+264 81 478 6303
info@omavi.com.na
Geotechnical & Geo-Environmental Consultants | Reg. No. cc/2018/ 08788

ENVIRONMENTAL ASSESSMENT (EA) REPORT FOR:

Exploration and continuation of small-scale quarrying of white marbles and granitoids/ gneisses for dimension stone production and to support renewal of mining claims 66714, 66731 and 66733 at Onjuva Village, Epupa Constituency, Kunene Region, Namibia

MEFT Application No.: APP – 003008

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Project Proponent: Zanite Investments cc

P.O Box 31, Omaruru, Namibia

Prepared by: OMAVI Geotechnical & Environmental Services

P.O Box 1642, Windhoek, Namibia

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LIST OF ABBREVIATIONS

CSR	Corporate Social Responsibility
DEAF	Department of Environmental Affairs and Forestry
EA	Environmental Assessment
ESA	Environmental Scoping Assessment
EMRP	Environmental Management and Rehabilitation Plan
EMA	Environmental Management Act
ECC	Environmental Clearance Certificate
I&APs	Interested and Affected Parties
MAWLR	Ministry of Agriculture, Water & Land Reform
MC	Mining Claim
MEFT	Ministry of Environment, Forestry and Tourism
MME	Ministry of Mines and Energy
PPE	Personal Protective Equipment
TA	Traditional Authority

1 INTRODUCTION

Zanite Investments cc (herein referred to as the Proponent), intends to resume with brownfield prospecting/exploration and small-scale quarrying on an abandoned white marble quarry and on two (2) other mining claims at Onjuva village in the Epupa Constituency of the Kunene Region. The three mining claims, namely, 66714, 66731 and 66733 were granted in June 2014 for dimension stone prospecting and mining. The planned drilling and test quarrying activities will cover the widely exposed marble and granitoid/ gneissic rock units within these license areas. Prospecting over the project area had previously been carried out by previous license holders and had proven that both the white marble and pink speckled black granitoid found within the areas are suitable for dimension stone production.

The envisioned activities will involve development of small-scale quarry operations support infrastructure such as worker's accommodation / camp, access roads, stockpile bays, prefabricated offices, workshops and ablution facilities; overburden stripping over the specific sites where drilling, test and continuous small-scale quarrying is to take place; the cutting of 5 to 6 m^3 rectangular sample and production blocks; on site sorting and stockpiling of such blocks; and ultimately, the haulage of such blocks to stone processing factories in Karibib and/ or Walvis Bay for further beneficiation.

The planned quarrying and prospecting (exploration) activities are listed in the Environmental Management Act (EMA) of 2007 and its EIA regulations of 2012 and cannot be conducted without a valid environmental clearance certificate (ECC). The provisions of such listed activities in the EMA are as follows:

- **Activity *3.1:*** *The construction of facilities for any process or activities which requires a license, right or other form of authorization, and the renewal of a license, right or other form of authorization, in terms of the Minerals (Prospecting and Mining Act), 1992.*
- **Activity 3.2:** *Other forms of mining or extraction of any natural resource whether regulated by law or not.*
- **Activity 3.3:** *Resource extraction, manipulation, conservation, and related activities*.

Omavi Geotechnical & Environmental Services was appointed to conduct an Environmental Assessment (EA) as per the EMA and its Regulations. The assessment aims to identify and realistically manage, mitigate and/or enhance physiographical, ecological, socio-economic and heritage related impacts that could manifest from the proposed activities. This is done to ensure that the project's activities are implemented in an environmentally and socially friendly manner to ensure sustainability of resources in the affected area, and to reduce adverse impacts to acceptable levels, while maximizing potential positive impacts (benefits) from the projects.

This scoping report aims to firstly establish the baseline conditions of the receiving environment; and thereafter identify and systematically assess potential environmental impacts associated with the proposed development and operational recommencement of quarrying activities. The accompanying draft Environmental Management and Rehabilitation Plan (EMRP) provides recommended impact management, mitigation and monitoring measures to minimize and/ or mange significance levels of adverse impacts, where complete avoidance is not possible. The draft EMRP further outlines measures that could be implemented to ensure that potential positive impacts are either sustained or enhanced over the duration of the proposed project. Collectively, these documents will then support the Proponent's application for an environmental clearance certificate (ECC) from the Ministry of Environment, Forestry and Tourism (MEFT) and the Ministry of Mines and Energy (MME) to permit the planned activities. The two (2) documents will further assist the Ministry of Environment, Forestry and Tourism's (MEFT) Department of Environmental Affairs and Forestry (DEAF) in making an informed, knowledge-based decision on the issuance of the Environmental Clearance Certificate (ECC) for the proposed activities.

1.1 Project Need and Desirability

The proponent of this project intends to re-commission operations of the existing marble and granitoid quarry at Onjuva village and to open new quarries on the 3 mining claims to produce 5 m^3 to 7 m^3 standard rectangular dimension stone blocks that would ultimately be sold locally and overseas to both consumers and stone processing factories. According to community members, the existing quarry ceased operations in 1997 and used to be operated by a different license holder. Ever since then no other form of industrial development with tangible benefits to the community has been realised in the area. A community rest camp was developed and established over the years through joint investment with a private developer and is currently the main source of income for the Orupembe conservancy and the concerned traditional authority.

The three mining claims concerned are situated along an elongated 350m – 400m wide white marble ridge which is flanked on either side by paragneisses/ granitoids. The marbles, paragneisses and granitoids are highly prospective for dimension stones due to their colour, patterns, durability, and low fracture frequency, especially with increasing depth from surface). The proposed quarrying, on site block cutting and downsizing, and ongoing prospecting activities will bring positive socio-economic upliftment to the drought-stricken and struggling economy of Onjuva village and the broader Orupembe communal conservancy. The projected benefits include value addition to the marble/ gneiss/ granitoid resources in the area which otherwise would have remained dormant and untapped.

Holistically, the proposed project is motivated by the following potential benefits:

- The community of Onjuva and the broader Orupembe communal conservancy greatly relied on small-scale livestock farming which used to be complemented to some extent by tourism due to the occurrence of wildlife such as Giraffes, Oryx, springboks, cheetahs, and leopards. Over the last 5 to 6 years, however, the severe droughts which struck and persistent over the Kunene region has greatly depleted the quantity of wild and domestic animals in the area to an extent whereby some families have either lost all their livestock while others have had to migrate to other afar areas in search for grazing land. According to the Orupembe conservancy conservation officer, Mr. Tjimingire, the amount wildlife such Kudus, Oryx, Springboks and Giraffes has equally drastically diminished due to the persistent droughts to such an extent that such species are rarely spotted in the area. As a result, means of making a living from livestock has become challenging and unsustainable for most families, and the local tourism industry has also greatly declined, especially because of the pandemic. This has adversely affected revenue generated from the Community-owned Marble Campsite. Because of these unfavourable conditions, the community would benefit from alternative economic sectors, of which the proposed project is well aligned with.
- The project will support increased knowledge and value addition of local mineral resources.
- The project has potential to improve the livelihoods of the local community through contract employment and possible procurement opportunities such as the provision of meat products, security services, site clearing services.
- The project has potential to contribute towards broader regional and national developmental goals through the injection of capital investments, license fees, surface lease fees, and government revenue realised through various forms of taxes including export duties, income tax, etc.

- The project could contribute towards potential technical skills development and skills transfer (such as operation of heavy earthmoving machinery, rock blade and saw cutters) to young community members.
- The project has potential to contribute indirectly towards the maintenance and rehabilitation of local infrastructures such as community water supply boreholes, infrastructure for rainwater harvesting.

1.2 Project Location

Mining claims 66714, 66731 and are located approximately 200 km directly west and along a straight-line trajectory from the regional capital of the Kunene Region, Opuwo, and approximately 25 km north of Orupembe. Collectively, the claims cover an area of approximately 51 Hectares (Ha) in size. The approximate corner coordinates of the claims are provided in **Table 1-1**. The area can be accessed via existing district gravel roads such as the D3707 and D3704 from Purros and Opuwo which ultimately connect to several village access tracks. The license exclusively lies on communal land under the jurisdiction authority of the Otjikakurukouje Traditional Authority in the Epupa Constituency and overlies the Orupembe Communal Conservancy, which was officially registered in 2003 as part of the Ministry of Environment, Forestry and Tourism's efforts to increase community based conservation and management of wildlife and forests (refer to **Figure 1.1**).

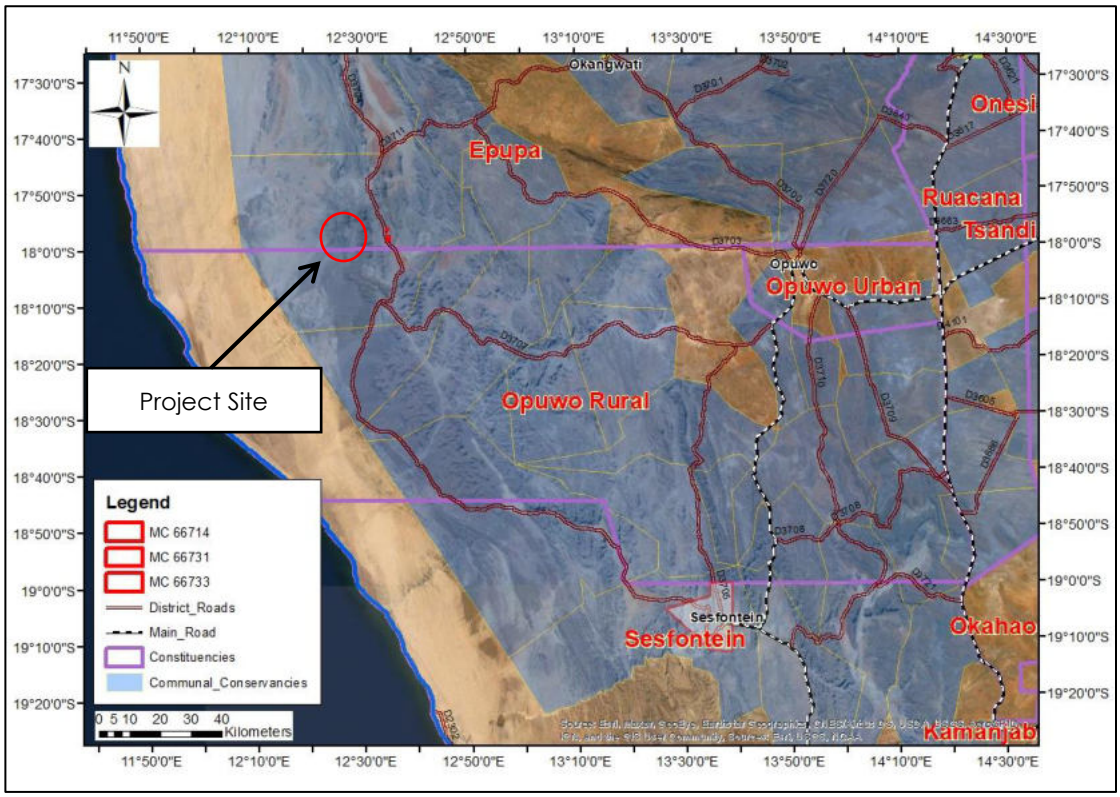

Figure 1.1. Regional locality map of mining claims 66714, 66731 and 66733

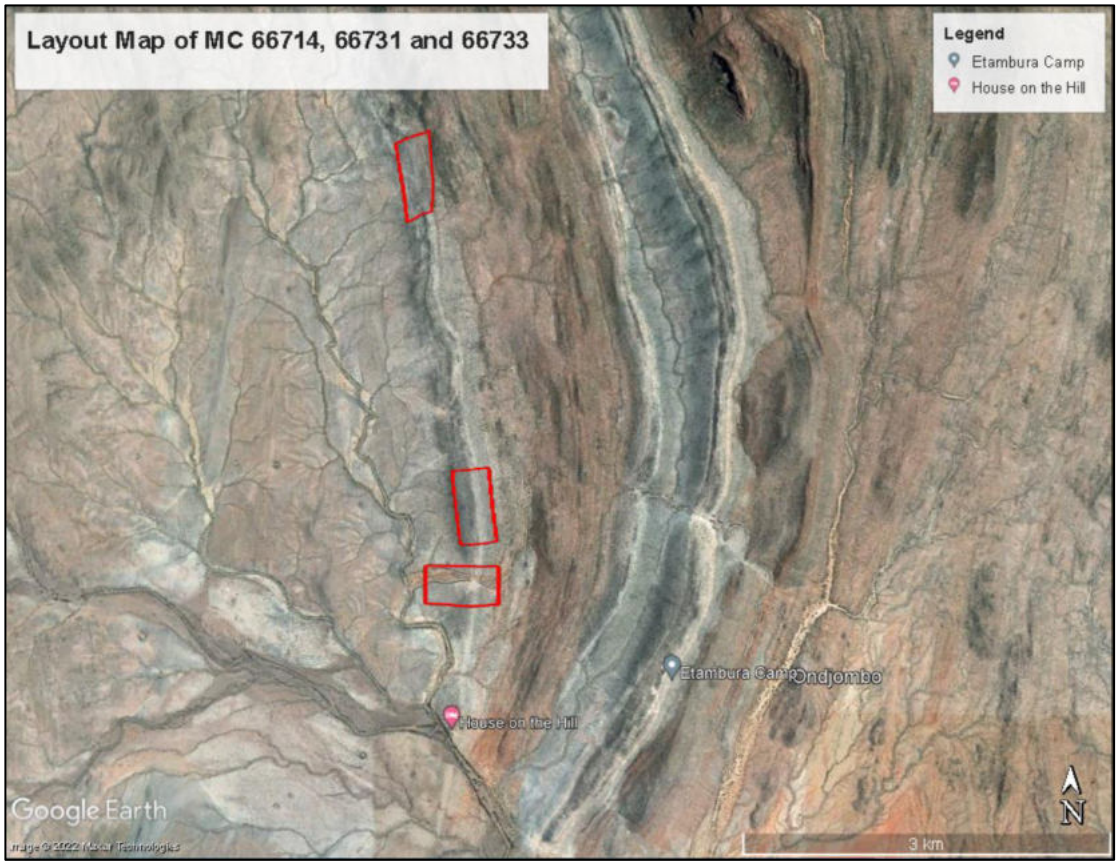

Figure 1.2. Local map of mining claims 66714, 66731 and 66733

Table 1-1. Approximate corner coordinates for mining claims 66714, 66731 and 66733

<table>
<tr><th colspan="2">Project Location</th></tr>
<tr><td>Approximate Site coordinates:</td><td>
Mining claim 66714:
<table>
<tr><th>MC</th><th>Lat</th><th>Long</th></tr>
<tr><td rowspan="4">66714</td><td>-17.975278°</td><td>12.585278°</td></tr>
<tr><td>-17.975278°</td><td>12.590833°</td></tr>
<tr><td>-17.978056°</td><td>12.590833°</td></tr>
<tr><td>-17.978056°</td><td>12.585278°</td></tr>
</table>
Mining claim 66731:
<table>
<tr><th>MC</th><th>Lat</th><th>Long</th></tr>
<tr><td rowspan="4">66731</td><td>-17.968333°</td><td>12.587500°</td></tr>
<tr><td>-17.968056°</td><td>12.590278°</td></tr>
<tr><td>-17.973333°</td><td>12.590833°</td></tr>
<tr><td>-17.973611°</td><td>12.588056°</td></tr>
</table>
Mining claim 66733:
<table>
<tr><th>MC</th><th>Lat</th><th>Long</th></tr>
<tr><td rowspan="4">66733</td><td>-17.945000°</td><td>12.583333°</td></tr>
<tr><td>-17.944722°</td><td>12.586111°</td></tr>
<tr><td>-17.950000°</td><td>12.586111°</td></tr>
<tr><td>-17.950556°</td><td>12.584167°</td></tr>
</table>
</td></tr>
</table>

1.3 The Proponent

The 3 mining claims are registered and held by Zanite Investments cc, of which Mr. G. Zandberg is the sole member. The proposed prospecting activities shall be carried out by this entity, either wholly or in partnership with 3rd party partners who may be approached to provide various technical and financial inputs.

