A. the rights of prospecting and research of mineral deposits of feldspar, quartz, lithium, tin, tungsten, niobium and tantalum. Under this contract, Saibrais carried out studies leading to the identification of the structure of the applopegmatites, using geological mapping, drilling (RC and core), chemical analyses and industrial aptitude tests. These studies confirmed the existence of mineralization reserves and the enormous potential of feldspars. In addition, associated with feldspars of these applopegmatites, the occurrence of lithium minerals such as petalite and spodumene was verified.

In 2003, in view of the promising results obtained in the prospecting and research work, Saibrais began the process of obtaining the concession for the mining of feldspar deposits, having complied with the environmental impact assessment procedure.

In 2006, the concession agreement was signed between Saibrais and the Portuguese government for the Barroso Mine, for a concession area of approximately 120 ha.

In 2010 Saibrais changes its corporate name to Imerys Ceramics Portugal, S.A., and during that year the Mina do Barroso Mine Plan was updated in order to obtain the Mining rights for the various mineralized bodies identified and characterized in the Mining ongoing exploration mining and research work.

This Mining Plan approved by DGEG, in 2010, gave rise to the amendment to the Concession Agreement, concluded in 2016, having expanded the concession area to about 542 ha and lithium was included as a minable substance.

In early 2017, Savannah (at the time Slipstream Resources Portugal Unipessoal, Lda.) obtained the transmission of the contractual position that was held by Imerys to the Barroso Mine, having developed, in recent years, a set of works to recognize mineralization. Until 2017 the exploration, mining research and mining works focused on production for

[1] Important World Agricultural Heritage System.
[2] FAO is an agency integrated into the United Nations (UN).

ceramics and not lithium for battery production. As a result, there is still the need to update the Mine Plan, for the expansion of the open pits, as well as to install an industrial unit for process and improvement of mineralization (mill), with the objective of producing a spodumene concentrate and feldspar and quartz co-products.

It is in this context that Savannah is working to expand the area of intervention including the installation of a processing unit to produce a spodumene concentrate and quartz and feldspar co-products.

With the preparation of the Mine Plan, in the previous study phase, Savannah intends to expand the concession area (Figure 3) mining from 542 ha to 593 ha.

The need for this increase in the concession area is motivated by the results obtained in the reconnaissance work on the mineral deposit (more than 45 drill holes, with 4,200 m) which revealed that some mineralized bodies extend outside the current concession area (Figure 6). In this way, the company intends to ensure the mining of this mineralized body (outside the current concession area) to ensure the viability of the mine.

The exploration work also allowed detailed identification of the configuration and characteristics of the mineralized bodies, leading to a resizing of the deposits. At Grandao, continuity of the mineralized body to the West was identified that is intended to be considered in this Mine Plan. The Pinheiro and NOA deposits remain with a configuration similar to the one previously planned. In relation to the other deposits, it was considered that at this stage they do not have characteristics that allow their economic exploitation, without additional exploration works.

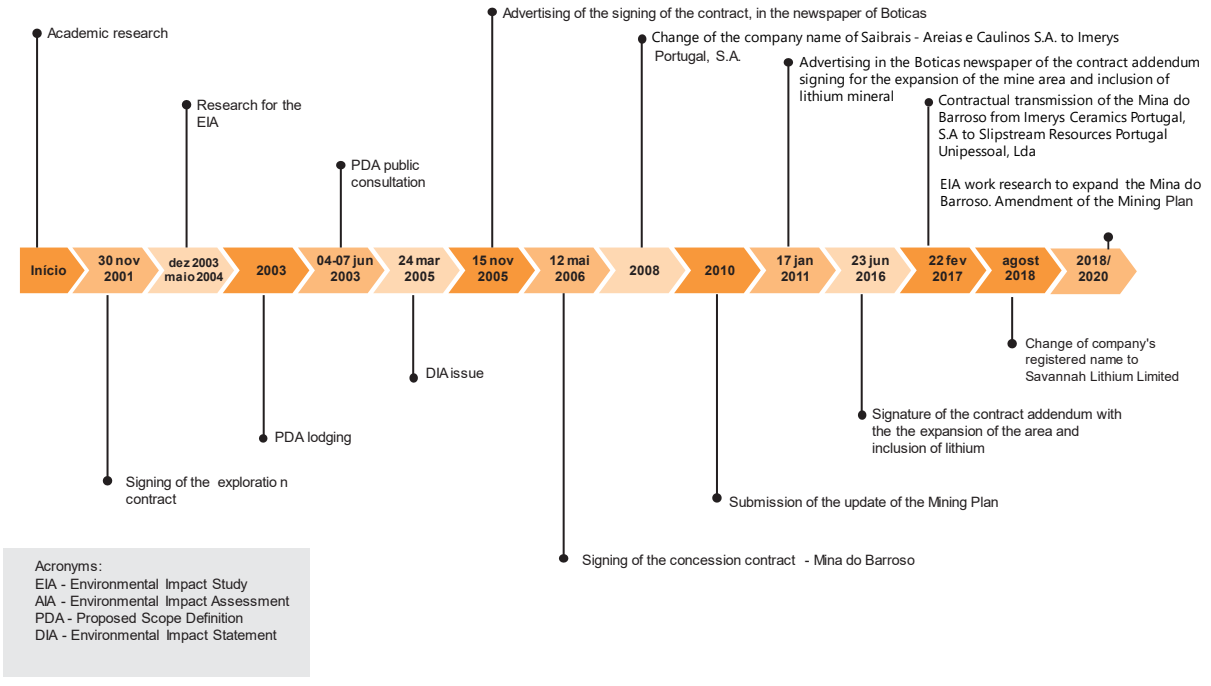


Figure 5– Chronology of the Barroso Mine project.

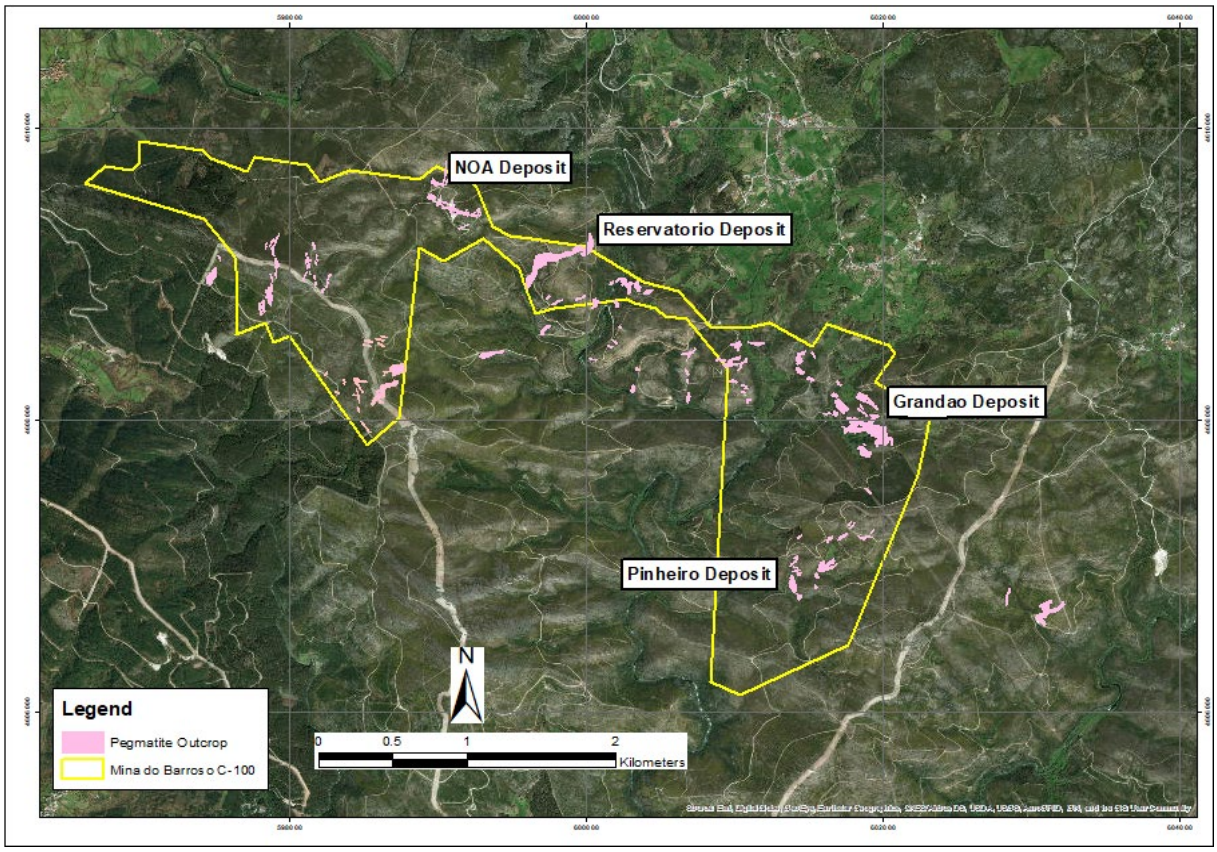


Figure 6 – Concession area C-100 and location of deposits and pegmatite outcrops.

The Barroso Mine will now include four mining open pits, Grandao, Pinheiro, Reservatorio and NOA. In addition to the increase in the Mining concession area and the increase in the Reservatorio and Grandão open pits, by extension of mineralized bodies, the other significant changes to the previously approved Mining Plan include:

- the elimination of the mining in five areas (from 9 open pits to 4 open pits);
- the inclusion of a lithiniferous pegmatite processing unit for the production of spodumene concentrate and quartz and feldspar co-products;
- the increase in the average extraction of lithinferous pegmatite to about 1 500 000 t/year;
- A Life of Mine of 12 years (16 years considering the construction and deactivation phases);
- the inclusion of two to four mining waste facilities to accommodate the rejected mill material and about 6 850 000 t/year of waste material produced as waste from the mine.

The mining work to be carried out in the Mine in the future will focus on the mining of lithiniferous pegmatite for the production of a spodumene concentrate for subsequent feed to lithium mineral processing establishments, having as co-products feldspar and quartz to feed the ceramic and glass industries.

It should also be noted that lithium is a strategic element for Portugal and Europe, given its applicability in modern industry, with the emerging demand for inclusion in electric powered car batteries, so there is an interest in European lithium mineral resources, which includes the Barroso-Alvão aplitopegmatite field. The geopolitical context and socio-economic changes at global level have changed the European Union's ("EU") view of the sustainability of the mining of mineral resources within Europe. In this way, EU countries currently have a position of valuing existing mineral resources within the EU, with a view to reducing the dependence on external markets for the supply of critical raw materials.

It is in this context that Savannah aims to expand the Barroso Mine area, and to install an industrial mineralization treatment facility for the production of spodumene concentrate and feldspar and quartz co-products.

5. PROJECT DESCRIPTION

5.1. INTRODUCTION

The mining work to be carried out in the mine plan will have as its main focus on the mining of lithinferous pegmatite for the production of a spodumene concentrate having as co-products feldspar and quartz to feed the ceramic industry.

The Project (Mining Plan) has the following technical parts:

- The Mining Plan outlines the plan for the extraction and use of mineral resources, using equipment, techniques and procedures that minimize potential environmental impacts, applying economically viable solutions. This is also part of the construction phase that establishes the mine installation and construction strategy.
- The Waste Management Plan that aims to define the methodology of waste management resulting from the exploitation, as well as its final destination, with the objective of minimizing impacts and complying with Decree Law No. 10/2010, of February 4.
- The Landscape Recovery Plan defines the rehabilitation activities of the mine, namely the green structure to be implemented, in order to integrate the landscaped mine area in the surrounding landscape, during and at the end of the exploitation, ensuring the rehabilitation of the area.
- The Decommissioning Plan presents the actions that will be necessary for the closure of the industrial activity of the mine and the controlled abandonment of space.
- The Health and Safety Plan is an aid in the management of safety and health at the work of the mine, in accordance with Decree-Law No. 324/95 of November 29.
- The Mining Pre-Feasibility Study aims to prove that the mining enterprise is economically profitable, incorporating the costs of the safety, infrastructure installation, exploitation, processing/processing, environmental protection, landscape recovery and deactivation, also combined with other economic parameters related to sales prices, contributions, taxes and fees due.

The main objectives that are intended to be maintained and complied with in this update of the Mining Plan are:

- Rationalize the mining of the mineral resource, minimizing potential environmental impacts and making the mine compatible with the surrounding space during its mining activities, through the implementation of the Mining Plan, and after the closure of the mine;
- Ensure adequate safety and health conditions in the work with compliance with the Health and Safety Plan;
- Rehabilitate the landscape affected by the mine, progressively with the development of the mine, through the implementation of the Landscape Recovery Plan, enabling the gradual environmental recovery of the affected spaces, and the total rehabilitation of the area after the closure. The fact that the mine is part of an area classified as the Barroso World Agricultural Heritage area determines the importance of the Landscape Recovery Plan;
- Minimize the environmental impacts created by the exploitation, through the adoption of preventive and corrective measures whose effectiveness will be evaluated by monitoring activities contemplated in the defined Monitoring Plan.

As the project is presented in the previous study phase, three project alternatives were considered. The proposed alternatives have been established with the assurance that any of the three are technically and economically viable.

Since the location of mineralization and its open pits is not relocatable, the alternatives are mostly distinguished by:

- Location of access roads to the outside;
- Location of the Mill and support facilities;
- Location of waste facilities;
- Sequence of mining of the open pits.

In succinct terms, the three alternatives can be characterized according to the following figures:

Alternative 1

This alternative is characterized by backfilling as much waste as possible inside the open pits once mining has concluded. Thus, the open pits of Pinheiro and of Noa are completely covered (back to ground level), and the Grandao open is pit partially backfilled. All waste installations will have only waste (rock extracted without any processing), with the exception of the Southern waste facility which will also receive the rejects from the mill. The North waste installation

will also have the function of acting as a visual and acoustic curtain, being the first to be built. The mill will be to the NE of the Pinheiro open pit and access off the mine will be a route north from the mill. The existing power line will have a new section (bypass) west of the Grandao open pit. The mining sequence of this Alternative 1 begins at Grandao, exploiting Pinheiro at the same time as the Grandao (in the 3rd year of exploitation), followed by NOA and finally Reservatorio (Figure 7).