1.4 The Environmental Consultant

Omavi Geo-technical and Environmental Services (hereinafter referred to as Omavi) has been appointed by the proponent to carry out an Environmental Assessment (EA) and draft an environmental management and rehabilitation plan (EMRP) for the project, and ultimately, submit all necessary documentation to the Ministry of Environment, Forestry and Tourism (MEFT) in support of the application for an Environmental Clearance Certificate (ECC) to the Department of Environmental Affairs and Forestry (DEAF).

The Environmental Scoping Assessment (ESA) was conducted by a qualified and experienced environmental practitioner, whose detailed curriculum Vitae (CV's) is attached. In addition, expert input was sought from experienced and qualified heritage and archaeological specialists to assess the risk of disturbing, destroying or fragmenting possible aspects of archaeological or heritage importance in the project area.

1.5 The Environmental Assessment Process

In accordance with the "Namibian EIA guidelines for mining sector of November 2019", the "the Namibian reporting guidelines for environmental assessment of 2018", the Environmental Impact Assessment (EIA) regulations No. 30 of 2012, and the Environmental Management Act (EMA) of 2007 (Act No. 7 of 2007) the process followed in undertaking this environmental assessment can be summarized as follows:

1. **Project screening process** – This entailed formulation of the Terms of Reference (ToR) of the proposed project with specific emphasis on the proposed activities, quarrying methods and technology, collection and review of baseline information pertaining to environmental and social receptors, stakeholders' engagement process, the impact assessment process, and preparation of a pragmatic Environmental Management and Rehabilitation Plan.
2. Following the drafting of the ToR, a Background Information Document (BID) was prepared which provides a high-level perspective of the project locality, the project activities and input, and served as a formal invitation to Interested and Affected Parties (I&APs) to become involved in the EIA process and provide tangible inputs and suggestions on how the project should be implemented. The BID and ECC Application were then submitted to the Office of the Mining Commissioner in the Ministry of Mines and Energy (MME) (i.e., the Competent Authority for this project) for notification and recommendations. The date stamped copy of the ECC Application from the MME was subsequently uploaded to the MEFT's EIA online portal for registration (**Application number APP-003008**), and the BID together with comments register form were then circulated to all identified and registered interested and affected parties (I&APs) for their input.
3. Invitation / notices to identified and registered interested and affected parties (I&APs) and the general public to participate in the environmental assessment process for the project, through local newspaper advertisements, direct email and telephonic call communications, and site notices at strategic sites to sensitize key stakeholders and authoritative institutions such as Line Ministries (MME; MEFT; Ministry of Water, Agriculture and Land Reform), Regional (Kunene Regional Council) and Local Governments (Epupa Constituency), and the affected community of Orupembe of the planned project.
4. Site reconnaissance survey of the area and consultative meetings were done and held, respectively with the Orupembe Community between 6th and 10th of September 2021. These were done to understand the geomorphology and landscape, geological,

Ecology and biodiversity, Air quality, hydrological, archaeological, demographic and socio-economic setting of the project area.

5. Compilation of the Draft Environmental Scoping Assessment (ESA) and Environmental Management and Rehabilitation Pan (EMRP) report (which consolidate all findings from the I&APs/public consultations, and based on project information provided by the proponent, literature research conducted and field observations**)**. The ESA report provides a summary of the public participation process followed, baseline information for environmental receptors, the impact assessment matrix adopted, and an assessment of the major impacts identified. The EMRP focusses on the proposed impact mitigation and enhancement measures for the project.
6. Circulation of the draft ESA and EMRP reports to all identified and registered I&APs for review, comments, and final input upon submission to the Department of Environmental Affairs and Forestry.
7. Submission of the ESA and EMRP reports, including all appendices to the report to the Department of Environmental and Forestry Affairs, via the MEFT's online portal, in fulfilment of all the requirements of the Environmental Impact Assessment (EIA) Regulations No. 30 of 2012 and the Environmental Management Act, (EMA), 2007, (Act No. 7 of 2007) for application of the Environmental Clearance Certificate (ECC) for the proposed project.
8. Notification of all registered Interested and Affected Parties (I&APs) confirming that the ESA and EMP reports have been submitted to the MEFT's EIA online portal for final public review and evaluation by MEFT.
9. Evaluation of the reports by MEFT and subsequent issuance of Record of Decision on the granting of an ECC.
10. If the ECC is granted, all I&APs will be informed of this outcome. Similarly, if the ECC is not granted communication to all I&APs will be made.

The overall environmental assessment process that was followed is illustrated schematically in **Figure 1.3**.

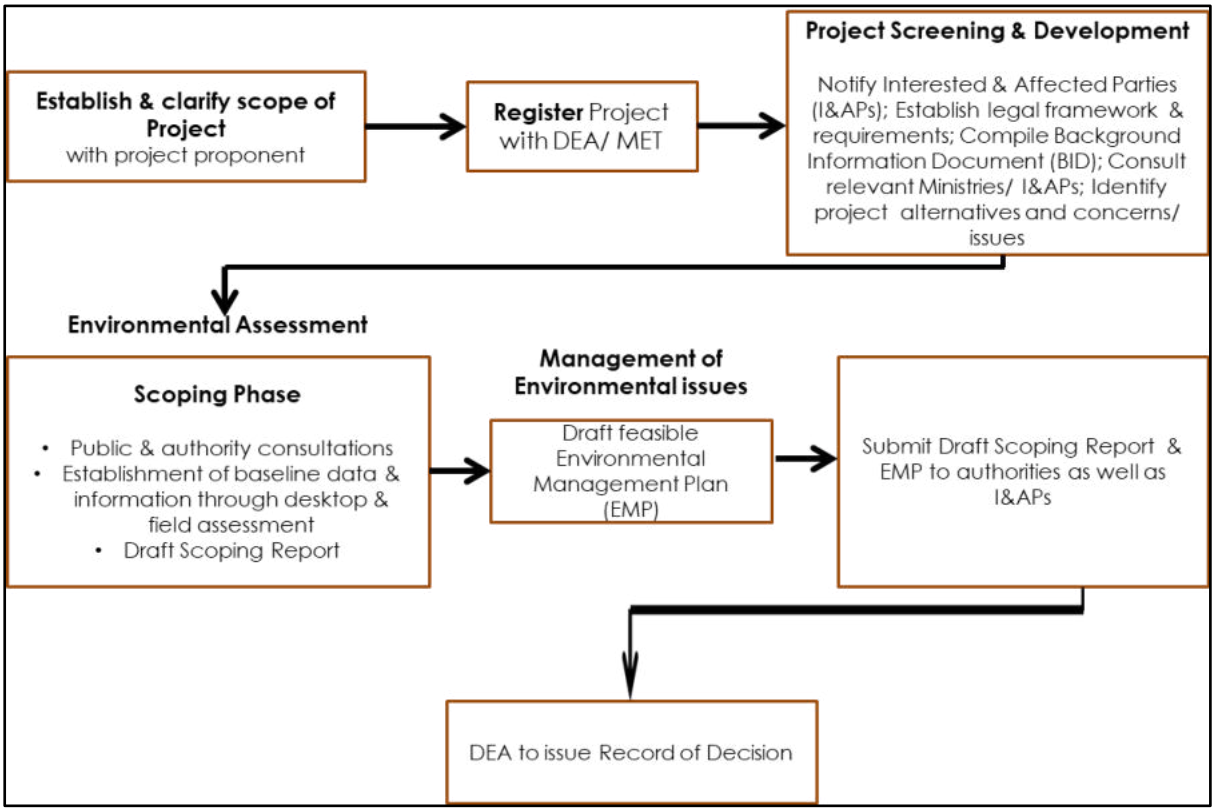

Figure 1.3. Schematic process flow of the Environmental Assessment Process Followed

2 PROJECT DESCRIPTION, ACTIVITIES AND PROCESSES

2.1 General overview

Dimension stone, which the resource and commodity of interest in this study, is a collective generic term used for various natural stones used for both structural and decorative purposes in the construction industry. Based on current market demands the main rock types presently quarried for dimension stone production in Namibia include granite, marble, dolerite and sodalite; which are primarily exported in both raw and processed form as sized blocks or end-consumer products (e.g., tiles, slabs or counter/ tabletops) to both regional and overseas markets such the Zambia, DRC, USA, Europe and China. It is crucial to emphasise that unlike other mineral resources, the economic viability of a dimension stone deposit is highly influenced by the quality (i.e., pattern, fracture frequency, extractable block size, colour, etc) of the host rock mass because this single attribute dictates the price a block, slab or countertop can fetch on the market. For this reason, prospecting and economic viability assessments for dimension stone deposits always include the extraction and subsequent beneficiation of a sample blocks for purposes of testing market desirability and demand for blocks or slabs with that specific colour or pattern.

A desktop study coupled with walkover field geological evaluation has already been conducted over the mining claims concerned, and for this the proponent already has an idea of where the good quality gneissic/ granitoidal and marble units occur within the license areas, at least based on visual judgement, exposed quarry walls and personnel experience. Those know sites will be the primary target sites for further exploration drilling, test quarrying and if justified by economics continuous small-scale quarrying. A designated area, located to the west of the targeted linear marble/ gneissic ridge and approximately mid-way between the 3 concerned mining claims has preliminarily been earmarked for the placement of the various support structures.

In accordance with conventional practice, the proposed project will entail the following stages:

- Construction of onsite and offsite support infrastructure, clearing of the quarry sites and access roads, and general site establishment
- Active brownfields exploration drilling and quarrying, on site sizing of blocks, transporting of mined blocks, and ongoing rehabilitation of the quarries and support infrastructure area, and
- Quarry closure, decommissioning, and final rehabilitation

The activities involved at each of these stages are elaborated on below.

2.2 Construction phase

The activities to be undertaken during the construction phase are summarised below:

- General site clearing of the proposed quarry areas, and erection/ installation of the camp site; waste rock area; access roads; stockpile bays for topsoil storage; temporary block sorting, storage and loading bays for blocks; and general operational support infrastructure areas (e.g., onsite office, maintenance workshop area, power supply genset pads, diesel and water tanks pads, temporary fenced off yard for solid and liquid waste)
- Widening and upgrading of existing access tracks and creation of new access routes to quarries, including the installation of culverts at river/ drainage channel crossings
- Topsoil removal and safe storage
- Overburden removal and usage of such overburden in cut and fill operations
- Geotechnical core drilling to inform the quarry(s) layout and designs
- Rehabilitation and possible deepening of existing water supply boreholes to support quarrying operations
- Erection of 700 – 1000m^2 corrugated sheet and concrete floor lined structure to be used as a maintenance workshop and storage space for spares and supplies. The concrete floors of such structure shall extend at least 1.5m beyond the boundary of the corrugated sheets to ensure ease of and effectiveness of containing any oil and lubricant spillages.
- Erection of three (3) 12 m long containers, with 2 stacked on top of each other, for workers accommodation at the proposed camp site
- Erection of one (1) 6 m long office container
- Erection of one (1) 6 m long container, partitioned for ablution facilities (toilets and shower) (**Figure 2.1**).
- Clearing of parking bays near each mining claim for tipper trucks, excavators, front end loaders, 4x4 bakkies and excavation of a 2 m deep hole about 20 m from each ablution facility container where a sewage septic tank would be installed for temporary sewage collection. Such hole shall be lined with a HDPE liner which would be anchored on the surface in a 1 m deep trench. The septic tanks shall be pump-emptied as and when the need arises.
- Erection of at least one above-ground 10 000L diesel tank for onsite diesel storage near each quarry. Such tanks shall be placed on a concrete bund for spillage control (**Figure 2.2**).

- Installation of a heavy-duty diesel engine powered generator near each quarry. Each of these generated shall be placed on a concrete bund and have an associated shade structure for heat control (**Figure 2.3**).
- Placement of 19 – 37.5 mm crushed aggregates across the accommodation and designated parking bay areas for dust suppression purposes. The aggregates can be sieved borrow material from nearby sources or could be generated by crushing overburden waste rock from the historical quarrying operations near MC 66714.
- Placement of solar panels on the roofs of accommodation containers for domestic power supply such as lighting and cooking.
- The creation of a 12m wide access gravel road along the western toe of the targeted ridge connecting the three (3) license blocks.
- Diversion of small tributaries away from the maintenance workshop, accommodation, temporary waste storage and oil storage areas.
- Ongoing engagement with the Orupembe community for local human resource planning and development

Figure 2.1. Typical containerized ablution and sanitation facility to be erected on site

Figure 2.2. An example of a 10 000L diesel tank installed onsite for diesel storage

Figure 2.3. Typical overhead shaded structure installed over a diesel engine powered generator mounted to a concrete slab

The construction and operation of a solid waste disposal site for is not allowed within the license area as the area lies within a conservancy. However, because generation of waste would be inevitable during construction and operations, a fenced off yard for temporary waste storage will be created close to the accommodation and office areas. Both liquid and solid waste will be stored in sealed containers and thereafter disposed of occasionally at an acceptable waste disposal site elsewhere. Ablution facilities shall be fitted with septic tanks in a lined pit and sewage shall be dis-infected periodically prior to pumping it out for subsequent disposal

at one of the closest municipal sewage disposal sites as and when the need arises. Discharge of wastewater into the environment (e.g., into dry ephemeral rivers) without treatment is prohibited under the Water Act of 1906.