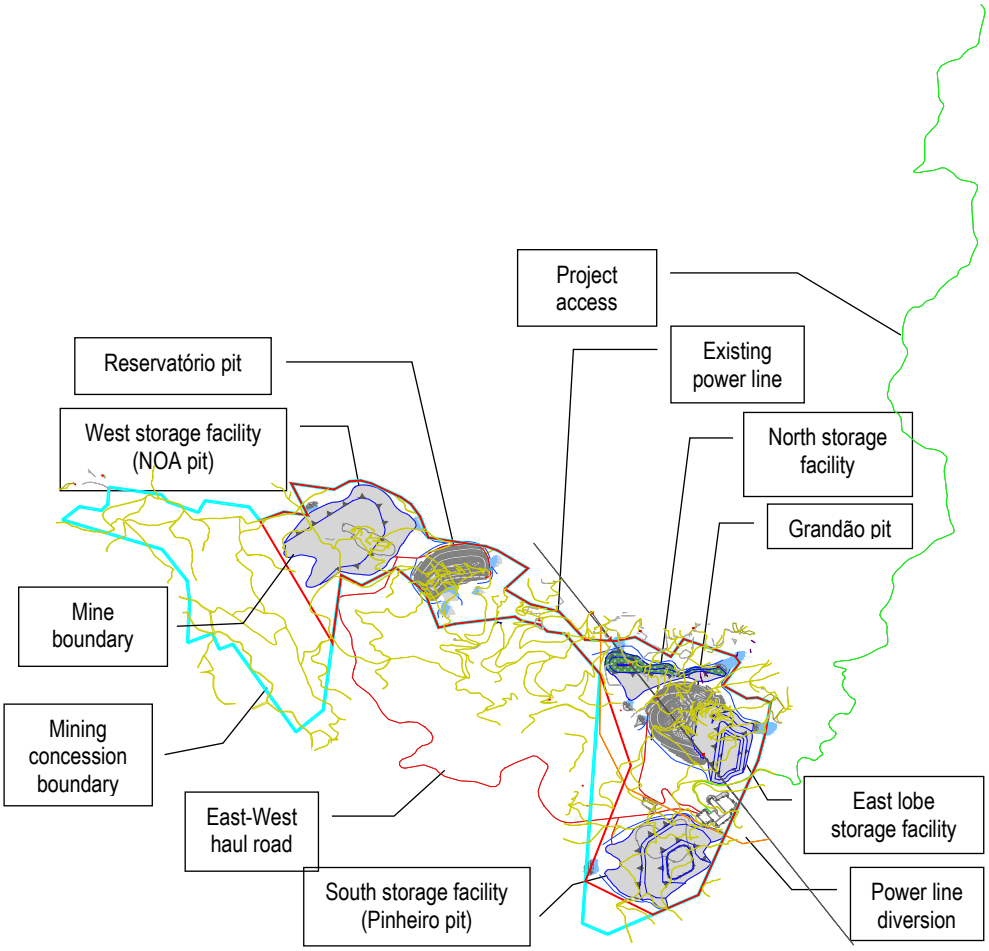


Figure 7 – Mine Scheme in Alternative 1.

Alternative 2

The sequence of mining of this alternative is started at the Pinheiro pit, before starting the Grandao pit shortly thereafter. Two years before the mining of the Grandao ends, the NOA pit begins (which lasts 2 years) and about 1.5 years later the Reservatorio pit begins (Figure 8).

This Alternative 2 is characterized by implementing the mill, NW of the Pinheiro open pit and the path to the exterior of the mine will have a route to the South and Southeast from Mill. The existing power line will have a new section (bypass) east of the Grandão open pit. The waste facilities overlap with the open pits of Pinheiro and NOA, as well as partly in the Grandao. All waste installations will have only waste (rock extracted without any transformation), with the exception of the South waste installation that will receive rejects from the mill, in addition to run of mine waste. This northern Waste Facility will be smaller in this alternative compared to the previous one.

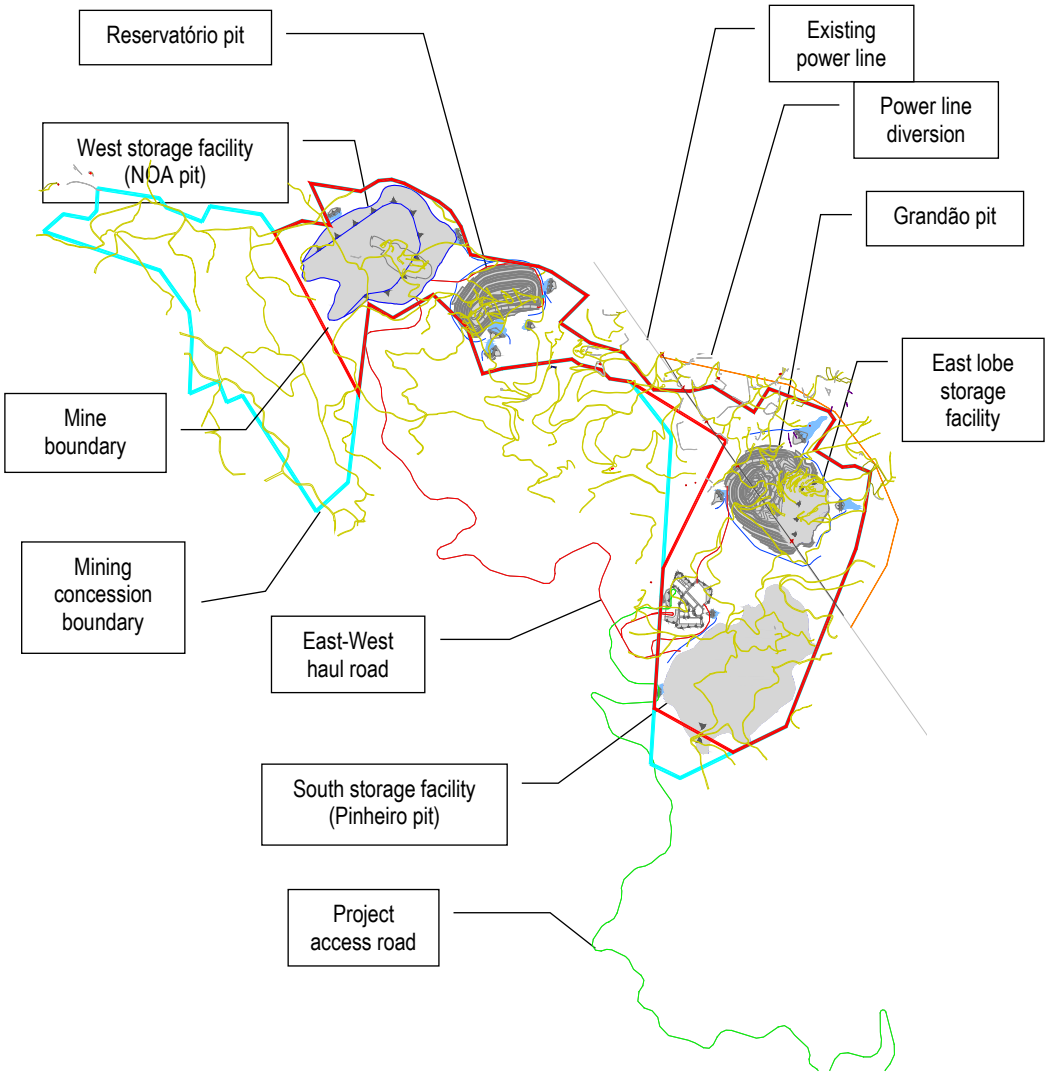


Figure 8 – Mine Scheme in Alternative 2.

Alternative 3

The sequence of mining of this alternative is started at the Pinheiro pit, followed by Grandao shortly thereafter. One year before the operation at Grandao ends, Reservatorio begins and then NOA, ending the operation of these two simultaneously (Figure 9).

Alternative 3 is characterized by implementing the new mill from the Pinheiro open pit and the road to the exterior of the mine will have a route to the South and Southeast from mill (identical to that defined in Alternative 2). The existing power line will have a new section (bypass) through the Northeast of the Grandão open pit. The waste facilities do not overlap with the open pits, except Pinheiro. All waste installations will have only waste material (rock extracted without any processing), with the exception of the southern waste installation that will receive rejects from the mill, in addition to waste material.

The characteristics of the open pits of the Grandão, Reservatorio, NOA and Pinheiro are identical in the three alternatives: with significant dimensions in the cases of Grandao (36 ha and mining level at 340) and Reservatorio (18 ha and mining level to 465) and moderate dimensions in the cases of NOA (5 ha and mining level at 610) and Pinheiro (11 ha and mining level to 460).

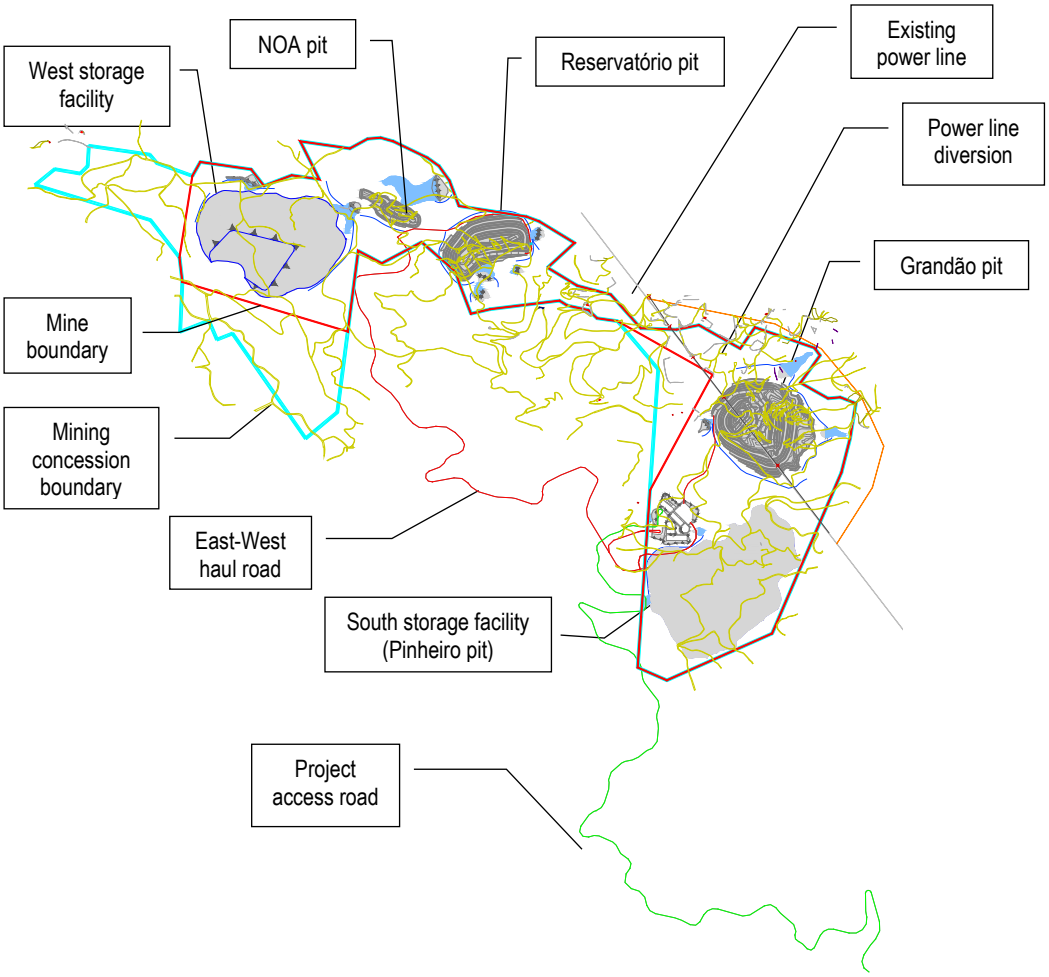


Figure 9 – Mine Scheme in Alternative 3.

5.2. MINING PLAN

5.2.1. INSTALLATION AND CONSTRUCTION

The installation and construction will be carried out in an approximate period of 2 years and will take about 300 to 350 workers for the construction of mining infrastructure (mill, access, water control systems, water supply, electricity and fuel). All construction activities will take place during the day (from 7 am to 8 pm).

Access Road

As part of the project's support infrastructure, an access road will be built that will connect the processing unit (mill) to the national road network (Figure 10). Only one of the access options will be built, depending on the location of the mill (Figure 10). The road will allow workers access, facilitate the delivery of materials and allow the shipment of products.

Two internal roads to transport material will also be built between the Mining mining infrastructure to allow the transfer of mineralization and waste material extracted within the mine area. One road will connect the Reservatorio and NOA extraction areas to the mill and the other will connect the Grandao open pit area to the processing unit. Other smaller roads connect the mill to the South Waste Installation (Pinheiro open pit) and the inner east-west road to the West waste installation (Figure 11).

It will also be necessary to build one or two bridges to allow the crossing of rivers, depending on the option selected (Figure 11). A single span bridge will be built as part of the south access road (if selected), crossing the Beça River. The other bridge will be built on the Covas River (common in both access options), as part of the construction of the internal road necessary to transfer mineralised material to the mill from the Noa and Reservatorio open pits.