The proposed general site layout is shown in **Figure 2.4** below

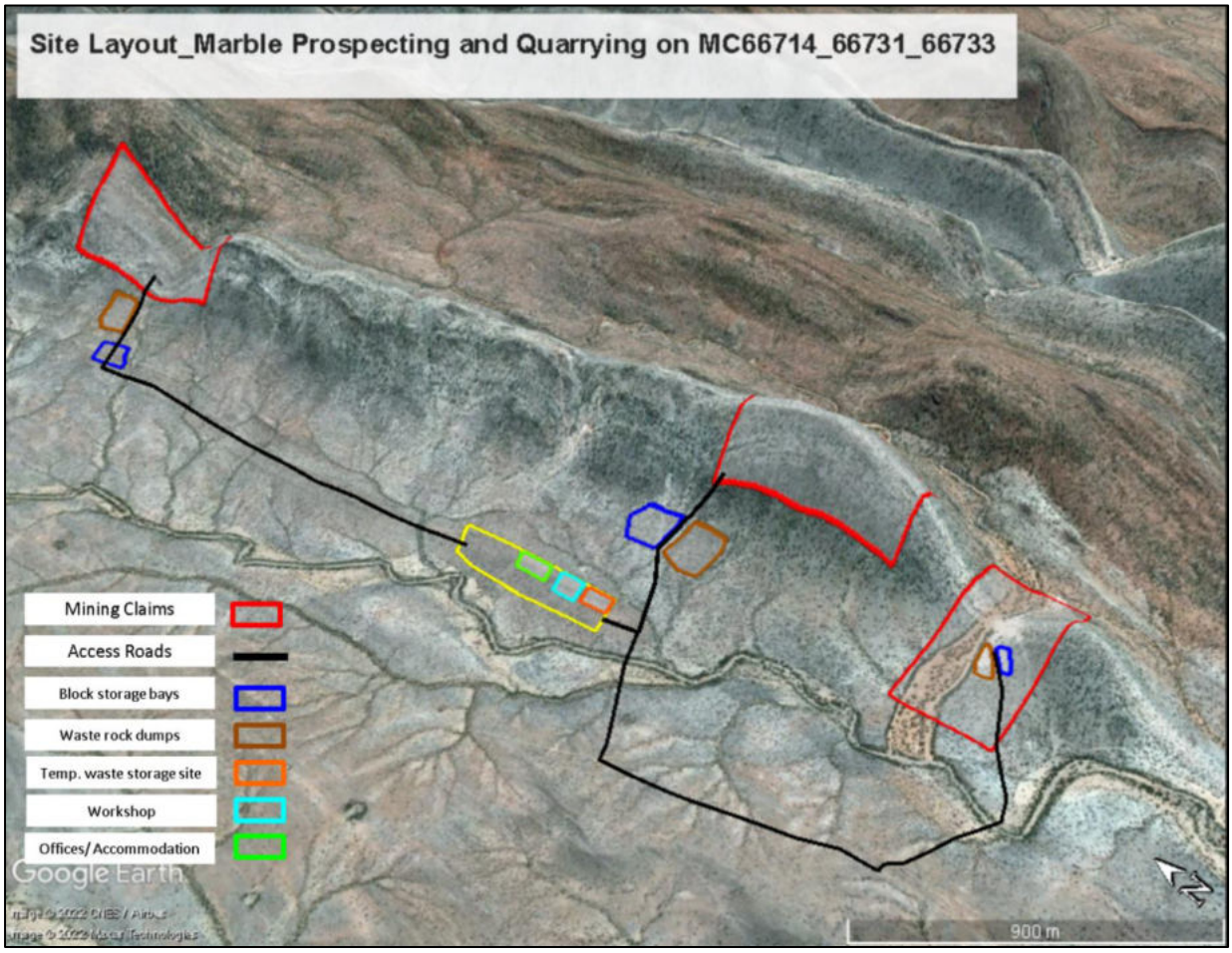

Figure 2.4. Proposed general site layout

2.3 Quarry Operation Phase: project inputs, processes & outputs

The inputs required during the operational phase of the quarry(s) in terms of capital equipment include the following:

- 4x4 mining support vehicles.
- Excavators / front-end loaders for overburden stripping, removal and initial splitting of blocks, and for block handling
- Water tanker to cart water to the quarry sites (from nearby new or rehabilitated water supply boreholes).
- Portable down-the-hole drill rig for block splitting,
- Tipper trucks for waste rock haulage to designated stockpiling bays

- Flat deck truck for long distance transportation of sized blocks to existing processing factories or to Walvis Bay direct shipment to overseas markets.
- Drilling fluids stored in manufacturers approved containers; and
- Water bowser for transporting water from water supply boreholes to the use areas
- Diesel truck (bowser) for transporting diesel to site.
- Diesel storage tanks and power generators (same as in construction phase)
- Diamond wire saw cutters for block extraction
- Submersible pumps to dewater quarries where necessary

2.3.1 Staff accommodation and Equipment Storage

It is anticipated that during full production, and depending on the market's performance, approximately 20 to 30 people (both skilled, semi and unskilled) will be employed. All the workers will be accommodated onsite at the quarry camp. All quarries will only operate during day hours. The accommodation, ablutions and kitchen facilities at the camp will all be powered by a solar system comprising solar panels installed on the roofs of the containerize and prefabricated structures.

All equipment and vehicles will be stored at designated storage or parking areas near the working sites.

2.3.2 Block Extraction Technology and Other Processes

According to Ashmole and Motloung (2008), the mining method in a dimension stone quarry is largely influenced by the geology of the rock mass. Block extraction will generally start by loosening large volumes of rock (usually in the 1000s of m^3 range) by means of primary cuts (using a combination of diamond saws, wire saws and blade cutters as shown in **Figure 2.5**) and then dividing the loosened boulders stepwise into smaller pieces until commercial blocks are obtained, whilst simultaneously discarding waste material as the process progresses.

At each of the planned quarries, quarrying for block extraction will start at the top of the ridge and progress downwards through the rock mass in vertical cuts of 4 to 6m per annum.

Selective quarrying will be always practiced, whereby one quarry will be mined within each of the mining claim at a time. Certain ridges within the chain of mining claims may be left untouched if the rock mass quality is not good or the rock mass quality does not meet market demands at the time. This will however only become apparent upon completion of the test quarrying program. Due to the focused and selective quarrying approach which would be adopted, the rehabilitation program will also be phased such that rehabilitation will be implemented around each quarry and advanced as quarrying around that specific site progresses.

The actual quarrying of good quality gneiss/ granitoid and marbles will be carried out by using diamond wire saw cutting technique until the quarry has advanced to a depth of at least 5 to 7m from surface, after which a combination of diamond wire saw cutting and blade cutting techniques will be adopted.

The dimension stone (DS) blocks extracted through these 2 techniques will be removed from the quarry by front-end loaders fitted with forks and moved to a designated stockpile area for further sorting and storage as shown in **Figure 2.6.**

Figure 2.5. Typical quarrying and cutting operations in a dimension stone quarry

Figure 2.6. Typical on-site block sorting and stockpiling prior to transportation for further beneficiation

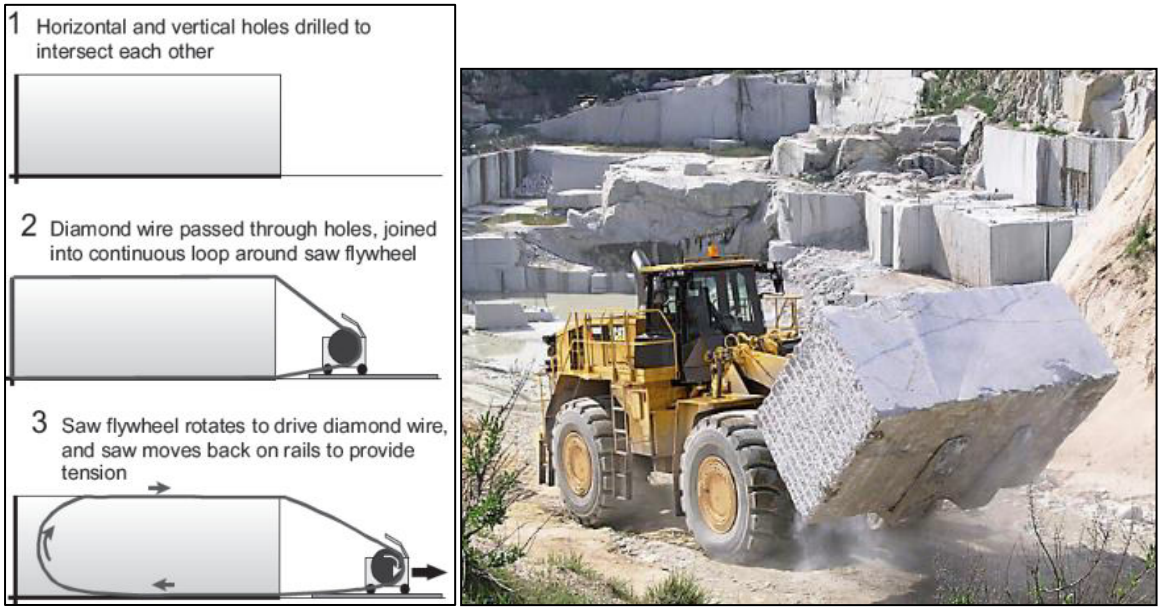

Figure 2.7. Illustration of quarrying by diamond wire technology and block handling from a quarry using a front-end loader

The removal of overburden is generally carried out with heavy earth-moving machinery. In some cases, the weathered zone is removed by drilling holes by jackhammers and slim drill machines for the drilling purpose. These holes are charged with light explosives and under controlled blasting methods the over burden material is loosened out. Subsequent diamond wire saw cutting involves drilling of two holes, which are drilled to intersect each other, and subsequently passing a diamond wire through these holes. The holes are typically created by applying 'Continuous Manual Hammering' or 'Slim Drill. The diamond wire is passed through the two holes and is then joined to form a continuous loop, which is placed over the flywheel of the saw. As the flywheel rotates, driving the diamond wire through the stone, the saw moves backwards along a track to maintain sufficient tension in the wire and in so doing the block is cut by continuous motion of the diamond wire saw (refer to **Figure 2.7**). The block freed from rock is toppled either pneumatically or by pulleys. The lifting and loading of blocks are done by 'Derrick cranes' and using various types of loaders. The diamond saw cutting technology has the advantage that it is associated with low noise and dust generation (Chatterjee *et al*. 2005).

Ashmole and Motloung, 2008 also stated that studies have shown that the use of diamond wire sawing has the added advantage of enhancing block recovery and reducing transportation costs by reducing the amount of waste generated and transported.

Depending on the final geometry of the quarry, handling of blocks from the quarry will most likely be by means of front-end loaders fitted with fork attachments (as shown in **Figure 2.7, right photo**). The same front-end loaders will be fitted with a quick coupler which allows for fast interchanging of the bucket with fork or boom, thereby enabling the same machines to be utilized for removal of overburden, handling waste material and cleaning the quarry when fitted with the bucket and pulling blocks down from exposed faces when fitted with the boom. Collectively, this will reduce the number of machineries on site, thereby reducing the likelihood of hazards such as machine-machine collisions, machine-person/ fauna collisions, as well as noise, fume and dust pollution.

2.3.3 Quarrying Output

The output of the mining process or from cutting and splitting are commercial 5 to 7 m^3 rectangular blocks. The annual production of the dimension stones from the planned quarries is not known at this stage, but the thickness of the deposits the quarries are expected to have a Life of Mine more than 25 years.

After extraction from the ground, the blocks are transported to a designated sorting and stockpile bay where they are sorted and stacked according to size and quality (colour, patterns, fracture frequency, staining, etc.). The blocks will subsequently be transported from site by means of flat deck trucks either to factories in Karibib and/ or Walvis Bay for further beneficiation, or directly to the port of Walvis Bay for shipping to overseas markets. This implies that no processing of dimension stone blocks will take place onsite, which has the upside that the amount of solid waste generated at the side is greatly reduced.

2.4 Quarry closure and rehabilitation phase

During the operational phase of a quarry's life, the impact on the environmental can be lessened by planning with future closure in mind. It is also good practice to plan mining where possible in such a way as to be able to utilise waste from operational quarries to fill the voids of worked out quarries. By planning properly, many voids from quarries and borrow areas can be filled up during the operational phase of a quarry at little extra cost (Ashmole and Motloung, 2008).

Therefore, towards the end of mining activities on active sites on the mining claims, progressive/ongoing rehabilitation will be carried by the Proponent. This will be done through rock shading, and partial backfilling with both waste rock and topsoil.

Once quarrying is completed, following the depletion of the dimension stone quality deposit, the activities will be decommissioned, and the sites will be rehabilitated as much as possible.

In summary, the quarry closure and decommissioning phase will entail the following:

- Dismantling of all infrastructures i.e., all support infrastructure, access roads
- Stoppage of all quarrying activities.
- Landscaping of all disturbed areas (grubbing and levelling of access roads, stockpile bays, etc).
- Subsequent disbursement of weathered rock and the potentially seed rich topsoil over reclaimed areas.
- Donation of boreholes and associated infrastructures (e.g., borehole pumps) to the affected community
- Workforce retrenchment, possible relocation and funding for alternative economic activities
- Social exit from communities, which is the process whereby support for community initiatives cease

Part of rehabilitation should also entail the following crucial measures:

- Re-vegetation of the disturbed sites using the plant species like those in the surrounds.

3 PROJECT ALTERNATIVES

This section explores alternatives that were considered and weighed up in this assessment and provides an indication of those options deemed to be most feasible for this project. The viability of the selected alternatives/options is based on those that were found to be less damaging to the environment, while maximizing potential benefits from the proposed activities.

According to the 2012 EIA Regulations the definition of the "alternatives", in relation to a proposed activity, refers to different means of generally meeting the same purpose and requirements of a proposed activity, which may include alternatives to –

- (a) the property on which or location where it is proposed to undertake the activity.
- (b) the type of activity to be undertaken.
- (c) the design or layout of the activity.
- (d) the technology to be used in carrying out the activity; and
- (e) the operational aspects (or modus operandi) of the activity

The concept of considering alternatives thus ensures that the environmental assessment process is not reduced to the defence of a single project proposal that is to the desire of the proponent, and therefore, provides an opportunity for unbiased considerations of options, to determine the most optimal course of action from an environmental perspective.

Alternatives that were considered for this project relate to:

- Project location.
- Quarrying techniques and technologies
- Supporting infrastructure during different stages of the project.
- The ''No-action'' alternative.

3.1.1 Limitations to the Project Alternatives

In evaluating alternatives to each of the above-listed aspects, the following factors were considered in line with best practice procedures as outlined under DEAT (2004):

- **Resource locality** – where alternative locations could be considered for the same resource and such alternatives are justified by social and economic factors.
- **Technological limitations** - where high costs or the environmental unfriendliness of a technology may prevent it from being considered as a viable option, or the lack of technological development may preclude certain options from consideration.

- **Environmental limitations** – where environmental factors such as climate, geology, hydrology, hydrogeology, potential impacts on the local ecology may prevent or favour consideration for a particular option.
- **Socio-economic limitations** – where socio-economic factors such as distance to processing facilities or markets, availability of infrastructure, current and future land-use, cultural significance, presence of heritage/ archaeological sites, and impacts on livelihoods may hinder or enhance consideration for a particular option.

These are considered below in the context of this project.

3.1.2 Project Location Alternative

The location of the mining claims is principally dictated by the spatial distribution of the rock type(s) of interest, which in turn is primarily determined by geological and geotechnical conditions. On top of this, the geographic location of the proposed quarrying activities is constrained to areas over which the proponent holds mineral prospecting and quarrying rights. Accordingly, the proponent chose to prospect and conduct quarrying on mining claims 66714, 66731 and 66733 because of:

- the massive occurrence of the desired marble, granitic and gneissic rock units within the claims' boundaries,
- the enormous resource of these rock units as judged from the lateral and depth (thickness) continuity of these units as judged from exposures in the adjacent existing quarry, and
- their seemingly good degree of durability

The proponent is restricted to prospect and mine only within the boundaries of the prospecting area over which they legally hold rights through permission granted by the custodian Ministry of Mines and Energy and the directly affected landowner(s). In reflection of the above, an alternative location for the proposed activities was not a viable option in this case.

3.1.3 Alternatives to quarrying methods and technologies

The techniques and methods to be adopted for prospecting and quarrying include:

- Bull dozers and front-end loaders to create access roads and remove rock rubble on the surface to expose bedrock.
- Air compressors to expose bedrock faces for detailed geological mapping of structures and continuity of the rock masses.
- Down-the-hole drilling to evaluate rock mass quality at depth.
- Butterfly cutting to extract sample blocks; and
- Diamond saw cutting.

- Block handling, sorting and on-site storage.

For the creation of simple and narrow access roads shallow excavation with the front-end loader bucket is deemed to be most economically and environmentally feasible option. Where the ground is flat this method would basically entail dragging the front-end loader's bucket across the envisaged footprint of the road, thus creating a pathway that can be used by small and large vehicles. Unlike in conventional road construction where the subgrade is ripped and re-compacted, this method ensures less modification of the soil's structure. Roads for accessing the ridge will involve dozing of surficial rubble into gently sloping access ramps, placing borrowed sandy material on top of such rubble, and ultimately, compacting the sandy material on those access ramps. The sand material will be borrowed from nearby drainage channels, particularly targeting patches that are free of vegetation.

Once the surficial overburden rubble has been removed, bedrock surfaces shall be exposed using air compressors. From an efficiency and effectiveness point of view air compressor technology is deemed to be most suitable compared to other traditional methods such as sweeping.

Down-the-hole rotary air blast drilling was selected as the preferred method for both block splitting and creation of holes for the diamond wire sawing cutting process. This is because in comparison to other drilling methods such as percussion drilling and diamond core drilling it is quick and relatively inexpensive, and therefore works well for block splitting purposes which typically require high drilling densities. The low cost makes it suitable for both ongoing brownfield prospecting and mining of low value products such as dimension stones. Although the method typically produces debris and dust the rigs to be used shall be fitted with a cyclone that captures most of the dust and prevents it from escaping.

For test and actual quarrying, butterfly and diamond saw wire cutting techniques were selected as the most favourable extraction methods for separating, cutting, and splitting blocks because of the reasons outlined below:

- Diamond wire sawing permits efficient cutting through the hardest of materials, and is thus deemed suitable for this project because the targeted host rock is hard
- Both butterfly and diamond wire saw cutting are associated with low noise levels and low dust generation compared to other block splitting technologies such as controlled blasting.
- Cutting is more accurate thereby enhancing recovery and minimizing generation of waste rock.

These are the most conventional and most practical methods (from an efficiency and economic viewpoint) used in the dimension stone industry worldwide to extract commercial blocks. For these reasons, no other alternatives were considered in so far as the technology and methods to be used are considered.

3.1.4 Alternatives to support infrastructures

Alternatives were considered for the different support infrastructures required to achieve the intended end goal without investing excessively. In this regard alternatives to support infrastructure such as access roads, locality of the mine camp, water and power infrastructure, ablution facilities, stockpile bays for blocks and waste rock, and fuel storage were considered. Due consideration was given to technological, economic, and environmental limitations of various infrastructural components in selecting the most feasible option. The alternatives considered in this regard are presented in **Table 3-1** below.

Table 3-1. Service infrastructure alternatives considered for this project

Category of Infrastructure	Alternatives Considered	Justification for selected option
Access roads	Create new access roads from the D3703	-to minimize project costs, environmental damage and project risk it was decided that proposed activities should utilize existing road infrastructure as much as possible and only create smaller additional access roads to access sites where no roads exist.
	Use existing farm access roads from the D3707 as much as possible	
Ablution facilities	Install fixed facility with septic tank	-To avoid long-term visual impacts & minimize rehabilitation costs portable container facilities were selected as the best option
	Portable facilities with septic tank	
Water supply	Use existing boreholes if any available on site	-Rehabilitate existing community boreholes and possibly drill new water supply boreholes. This will have an added advantage that boreholes can be shared with the community for livestock water provision
	Drill new borehole	
	Bring water from Orupembe	

Category of Infrastructure	Alternatives Considered	Justification for selected option
Diesel storage	Install fixed above-ground diesel tank on site	-Install a fixed above ground diesel tank to guarantee sufficient fuel storage. The fact that the tank will be in one place will help minimize risk of pollution that would otherwise arise from a trailer mounted option
	Trailer mounted diesel tank with a containment bund	
Power supply	Diesel generator	-Most practical & economically option during quarrying phase is to use diesel generator to power all quarry and cutting activities
	Install photovoltaic solar panels	-Installation of solar panels at the camp for domestic power supply only.
	Connect to nearest 3-Phase grid or substation	
Container Site Office, Storage and Worker accommodation	Erect dis-mantlable prefabricated container	Favoured option due to: (a) Ease of installation, (b) Low installation costs and (c) Ease of dismantling & moving
	Erect Permanent buildings	Lease favoured & unlikely viable due to high CAPEX and long terms visual impact
	Offices off-site	Not ideal or preferred as office or accommodation need to be at production site to enable ease of responding to exploration demands

Category of Infrastructure	Alternatives Considered	Justification for selected option
Cut out blocks or not during prospecting (exploration)	Cut out blocks for further beneficiation to fully assess rock mass quality and demonstrate product to potential markets	This is the most favoured option as clients always want to first see the final product
	No cutting of sample blocks. Rely solely on rock core to evaluate rock mass quality for dimension stone production viability	Option not favoured as rock core can miss weak and fractured zones. Additionally, it does not allow the proponent to demonstrate final product to prospective markets

3.1.5 No-Go Alternative

The "no action" alternative implies that the status quo remains, and nothing happens. Should the proposal to extract suitable blocks for possible dimension stone product on the 3 mining claims be discontinued, none of the potential impacts (both positive and negative) identified would occur. If the proposed project is to be discontinued, the current land use and socio-economic dynamics of area will remain unchanged.

This option was considered and a comparative assessment of the environmental and socio-economic impacts of the "no action" alternative was undertaken to establish what benefits might be lost if the project is not implemented. The key loses that may never be realized if the proposed project does not go ahead include:

- Potential continued shortage of blocks for beneficiation at the processing factories, which may contribute to undesired closure of such facilities in the medium to long run.
- Lost opportunity for foreign direct investment.
- Employment for about 30 to 40 people will not be realized.
- Loss of potential income to local and national government through land lease fees, license lease fees and various tax structures.
- Socio-economic benefits such as skills acquisition to local community members, borehole upgrades, etc would be not realized.
- No business boost for local businesses through sub-contracting agreements such as provision of site security services.

Considering the above losses, the "no-action/go" alternative was not considered a good option for socio-economic development of the affected area. Hence, this option was dismissed.

The project activities and their alternatives described above are governed by certain legislations and these need to be complied with throughout the project life cycle. The applicable/relevant legislations, policies and guidelines are presented under the next chapter.

4 APPLICABLE LEGAL FRAMEWORK, POLICIES AND GUIDELINES

4.1 National Legislation

Within the Republic of Namibia all mineral rights are vested in the state and are regulated by the Ministry of Mines and Energy (MME) whereas sustainable exploitation and management of the environment and use of natural resources is regulated by the Ministry of Environment, Forestry and Tourism (MEFT).

The Minerals Prospecting and Mining Act (Act No. 33) of 1992 is the principal act governing exploration and mining of mineral resources in the Republic of Namibia. From an environmental management viewpoint, this Act stipulates the undertaking of an environmental impact assessment during prospecting or mining/ quarrying operations, coupled with the development of site and project-specific environmental management and rehabilitation plans which collective ensure that potential major impacts (both negative and positive) are well understood and assessed prior to commencement of any activities. The Ministry of Mines and Energy (MME) is the custodian agency for the administration and enforcement of the Minerals (Prospecting and Mining) Act.

Conversely, MEFT is the overseeing custodian agency for the administration and enforcement of the EMA, with the enforcement of the Environmental Impact Assessment Regulations of 2012 specifically being entrusted with the Department of Environmental Affairs and Forestry within MEFT. This Act stipulates that possession of an Environmental Clearance Certificate is a pre-requisite for undertaking any activities listed under the Environmental Impact Assessment Regulations of 2012. The act further sets out under Section 58 and in the Government Notice No. 29 of 2012 a detailed framework and schedule for conducting Environmental Impact Assessments for mining companies or any entity that plans to undertake quarrying or mining at any scale.

A review of applicable and relevant Namibian legislation, policies and guidelines to the proposed development are given in this chapter. This review serves to inform the project Proponent, Interested and Affected Parties and the decision makers at the DEA as well as the mining commissioner of the requirements and expectations, as laid out in terms of these instruments, to be fulfilled by the project proponent in so far as the activities proposed under this project are concerned. The applicable local (national), and where necessary international legislation, policies and guidelines are summarised in **Table 4-1 and Table 4-3.**

Table 4-1. Applicable legislation, policies and guidelines to the proposed dimension stone quarrying/ mining activities

LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	IMPLICATION ON THIS PROJECT
Relevant Acts		
The Constitution of the Republic of Namibia (1990)	Government of the Republic of Namibia	The Namibian government has adopted several policies that promote sustainable development. Most of these originate in clauses of the Constitution of the Republic of Namibia. In Article 95 (i), the State undertakes to actively promote and maintain the welfare of the people by adopting policies aimed at the utilisation of natural resources on a sustainable basis for the benefit of all Namibians. Articles 91(c) and 95(l) are also of relevance to sound environmental management practice. In summary, these refer to: • Guarding against over-utilisation of biological natural resources. • Pursuing sustainable natural resource use • Limiting over-exploitation of non-renewable resources. • Maintaining biological diversity • Ensuring ecosystem functionality. • Protecting Namibia's sense of place and character. Through implementation of the mitigation measures set out in this Scoping Report (ESA) and the accompanying Environmental Management and Rehabilitation Plan (EMRP), the owner of the ECC shall advocate for sound environmental management as set out in the Constitution of the Republic of Namibia.
Environmental Management Act No. 7 of 2007 and its 2012 EIA	MEFT: DEAF	Part 2 of the Act sets out 12 principles of environmental management, summarized as follows: • Community involvement in natural resources management, must be promoted and facilitated.

LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	IMPLICATION ON THIS PROJECT
Relevant Acts		
Regulations Government Notice 28-30 (Government Gazette 4878		• The participation of all I&APs must be promoted and decisions must consider the interest, needs and values of all I&APs to promote transparency. • Equitable access to environmental resources must be promoted and the functional integrity of ecological systems must be considered to ensure sustainable systems. • Assessments must be undertaken for activities which may have significant effects on the environment or the use of natural resources. • Sustainable development must be promoted in all aspects relating to the environment. • Namibia's cultural and natural heritage including, its biological diversity, must be protected and respected. • The option that provides the most benefit or causes the least damage to the environment, at a cost acceptable to society must be adopted to reduce the generation of waste and polluting substances at source. • The reduction, re-use and recycling of waste must be promoted. • A person who causes damage to the environment must pay the costs associated with rehabilitation of damage to the environment and to human health caused by the pollution. • Where there is sufficient evidence which establishes that there are threats of serious or irreversible damage to the environment, lack of full scientific certainty may not be used as a reason for postponing cost-effective measures to prevent environmental degradation; and • Damage to the environment must be prevented and activities which cause such damage must be reduced, limited, or controlled.

LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	IMPLICATION ON THIS PROJECT
Relevant Acts		
		The proponent has the responsibility to ensure that the proposed activity, as well as the EA process, conforms to the principles of this Act. In developing the EA process, OMAVI has been cognizant of these requirements, and accordingly the ESA process has been undertaken in conformance with this Act and the EIA Regulations (2012). Several listed activities in terms of the Act, are triggered by the proposed activities.
Mineral Prospecting & Mining Act (Act no. 33 of 1992)	MME	Sections 50, 52, 54, 57 and 130 of this Act sets out provisions for environmental management for activities arising from mineral exploration and mining, as follows: • That the mineral license holder is required to prepare an ESA or EIA and an EMP and make revision of such EMP from time to time • That the mining license holder is liable to pay compensation where in course of the exploration or mining operations; any damage is done to the surface of land, water source, cultivation, building or any other structure • That the holder of a mineral license cannot exercise any rights on a private land until the holder has entered into an agreement with the owner regarding payment of compensation • That the license holder shall take all necessary remedial steps to reasonable satisfaction of the minister for any damage caused by any mining operations on closure of mines. • That the minister is empowered to direct the mineral license holder for carrying out good reconnaissance, mining and prospecting practices for the protection of the environment, and conservation of natural resources payment of liability fees and royalty and remedial steps for any damages and

LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	IMPLICATION ON THIS PROJECT
Relevant Acts		
		• That the mineral or mining license holder shall report pollution in course of any mining or prospecting operations and make remedial measures for such. The abovementioned provisions are all relevant to the proposed activities and were thus considered in the ESA process and drafting of the EMRP.
Charter for Sustainable and Broad-Based Economic and Social Transformation in the Namibian Mining Sector 2014 – 2020 (The Namibian Mining charter)	The Chamber of Mines of Namibia	This charter aims to facilitate meaningful participation of historically deprived Namibians in the mining industry. It has effectively been developed as an instrument to effect transformation and sets specific targets for mineral license holders active in Namibia. The proponent must thus ensure that previously disadvantaged Namibians are actively availed opportunities to participate in the proposed project through employment, skills development, and downstream/ support business opportunities such as through procurement of goods (e.g., meat products, etc.) and services (e.g., security, cleaning, mechanical repairs, translation)
The Minerals Policy of Namibia, 2003	Ministry of Mines and Energy	This policy sets out guiding principles and directions while communicating the values of the Namibian people in pursuit of the development of the mining sector. This policy stipulates that the funding of final mine closure plans (including rehabilitation), and that government will monitor industry compliance with these mechanisms using the Environmental Management and rehabilitation Plan (EMRP) contracts. The government also expects the industry to take the challenge of social responsibility in terms of planning for closure, community involvement and empowerment of formerly disadvantaged people.

LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	IMPLICATION ON THIS PROJECT
Relevant Acts		
		Section 2.2.5 Mine Closure / Integrated Mine *Use* stipulates that mine closure be planned, and form part of an integrated land use strategy involving engagement with communities. Before a mining licence is granted, a final mine closure plan, including a funding mechanism to deal with environmental pollution and infrastructure, should be developed and submitted. ***Section 2.2.6 Social Responsibility of Mining Companies*** stipulates the need for mining companies to engage with communities and address social responsibilities through support programs, training and community participation. ***Section 5.3 Environmental Rehabilitation*** indicates that government will ensure compliance with national policies and guidelines during rehabilitation and, where appropriate and applicable, with global best practice; with relevant stakeholders, it will investigate the established financial mechanisms for environmental rehabilitation and aftercare.
Pollution Control & Waste Management Bill	MEFT and others	This Bill serves to regulate and prevent the discharge of pollutants to air and water as well as providing for general waste management. The Bill repeals the Atmospheric Pollution Prevention Ordinance (11 of 1976). In terms of water pollution, it will be illegal to discharge of, or dispose of, pollutants into any watercourse without a Water Pollution Licence (apart from certain accepted discharges). Similarly, an Air Quality Licence will be required for any pollution discharged to air above a certain threshold. The Bill also provides for noise, dust or odour control that may be considered a nuisance. The Bill advocates for duty of care with respect to waste management affecting humans and the environment and calls for a waste management licence for any activity relating to waste or hazardous waste management.

LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	IMPLICATION ON THIS PROJECT
Relevant Acts		
		The proposed activities will entail the discharge of gaseous pollutants into air from diesel powered machinery, increase noise levels and dust generation during surface clearing, stripping and quarrying in the vicinity of the quarry, and also generate solid waste (e.g., waste rock and domestic waste).
Water Act (No. 54 of 1956)	MAWLR: Department of Water Affairs: **Mr. Franciskus Witbooi (Deputy Director: Water Policy and Water Law Administration.** **Tel: (061) 208 7158**	Makes provision for several functions pertaining to the management, control and use of water resources, water supply and the protection of water resources. **The Proponent should prevent any potential pollution of groundwater and surface water. Water should be used in a sustainable way and recycled as far as possible. A water abstraction permit will be required from the Department of Water Affairs prior to abstracting any water from a borehole or surface water course for industrial usage. For this, test pumping and borehole yield data would be required.**
Water Resources Management Act (Act No. 11 of 2013)		This Act provides a framework for managing water resources based on the principles of integrated water resources management. It provides for the management, development, protection, conservation, and use of water resources. Should the proponent wish to undertake activities involving water abstraction and/or effluent discharge, the relevant permits will have to be applied for. Of utmost importance are Sections of the Water Resources Management Act No. 11 of 2013 that pertain to the protection of groundwater and aquifers. These are Section 63 (Wastage of groundwater), 64 (License to dispose of groundwater abstracted from mine or underground work), 66 (Protection of aquifers) and 68 (Pollution control).

LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	IMPLICATION ON THIS PROJECT
Relevant Acts		
		The proponent is likely to use groundwater to support the proposed quarrying activities. Potential spillage of hydrocarbons and the use of drilling fluids during ongoing exploration drilling has potential to pollute groundwater and any temporary surface water that may be present in streams. This is particularly crucial for the area concerned due to the drought-stricken and low rainfall nature of the area, which makes the area sensitive to water resources over-exploitation. Furthermore, any watercourse on/or near the site and associated ecosystems should be protected or diverted in alignment with the principles above. Mitigations measures were included in the EMP to reduce impacts on watercourses that could not be avoided
Nature Conservation Ordinance (Act No. of 1996)	MEFT	The Nature Conservation Amendment of 1996 (section 73.1) provides for an economically based system of sustainable management and utilization of game in communal areas; to delete references to representative authorities; and to provide for matters incidental hereto. Although the proposed site for development is not located within protected areas, there is indigenous vegetation on the sites and therefore this Ordinance is relevant. A permit is required should any species onsite, with a protected or endangered status, be damaged or removed. For the removal of such species the proponent will have to apply for such a permit prior to commencing with the proposed activities.
Local Authorities Act No 23 of 1992	**Contact Person:** **Traditional Chief and Councillors of Otjikakurukouje Traditional Authority and Orupembe Conservancy**	The Traditional Authority is the responsible Local Authority of the affected project site area and have been consulted and consent sought to ensure transparency and good working relationship between the project proponents and the traditional authorities. The traditional authority shall play the over-arching role of ensuring that the affected community benefits from the proposed project.

LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	IMPLICATION ON THIS PROJECT
Relevant Acts		
Forestry Act (Act No. 12 of 2001)	MEFT: **Permits are required for the removal of protected plants species.** **For the protected vegetation onsite (project site), the Proponent should contact Forestry Office (Ministry of Agriculture, Water and Land Reform)** **Director: Forestry** **Tel: (061) 208 7663**	The Act provides for the management and use of forests and forest products. Section 22. (1) provides: "Unless otherwise authorised by this Act, or by a licence issued under subsection (3), no person shall on any land which is not part of a surveyed erven of a local authority area as defined in section 1 of the Local Authorities Act, 1992 (Act No. 23 of 1992) cut, destroy or remove - (a) vegetation which is on a sand dune or drifting sand or on a gully unless the cutting, destruction or removal is done for the purpose of stabilizing the sand or gully; or (b) any living tree, bush or shrub growing within 100 m of a river, stream or watercourse." Any endangered fauna shall equally be treated in a similar manner. The proponent will apply for the relevant permit under this Act if it becomes necessary.
Soil Conservation Act (Act No. 76 of 1969) And	MAWLR	The Soil Conservation Act makes provision for the prevention and control of soil erosion and the protection, improvement and conservation of soil, vegetation and water supply sources and resources, through directives declared by the Minister. The Nature Conservation Act makes provision for how communities perceive and value natural resources such as wildlife and plant species.

LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	IMPLICATION ON THIS PROJECT
Relevant Acts		
The Nature Conservation Amendment Act (Act No. 5) of 1996)		Either Acts are applicable since stripping of topsoil and surface clearing will take place to expose the targeted rock mass. Mitigation measures are included in the EMRP to preserve topsoil and reduce impacts on topsoil.
Regional Councils Act (Act No. 22 of 1992)	MURD	The Regional Councils Act legislates the establishment of Regional Councils that are responsible for the planning and coordination of regional policies and development. The main objective of this Act is to initiate, supervise, manage, and evaluate development at regional level. The relevant Regional Council for this project is the Kunene Regional Council (specifically the Epupa Conservancy) which is an I&AP and has been notified and provided with an opportunity to provide input on the proposed activities.
Petroleum Products and Energy Act (No. 13 of 1990) Regulations (2001)	MME: Petroleum Affairs Division	Regulation 3(2)(b) states that "No person shall possess or store any fuel except under authority of a licence or a certificate, excluding a person who possesses or stores such fuel in a quantity of 600 litres or less in any container without a designated license. **This law is applicable to this project because diesel will be stored on site during the construction, operational and mine closure phases to support power supply and all mobile plant.**

LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	IMPLICATION ON THIS PROJECT
Relevant Acts		
The Road Traffic and Transport Act (No. 22 of 1999)	MWT: Roads Authority	The Act provides for the establishment of the Transportation Commission of Namibia; for the control of traffic on public roads, the licensing of drivers, the registration and licensing of vehicles, the control and regulation of road transport across Namibia's borders; and for matters incidental thereto. **The law nonetheless applies to this project as all long-distance flat deck trucks and operators/ drivers would need to be road worthy and licensed. Additionally, the transportation of blocks to beneficiation factories or the port of Walvis Bay will require that minimum road load limits are adhered to.**
National Heritage Act (Act No. 27 of 2004)	MEAC	The Act makes provision for the protection and conservation of places and objects of heritage significance and the registration of such places and objects. Part V Section 46 of the Act prohibits removal, damage, alteration or excavation of heritage sites or remains, while Section 48 sets out the procedure for application and granting of permits such as might be required in the event of damage to a protected site occurring as an inevitable result of development. Part VI Section 55 Paragraphs 3 and 4 require that any person who discovers an archaeological site should notify the National Heritage Council. Section 51 (3) sets out the requirements for impact assessment. - **No sites of archaeological, historical, heritage or cultural significance were identified within the license area** **However, should any other objects of heritage/ archaeological significance be identified after commencement of the project activities, the work must cease immediately in the affected sites proper documentation by qualified and experienced archaeologists must be carried out, and**

LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	IMPLICATION ON THIS PROJECT
Relevant Acts		
		the necessary steps taken to seek authorization from the Council as outlined in the "chance find" procedures.
Public Health Act (Act No. 36 of 1919)	MoHSS: Occupational Health	The Act serves to protect the public from nuisance and states that no person shall cause a nuisance or shall suffer to exist on any land or premises owned or occupied by him or of which he is in charge any nuisance or other condition liable to be injurious or dangerous to health. The proponent shall therefore ensure that all machinery and activities are designed and operated in a way that is safe to public health and that the noise and dust emissions which could be considered a nuisance remain at acceptable levels. Settlements within proximity shall be spoken to arrange working times when quarrying activities are to commence, especially for quarries closer to their homesteads.
Labour Act, 2007	MLIEC	Sections 3, 4, 5, 11, 16, 23-27, 44 and 135 make provision for the following: • That a person may not employ a child under the age of 14years • That children are prohibited for employment in a mine and other dangerous circumstances • That forced employment of persons is prohibited • That an employee is entitled to monetary remuneration daily, weekly, fortnightly, or monthly in cash, cheque, and direct deposit into a bank account • That the work hours of an employee are 45 hours in a week, over and above which an employee is entitled to additional payment overtime wage

LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	IMPLICATION ON THIS PROJECT
Relevant Acts		
		• That employees are entitled to (a) annual leave on the basis of the average number of days worked over the year, (b) a day's sick leave for every 26days worked, (c) compassionate leave for a period of 5days in 12 months which is fully paid, and (d) leave on public holidays, • That female employees that have completed 6 months of employment are entitled to 12 weeks of maternity leave, which can be extended for a further period of one month • That the minister is empowered to make regulations in relation to safety, health, hygiene, sanitation, and welfare of persons employed in or about mines, including sea-bed operations The proponent is expected to be compliant with the above provisions and as such the above provisions were accounted for in the ESA report and accompanying EMRP.
Relevant Policies and Regulations		
Guidelines for Management of Conservancies and Standard Operating Procedures of 2013	MEFT: Directorate of Parks and Wildlife Management	This guiding document provides a framework and standard operating procedures for the establishment and management of conservancies in Namibia, provides a coordinated effort and involvement of local community stakeholders in conservancy support, and fosters biodiversity conservation outside Protected Areas through the wise and sustainable use of natural resources and indigenous knowledge

LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	IMPLICATION ON THIS PROJECT
Relevant Acts		
Environmental Assessment Policy (1994)	MEFT: DEFA	This policy aims to promote sustainable development and economic growth while protecting the environment in the long term by requiring environmental assessment prior to undertaking of certain activities. Annexure B of the policy contains a schedule of activities that may have significant detrimental effects on the environment, and which require authorization prior to undertaking. **Please see** Table 4-2 **for a summary of the activities that would require authorization for the proposed quarrying.**
Mine Health & Safety Regulations (under section 138A of the Mining Act, 1992)	MME: Mine Safety & Services Division MoHSS: Occupational Health Division	These set of regulations are aimed at ensuring that mines are operated in a safe manner to prevent fatalities, injuries, and long-term health hazards. The regulations make provision for: • Employee's right to leave unsafe working places • Obligation of a mine manager to provide for all safety measures in a mine or quarry • Reporting of accidents to the chief inspector and keeping a record of such accidents • Requirements for the mine manager to provide occupational health services at area of mining activity • Requirements for stability of excavations; provision of waiting areas; provision of fencing and gates; schemes for working in vicinity of water body. • Provision for mine dump or mine tailings facility • Ensuring that all parts of a mine are well ventilated with minimum standards of air quality • The mine manager's responsibility to formulate a scheme for safe movement of vehicles being use in the mine/ quarry • The mine manager's responsibility to formulate a scheme for identifying hazards at the area of mining activity and provision of appropriate protective equipment

LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	IMPLICATION ON THIS PROJECT
Relevant Acts		
		• Ensure that the mine manager provides first aid and firefighting equipment and procedures where exploration/ quarrying activities are being conducted All the above-mentioned provisions are relevant to this project and were thus considered in the ESA process and EMRP.
Atmospheric Pollution Prevention Ordinance (1976)	MoHSS	This ordinance provides for the prevention of air pollution and is affected by the Health Act 21 of 1988. Under this ordinance, the entire area of Namibia, apart from East Caprivi, is proclaimed as a controlled area for the purposes of section 4(1) (a) of the ordinance.
Hazardous Substance Ordinance, No. 14 of 1974	MoHSS	The ordinance provides for the control of toxic substances. It covers manufacture, sale, use, disposal and dumping as well as import and export. Although the environmental aspects are not explicitly stated, the ordinance provides for the importing, storage, and handling. This Ordinance is relevant to the project under review as potentially toxic substances such as diesel and chemicals for sewage treatment will be utilized during various stages of the proposed project.