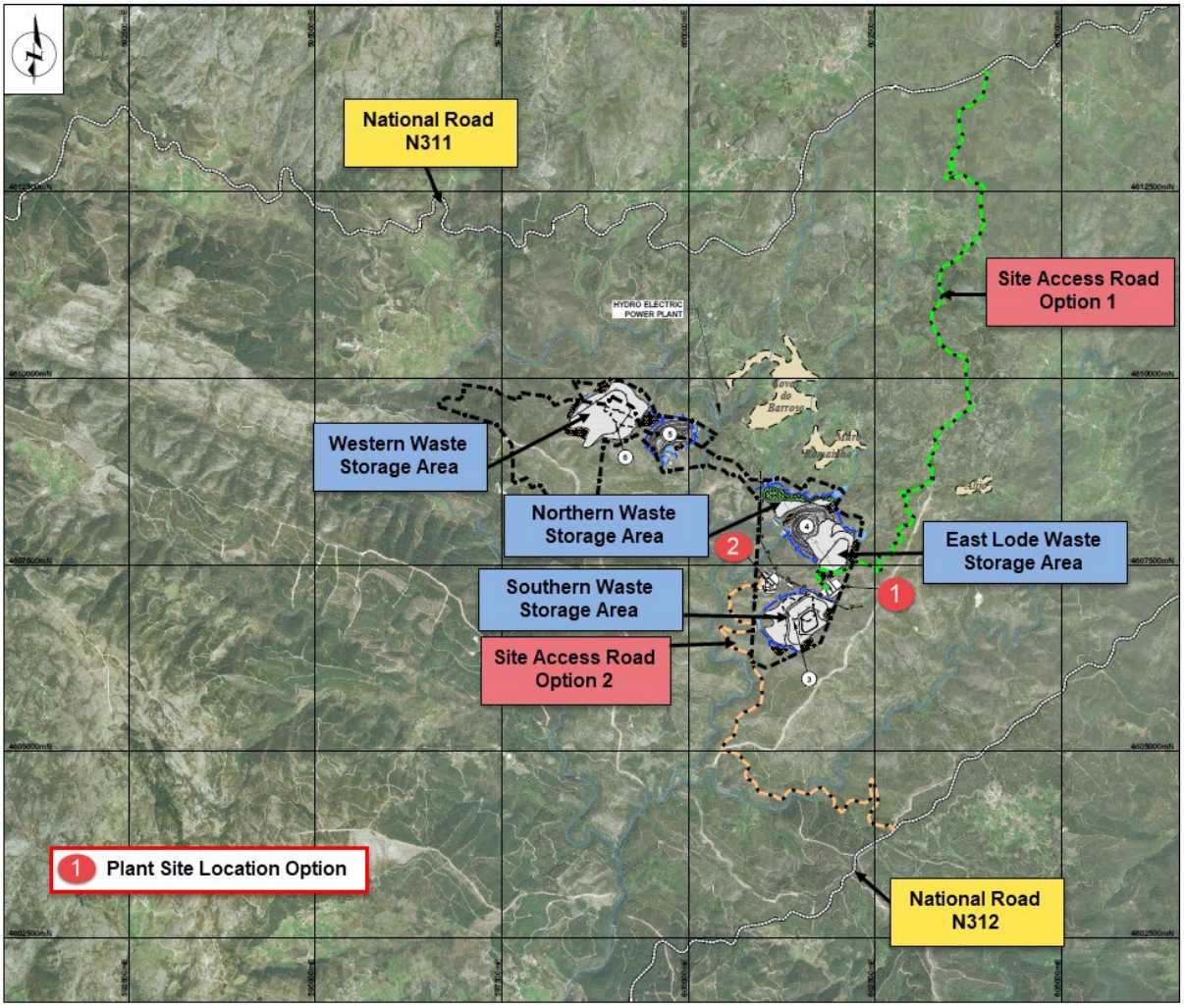


Figure 10 – Location of the options for the access road to the project.

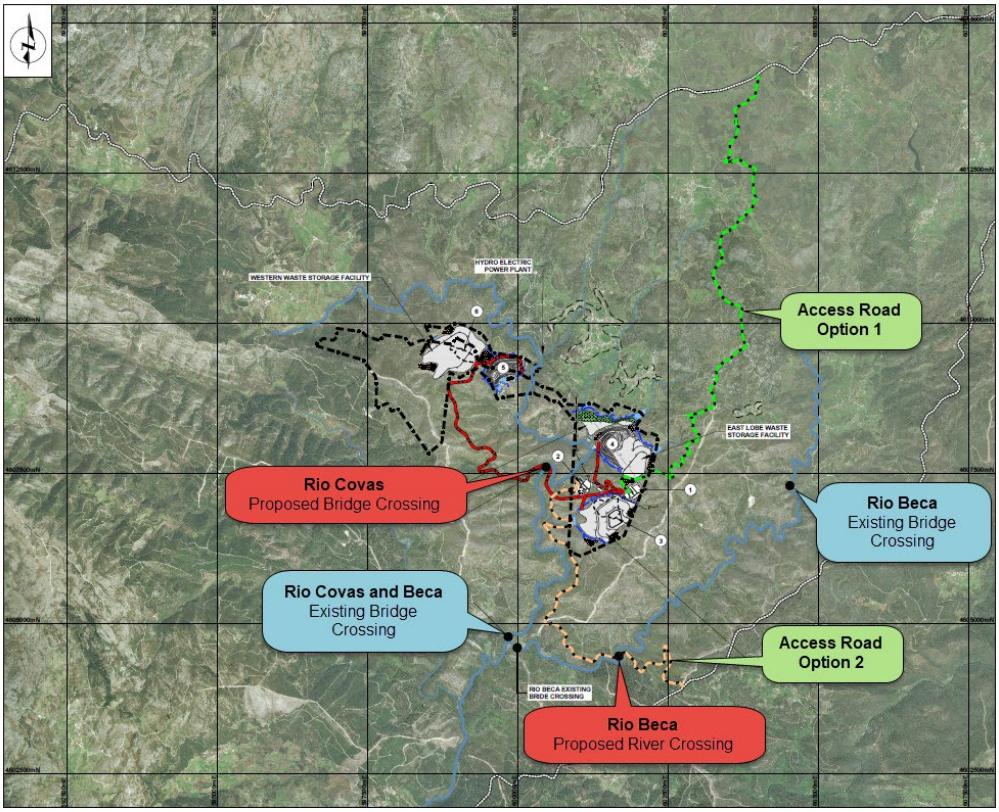


Figure 11 – Location of Existing Crossings and Proposals.

Surface water diversion and control structures

The Mining Project includes three options with regard to the management of surface waters within the limits of the mining area: 1) Option that minimizes the construction of structures to control surface flows and sediment transport and, consequently, does not provide guarantees of the quality of the waters released to the natural water environment, namely the Covas River; (2) option providing for the construction of infrastructure for the diversion of clean water, separation between clean waters (undisturbed waters) and waters resulting from the intervened areas (disturbed waters), as a consequence of mining activities and the installation of a water filtration/treatment unit prior to its return to the natural water environment; 3) Option with philosophy identical to option 2 but sized to accommodate flows resulting from extreme rainfall events, in such a way that it ensures the improvement of the quality of water flowing to the Covas River.

Water supply to the mill

Surface water resources, namely their availability, are a critical factor for the success of the mining project, since the Project foresees a water need of 0.570 hm^3 of water for its first year of operation and 0.510 hm^3 for the remaining years of the mining operation. The mining project includes three options in terms of water sources to supply water needs: 1) Use of accumulated water at the bottom of the open pits complemented with a set of groundwater catchments (vertical holes); 2) Use of flow rates of surface flows (other than those of the Covas River),use of the water from the open pit with possible construction of water storage infrastructure (in water diversion and sediment control structures); 3) Mixed origin that includes water from the surface runoff, the open pits, surface waters captured in the area of the mining concession and, in case of water shortage, water captured directly from the Covas river.

Electricity supply

There is a 60 kV airline that connects the Covas de Barroso Mini-Hydro plant to the EDP substation located in Fonte de Mouro. The power line crosses the area of the Barroso Mine, on the Grandao open pit, and will need to be moved before the start of the mining of this open pit. Most of the energy required for the project is expected to be supplied from

this line. The mine's main substation will consist of 60 kV external equipment, 60 kV/11 kV reducing transformer and an 11 kV main distribution frame installed in a dedicated compartment.

Fuels, effluents and communications

There will be 2 diesel tanks, with 55 000 litre capacity each, which will have a retention basin and supply island, equipped with retention basins and hydrocarbon separator, in order to avoid contamination of soils and waters. The internal communication will be performed with two-way radios (by operational area), and external communication with existing mobile telecommunications systems (voice and data). There will also be an ETAR with membrane bioreactors (with a capacity of up to 50 m3/day).

Figure 12 – Examples of diesel supply units and ETAR.

Mill

A mill will be constructed for the treatment of mineralization, in one of the two options presented in Figure 10. The mine will also have a set of auxiliary facilities, which will support the activities to be developed, namely, the social and hygiene facilities for the use of workers, workshop and support warehouses for the various consumables of the mine and various tools.

5.2.2. MINING

The operation will take place over a period of 12 years and will require 201 to 243 workers. In the mining phase, the mine's activities take place with different schedules, depending on the operation and the site concerned, and the less noisy operations can take place 24 hours a day. The mill will work 24 hours a day for 365 days a year.

The average amount of mineralization mined is about 1 446 000 t/year. Over the 12 years the extraction will vary between 1 023 000 t/year and 1 604 000 t/year. In terms of waste material, the average amount to be extracted annually will be around 6 851 000 t/year, with a minimum of 2 119 000 t/year and a maximum of 11 528 000 t/year.

Extraction

The extraction of the material will be carried out via open pit mining, using explosives. The broken material will be loaded by loaders or rotary excavators into dumpers and transported to the appropriate destination. The crude mineralization will be transported to the processing unit (mill) where it will be beneficiated to generate two products: spodumene concentrate (export), quartz and feldspar (ceramic and glass industry). The waste material will sent to landfill (waste facilities). Similarly, the reject from the mill will be deposited in the South Waste Installation (in the vicinity of this installation).

Equipment

The number of units of equipment required for the operation varies throughout the life of the project, with the volume of material handling and the transport distance of the waste material and mineralization, and will consist of: Rotary excavators, bulldozers, road watering trucks, dumpers, graders, front end loaders, trucks, light vehicles and drill rigs.

Mill

In the Barroso Mine, lithiniferous pegmatite will be processed and treated in the mill, producing a concentrate of spodumene, with feldspar and quartz as co-products. The mill will receive the rock with an average content of about 1% Li2O, concentrating it to approximately 5.5 to 6.0% Li2O. During this process, the mass will be reduced from about 1 500 000 t / year (incoming) to approximately 180 000 t / year (out).

The mill of the Barroso Mine will contain the following areas of primary processing: crushing; primary, secondary and tertiary crushers; removal of mica; reflux classifier; grinding; ball mill; magnetic separation; *WHIMS*; fluctuation; filtration, removal of excess water and storage of concentrate and filtration and removal of excess water and storage of rejects.

Auxiliary installations

Integrated in the mill, there will be other facilities to support the operation, including fuel tanks, mechanical workshop, warehouse, office, laboratory, changing rooms, toilets, medical and first aid facilities, cafeteria, etc. There will also be a car parking area next to the mill. Next to the mill will also be installed a Mine Water Treatment Plant (ETAM), with a view to collecting the waters circulating in ditches and dispatch areas, treating them and incorporating them in the process of mill. Next to each operating open pit, there will be containerized sanitary facilities to serve the employees who operate in this open pit.

5.2.3. WASTE MANAGEMENT

In the mining of the various open pits, it is estimated that the waste material totals approximately 83 792 000 t, essentially made up of stones and soil (waste) and rejects. Most of these residues will be stored in Waste Installations (Integrated Waste Landform) and in the landscape recovery process, more specifically in the filling and re-modeling of the areas mined.

In reference to the production of non-mining waste as a result of the ancillary activities to be developed in the mine area. Such waste will be managed autonomously and independently of mining waste and be forwarded to duly licensed waste management operators. Non-mining waste will be produced in the various support facilities and will be properly packed, by typologies, until collected by waste management operators. In the case of waste resulting from equipment maintenance (such as waste oils and oil filters) they will be stored separately in retention basins and covered, in order to avoid any leakage to the outside, and then sent to an accredited facility.

5.2.4. SAFETY AND HEALTH

Given the relevance that occupational accidents and occupational diseases have in the most important aspects of the lives of its employees and families, Savannah will proceed to the preparation of the Health and Safety Plan (PSS), respecting legal provisions.

5.2.5. LANDSCAPE RECOVERY

The proposal for landscape recovery presented aims to ensure that the entire area to be disturbed is properly integrated into the surrounding landscape both during the construction phase, either in the mining phase or at the end, in the post-mining period.

In the construction phase of the project the elements that will act as a visual barrier to minimize the impacts resulting from changes in the landscape will be created and reinforced. In particular, the:

- planting of vegetation curtains with tree's and shrub's on raised earthen bunds in order to create dense visual barriers and thereby reduce the visual disturbance from the places with the highest number of sensitive receptors;
- Planting of tree vegetation along the internal roads of mining access will also be completed, aiming at reducing the emission of dust to the surrounding;
- Delimitation of circulation and material storage areas.

The mining methodology consists of a phased intervention strategy for each mining open pit, that is, only one area will be mined at a time and when the mining ends in the respective open pit, it will be immediately subject to partial or complete landfill, environmental and landscape modelling and recovery.

It is intended to create a constant balance between areas being mined and areas in recovery, allowing the successive release of areas as the mining advances to the following open pits and a shorter operating time and reduction of the period of land use for mining. This will give a greater guarantee that, at the end of the mining, the area is rehabilitated for other uses.

It is also important to note that, in all rehabilitation and topographic modeling operations, the waste products produced during the mining of the mineral resource will be used. Once the final project quotas are reached, the modeled areas will be coated with a layer of topsoil, on which the sowing and planting will be carried out, with the exception of the places that are left with water plans.

Proposals were made for the recovery and landscape reclamation to be carried out at each of the areas disturbed by mining:

- **Open pit of Grandão and Open pit Reservatorio** – The recommended type of recovery includes the performance of landfill and modeling operations along all levels of the excavation greater than 490mRL and 590mRL, respectively. Considering the pits will intersect the standing water table and that these pits will be fed by an upstream water line, it is proposed that these be flooded creating a pond at a maximum level of 490 mRL and 590 mRL, respectively, from that level the flow will continue, for the natural drainage lines in the surroundings. Along the marginal area of the lagoons, an autochthonous riparian gallery will be installed in order to stabilize the margins and increase the biodiversity there (Figure 13).
- **Pinheiro open pit** – The recovery solution presupposes the pit as a waste and discarded mining waste facility, which will contribute to the complete filling of this open pit and creation of a re-modelled landfill that will integrate with the current topography on slope flank. (Figure 14).
- **NOA Open pit** – The type of works in terms of landscape recovery proposed in this pit located in the Northwest quadrant of the concession area, include landfill and shaping operations along the levels of the excavation slopes and at the base of the pit (Figure 15).
- **Areas occupied with waste facilities –** Waste facilities develop over time as mining progresses, which are constructed with waste landfill materials from mining and rejected from the mill (in the case of South Waste Installation),will be rehabilitated with a layer of topsoil, which will be spread in order to allow the installation of vegetation and integration of the mining area into the surrounding landscape (Figure14).
- **Infrastructure areas** – This includes all spaces occupied with mining buildings and infrastructure, namely industrial facilities (mill) and support and equipment. The procedure for the recovery and landscape rehabilitation begins with the deactivation and removal of these infrastructures and involves mobilizing and rehabilitating the land through rip or scarification and tillage, then proceeding to the spreading of topsoil and adequate vegetation covering (Figure16).
-

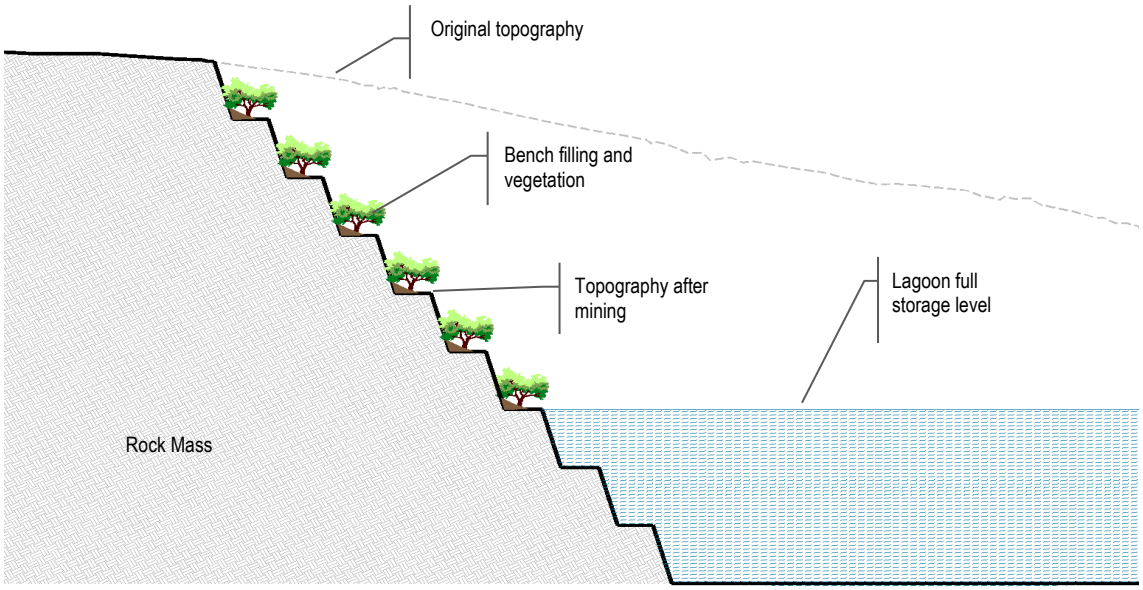


Figure 13 – Cross-section of landscape recovery in open pits with landfill solution and revegetation of the landings and pond at the base of the open pit.