Table 4-2. Summary of relevant activities listed under the 2012 EIA Regulations

ACTIVITY	DESCRIPTION OF ACTIVITY	RELEVANCE OF LISTED ACTIVITY
Activity no. 2.1	The construction of facilities for waste sites, treatment of waste and disposal of waste	The proposed activity will require development of stockpiles for waste rock not suitable for production as well as stockpiling of topsoil stripped off to access the targeted rock units at depth
Activity No. 3.1	The construction of facilities for any process or activities which requires a license, right or other form of authorization, and the renewal of a license, right or other form of authorization, in terms of the Minerals (Prospecting & Mining Act), 1992	The proposed project will entail drilling and quarrying activities, both of which require environmental clearance prior to commencement as per the EMA
Activity No. 3.2	Other forms of mining or extraction of any natural resources whether regulated by law or not	The proposed project would require surface clearing and excavation over the footprint of the targeted rock masses and support infrastructure sites, followed by subsequent drilling, and possibly bulk excavation and cutting to extract sizable commercial blocks.
Activity No. 3.3	Resource extraction, manipulation, conservation & related activities	
Activity No. 9.4	The storage and handling of a dangerous goods, including petrol, diesel, liquid petroleum gas or paraffin, in containers with a combined capacity of more than 30 m^3 (30 000L) at any one location	Diesel will be stored on site in above-ground tanks to provide fuel to the power generator and all plant

4.2 International Treaties and Conventions

The international treaties and conventions applicable to the project are as listed in **Table 4-3** below.

Table 4-3. International Treaties and Convention applicable to the project

STATUTE	PROVISIONS	PROJECT IMPLICATIONS
The United Nations Convention to Combat Desertification (UNCCD	Addresses land degradation in arid regions with the purpose to contribute to the conservation and sustainable use of biodiversity and the mitigation of climate change	The project activities will take place in an area with abundant vegetation, primarily in the form of Mopane trees, and should there not be implemented in a manner that they contribute to desertification and destruction or loss of biodiversity habitats. For this to happen surface clearing of vegetation must be spatially confined, and the installation of structures like fences should be implemented only in areas where it serves as safety barrier to animals
Convention on Biological Diversity 1992	Regulate or manage biological resources important for the conservation of biological diversity whether within or outside protected areas, with a view to ensuring their conservation and sustainable use. Promote the protection of ecosystems, natural habitats, and the maintenance of viable populations of species in natural surroundings	Removal of vegetation cover and destruction of natural habitats should be avoided and where complete avoidance is impossible it should be minimised
Stockholm Declaration on the Human Environment, Stockholm (1972)	It recognizes the need for: "a common outlook and common principles to inspire and guide the people	Protection of natural resources and prevention of any form of pollution.

STATUTE	PROVISIONS	PROJECT IMPLICATIONS
	of the world in the preservation and enhancement of the human environment.	

5 DESCRIPTION OF THE RECEIVING ENVIRONMENT (BASELINE)

This section provides an overview of the status of the climatic, biophysical, social, and economic environment covered by the 3 mining claims, based on a holistic analysis of baseline data and information as deduced from field assessments (e.g., transect walkovers), literature review and consultation with the indigenous communities and local authorities to verify the data that was collected remotely. This provided a baseline against which changes that would possibly arise because of the proposed activities can be measured and monitored through time.

5.1 Current Biophysical Environment

5.1.1 Climatic Conditions

Climatic aspects such as temperatures, rainfall, wind, humidity and daily sunshine hours are described in this section. These aspects are crucial in establishing the potential impacts of dust generated from quarrying activities as well as the risk of exposure of surface water to potential pollutants during periods of rainfall and overland runoff. The direction and travel distance of dust and water pollutant plumes can be predicted from this information, which in turn helps to inform layout planning of infrastructure as well as the extent to which the receiving environment might be impacted.

This area as per the rest of Namibia, falls within the Subtropical High-Pressure Zone, characterised by dry air, low rainfall, long sunshine days and predominantly high temperatures (Mendelsohn *et al*., 2009). At the time of this study no weather stations existed in the vicinity of the 3 mining claims but data sourced from reliable climate data sources such as Meteoblue (https://www.meteoblue.com/en/weather/webmap/beta/uis_namibia) for the project area suggest the patterns described below. Contours and graphical representation of the various climatic patterns are shown in **Figure 5.1**.

- **Air temperature:** Air temperature is important from an environmental impact assessment perspective both for determining the effect of plume buoyancy (the larger the temperature difference between the plume and the ambient air, the higher the plume can rise), and determining the potential development of mixing layers. Maximum average daily temperatures in the project area are experienced during the summer/ spring months (September – March) and are typically in the range of +/- 35˚C - 38˚C, while minimum average daily temperatures are experienced between April and July, and are generally around 16 - 18˚C. The high average maximum temperatures

that can be experienced during the summer and spring months can adversely affect workers through dehydration, fatigue and sunburn.

- **Sunshine Hours:** The area is generally characterized by long daily sunshine hours in the range of 11 to 13 hours. Sunshine hours are important as they determine daily operational hours for the quarries, which in turn directly dictates periods of likely nuisance to the public and wildlife due to noise, ground vibrations, etc.
- **Wind:** Wind direction and wind speed are of critical importance when it comes to the potential impacts from dust. The wind direction determines the general path that solid particulates and air pollutants will likely follow, and the spatial extent or distance such particles are likely to travel. Data extracted from the meteoblue website suggests that winds in the project area are predominantly from a south-easterly direction. The main village of Onjuva as well as the envisaged mine camp are both located upwind of the proposed quarries to reduce the impact of possible dust ingress on the community and mine workers. Wind speeds in the area are typically in the range of 3 to 4 km/hr according to data from meteoblue.
- **Precipitation:** Precipitation in this area can be expressed in terms of rainfall and fog. Baseline rainfall data is vital for impact studies as it affects the following aspects:
    - Amount of available runoff during the rainy seasons.
    - Effective removal of atmospheric particulates, and
    - Inhibition of dust generation
    - Frequency and amount of available recharge to local aquifers

Fog also plays a role in dust suppression, but it also adversely affects visibility and can therefore contribute to unsafe conditions on a mining site. Additionally, fog is a major source of corrosive agents that attach steel and is therefore an important aspect to consider in the design of any steel components as such components need to be protected against possible corrosion.

In the absence of site-specific rainfall data, reliance was placed on available data for the Kunene Region as deduced from Mendelsohn *et. al* (2009) as well as rainfall patterns observed and communicated by community members over the past 4 to 5 years. The Kunene Region is generally characterized by an arid climate with low annual rainfall. It can therefore be expected that runoff on the targeted ridges will occur in the form of thin sheetwash over the side slopes of these mountains and ultimately enter the local river system which forms part of a much larger catchment that drains into the Atlantic Ocean near Mowebaai. The average annual rainfall generally increases from west to east from an average annual rainfall of less than 50 mm in the west to up to 350 - 400 mm in the east

and is very sporadic. The rainy season typically lasts from October to March with the main rainy season between February and March. The regional variation in rainfall is well reflected by fluctuations in the condition of natural vegetation in the area. The project site is about 85 km from the coastline, along a straight-line trajectory, and therefore lies outside the fog belt which according to Mendelsohn *et al.* (2012) only extends about 20 km from the coast.

- **Relative Humidity:** relative humidity in the concerned area is approximately in the range of 50% to 55%.

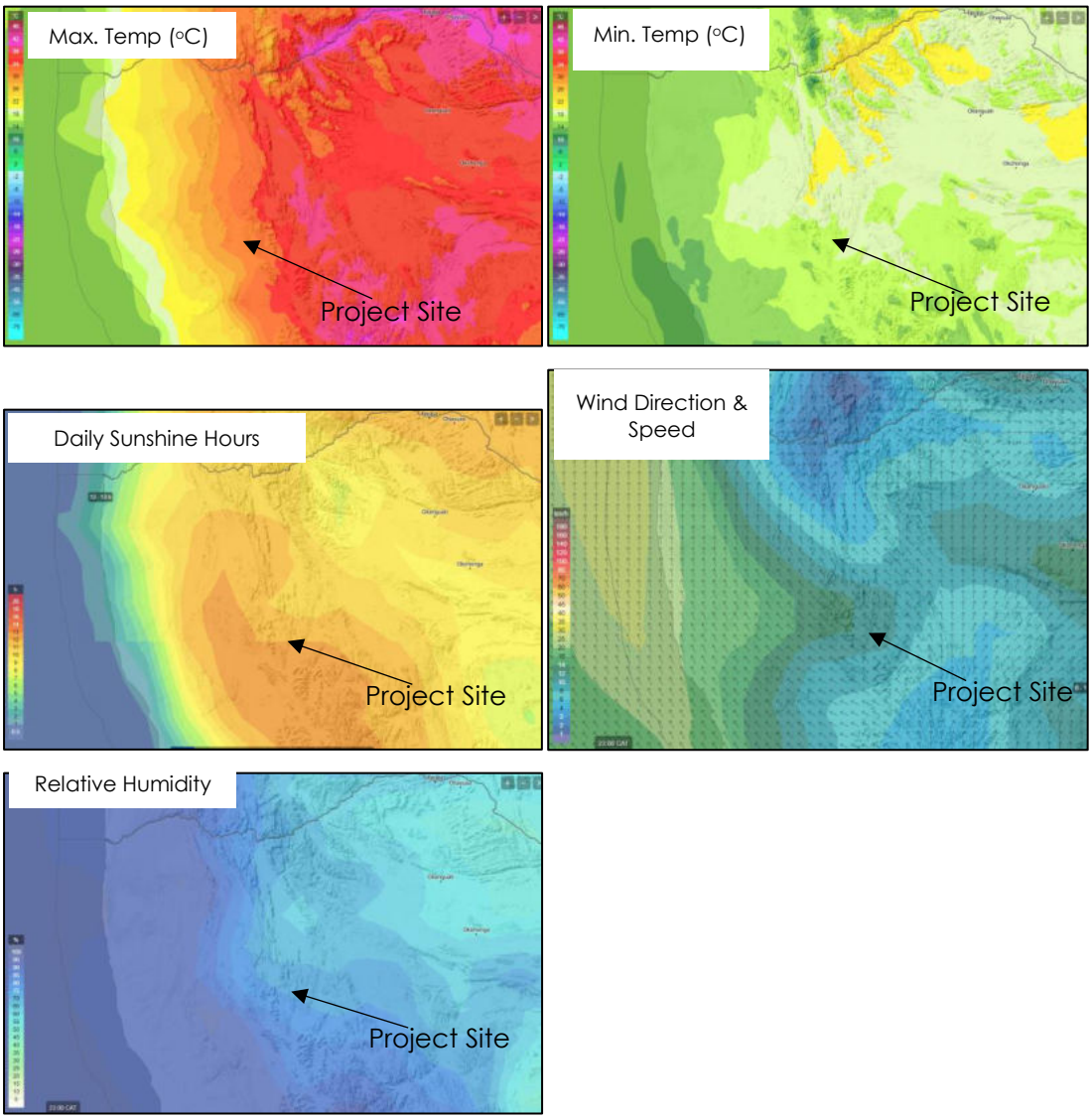

Figure 5.1. Graphical representation of climatic patterns in the study area (Source: https://www.meteoblue.com/en/weather/webmap/beta/uis_namibia)

5.1.2 Air Quality

Air quality is of importance as it has a direct impact on human and biodiversity health. Ambient air quality is likely to get altered, at least to some extent, because of dust fall out and the

emission of fugitive gases from the burning of diesel during the construction and operational phase. At present Namibia does not have any air quality standards that can be implemented. Therefore, in accordance with Article 144 of the Namibian Constitution, regional and/ or international standards may be adopted.

At the time of this study ambient air quality conditions could not be ascertained due to a lack of monitoring data. Accordingly, the proponent has agreed to set up a monitoring network of dust fall-out buckets around the site prior to the construction phase to help establish ambient air quality prior to construction conditions. The program will run for approximately 8 months prior to the commencement of construction. Results from the dust fall out monitoring program will then provide a baseline against which to gauge post construction levels and to benchmark against accepted industry standards. The monitoring program shall also include monitoring of nitrogen dioxide (NO_2), Sulphur dioxide (SO_2) and Ozone (O_3) concentrations.

5.1.3 Surface Water, Drainage and Topography

As shown in **Figure 5.2** the concerned project area lies on the border between the Kunene and Khumib catchments. Collectively, these catchments cover a surface area of approximately 30 000km^2. Near the proposed exploration and quarrying site, the two catchments are made up of the Ondusengo main river which flows in from the northwest and intercepts one of its main tributaries just west of the Onjuva marble community campsite, and the Otjinjange river which drains part of the Lower Kunene sub-basin and discharges into the Kunene River. These two major rivers join up around Onjuva to form the Khumib river which discharges into the Atlantic Ocean near Mowebaai, but according to Strohbach (2008) it often ends within the desert in localized pans where it is effectively dammed by the ever-moving sand sea, and only seldomly does it make it to the Atlantic Ocean unhindered. Both the Ondusengo and the Otjinjange rivers only flow for part of the year during and immediately after precipitation and are therefore short seasons ephemeral streams. The Otjinjange river generally has a steep river profile characterized by steep gradients (averaging 1:400), rapids and a channel controlled by the bed-rock structure. Conversely, the Ondusengo river flows more over flatter plateaus and is characterized by a wider river profile.

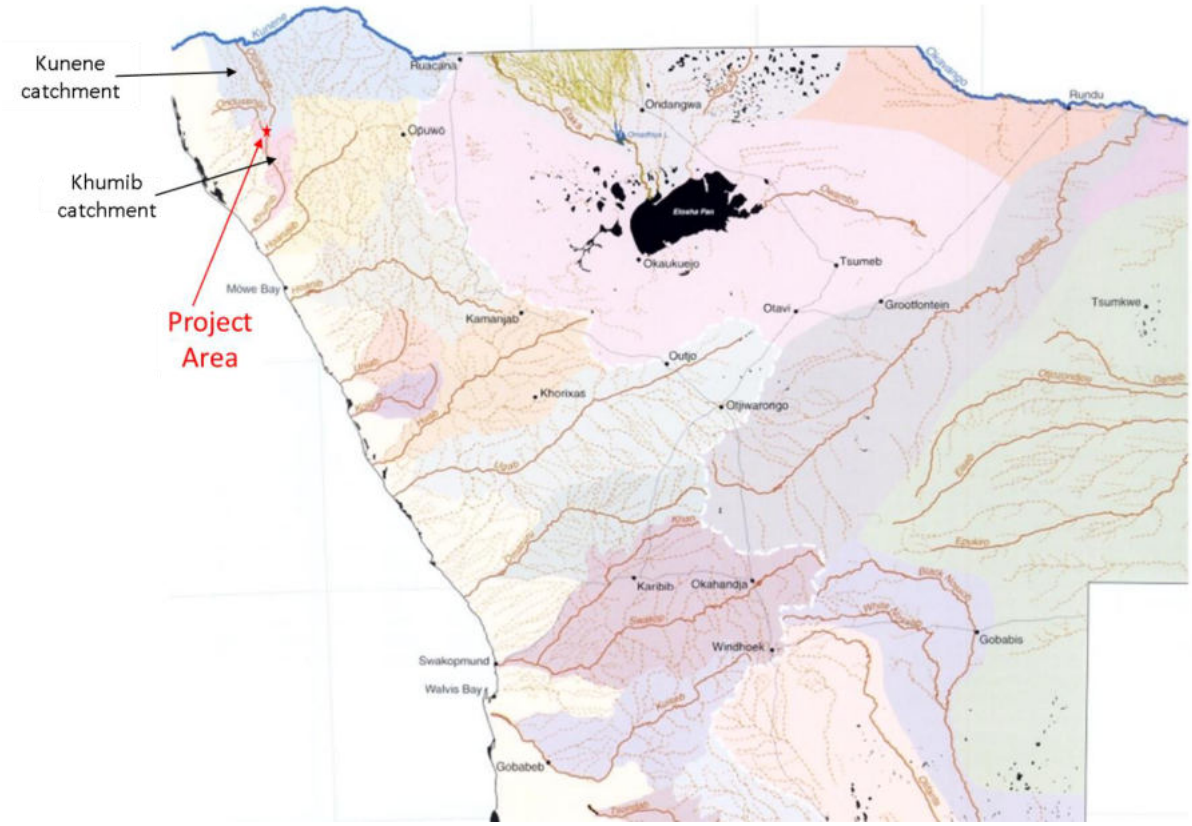

Figure 5.2. Location of project area relative to major catchments of Namibia (extracted from B.J. Strohbach, 2008 and Mendelsohn *et. al.*, 2002)

The targeted marble ridge at Ondjiva is generally flanked to the west and east by well-developed meandering tributaries of the Ondusengo river which are also known to flow after short periods of precipitation; thereby acting as a source of water to the community during the rainy seasons (October to March). The majority of runoff is generally generated from rain falling between October and March, but due to the persistent droughts in recent years runoff has been scarce. One of the main Ondusengo tributaries in the area cross cuts the linear marble ridge within Mining Claim 66714 right by the existing marble quarry. Several very localized streams drain towards these tributaries from the targeted ridge.

Judging from the presence of boulders in the main Ondusengo river, flow in this river is anticipated to be turbulent while sheet flow is anticipated over the ridge slopes and plateau.

Topographically the area comprising the mining claims is characterized by a north-south high relief marble/ granitoridal ridge with steep slopes which drastically transition to a flat wide plateau extending westward where all the quarry support infrastructure such as the mine camp, waste rock dumps and block sorting and storage bays will be located. Along the east the ridges drastically transition to a steep sided stream and rises again into another high relief elongated ridge of volcanic rocks.

Mining claim 66714, which encompasses the historical marble quarry, is crosscut in the middle by a major river which encroaches into the existing quarry.

5.1.4 Groundwater potential and recharge

According to the National Groundwater System (GROWAS II) the project site lies within the broader Kunene groundwater basin. The average rainfall ranges from less than 50 mm/annum in the west to slightly more than 300 mm/a in the east. Except for the Kunene River, all rivers are ephemeral. Because the basin is largely characterized by hard rock hills and valleys, groundwater potential is generally low owing to restricted recharge through the impervious rock bodies. Consequently, aquifers with reasonable groundwater potential are generally confined to locally fractured zones and faults in the host rock masses (**Figure 5.4**), and such fracture zones provide water for domestic consumption and livestock farming in the area.

Locally, however, the thick alluvial sediments of the Ondusengo and Khumib rivers are known to host alluvial aquifers which are recharged by runoff and flooding immediately following precipitation and flash floods. For the area of Onjuva these aquifers seem to be the primary sources of water as most of the known boreholes lie within the flood plains of these rivers. Because precipitation is low however, recharge is generally limited and as a result these aquifers tend to have hard water which is mainly only fit for watering stock.

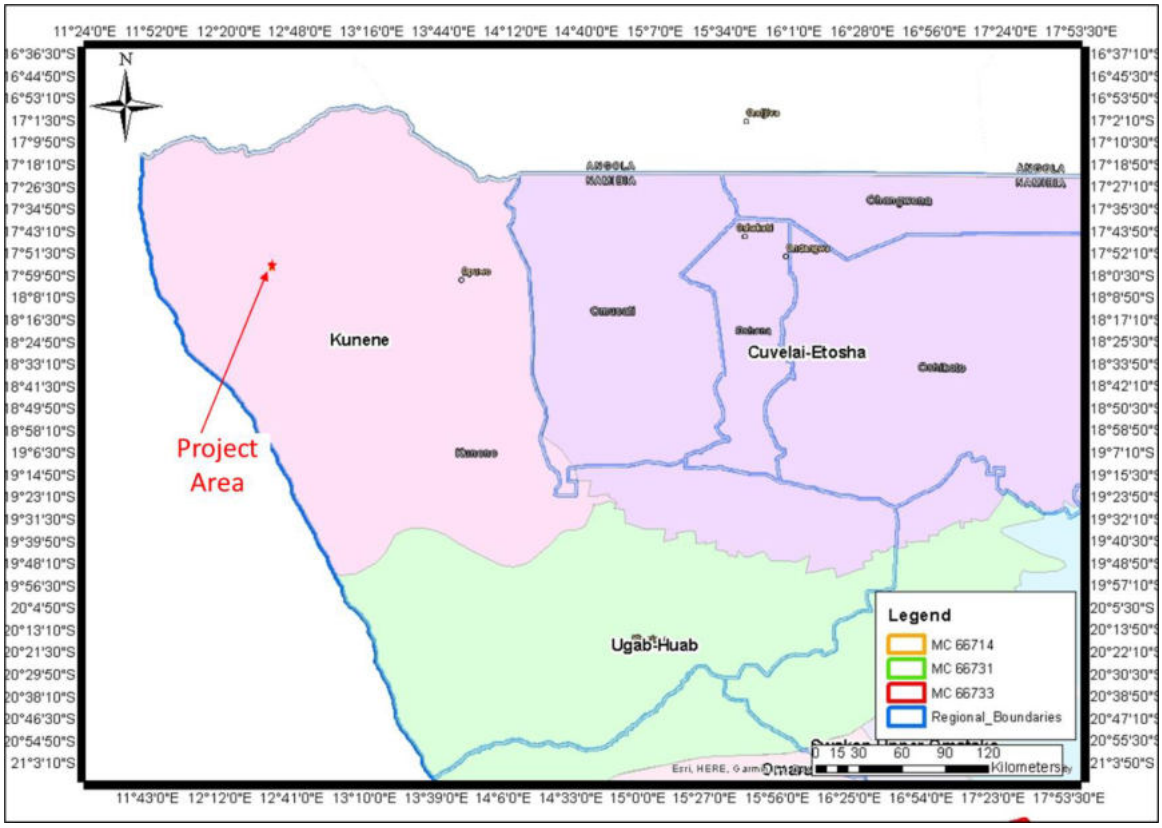

Figure 5.3. Groundwater basins of northwest Namibia, and the project site location relative to these basins

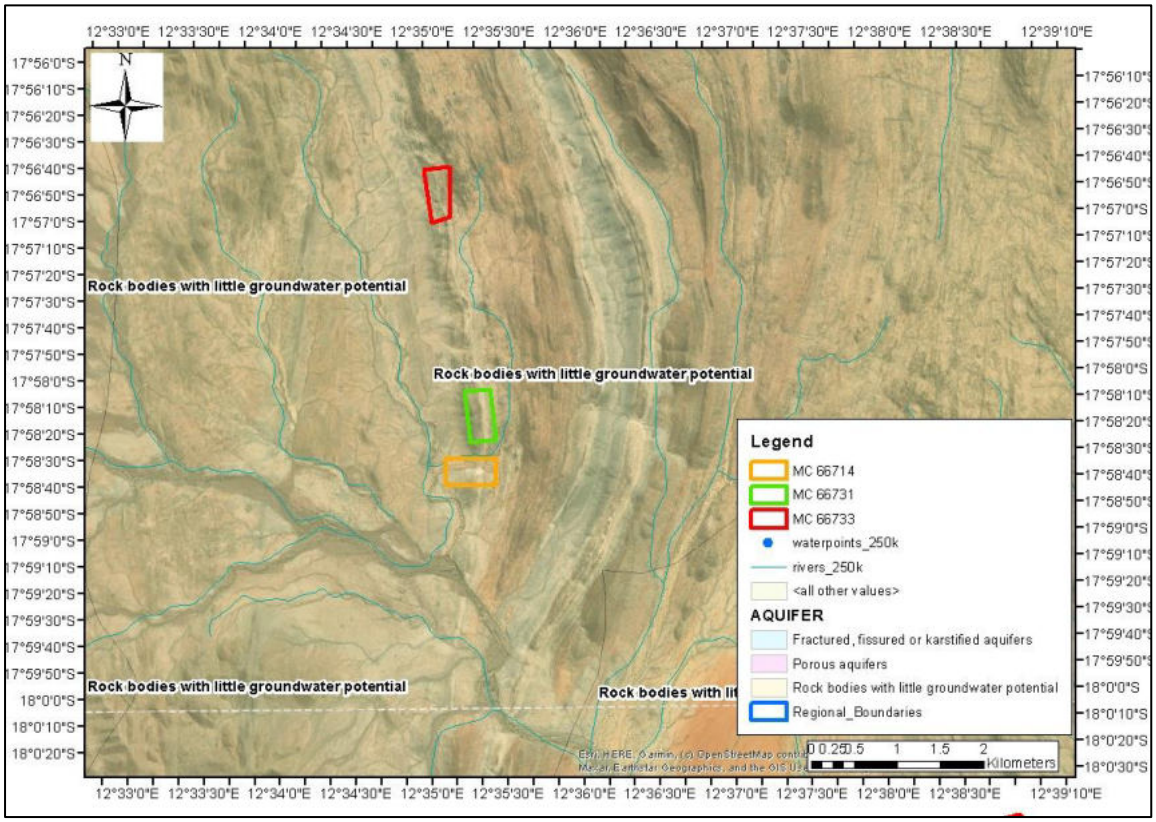

Figure 5.4. General characteristics of groundwater sources in the project area

Based on information provided by the Orupembe conservation officer there are currently 2 boreholes near the envisaged project site which are currently used. Both are sited in alluvial sediments. One of the boreholes is located adjacent to the marble community campsite and the other is close to the community clinic. These boreholes supply water to the campsite and its staff, as well as to the residents of Onjuva. There are also other government boreholes in the village but due to poor maintenance of these boreholes most of them are no longer in use.

According to the Van Wyk *et al*, (2001)'s Groundwater Resources Vulnerability Map of Namibia, the risk of pollution is assessed based on the aquifer type, groundwater flow, depth to groundwater and annual recharge. Groundwater pollution would generally be a concern on such areas that are overlain by the porous sediments and alluvial (sediments) aquifers, especially, if there is a significant point source of pollution. The vulnerability of groundwater to pollution in the broader Kunene basin can therefore generally be expected to be low. However, locally for the concerned project area the vulnerability of groundwater to pollution can be expected to be moderate to high owing to the pervious nature of alluvial sediments overlying the local alluvial aquifers. If precipitation in the area was high, then the vulnerability risk would be high but because there is hardly any free-flowing surface water for most of the year, the risk for pollution is inherently lowered.

5.1.5 Habitats and Flora

Broadly, the project area is dominated by semi-desert and sparse savannah landscape. Three broad habitat categories were identified in the project area based on the geomorphological contrast as well as the type and density of vegetation. These habitat categories include:

- The flat lying plains between mountains,
- The ephemeral stream floodplains and drainage channels, and
- The marble/ granitoidal ridges

The habitat and floral characteristics for each of these are described in detail below.