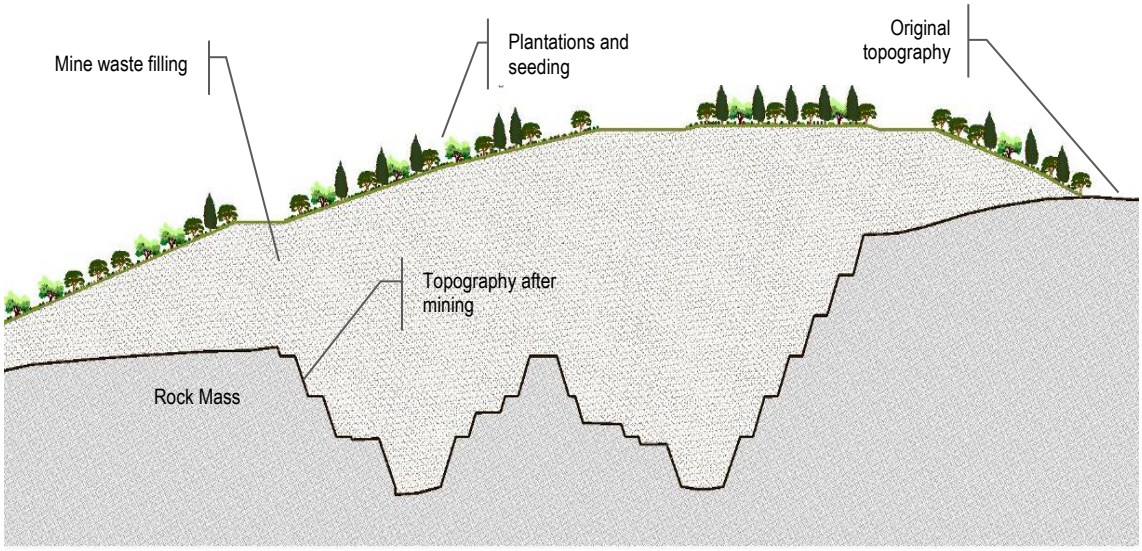


Figure 14 – Cross-section of landscape recovery in open pits with filling solution and waste installation.

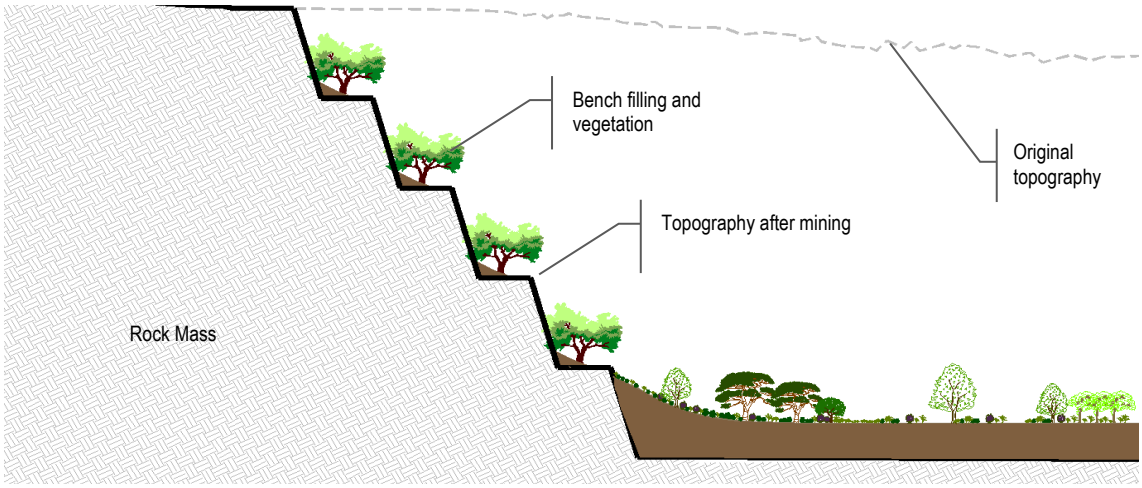


Figure 15 – Cross-section of landscape recovery in open pits with landfill solution at excavation levels.

Figure 16 – Cross-section of landscape recovery in infrastructure areas.

5.2.6. DEACTIVATION

In years 15 and 16, dedicated to the decommissioning of the mine and remaining work of landscape recovery, the activities will take place only in the daytime period, i.e., from 7:00 am to 8:00 pm.

The social and support facilities as well as the workshop and warehouse will be dismantled and remobilized out of the mine area. However, depending on the conversations that may be established with local entities, some facilities may remain on site and be re-purposed. The dismantling of the mill and other industrial support facilities, namely fuel tanks, as well as semi-mobile and fixed mine equipment, including generators, will also be remobilized outside the mine area.

With regard to the diversion structures of the water lines that converge to the Grandão open pit and to the Reservatorio open pit, their deactivation will occur only when the ponds inside these open pits are with a dimension close to the maximum filling level. Thus, the water filling of these lagoons, in the initial years, will be carried out by rainwater and infiltration of groundwater. Thus, it is ensured that the flow of water to the Covas River is not compromised in the filling period of the lagoons. At this stage the capture holes will be sealed.

6. REFERENCE SITUATION AND IMPACT FORECASTING

The project footprint was characterized by the study of all potentially affected environmental components, covering biophysical, socio-economic, cultural, planning and environmental quality aspects. Depending on the potential negative impacts, for each of the environmental components studied the EIA considered specific minimization measures compiled in the following chapter.

6.1. CLIMATE AND CLIMATE CHANGE

The climate of the Barroso region is characterized by a temperate climate, with rainy winters and dry and slightly hot summers. With regard to climate, mining activities are not expected to have an impact on it. However, it was found that some climatic characteristics, for example, winds and rain, may influence the dispersion of dust.

As for climate change, it is found that the region faces particularly relevant challenges, namely with regard to the occurrence of more frequent drought cycles, lower water availability, increased likelihood of rapid flooding (heavy rainfall) or forest fires (associated with extreme high temperatures and low humidity). However, considering the lifetime of the activity (about 12 years), it is not expected to be responsible for, or could suffer from, significant changes in climate.

6.2. GEOLOGY AND GEOMORPHOLOGY

The regional geomorphology, where the Barroso Mine is located, is marked by opposing high reliefs and deep valleys.

In the formation of aplites and, or pegmatites, the main deposits of tin and lithium which exist in the region are found, and the work developed in the region revealed the presence of applopegmatitic veins with high contents in lithium. The veins with lithiniferous mineralization are an important mineral resource, having characteristics as raw material for the manufacture of ceramic pastes, glass, lubricants, pharmaceuticals, cosmetics and more recently as raw material for the production of batteries.

Currently there is an exponential interest in lithium existing in this mineralogical context, due to the desire to obtain Li metal from Li_2O concentrates with subsequent metallogenic treatment. In other words, today the world economy tends to use clean alternative energies to the detriment of fossil fuels, thus there is a high demand for lithium in international markets for application in the automotive industry, particularly in the new generation of electric powered cars, greatly increasing interest in these mineral deposits.

As for the impacts, the excavations to be carried out in the open pits, the construction of waste installations and drainage systems and the creation of platforms for the support facilities constitute a change in the original relief, which constitutes a certain negative, permanent impact of moderate magnitude, with the exception of open pits and waste installations, where the impact on the relief will have a high magnitude, as there will be some re-modelling from existing ones.

The excavations to be carried out in the open pits will induce the destruction of geological formations, which will constitute an impact, negative, certain and permanent, but of reduced magnitude, since they do not constitute geological values to preserve either rare formations or constitute a significant loss in geological terms, given the abundance in the region of these geological formations.

In the case of the excavation of the mineral resource itself, its mining will have an overall positive impact, since it translates into the use of a mineral resource that can be economically exploited.

6.3. SURFACE WATER RESOURCES

The Barroso Mine is part of the Douro hydrographic region, being crossed by the Covas River, a tributary of the right bank of the Beça River. The latter is a tributary of the Tâmega River, one of the main tributaries of the right bank of the Douro River. Within the limits of the concession area, or in its vicinity, there are also other water lines of lesser expression, namely two tributaries on the left bank of the Covas River (Corgo do Fojo and Corgo dos Lamais) and a tributary on the right bank called Couto brook.

The impacts identified on surface water resources are:

- affectation of the affluents of the Covas River through the pits, in the places where the ore will be exploited
- diversion of water, hydraulic passages, perimeter valleys and flood channels around the main infrastructures to be built on the surface, further increasing the construction of basins to control sediments around the open pits as well as the building and the waterworks.
- consumption of water of surface origin, mainly for the consumption of the mill, coming from two distinct origins, the tributaries of the Covas River[1] (Corgo dos Lamais and Corgo do Fojo) and, if authorized, the Covas river itself;
- potential minor affect of the ecological flow of the Covas River between June and August, according to a study of ecological flow rates of the Covas River;
- Waterproofing of the Covas River hydrographic sub-basin with the installation of the main infrastructure to support the mine (mill, heaps, social facilities) that will occupy an area of 1.4 km^2, with a consequent increase in peak water flows.

The impacts identified above have an increasing character during the construction phase, are considered stabilized in the mining phase and will decrease in magnitude in the deactivation phase, namely with the replacement of the water lines (whenever possible), with the end of retention and consumption of surface water. After the closure of the mine, the hydrological regime will approach the current hydrological regime, foreseeing slight attenuation of the peak water flows, due to the small lagoons created in the pits (2), with reduced flow regularization capacity.[2]

6.4. UNDERGROUND WATER RESOURCES

From the point of view of underground water resources and according to existing information, the region manifests scarce underground water resources, a consequence of the presence of steep reliefs with strong slopes. Potential impacts, are referenced below:

- The excavation of open pits (Grandao, Reservatorio, NOA and Pinheiro) will eventually change the hydrodynamic pattern of groundwater. This uncertainty will be diminished in the near future with the measurement of the tributary flow rates to the open pits (during their advance) and georeferencing of water inflows;
- There is no expected impact on groundwater catchments for public supply as they are far from the open pits at least 1.3 km away;
- There is no expected impact on particular groundwater catchments, given the distance they are from mining intervention areas (in particular open pits) and also taking into account the geological framework;
- Given the distances between the grasslands and the locations of the open pits, it is considered that there is a single grassland that could be affected by the excavations, the grassland immediately north of the Grandao open pit.

6.5. WATER QUALITY

For the development of the Barroso Mine project, water will be captured for industrial use (dismantling operations, processing and dust suppression) from the bottom of the open pits, surface flows and, in one of the options presented the Covas river itself.

The quality of surface water and groundwater may be affected by mining activity by: dust entrainment and/or outdoor deposits of workings (either waste or rejected); accidental spillage of oils, lubricants and/or fuels used in machinery and vehicles, suitable for operation and transport; problems in ETAR and ETAM.

[1] It has been proven that impossibility of groundwater to be the main source of water

[2] According to the Landscape Recovery Plan (PRP) the topographic replacement of three of the open pits will be partial, with the creation of ponds in the open pits of Grandao and Reservatorio.

Domestic effluents generated in social facilities will be sent to watertight septic tanks, and treated in the TARS, no longer constituting any focus of contamination, provided that they are properly routed to a licensed final destination.

The fuel used for the project will be stored in a tank(s) on the surface with a retaining basin attached and the oils (new and used) will be stored in watertight containers, located on a waterproofed and covered surface.

Drinking water for use in social facilities (cafeteria, changing rooms and toilets) and for ingestion will come from a water treatment plant planned for the mining area.

6.6. AIR QUALITY

The Barroso Mine is located in a rural area occupied by forests and production forest (brave pines), and small villages. For the characterization of the reference situation of Air Quality a sensitive receiver was placed in the village of Covas do Barroso, near the mine (300 meters), where dust measurements were performed, for 14 days, and it was verified that the concentration levels of dust measured do not exceed the limit value established by the legislation in force.

In order to quantify the potential impacts induced by the project, simulations were performed to determine the concentration of dust in the surrounding area. To this end, dust emissions were simulated in the mine area (uncovered roads, crushing (lading) and mining, verifying that the operations resulting from the work of the Barroso Mine will be responsible for the occurrence of negative impacts, but not significant in terms of air quality and will be in compliance with the legal emission limits.

6.7. SOUND ENVIRONMENT

Mina do Barroso is located in a rural area with a low human occupation, with special mention to the villages closest to the concession area: Covas do Barroso, Dornelas, Romainho and Muro.

For the characterization of the Sound Environment, noise measurements were made to the main sensitive receptors potentially affected by the mining operations and their accesses, verifying that the values are lower than those legally stipulated.

The impact assessment was carried out using specific *software,* namely the environmental noise forecasting and mapping program, concluding that in the mining phase negative impacts will occur due to the work of the different equipment associated with the production process, as well as vehicle traffic. Nevertheless, modelling demonstrated compliance with the legislated noise limit values at all times of the day and night.

6.8. VIBRATIONS

Mining of the lithium mineralization (hosted in spodumene) it will require the use of explosives to break up the rock. The detonation of explosives will inevitably generate vibrations. As part of the work related to the mining of the current mine open pit for ceramics, vibration monitoring campaigns were carried out, using engineering seismographs, and it was concluded that there are no impacts expected to affect the existing structures in the mine's surroundings.

In the Barroso Mine the proposed blasting plan includes regular maximum instantaneous loads of 40 kg of explosives so no impacts on the vibration factor are expected.

6.9. SOILS AND SOIL GEOCHEMISTRY

The soils that occur in the design and surrounding area are predominantly poor soils in terms of fertility, having as original material granites and shales.

The Mining Plan provides for the withdrawal of the topsoil from affected areas, their storage and treatment and subsequent placement in the areas to be recovered. Thus, regardless of the productive capacity that the soils present, it is considered that the impacts associated with the project will be of little importance, since the soils present here will be preserved.

In the scope of soil geochemistry and with the objective of establishing a basic reference in relation to the chemical composition (inorganic and organic) of the soils of the mining area and its nearby surroundings, a soil sampling campaign and subsequent laboratory analysis were carried out. Twenty-six sites considered representative of the various areas to be intervened by the project were sampled. Currently, it is verified that the characteristics of the soils result essentially from the mineralogy of the underlying geological formations.

6.10. WASTE MANAGEMENT

In the mining and treatment of the mineralization of the Barroso Mine there will be production of mining waste (waste and rejected) and non-mining waste (oils, domestic effluents, tires, etc.). Therefore, a specific waste management plan has been developed for the mining project - the Waste Deposition and Management Plan. Based on the waste management plan, defined with the Mining Plan (project), allows us to note that no negative impacts are foreseen with correct construction, management and monitoring.

6.11. ECOLOGICAL SYSTEMS

The proposed project's disturbance area is characterized by the presence of extensive areas of native bush (73% of the mapped area). Occasionally, tree formations of high ecological value are observed, such as oak trees and areas of well-preserved riparian vegetation (<5% of the mapped area). The human presence in the area is relatively low and is observed by the presence of areas of grassland, agricultural areas and by some plantations of exotic species, such as eucalyptus. The mapped artificial areas refer to places where the activities of the mine are carried out and areas of prospecting already carried out, as well as existing roads.

Studies identified 373 species of flora with potential occurrence within the study area distributed by 74 botanical families, of which 22 stand out with greater interest for conservation. During the fieldwork, 211 of these species were recorded, of which 5 have high conservation value: *Veronica micrantha*, Quercus *suber*, *Ilex aquifolium*, *Dactylorhiza maculata* and Serapias *língua*.

The presence of 6 natural habitats was confirmed, including habitat 91E0* - Alluvial forests of *Alnus glutinosa* and Fraxinus *excelsior* in the Beça River and Covas river. In the water lines there is also the presence of Habitat 92A0 - Forest- galleries of *Salix alba* and Populus *alba,* and there are other areas with swathes of galaico-Portuguese oak of *Q. robur* and Q. *pyrenaica* (habitat 9230).

The fauna study of the area has identified 142 species of invertebrates and 218 vertebrate species. In relation to invertebrates, among the list of 142 species 10 species with status stand out: the gastropod Geomalacus *maculosus,* the bivalve Margaritifera *margaritiferous* and the insects, *Lucanus cervus,***Callimorpha quadripunctata* (priority species), *Euphydryas aurinia, Coenagrion mercuriale, Cerambyx bristler, Gomphus graslinii, Macromia splendens* and *Oxygastra curtisii*..

Among the 218 vertebrate species, 31 have threatened status, of which it was possible to observe 2 during fieldwork, a bird *(Circus pygargus)* and a bat (*Miniopterus schreibersii*). Among the species potentially present in the area are the species: the river trout *(Salmo trout), the* Northern straight-mouth nase *(Pseudochondrostoma duriense),* the Northern escalo. *(Squalius carolitertii),* the Golden striped salamander *(Chioglossa lusitanica),*the Palmate newt (*Triturus helveticus*), the European flat snake (*Coronella austriaca*), the Cordoned viper (*Vipera latastei*), the Seoane's viper (*Vipera seoanei*), the Montagu's harrier-(Circus *pygargus*), the Rock *thrush (Monticola saxatilis),* the Red-billed crow *(Pyrrhocorax pyrrhocorax),*the Greater horseshoe bat (Rhinolophus*ferrumequinum),* the lesser horseshoe bat *(Rhinolophus hipposideros),* the Mediterranean horseshoe bat---*(Rhinolophus euryale),* the greater mouse-eared bat (Myotis *myotis),*the Southern fringe bat (*Myotis escalerai*), the Common bent-wing bat *(Miniopterus schreibersii),* the European wildcat *(Felis silvestris),* the Pyrenean desman *(Galemys pyrenaicus),* the wolf *(Canis lupus).*

With regard to the presence of a wolf, the study area does not intercept the known territory of any pack, but it is possible to notice that there are several packs in the surroundings, according to Pimenta *et al*., with records of its presence near the concession area (in 2014, 2015 and 2017), and there is also knowledge of a breeding site about 5 km from the concession area. Thus, it is believed that the species can use the area under study but only as a place of passage.[1][2][3][4][5][6]

[1] Pepper *et al*., 2005
[2] ICNF, 2017
[3] IBERDROLA, 2015
[4] ICNF, 2017
[5] Bioinsight, 2018
[6] Bioinsight, 2019

As for the Pyrenean desman *(Galemys pyrenaicus),* the water lines that cross the study area are considered as important for the conservation of the species, namely the Beça River and the Covas River, and the presence of the species in the Covas River was confirmed during the fieldwork carried out.[1]

The main impacts on the flora during the construction phase are related to the direct destruction of biotopes due to the activities of removal of the plant cover and stripping of the surface layer of the soil and the construction activities themselves of the design components (*e.g.*: mill, accesses), the impacts resulting from will be local (because the deforesting is confined to the intervention area) and of moderate or low significance, and minimized by the application of appropriate mitigation measures.

The impacts on the fauna resulting from the construction phase of the project, result from the opening or improvement of accesses, increased presence of people, machines and vehicles in the area affects, the work and emission of noise and artificial light resulting from the installation of the various elements that make up the project. The potential impacts resulting from these actions relate to the change in the use of space by some species of fauna and the decrease in the number of effective populations of fauna in general in the area and result mainly from the disturbance caused by all the actions in progress, as well as the loss of habitat and mortality of individuals, due to accidental causes. In any situation, the expected impacts are local.

During the mining phase, extraction will begin in the concession area by exploiting the different open pits. The mining phase is also associated with the use of several drains. Thus, the main impacts (transverse to the various alternatives) on the flora and vegetation are related to the removal of the plant cover and disturbance of the surface layer of the soil in the areas to be mined and in the areas of waste installations. It is also predicted the degradation of biotopes present in surrounding areas, caused by the various movements of people and vehicles present in the area, due to dust deposition, tramps and possible passage and parking of vehicles. These impacts are classified as local, and with low to very low significance, depending on the ecological value of the affected biotopes.

As for the favoring of the installation of exotic and invasive species, the presence of nuclei in the study area, and in nearby areas, makes it predict their possible dissemination in the area, facilitated by the opening of vegetation-free spaces and the presence of constant disturbances. This impact is considered low significance and local, confined to the project area. During this phase work will also begin on landscape recovery, which will be done in parallel with the mining of the open pits, and even where local, are expected as positive impacts.

The main impacts on the fauna at this stage are related to the presence of people, machinery and vehicles in the area affected by the mining operations and emission of noise resulting from the mining of the open pits, including controlled detonations, and the loss of habitat in the sites used by the project. During the mining phase, the impacts described for the construction phase are expected to be slightly increased, as there is a greater volume of vehicle movements in the area, in particular in access to the project and in the daytime period.

For fauna in general, there is expected to be a decrease in the population numbers caused by temporary removal due to habitat loss, disturbance and accidental mortality. At this stage, many species should already be accustomed to the existing disturbance, even with the existence of detonations to break the rock. Thus, it is considered that this impact is temporary, of very low magnitude and very low significance, with effects essentially on the local scale.

With regard to the chiropters and the avifauna, in particular for the species with greater sensitivity, taking into account the characterization made, it is considered that possible impacts, to happen, will be negligible.

As for the wolf, it is considered that the disturbance caused by the project may cause a change in the use of space by the population. This impact, occurring, will have greater significance in alternative 1.

With regard to aquatic fauna and the quality of the biological elements of the water lines, only impacts related to the construction of two crossings are expected, one on the Covas River (internal access) and a second on the Beça River (only in alternatives 2 and 3). Under any circumstances, only local impacts of low to moderate significance are expected.

6.12. LANDSCAPE

The territory where the proposed project expansion of the Barroso Mine will take place is characterized by its vigorous relief, with mountains and embedded valleys.

[1] Queiroz *et al*., 1998

The study area has a reduced overall visual sensitivity, so any intervention in the territory is possible whenever it does not drastically alter the setting in which it is included, even if any intervention is the subject of careful study and planning in order to be integrated into the surrounding landscape.

Mining activities such as deforesting and stripping of the areas to be intervened, as well as the morphological changes generated by the mining and waste facilities will constitute negative visual impacts. However, the project presupposes the phased landscape recovery of the affected areas, as the final quotas of the respective components that integrate the mining project are being achieved, and a productive and sustainable landscape is replaced in the shortest possible time, as provided for in the Landscape Recovery Plan (PRP). In fact, the advance of landscape recovery in parallel with mining will make it possible to mitigate, in an effective way, the generality of the expected landscape and visual impacts.

6.13. TERRITORY

According to the Municipal Master Plan (PDM) of Boticas the area to be granted is framed in the planning letter, the proposed area for the mine is included in *Rural Soil (Agricultural* Spaces, Forest Spaces and Natural Spaces - Rocky Outcrops and Water Courses and Plans), Municipal *Ecological Structure, Areas of Geological Potential (Dornelas / Cova do Barroso)*. In the letter of Constraints in the area proposed for the mine, the following services and restrictions of public utility are identified: REN, RAN, Public Water Domain, Mining Concessions, Areas submitted to Forest Regime; High Voltage Network. In the Conditioning Plant of the Areas Covered by Fires in the last 10 years there are the occurrence of fires in the years *1995 to 2002.* In the Fire Risk Chart Conditioning Plant, the classification of *Very Low, Low, Medium, High and Very High Hazards is verified.*

About REN of the municipality of Boticas, it is also worth mentioning that the mining project affects the following ecosystems: Watercourses Beds, Waterlines Headwaters, Maximum Infiltration Areas and Areas with Erosion Risks.

It should also be noted that the Barroso region (which extends through the municipalities of Boticas and Montalegre), has been classified as world agricultural heritage by the Food and Agriculture Organization of the United Nations (FAO).

It is noteworthy that no significant conflicts were detected between the implementation of the project and the recommended uses for the area under study, which prove to be impediments to its development.

6.14. SOCIO-ECONOMICS

The Barroso Mine project is part of a rural area, in a space with important natural and landscape resources. Sparse human occupation in the area surrounding the site of implementation of the project, verifying vast areas without any type of occupation, the nearest locations of the mine are: Vila Grande and Dornelas (1800 m, 1200 m and 720 m in the west direction, respectively), Vila Pequena, Espertina and Antigo (located to the Northwest, 1200 m and 650 m, respectively), Romainho, Covas do Barroso and Muro (at 200 m, endo 750 m and 400 m in the north direction, respectively), Alijó (1300 m to the Northeast) and Lousas (800 m southwest). The municipalities covered (Boticas and Ribeira de Pena) have weak population dynamics, with a progressive increase in the aging population, and a business fabric based mainly on the tertiary sector.

The following aspects of the social and economic characterization stand out:

- the municipality of Boticas recorded, in 2011, a decrease of about 10% of inhabitants, compared to 2001. Like Boticas, the parishes of Covas do Barroso, Dornelas and Vilar and Viveiros also saw their population decrease by about 25%, 18% and 17%, respectively. In the municipality of Ribeira de Pena, the resident population follows the same trend, with a decrease of 12% compared to 2001 in the county seat, 23% in the parish of Canedo and 16% in the parish of Santa Marinha;
- the territorial units under study are in a progressive process of aging, in view of the reduction of younger age groups, being the most representative age groups, both in the municipalities and in the parishes, those related to the intervals of 25 to 64 years and 65+ years (this process is materialized in the risk of closure of public services in the municipality due to the lack of scale verified, demographic decline and population ageing);
- the municipalities analyzed present, in general, an average qualification of the workforce, an activity rate between 20 and 35% and an average unemployment rate of 9%, in the municipality of Boticas and 20% in the municipality of Ribeira de Pena;
- both municipalities (and the parish of Ribeira de Pena) are based on their productive structure and employability, mostly in the tertiary sector, while in the parishes of the municipality of Boticas there is a balanced distribution by the

three sectors of economic activity (with the exception of the parish of Vilar and Viveiro, which follows the trend of what happened in Boticas);

- the primary sector mirrors endogenous products of recognized quality – some with Protected Designation of Origin (PDO) and Protected Geographical Indication (PGI);
- both municipalities have good road accessibility (proximity to the A7).

Mining activity represents, from the point of view of the socio-economy, an important development factor, both by the use of existing mineral resources and by the industries it feeds upstream, being, in this area, a pole of economic growth, generating direct and indirect employment and polarizing the diversity of local and regional economic activities. In this sense, the impacts resulting from this activity are obviously positive. The possible negative impacts relate mainly, to the potential environmental impacts, treated with greater depth in the corresponding environmental factors. However, they are still important from a socio-economic point of view if they negatively affect the quality of life of the populations and their daily lives.

It should also be noted that a survey was made, based on the analysis of strategic documents for the region and direct contact with the population involved, of the needs felt locally, resulting in a set of actions that will benefit the localities and populations affected by the project. The actions to be developed are distributed in several areas of intervention: Energy, Health, Mobility, Social Support for Young People, The Needy and The Elderly, Agriculture and Rural Development, Employment and Economic Promotion and Civil Protection and will be better presented in chapter 8 of this RNT.

6.15. HUMAN HEALTH

In relation to this Project, due to the characteristics of its activity and the characteristics of its location (population and occupation of the surrounding territory), it is not expected, that it will generate relevant impacts on Human Health. However, these potential impacts of the Project will be evaluated in an integrated way with other factors, such as the vulnerability of the project in water resources and water quality, sound environment, vibrations, air quality, soils (soil geochemistry) and waste management and how these aspects can also relate to lifestyles and health.

6.16. CULTURAL HERITAGE

A study on the Cultural Heritage for the project was carried out based on documentary research and field work, having identified 10 occurrences in the mining concession area and 85 in the surrounding area.

The characterization of impacts is based on (1) the physical nature of occurrences of cultural interest, (2) the degree of incidence or proximity (partial or total overlap) of the impacting action on the occurrence of cultural interest and (3) on the intrinsic cultural value of the occurrence subject to impact. For this purpose, the minimum distances between the peripheries of the various parts of the Project and the quoted positions or peripheries of occurrences of cultural interest were estimated from detailed mapping.

Comparing the cartographic implementation of the 102 occurrences with the alternatives of the project, several negative impacts are identified that can be considered non-critical and minimized, either in the installation phase of mining infrastructure and in the mining phase of the mineral ore. More complex is the assessment of the intrusive effect of the Project on the Agricultural Landscape of Barroso, subject to compensatory measures and best appreciated in the following point.

6.17. BARROSO WORLD AGRICULTURAL HERITAGE

The Barroso region is an agricultural region dominated by livestock production and the typical crops of the mountainous regions. The mountainous landscape is historically related to traditional agricultural systems, largely based on livestock farming, mainly cattle, and cereal production, giving rise to a landscape mosaic in which pastures, cultivation areas (rye fields and vegetable gardens), and forests are interdependent, and where animals are a key element.

From a cultural point of view, the inhabitants of Barroso developed and maintained forms of social organization, communitarianism being one of Barroso's characteristic values, closely associated with rural practices of collective life.

The designation of this territory as GIAHS site – Globally Important Agricultural Heritage Systems - reflects FAO's intention to promote and preserve the agricultural heritage present here, as well as the relations between the various elements that compose and sustain it. In particular, traditional agricultural systems (historically related to mountainous landscapes), largely based on livestock farming and cereal production that have given rise to a mosaic in which ancient pastures, cultivation areas and forest areas interrelate and become co-dependent in landscape transformation.

According to the evaluation carried out the impact of the mining of the Barroso Mine on the Barroso region, can be considered indirect, negative and certain. In accordance with chapter 7 and 8 minimization and compensation measures have been complied with to meet and develop the cultural and landscape attributes that determined the classification.

6.18. ENVIRONMENTAL RISKS

A risk analysis was undertaken and the following potential risks were identified: sliding of materials; road accidents at the entrance to the national road network at ER 311, or N 312; contamination of water lines, soils or aquifers (accidental spills); high rainfall, forest fires and earthquakes.

Savannah's commitment to accident prevention and protection in the development of the mining project contributes to the reduction of the risks associated with the activity of mineral deposit exploitation.

7. MINIMISATION MEASURES

7.1. INITIAL CONSIDERATIONS

After identifying the main impacts associated with the implementation of the project, corrective and minimizing measures were defined that ensure the proper balance of the environment in the proposed development area and its surroundings. Minimization measures to be adopted during the various phases of project implementation are presented with a view to mitigating planned disruptions.

Some of these measures constitute integrated or complementary aspects of the interventions included in the Mining Plan as in the mine's own work. Others refer to the most appropriate technical and environmental solutions, in order to ensure that this Project constitutes an example of environmental excellence and environmental protection.

Thus, it is noteworthy the existence of some rules and procedures common to virtually all environmental factors that will make it possible to effectively mitigate the impacts expected. These measures will be integrated into the Mining Plan itself and undergo the correct management of the mining of the mineral resource, since it is at this stage that the most significant impacts were found and, later, by the implementation and proper maintenance of the recommended Recovery Plan. Thus, the general measures to be implemented are summarized, after which the minimizing measures of the environmental impacts found are described, specific to the environmental factors that are more sensitive due to the impact assessment made.

7.2. MEASURES OF A GENERAL NATURE

In the construction and operation phase**,** the general minimization measures to be implemented go through the following actions:

- the actions relating to the installation and operation shall be confined to the smallest possible space, limiting the areas of intervention so that they do not unnecessarily intersect and affect the border areas not intervened;
- the perimeter of the construction work and mining area will be sealed and flagged, in order to limit as much as possible the entry of strangers and thus avoid accidents;
- the destruction of the vegetation cover will be limited to the areas strictly necessary for the execution of the work and the continuation of the Project ensures that these are properly recovered in the shortest possible time;
- the Recovery Plan includes the stripping and storage of the top soil for further use in landscape recovery work and thus ensure greater success in the implantation of vegetation;
- the places of deposition *of* waste materials are duly defined in the Mining Plan;
- management of non-mining waste will be carried out as defined in the Project management plan, which guarantees the correct storage, management and handling of waste produced and associated with the mine,namely oils and fuels, solid waste and waste water, through its treatment and, or collection and conducting to appropriate

warehouse/final destination (duly accredited by the Portuguese Environment Agency - APA), thus reducing the possibility of accidents and contamination;

- the Mining Waste Management will be carried out as defined in the Project management plan, which guarantees its correct storage, management and handling, specifically, the referral of discarded waste to the appropriate waste facility;
- the equipment to be used in the operation of the mine must comply with the legal standards in force, relating to gaseous emissions and noise, minimizing the effects of their presence;
- the vegetation proposed in the Recovery Plan respected the floristic cast of the region, thus ensuring greater success in its integration with less effort and maintenance costs;
- the Project provides for the periodic maintenance of equipment and machinery associated with the operation, thus ensuring compliance with the standards relating to the emission of air pollutants and noise;
- the accesses of the interior of the mine will have to be maintained in good traffic conditions, by *application of* appropriate surfaces in places subject to greater vehicle movements;
- all mine accesses will have to be watered/sprinkled regularly and systematically during the driest seasons, in order to minimize dust emissions;
- the operator should carry out training and dissemination actions to its mine workers on environmental and safety standards and care, to be taken into account in the course of the work;
- the Monitoring Plan integrated into this EIA will be implemented in order to detect any deviations from the expected impacts and to carry out its timely correction;
- the operator should ensure that safety standards are correctly complied with, with a view not only to safety but also to minimising disturbances in the activity of surrounding villages.

The **following general measures** are recommended in the deactivation phase:

- the removal and cleaning of all waste deposits or hazardous substances (waste oil deposit tanks, fuel tanks, etc.) will have to be ensured, ensuring their proper disposal to the final destination in accordance with the requirements specified by the EPA and established in the Project (Waste Management Plan);
- the dismantling and removal of the equipment in the mine will be carried out, taking the necessary steps to ensure that, whenever possible, this equipment will be reused or recycled or, if that is impossible, sent to an appropriate final destination;
- a survey will be carried out to ensure that all areas affected by the activities associated with the operation are properly recovered in accordance with the defined Recovery Plan, so that there is, in the shortest possible time, a formal link between the affected area and the surrounding landscape.

Finally, for **the post-Deactivation phase,** the following general measures stand out:

- evaluate the evolution of the recovered area through the continuation of the monitoring and conservation activities of the mine,with special attention to the behavior of the areas and vegetation growth;
- carry out regular inspections of the mine in order to verify the state of conservation of the waste installation, the sealing and signaling, in order to ensure adequate protection against accidents.
- The implementation of these minimization measures, mostly integrated into the Mining Plan (Project), will bring direct and indirect benefits to the projects environmental factors, so then they are described only when there are concrete actions with influence on the areas of analysis concerned.

7.3. SPECIFIC MEASURES

7.3.1. GEOLOGY AND GEOMORPHOLOGY

The minimization measures to be implemented in terms of geology and geomorphology are already incorporated into the project (Mining Plan). Thus, in relation to the erosive processes that are expected to be increased, it is planned the construction of decanting basins (sediment control structures) at various points in the mine area that will allow the decanting of fine particles before the return of drainage waters to the natural environment.

To minimize the impacts on geomorphology, partial reuse of mine waste is foreseen in partially filling excavation voids.

In the case of the structural stability of the massif, the method of mining by benches and levels will be adopted, which will ensure the stability of the excavations. The same methodology will be used in the construction of waste facilities, also with benches and levels, which will ensure its stability.

7.3.2. SURFACE WATER RESOURCES

Although there are no significant negative impacts on surface water resources in the construction phase, the need to comply with preventive measures such as monitoring water consumption on the different construction fronts is not expected, avoiding their waste as much as possible, and not strangling sections of hydraulic passages and/or creating artificial barriers to normal water flow, creating upstream flood zones and downstream water deficit.

The following minimization measures are suggested for the mining phase:

- The start of the mill should occur in a month with high water availability;
- Adequate maintenance of the of the affected areas and their access should be ensured, with periodic inspections of the diversion channels, flood channels, hydraulic passages and jacks around the open pits, the wall and the works, in order to prevent silting and retention of run-off water. These inspections should be more frequent in periods of increased rainfall and should be accompanied by cleaning operations;
- Gutters should be placed on the roof of the mill for the collection of clean rainwater for use in the industrial process;
- Water consumption should be monitored at least every two weeks, and meters are installed at locations in the water supply network considered relevant;
- Reduction of water consumption in June, July and August, to scrupulously comply with the ecological flow regime in the Covas River;
- In case of identification of leakage and/or rupture of water supply pipe, the repair should take place as soon as possible, avoiding water waste.

For the deactivation phase, it is recommended that the drainage network be re-established as close to the original form as reasonably possible, avoiding the creation of areas of water stagnation.

7.3.3. UNDERGROUND WATER RESOURCES

The use of groundwater in the construction phase is not foreseen and no significant negative impacts on underground water resources are foreseen. Nevertheless, - it is recommended that no construction be carried out near the springs identified in the terrain, and that no groundwater points are impacted, namely vertical holes and piezometers already built.

The following minimization measures are recommended for the mining phase:

- If groundwater captures, including vertical holes, are used to supply water to the mining project, the flow size should be such that it does not cause excessive drawdowns of the groundwater level;
- If an unequivocal causal relationship is proven between the deepening of a given open pit and the decrease in flow rate (or excessive lowering of the groundwater level) of a given groundwater uptake of third parties, the feasibility of waterproofing the fracture or productive fractures causing the impact should be studied;
- If an unambiguous causal relationship is proven between the deepening of the Grandao open pit and the significant decrease in water in the soil of the grasslands located 400 meters to east and immediately to the north, Savannah should provide water (with quality) to keep these grasslands viable and "healthy" with regard to soil moisture.

For the deactivation phase, it is recommended that the holes and piezometers should remain operational and properly protected against acts of vandalism, so as to enable the implementation of the monitoring plan recommended for the two years following the deactivation phase.

7.3.4. WATER QUALITY

In order to minimize the potential negative impacts on water quality, the following minimization measures are suggested, many of them already incorporated into the Project.

In the construction phase:

- Construction of retention basins and decanting of "fines" with useful volumes such as allowing sufficient residence times for efficient decanting, with the minimum or absence of addition of flocculants;

- Excavation of basins dedicated to the washing of concrete mixers, waterproofed with geotextile, so the water infiltrates and the cement / mortar is retained in the basin. Once saturated, the cement should be removed, and preferably sent to the recycling unit of construction and demolition materials;
- When the bridges associated with the access to the mines are built, move as far as possible away from the water lines crossed (including the Covas River) and deposits of materials that are easily eroded and dragged into the water lines.

In the mining phase:

- The existence of a safety margin in the retention and decantation basins of "fines" should be permanently guaranteed, in such a way that there are no overflows of the fluids retained there;
- Removal of the decanted solid fraction in the retention and decanting basins of "fines", whenever they reach approximately half a meter (0.50 m) in height and move these materials to the margins;
- It is expressly forbidden to pump dirty water (with high content of total suspended solids) into the surrounding water environment;
- Maximum reuse of water in the industrial process (mill) should be guaranteed in order to establish a hydraulic circuit as closed as possible;
- Lubrication of the drilling material (in particular threads between sections of rods) should be strictly necessary in such a way as not to migrate and do not mix with any intersected groundwater;
- The pumping or injection of water to the surrounding water environment can only happen if it is previously confirmed compliance with the normative values contained in Annex XVIII (Emission limit values (VLE) in the discharge of waste water) of Decree-Law N. 236/98 of August 1. This situation, if it happens, should be reported in a timely manner to the ARH-North;
- The water accumulated in the retention and decanting basins of "fines" should be monitored on a minimum weekly basis for the parameters electrical conductivity, pH and turbidity, keeping the records preferably filed in digital format *(e.g.:* location, date and time, values of electrical conductivity, pH and turbidity);
- Construction of a drainage network of dirty water to receive water from the mill platform and workshop areas, channeling them to the decanting basin after passing through one or more hydrocarbon separators;
- Hydrocarbon separators must be permanently accessible for periodic maintenance;
- The cleaning of the hydrocarbon separators must be carried out by an accredited company, which will transport oily waste to a duly licensed site;
- Chemical substances to be used in the mill in the processing circuit must be packed in a waterproofed place and without contact with rainwater and/or surface run-off, complying with the recommendations of the respective product safety data sheets;
- The periodic maintenance and review of all vehicles, machinery and equipment present on site must be ensured, keeping the records updated of such maintenance and/or revision by equipment (of the type of revision sheets) according to the specifications of the respective manufacturer;
- Ensure periodic maintenance and review of the septic tank(s);
- Ensure periodic inspection of the retention basin(s) under the fuel tank(s), thus preventing inadvertent fuel overflows;
- As a measure to prevent accidental spills of contaminants (oils and lubricants), all mine workers should be instructed that, in the event of a spill, the mine manager is immediately notified, the equipment sent for repair and the contaminated area confined, removed and collected by an accredited company in order to be processed at an appropriate final destination.

In the decommissioning phase, it will be necessary prohibit access to unauthorized personnel to the area. Likewise, all the infrastructures of the drainage network will have to be maintained in good condition and functioning, maintaining the separation of dirty waters and clean waters, thus preventing the transport of polluting substances to the surrounding water environment.

In the places corresponding to the open pits of the Grandão and the Reservatorio, given the creation of ponds, it should be ensured both restricted access to the area, making it impossible for these sites to become illegal waste streams of different nature, or that the waters stored here do not result in stagnant waters.

Also, in the decommissioning phase, it should be ensured that in the workshop or maintenance areas of machinery and equipment and in areas intended for the storage of lubricants there will be no contamination of the soil by any types of polluting substances, and after demolition, all materials that have been in contact with these substances will be separated and sent to controlled landfill. The quality of the soils underlying these areas should be measured with visual inspection, using small trenches (sanjas) that expose at least 50 cm surface soil. In case of suspected contamination, soil samples should be taken for subsequent laboratory analysis.

7.3.5. AIR QUALITY

The suspended particles are the main air pollutant emitted by the exploration works at the Barroso Mine. This pollutant will be generated mainly by resuspension from the access roads (paved or not), with the possibility of limiting its emissions. In view of this conclusion, it is recommended that the control of fugitive particulate emissions from unpaved roads in the interior and at the access of the mine, using irrigation by water sprinkling, essentially in the dry months.

The results presented in the environmental impact assessment show that particulate emissions levels will comply with applicable legislation. Nevertheless, it is desirable that some measures be taken to reduce particulate emissions, such as sprinkling water on unpaved roads which could lead to a significant reduction in particulate emissions. The implementation of this measure should contribute to compliance with the limits imposed by Decree Law n. 102/2010 of 23 September, which will be validated through the implementation of the Monitoring Plan.

In the transport of the materials, particular attention should be paid to the control of the condition and cleaning of the vehicles used.

7.3.6. SOUND ENVIRONMENT

From the impact analysis carried out it is concluded that the limit values established by the legislation for permanent noisy activities will be met at all points considered, taking into account that the sensitive and mixed areas are not yet delimited. Nevertheless, because it is an activity that is susceptible to changes in the local acoustic environment, it is considered that some minimization measures should be considered to limit the noise produced by the work. These measures include:

- construction of tree barriers as a means of noise containment, stipulated in project;
- the modification of the entry and development of the extraction of the Reservatorio open pit to reduce noise levels in the nearest sensitive receptors;
- the awareness of drivers of the different equipment, both with regard to the driving conditions to be adopted and with regard to the mechanical and maintenance conditions of those vehicles. To this end, measures should be adopted to disseminate information on this awareness raising, through leaflets to be made available to drivers;
- the awareness of workers with regard to the work to be carried out within the mine, using appropriate training to the procedures that must be followed in the work in order to minimize the noise produced;
- the equipment to be used in the work must comply with the requirements of Decree-Law No. 76/2002 of March26, and the use of machines that do not have an indication of their sound power, guaranteed by the manufacturer, should also be avoided;
- Finally, it is considered important to adopt a set of rules of good practice that should be transmitted to all employees and persons affected by the mine, which may be in the context of internal training, information boards or others.

7.3.7. VIBRATIONS

The vibrations resulting from the blasts in this mine are not expected to exceed the thresholds of NP 2074. However, the detonations will be monitored, resizing the fire diagrams, changing the load per hole, the number of delays per hole or the change in the type of explosives used, the type of primers used, the change in the proportion of the different types of explosive, the change in the layout of the holes, etc.

In the event of inconvenience situations, caused by the fact that the vibrations induced by the blasts may be perceptible by the population, it is considered that measures can be adopted with a view to reducing these impacts, by warning of the date and time of the blasts.

7.3.8. SOILS AND SOIL GEOCHEMISTRY

One of the most important measures with regard to the soil factor, is the preservation of the top soil through the surface disturbance of the areas to be affected and subsequent storage in pargas (top soil conservation area), properly safeguarded and cared for.

Where it is necessary to pick up the soils, in particular in the context of the opening of roads, infrastructure or excavations, the storage and preservation of the striped surface layer, corresponding to the plant land with greater productive capacity (with higher organic matter content in minerals), should therefore be ensured, in order to be used in the landscape recovery of the affected areas. These soils will be deposited on the modeled and compacted materials, serving as a substrate for the implantation of vegetation.

Storage should be carried out in pargas (top soil conservation area), which should have a narrow, long structure and a height never exceeding 3m, with the top slightly concave for a good infiltration of water. They should be sown with a tupine or pumpkin at the rate of 5 g/m^2 to avoid the appearance of weeds and to better conserve these soils.

Areas with industrial and support facilities should always be well waterproofed and/ or paved, as foreseen in the project. The same should be the case in the storage sites of polluting products such as oils and greases which should be properly waterproofed and provided with properly sized retention basins.

Products such as oils, fuels and lubricants should also be handled in an appropriate place, as spillage of this type of product induces contamination and pollution of the soil and subsoil and consequently aquifer resources.

In the construction phase or in the mining phase provided that there is concrete circulation in the Project area, the washes of concrete mixers will have to take place in basins excavated in the soil and waterproofed with geotextile. When these basins are closed, the consolidated cement should be removed and sent to a licensed concrete/cement recycling unit.

In short, the correct implementation of soil conservation measures assumed by the project (especially in PRP), after the end of the mining phase of the affected areas, will aim to achieve a sustainable natural system, minimizing negative impacts, generated during the mining phase and reconverting, globally in the long term, a significant and permanent positive impact.

7.3.9. WASTE MANAGEMENT

In the mining and treatment of the mineral deposit of the Barroso Mine there will be production of mining and non-mining waste, and its handling, storage and disposal carried out in compliance with the Waste Management Specific Plan within the scope of the mining project.

7.3.10. ECOLOGICAL SYSTEMS

To minimize the negative impacts, it is recommended that the temporary structures to support the work are located within the project area, in areas of low or very low ecological value biotopes, preferably in areas that will be later affected by other components of the project, avoiding the allocation of extra areas to it. In the case of accesses to the work, it is recommended to use the existing accesses, minimizing the cutting of vegetation and degradation of the surrounding biotopes. The works must be started outside the most sensitive period for the wolf (reproduction and dispersion), allowing the packs to find appropriate breeding places, far from the most disturbed areas. The execution of construction activities between April and September should still be limited to daytime. Several measures are also suggested to reduce accidental mortality, such as circulation at low speed and the sealing of project areas after deforestation.

To maximize the positive impacts, it is recommended that the species used in the PRP be indigenous and originate in the region. For that, propagules must be collected in the area and natural regeneration should be used. In these areas, it is also recommended that the control of invasive exotic flora species be carried out.

It is recommended that sampling be directed to high value species of flora during the RECAPE with potential presence in the study area in the places where it is known that the removal of vegetation will be carried out, considering that the collected data may dictate the need for possible additional measures. There is also an information gap regarding the situation of the wolf in the study area, so it is recommended to carry out a study directed to this species that allows us to understand the situation of the wolf in the area of the project, what makes the use of the area and whether there are breeding areas in the area and its vicinity.

The effectiveness of the proposed measures should be assessed in the implementation of the different monitoring plans proposed and to be specified in the RECAPE phase.

7.3.11. LANDSCAPE

The measures to minimize the visual and landscape impacts resulting from the activities of the mining of the Barroso Mine rely on the effective and scrupulous implementation of the Mining Plan and the Landscape Recovery Plan (PRP), integrated in the project, which will ensure its phased recovery, in conjunction with the progress of mining.

It should be highlighted that many of the measures integrated in the PRP will also have beneficial implications on other environmental factors, since, as a whole, they will tend to protect in an integrated way all environmental factors. Thus, the following guidelines were included in the PRP to minimize the impacts associated with the construction and mining phase of the project:

- Implementation of visual barriers, with earthen bund walls and tree-shrub curtains along the internal accesses and surrounds with visual accessibility to the mining areas, during the phase prior to mining. It is also a measure to minimize the dispersion of dust in the surroundings of the project and in the accesses;
- Preservation and maintenance of existing vegetation in the surrounding areas not affected by mining;
- The development of landscape recovery work will accompany the phasing-out of mining, in the sense that, whenever the final phases of mining are reached at each stage of the operation and there is no risk of disrupting the normal functioning of the mining activity, these areas are integrated more quickly into the surrounding landscape, so that the total impacted area is only that necessary for the activity of the extractive industry at any given time;
- Filling of some excavated areas using landfill resulting from the mining, which will follow, the replacement of the top soil and the restoration of an autochthonous vegetation cover;
- The selected floristic cast corresponds mostly to the local vegetation, in order to ensure the renaturalization of the space in accordance with the surrounding landscape, considering that it is a World Agricultural Heritage territory of FAO;

For the deactivation phase, it is considered essential that the implementation of the PRP is only given as considered completed, after inspection that proves the rehabilitation of all affected areas in the course of extractive activity.

7.3.12. TERRITORY

It is the general objective of the territory management instruments (IGT) and particularly the Municipal Master Plan of Boticas, to carry out the framing of human activities through rational management of natural resources, including the mining of geological resources, with a view to promoting both socio-economic development and the well-being of populations in a sustained manner.

In order to promote the best framework of the mine within the framework of the IGT in force with an incidence in the area under study, the management of the mine should be based on a strategy of sustained development, making the mining of geological resources compatible with the territory, with the promotion of the quality of the environment and the quality of life of local populations. In pursuit of these objectives, it shall take into account the following measures:

- establish the dialogue with the Municipality in order to, in the context[1], of revision of the PdM de Boticas, to safeguard the complete adequacy of the occupation and activity processed in the scope of the mining concession, with the classes of spaces and conditions defined in the area of intervention;
- carry out an mining in agreement with the Mining Plan, complying with the parameters established in this plan, aiming at the rational and sustained utalisation of the geological resource, making the mining compatible with the natural, heritage, social and cultural values of the territory in which it is part;
- the measures defined in the Landscape Recovery Plan, in particular those that contribute to the reforestation of the mining area, are of increased importance in this context, and its correct implementation is essential to promote the better landscape integration of the mine during the mining and to give it, at the end of this, a forest use in agreement with the qualitative standards that are intended to be achieved;
- pursue policies for continuous improvement of the waste management system produced in the mine and for the preservation of water quality and availability;

[1] Process that is in progress.

- measures for the maintenance, promotion and expansion of potential ecological corridors, thereby enhancing habitat conservation and facilitating the normal dynamics of wildlife according to the respective biology of each species;
- measures to protect/rebuild/recover riparian galleries along the water lines that will eventually be affected by the mine operation;
- implement a network of fire breaks (divisional network) and the cleaning of bushes by tracks, on both sides of the main road network, within the area to be exploited (to be framed under the Municipal Plan for Forest Defense Against Fires of the municipality of Boticas);
- ensure the maintenance of the road and divisional network in the area of the mine concession;
- ensure water quality control by an accredited entity;
- to fund the fish planning project of the Covas River;
- financially support the project for the possible annexation of land to the associative hunting area;
- installation of sowing for hunting (to be carried out, if necessary, in the clearings of the wasteland lands)
- given that the associative hunting areas pay a fee to the state for the concession of the hunting area, it should be assured to the association of hunters that the value of the fee corresponding to the area where it will not be possible/allowed to hunt will be assumed by Savannah during the period of operation of the mine;

According to the management instruments of the territory in force for the territory, and given that the area of the mine, in particular the Pinheiro and Grandão open pits, focus on REN water lines, it is considered that the minimization measures related to this environmental factor also go through full compliance with the General Minimization Measures and the specific recommendations presented regarding water resources and water quality.

7.3.13. SOCIO-ECONOMICS

After identifying the main negative impacts resulting from the project, although not very expressive, it is necessary to define minimizing measures that ensure the proper balance of the territory in the area of the proposed development and its surroundings and possible disturbances of the population and economic activities. The measures presented include recommendations, i.e., preventive measures, which aim to mitigate predictable effects on the environment and social or others that may occur.

To this end, the following general measures to be applied within the socio-economy are recorded:

- Disseminate information about environmental monitoring, maps with the different stages of development of the mine, poster with the *chronology* of the whole process (measures that, moreover, are already developed by the Information Center developed by the company);
- Deepen ties with the community and the municipality, responding to concerns arising from the implementation of the project and trying to meet the needs that are being identified by the population;
- Consideration of a Health and Safety Plan that contributes to substantially reducing the risks that workers and other personnel involved in the construction and Mining phase may take. Full compliance with the said Plan is considered indispensable, and the responsible entities should ensure the supervisory actions to verify the established rules;
- An appropriate Mining and recovery phase-out should be defined, which promotes the revitalization of the intervened areas in the shortest possible time interval and concentrated in well-defined areas, avoiding the dispersion of intervention fronts in different locations at the same time;
- Cautionary signs should be placed that cause an increased risk of fire, especially by fogging or leaving flammable or potentially fire-triggering material, such as reflective glass or metal packaging, in areas of contact with shrubby and arboreal vegetation;
- Carry out a survey, prior to the Mining of the Grandão open pit, to the houses closest to the localities of Romainho and Muro, with a view to constituting a photographic record of the buildings for the purpose of checking future damage, such as opening cracks in the walls, due to the use of explosives;
- Invest in the best technologies available to the industry, aiming to achieve the best quality standards and the best environmental performance, as well as making mining activity more attractive to young people of active age;
- Inventory grazing areas in and around the area to be exploited, characterizing this type of activity (by type of animals or by their quantification), and articulate with the shepherds measures on habitat to improve pastures and access to them.

- Take inventory of other activities that currently occur in the surrounding area of the mine (producers of Barrosã meat, Trás-os-Montes potatoes, beekeepers, among others), and articulate with the holders of these activities measures on habitat in order to reduce any negative impacts that the mining of the mine may have on them;
- In the event of water scarcity in the grasslands upstream of the mine, directly related to the mining activity, Savannah will provide water for the grasslands;
- Provide, according to a specific planning, the closure of the mine. The PRP that accompanies this EIA includes the environmental and landscape recovery actions to be implemented with the deactivation of the mine. These actions should be integrated into a broader plan, to be carried out at the beginning of the operation and to be systematically updated, integrating human resources management policies, environmental risk management and community consultation.

In particular, in the context of the quality of life of the populations:

- Ensure that the methods and equipment that cause the least possible noise are selected. This measure is mainly aimed at minimizing the inconvenience of the population in the vicinity of the intervention areas and the workers themselves and other workers;
- Adopt the use of electric heavy vehicles, which would allow the realization of urban crossings with a lower level of associated noise, ensuring the preservation of the quality of life of local residents. As far as this is not a viable option, due to the lack of availability of such equipment on the market, to ensure SAVANNAH'S commitment to the adoption of these vehicles as soon as it becomes an enforceable action;;
- Although the mining enterprise is in operation 24 hours, establish that the noisiest operations are restricted to the daytime and on weekdays;
- to make the drivers of machinery and vehicles used for the operation of the mine to be made aware of the speed limits set out in the various routes used within and in accessing the work area, as well as of the need for periodic reviews of vehicles, so that the permissible sound levels are not exceeded;
- Perform periodic maintenance of equipment and machinery associated with the operation, ensuring compliance with the standards relating to the emission of air pollutants and noise;
- When moving land (excavation, landfill) during the period of drought or in periods of poor rainfall, the moistening of areas with land movements or circulation of vehicles should be watered, in order to avoid the lifting of dust and the inherent allocation of the population residing in the surrounding area of the mine area;
- Measures should be adopted to minimize noise and dust creation (defined in the environmental factors themselves);
- Periodic measurements of the propagation of noise and vibrations caused by dismounts, with a view to defining measures to mitigate population affectations;
- Practice an adequate policy of social responsibility, making available to local and regional authorities and local and regional public entities the resources and technical competence of the company, contributing to the meeting of solutions that promote the development and quality of life of the populations;

Economic and employment activities:

- Establish the company's headquarters in the municipality to ensure that tax revenues revert, at least partially, to the municipality;
- Use of local and regional companies to supply the recurrent needs of the mine (equipment and consumable materials, maintenance of infrastructure), in order to focus locally the economic dynamic that will be felt;
- positively discriminate against the local population, where it is necessary to increase possible jobs, with the aim of contributing to the reduction of unemployment levels;
- Implement professional training actions designed for the specificity of the extractive industry, adopting programs that promote the professional qualification of mine workers and provide their effective integration into the company;
- Continued training/updating and dissemination actions to mine workers on the standards and care to be taken into account during the work;
- Given that the associative hunting areas pay a fee to the state for the concession of the hunting area, it should be assured to the Boticas Hunters Association that the value of the fee corresponding to the area where it will not be possible/permitted to hunt will be assumed by Savannah during the period of mining of the mine;
- Financially support the installation of drinking fountains or artificial feeders for smaller hunting.

And finally, in the context of accesses:

- In order to reduce the risk of accidents by bringing people closer to the intervention sites, safety areas with limited and duly flagged access should be established;
- ensure that the correct compliance with safety and signaling standards for transport vehicles on the public access route is continued, taking into account the safety and minimization of disturbances in the activity and mobility of the population and in road traffic;
- Ensure that the vehicles affected by the dispatch use a system of cleaning of the track, thus preventing the degradation of the conditions of adherence at the entrance to the public access road, thus contributing not to affect the conditions of adherence of the track and, consequently, preventing road accidents;
- Promote the placement of signs in places to be determined, which alerts to the proximity of areas with heavy vehicle circulation;
- Place signs at the exit of the mine that remind truckers of the need to redouble driving care when approaching population clusters;
- Collaborate with local authorities by taking the initiative to report problems or suggest possible improvements in the field of road safety.

7.3.14. HUMAN HEALTH

It is considered that the minimization measures related to this environmental factor go through full compliance with the General Minimization Measures, and the specific recommendations presented in water resources and water quality, sound environment, vibrations, air quality, soils (soil geochemistry) and waste management.

7.3.15. CULTURAL HERITAGE

- Measure 1. Inclusion of occurrences identified in the study area in Plant Conditioning, except for isolated, mobile findings. This measure aims to signal and ensure the maintenance of the current state of conservation of the occurrences under this. Its application shall extend to subsequent stages;
- Measure 2 (before construction). Systematic prospecting of plots of land that have not been researched in this evaluation phase;
- Measure 3 (before or during construction). Topographic, graphic, photographic representation and elaboration of a descriptive memory (for future memory) of the events of cultural interest that may be destroyed as a result of the execution of the project or suffer damage resulting from the proximity to the front of the work;
- Measure 4 (before or during construction). Execution of archaeological surveys to characterize occurrences with the risk of being affected by the work that are exposed during the work. The results obtained can determine the execution of excavations in the area;
- Measure 5 (construction and deactivation phases) Comprehensive and continuous monitoring of the work, by archaeologist, with preventive effect in relation to the affectation of unknown archaeological remains. This follow-up consists of the observation, by archaeologist, of the operations of removal and revolving of soil (deforesting and surface stripping in actions of preparation or regularization of the land) and excavation in the soil and subsoil. It includes the implementation or monitoring of the implementation of other measures proposed for this phase. The mobile findings collected during the work must be placed on deposit accredited by the cultural heritage body;
- Measure 6 (mining and deactivation phase). Communication by the promoter of the project, to the Directorate General of Cultural Heritage, of the possible appearance of archaeological remains, and must do so immediately, in order to trigger the mechanisms for evaluating their cultural interest and their safeguarding.

7.3.16. BARROSO WORLD AGRICULTURAL HERITAGE

Actions and measures are proposed that should be adopted with a view to concerting the various actions, in particular those related to the promotion and enhancement of the GIAHS classification, contributing to a better appreciation and dissemination of the activities and products of this territory. In particular, implementing an Action Plan for the dynamic conservation of the site as a GIAHS site. This Action Plan will be supported by four pillars: the promotion of Barroso as

the territory of GIAHS; the training of agricultural or traditional producers and enterprises; the economic and social promotion of agroforestry and pastoral systems in the Barroso region; the valorization of cultural and natural heritage.

8. COMPENSATORY MEASURES

8.1. INITIAL CONSIDERATIONS

Savannah has developed two specific plans for implementing compensatory measures: **The Benefit Sharing Plan** and the Good **Neighbor Plan.**

The Benefit Sharing Plan is a retribution program that aims to share with the surrounding communities the benefits of the Barroso Mine project.

The Benefit Sharing Plan ensures that local communities receive a fair share of the benefits of resource exploitation, and that these benefits are sustainable and in agreement with the needs of the community and local development objectives. The goal is to determine that Savannah's environmental compensations are in agreement with the needs and objectives of the municipality, through social investment, employment and other contributions, supporting the municipality of Boticas to achieve its development goals. The Benefit Sharing Plan ensures the implementation of short-term compensatory measures in the course of the mine's operation, but is also focused on the long term, to last after the closure of the mine, leaving a legacy for the future.

The Good Neighbor Plan defines the use by local communities and associations/institutions of some of the infrastructure and social services developed by the mine during its useful life.

This Plan is reflected in savannah's commitment to supporting economic development and promoting social support such as: shopping for local businesses to support local business development and new business creation, shared infrastructure through the use of the mine clinic in urgent situations, the use of mine workers' transport vehicles, among many others. The main objective of these social measures is to enable the surrounding communities to enjoy and receive support for key issues such as health or transport.

Savannah intends to develop the Benefit Sharing Plan and the Good Neighbor Plan, in close cooperation with the entities and agents present, namely the Municipality of Boticas, the Parish Councils of Covas do Barros and Dornelas, the Compartes dos Baldios de Couto Dornelas and Covas do Barroso and the United Association in Defense of Covas do Barroso and the local population.

8.2. WATER RESOURCES

In the field of Water Resources, Savannah considers that the following counterpart and benefit solutions can be proposed:

The **Benefit Sharing Plan will include the following actions:**

Cleaning and clearing of the bed and margins of the water lines will be carried out as a measure of conservation and rehabilitation of the hydrographic network. As the beds and margins of the water lines are located in rural buildings, cleaning and clearing the bed and margins of the water lines is the responsibility of the landowners. Savannah, with the agreement of the owners and / or the representatives of the shares, in the case of vacant land, will proceed to the development and implementation of an Action Plan for the cleaning and unblocking of the bed and margins of the water lines. Cleaning and clearing consists of removing residues and selective removal of vegetation (also weeds / weeds) that can also put existing hydraulic infrastructures such as bridges, pontoons and dams at risk.

These cleaning actions will aim to maintain non-weed trees and shrubs on the banks; as well as the herbaceous vegetation of the slopes; allow the enjoyment of the waters; ensure flow conditions (sands, muds, sediments) in normal or extreme hydrological situations, with the objective of minimizing the risk to people and goods in flood situations and reducing the risks of slope erosion and, consequently, silting up water lines.

The Action Plan to be drawn up with the identification of the measures for cleaning and clearing the bed and margins of the water lines will be carried out on non-navigable or floating water lines, including water lines that dry out temporarily, on the Covas River and its tributaries, after authorization from the Portuguese Environment Agency.

The **reinforcement of water points** will be guaranteed by the improvement or construction of infrastructure for efficient storage and additional water supply for fire fighting. The improvement or construction of tanks or ponds for fire fighting, but also for private use, such as irrigation, will be those that may be identified as necessary in the Municipal Plan for The Defense of the Forest Against Fires of Boticas, for the parish of Covas do Barroso and for the parish of Dornelas.

8.3. SOCIO-ECONOMICS

For the characterization of the reference situation, a survey of local needs was carried out, based on the analysis of strategic documents for the region and by direct contact with the population involved. From this study, interventions were identified that will benefit the municipality of Boticas, in general, and the populations of the mine surrounding area that can potentially be affected. The actions to be developed are considered as social benefits and are distributed in several areas of intervention and will be previously discussed with public entities and the local population.

The Benefit Sharing Plan will include the following actions:

In the area **of Employment and Economic Growth will** include the development of a program *of (1) local entrepreneurship* with a view to raising support for the development of projects that allow the creation of jobs in the county. Another measure includes, whenever possible, the *(2) acquisition of materials, products and services in the region,* as well as (3) promotion *of* the accommodation of mine employees in housing in the surrounding villages (properly rehabilitated), provided that the employees so wish. To support the *(4) employability* of local workers in the mine, Savannah intends to work together with the local authority, employment and vocational training center and local trade association to develop vocational training programs to empower community members to secure jobs at the mine.

In this Plan Social **Support** will be promoted through (1) awarding *scholarships* to the best natural students in the county, boosting (2) leisure time activities for children, and developing and supporting other valences of the current Covas do Barroso Day Center, in order to increase the level of (3) support to the *senior population* of Covas do Barroso, Romainho, Muro, Lousas, Dornelas, Vila Grande, Vila Pequena, Espertina, Antigo, Pernalonga and Alijó.

The Good Neighbor Plan will include the following actions:

In the area of Mobility, it is expected that the fleet destined for the transport of mine workers can also serve for the *(1) transport of the local population,* in periods of absence of transport of workers. This support for transport also includes the *(2) acquisition of* a van for Santa Casa da Misericórdia, facilitating the movement of the population and focused on supporting health services.

For the training of populations, significant efforts will be made in the (1) formation of local populations on relevant mining and environmental issues, which will allow the trainees to understand and monitor the work of the Barroso Mine.

Empowering populations

The mine will have a health **post** on site, with an ambulance and a team of qualified health professionals. In addition to providing service to the mine, (*1) the clinic, staff and ambulance will be made available to residents* of Covas do Barroso, Romainho, Muro, Lousas, Dornelas, Vila Grande, Vila Pequena, Espertina, Antigo, Penalonga and Alijó, in case of emergency, as part of our Good Neighbor Plan.

In the field **of Civil Protection** a program will be developed to reduce the risk of fires with (*1) support in the cleanliness and environmental recovery of forests,* namely in the Baldios of Couto Dornelas and Covas do Barroso, and support in the context of (*2) renewal of materials and equipment* for the Firefighters of Boticas. It will also be promoted to (3) replacement of invasive and *non- autochthonous flora* together with improved access to the *Covas* River to allow the local community to enjoy the improved leisure areas.

The Benefit Sharing Plan and the Good Neighbor Plan under **Sustainability** will include the development of several actions: *(1) improving environmental heritage* - including tree planting projects, autochthonous species recovery projects and rehabilitation projects of spaces with unique or exceptional environmental value, with the creation of conditions for the installation of, among others, oaks, chestnut trees, cork oaks, strawberry tree and thereby attract the local fauna, especially deer; *(2) improvement of the built heritage* - will include projects to recover cultural heritage and projects for the requalification of population centers and public spaces; (3) *promoting proximity purchases and valorization of local products* - will cover projects for the acquisition of fresh food to local producers to provide the company's cafeteria and initiatives to promote and value local products.

8.4. BARROSO WORLD AGRICULTURAL HERITAGE

Within the scope of the municipal classification (together with the municipality of Montalegre) as a World Agricultural Heritage site called Barroso, Savannah considers that compensation solutions can be proposed.

The Benefit Sharing Plan will include the following actions:

Given the recognized importance of Barroso as a World Agricultural Heritage, Savannah proposes to sponsor the execution of a **Historical and Ethnographic Study** of the Beça and Covas River Valleys, with publication of results until the end of the second year of exploration of the mine.

In the field **of Agriculture and Rural Development,** the measures intervene in the Agricultural and Livestock Programme of Barrosã cattle and Bísaro pigs, through the development of programs to support the dissemination and protection of these breeds.

In collaboration with FAO, and as part of broader initiatives and partnerships, Savannah will support local agriculture, it aims to develop **a program** to support ***local chefs*** **who** know the region's products well and who will be the promoters of both products and the region, while also ensuring recognition of their work.

Compensation will also be negotiated for the loss of land income from the Wastelands of Couto de Dornelas and Covas do Barroso. Bearing the costs of the Sappers.

The Good Neighbor Plan will include the following actions:

Savannah intends to supply the mine's restoration space by **acquiring as many products as local suppliers,** stimulating local production and contributing to the development of productive activities, which are so important to the region. In this way, it will be possible to create a virtuous circle, stimulating the local economy and the production of products such as barrosã meat, honey, smokehouse, vegetables, among many others.

There is still availability, on the part of Savannah, to leave some of the mine's infrastructures on site, namely warehouses and offices, in conditions of use, which may allow hosting organizations that promote local heritage and even install nurseries for indigenous plants or monitoring teams. environmental.

Savannah's commitment will be to make an annual allocation of €500,000 for the implementation of the Benefit Sharing Plan and estimates an operating amount of €100,000 per year to comply with the Good Neighbor plan.

9. MONITORIZATION PLAN

The EIA includes a monitoring plan defining the procedures for monitoring the evolution of environmental strands considered more sensitive following the environmental impact assessment carried out. The environmental factors considered to integrate this monitoring plan were: Water Resources (surface and underground), Water quality, Air quality, sound environment, vibrations, soils (quality and geochemistry), ecological systems, landscape, socio-economics and heritage.

In this context, it is envisaged the periodic sending of monitoring reports to the EIA authority, where the actions developed, the results obtained and their interpretation and confrontation with the forecasts made in the EIA will be presented.

10. CONCLUSIONS

In summary, the following aspects can be highlighted:

- The most significant positive impacts induced by the project occur at the level of the socio-economy, with local, regional and even national expression;
- According to the technical evaluation made, any negative impacts induced by the actions of the project determine that it includes specific plans, such as the Waste Deposition and Management Plan and the Landscape Recovery Plan. It is also determined to monitor and control the evolution of environmental aspects considered sensitive through the Monitoring Plan;
- The implementation of the recommended minimization measures allows to reduce, evidently, the spatial and temporal projection of negative impacts, and allows the revitalization of the space affected by exploitation.

It is noteworthy that the project considers the recommendations of the EIA, namely, in, terms of environmental monitoring of environmental factors as critical, which will allow the environmental revitalization and landscape framework of the area affected by mining activity in the short-medium term.

Thus, it is considered that the concession of expansion of the Barroso Mine will contribute to the development of the region. The most significant positive impacts resulting from the Barroso Mine are related to the creation of jobs (between 201 and 243 employees), with the creation of the gains that Savannah may represent for the county.