The flat lying plains

The flay lying plains forming the area earmarked for the quarry waste dumps and support infrastructure is characterized by gently rolling hills which are intercepted by small drainage streams and comprise a thin cover of calcareous sandy gravelly soils. These plains are dominated by small to medium sized scattered trees and shrubs of the *Mopane (Colophospermum mopane)* with rather sparse grass and traces of other plant species. The *Mopane (Colophospermum mopane)* is a protected species in Namibia, and is therefore of

conservation interest, thus requiring a removal permit prior to any clearing and/ or relocation. According to Giess (1998), this floral zone forms part of the Mopane Savannah. This habitat has been modified by human activities such as wood harvesting, livestock grazing and access roads/ tracks. These activities are currently ongoing. Roads and associated support infrastructure will be in this habitat. This habitat is **least sensitive** due to the generally high known recovery of the dominant vegetation, the Mopane *(Colophospermum mopane*) but care should be taken to minimize the footprint of grounds to be cleared as well as to maintain natural drainage flows. The typical vegetation of the flat laying plains is shown in **Figure 5.5** below.

Figure 5.5. Typical soils and vegetation cover of the flat plains with marble ridge in the background

<u>The ephemeral stream floodplains and riverbeds</u>

The drainage channels habitat in the concerned mining claims is essentially made up of small, localised drainage channels and tributaries flowing into the Ondusengo River, with one of the tributaries flowing adjacent to the existing marble quarry. Although the Ondusengo river is not intercepted by any of the three mining claims, it together with its tributaries are an important habitat in the area for the following reasons. First, the small drainages and catchments cross cutting the mining claims empty into the Ondusengo river. Secondly, it is an important source area of high diversity in an arid landscape and an important source for both surface and ground water. Any activity in the catchments will affect the ecology of the Ondusengo river and its tributaries. The banks of the Ondusengo river contain a relatively dense population of large woodland mopane trees, while the smaller drainage channels comprise scattered medium sized mopane trees. The main river channels comprise a well-developed soil profile of

light brown to reddish alluvial sands with gravels and cobbles of the local rock units. It is anicipated that the vegetation in the drainage channels provide habitats to amphibians and small reptiles that rely on burrowing in soil and rocks for shelter, as well as mammals such as springboks, kudus and gemsbokS as well as birds that rely on larger trees for shelter. At the time of the site visit in September 2021, the area was quite dry and only vegetation along the streams seemed to have leaves and could therefore serve as good shade even for domestic animals. Considering the above observations, this habitat class is **sensitive**. The typical vegetation of this habitat is shown in **Figure 5.6** below.

Figure 5.6. Typical alluvial sand and riverine savannah shrub and woodland of the stream floodplains and riverbeds

<u>The marble/ granitoidal ridges</u>

The typical vegetation of the marble ridges targeted for continuous exploration drilling and quarrying for dimension stone production is shown in **Figure 5.7** below.

Figure 5.7. Typical vegetation of the mountainous habitat

This habitat occurs on the marble and granitoidal ridges where drilling and quarrying will be taking place, and where most of the irreversible impacts (drilling, quarrying and open cast mining) will take place. The habitat is generally characterized by a thin layer of sandy gravelly soil overlying hard rock marbles and metamorphosed granitoids and is dominated by highly scattered medium-sized trees and shrubs of *Colophospermum mopane* and including *Terminalia prunioides* and *Commiphora mutlijuga.* Since the *Colophospermum mopane* is a protected species and that it is likely to be impacted by the proposed exploration and quarrying activities, and likely destruct habitats for leopards (which are known from the area) and other mammals such as mountain zebras, this habitat is perceived to be of a high sensitivity.

5.1.6 Habitats and Fauna

Based on site observations, wild animal life in the area seems to be scarce, particularly when it comes to mammals. Based on verbal communication with community members the dominant wildlife sporadically spotted in the area (mainly along the drainage channels and on the plains) during the rainy seasons are summarized in Table 5-1. The area is also known to have a reasonable population of Leopards that mainly stay in the mountains.

Before the persistent droughts that lasted for close to 4 years, the area reportedly used to host a healthy population of cattle but virtually the entire population has since succumbed to the drought and at the time of the site assessment families were only seen to be farming with a small quantity of goats. These domestic animals generally roam across all three habitats. Because of the predominant lack of wildlife throughout the year there is generally a high frequency of goat attack by leopards, and such incidences are recorded and well documented by the conservancy.

Table 5-1. Mammals sporadically spotted in the study area

Scientific name	Common name
Antidorcas marsupialis	Springbok
Oryx gazella	Gemsbok/Oryx
Struthio camelus	Ostrich
Equus zebra	Mountain zebras

Because of the diversity of habitats, the site also hosts a high diversity of bird life.

5.1.7 Geology, Topography and Soils

On a regional scale the project area lies within the Central Kaoko Belt as shown in Figure 5.8 below. The **Central Kaoko Zone** is characterized by large, eastward verging folds of early-Proterozoic metamorphic basement which is overlain by Darama Supergroup meta-sediments. The metamorphic basement primarily comprises red and grey porphyroblastic and migmatitic gneisses and minor meta-sediments in the form of quartzite and schist, which collectively belong to the Okapuka Formation. Conversely, the Damaran Sequence consists of the basal Nosib Group comprising meta-clastic sedimentary rocks such as conglomerate, quartzites and meta-arkose, and these are overlain by time-equivalent meta clastic and calcareous units of the Swakop Group which include schists, quartzites, meta-volcanics and marble.

The primary target rock units for dimension stone quality prospecting and quarrying on the 3 claims are the white marbles of the Swakop Group and the reddish and greyish gneisses of the

Okapuka Formation. These rock units had been quarried previously in one of the claims for dimension stone production and appear to be durable and of good quality at depth as evident from exposed faces in the historical quarry and the abandoned blocks from this quarry (refer to **Figure 5.9**). The marble unit occurs as a laterally extensive elongated sleeve flanked on either side by the red/ grey gneissic units. The gneissic units depict a prominent joint set parallel to the foliation which partly explains why seem to weather faster than then the marbles.

Based on field observations, these targeted marble and gneissic units are either largely exposed on the surface or covered by a thin poorly developed layer of medium dense sandy gravels primarily comprising clasts of the same rock units as shown in **Figure 5.10.** The soils in the area are largely undisturbed, except in the vicinity of the existing quarry and proximal to existing access tracks. Because of their durability, the marbles and gneisses form a high relief north-south trending belt in the project area (**Figure 5.10**).

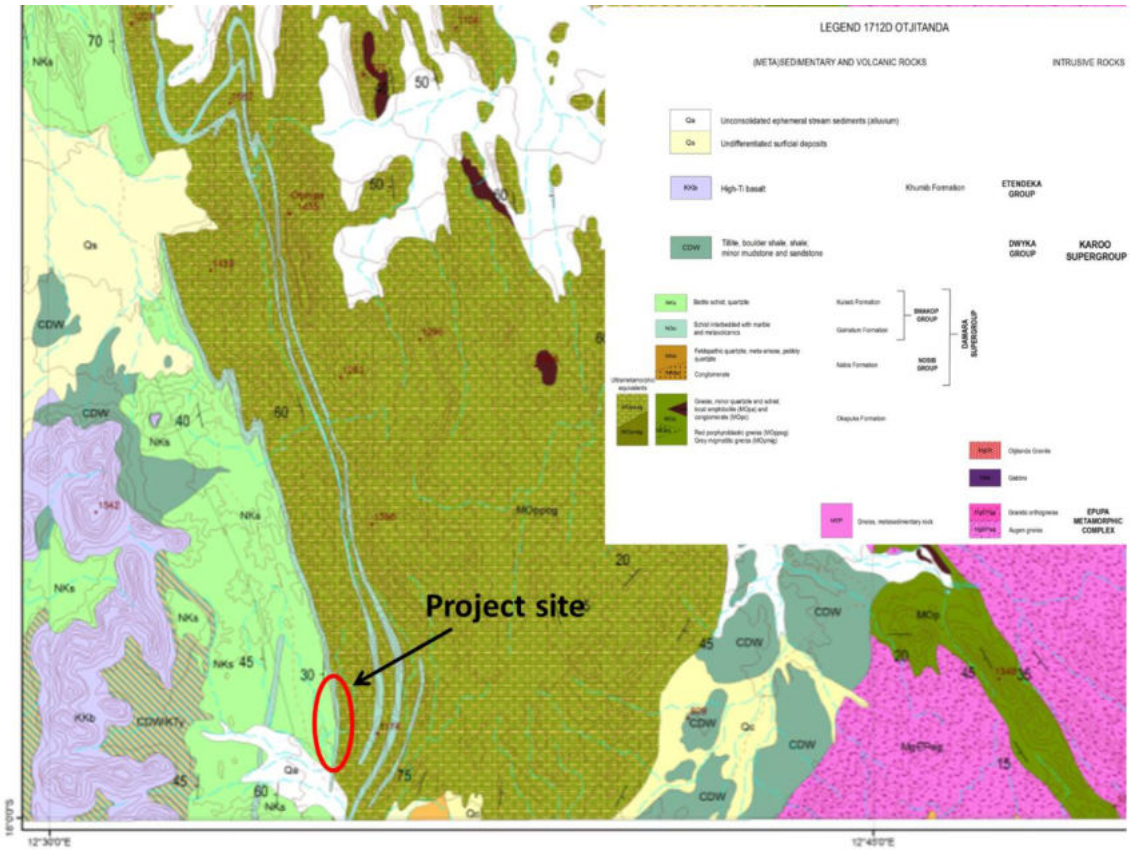

Figure 5.8. Regional Geology comprising the project area (Map sheet 1712D Otjitannda)

Figure 5.9. Red/ grey gneiss and white marble occurrence within the target area. The quarry exposures and extracted blocks are from previous quarrying in the area which ceased in 1997.

Figure 5.10. Typical sandy gravel soil cover and a historical access road in the project area. Note the high relief landscape in the background of marble and gneiss units

5.1.8 Community, Demographics and Villages

The area exclusively belongs to the Ovahimba ethnic group and comprises a mixture of all age groups as observed during the community consultation meeting and a regular gathering of community members at a cuca shop adjacent to the Onjuva clinic. There however appears to be a dominance of the middle-aged population, which is a positive for the project as this age group qualifies as capable workers for the planned quarries.

The project site is in Onjuva village. Other nearby villages, within a 10 km radius of the mining claims, are located to the southeast of Ondjuva and have a similar demographic structure based on field observations.

5.1.9 Current revenue sources and livelihood strategies

There are very limited to no industrial activities in the project area, and for this reason subsistence farming, specifically small stock and cattle subsistence farming, is the primary source of revenue and livelihood at household level. A very limited number of isolated cuca shops also exist at Onjuva village where people sell soft drinks and beers and are an additional source of revenue for some households. This is supplemented by very limited formal and informal employment as outlined below.

The marble community camp site, which is owned and managed by the local community through the Orupembe Communal Conservancy, is one of the main revenue streams for the community's trust. The camp site and the conservancy at large also serve as a source of employment in the area with locals employed in the capacity of casual tour guides, conservation officers, bookkeepers, and camp site supervisors. It is reported that a large population of the active population has also migrated to Opuwo in search for income opportunities and better living conditions, while some senior members of the community have embarked on nomadic migration to areas as far as Omakange in search for grazing pasture for the few herds of cattle they have left.

5.1.10 Additional physical, social and economic elements of the receiving environment

A summary of additional physical and social elements of the receiving environment are presented in **Table 5-2**.

Table 5-2. Biophysical and socio-economic elements of the receiving environment

SUMMARY OF BASELINE ENVIRONMENT			
PHYSICAL ENVIRONMENT		**SOCIO-ECONOMIC ENVIRONMENT**	
Water and Power Infrastructure	- At least 3 water supply boreholes were identified in Onjuva during the site reconnaissance visit and are currently shared with the community for household water supply. These boreholes are located at the following places: the marble camp site, the community clinic and at Onjuva primary school.	Health, Education, and literacy	- The Onjuva state clinic is resourced to provide basic first method of treatment for most illnesses to community members. However, because of the deep cultural roots and believes, the first preferred method of treatment for most families is still with traditional medicines. Only if traditional remedies do not work do households consider seeking formal medical attention.

SUMMARY OF BASELINE ENVIRONMENT			
PHYSICAL ENVIRONMENT		**SOCIO-ECONOMIC ENVIRONMENT**	
	The boreholes generally produce hard and slightly salty water and for this reason the borehole infrastructure at the Onjuva clinic comprises a water purification and softening system which makes the water fit for human consumption. Due to the arid climate in the area, surface water infrastructure is generally scarce. Power infrastructure is almost non-existent in the area, except at the community clinic and the House on the Hill self-catering lodge where solar power is present. These facilities are not shared with the local community		Education facilities in the project area are extremely limited. The Onjuva pre-primary and primary school only has up to grade 3, and children walk to this school daily from as far as Orupembe which is approximately 25km away. Given the distance of the other villages from this school, many children are unable to attend school.

SUMMARY OF BASELINE ENVIRONMENT			
PHYSICAL ENVIRONMENT		**SOCIO-ECONOMIC ENVIRONMENT**	
			The distance to and quality of available facilities also means many children attend school in places as far as Opuwo, Okaoko-Otavi and Okanguati; spending term time in these towns with relatives and returning to villages only during school holidays. Because of all these constraints, the most common level of education is typically some years of primary education and in some cases followed by some years of secondary education. Higher education is uncommon.

SUMMARY OF BASELINE ENVIRONMENT			
PHYSICAL ENVIRONMENT		**SOCIO-ECONOMIC ENVIRONMENT**	
Infrastructure & Services (roads, sewage, telecommunication, power supply)	From the D3707 at Orupembe the site can be accessed via ordinary dirt road tracks which lead up to Onjuva village and the abandoned quarry. There are no sewer facilities in the area, except at the community clinic, the House on the Hill lodge and at the Etabura Private Lodge. There are also no telecommunication infrastructure or network coverage in the area	Cultural and customary practices of the Ovahimba people	- The Ovahimba practice polygamism as well as early arranged marriages. A Himba girl is not considered a fully-fledged woman until she bears a child, and this is one of the reasons why teenage pregnancy is high in the area to this day. Another identity of the Ovahimba culture is that the men own the livestock, but women take care of it. - According to the conservancy officer, the Ovahimba families still perform traditional rituals, but such rituals are typically performed in the respective homesteads.

SUMMARY OF BASELINE ENVIRONMENT			
PHYSICAL ENVIRONMENT		**SOCIO-ECONOMIC ENVIRONMENT**	
	- Solar power is only present at the local clinic and the 2 private lodges in the area. The general community largely relies on natural fire using wood harvested from the local forest to cook, heat up during winter and for lighting.		

5.1.11 Archaeological and Heritage Sites

A field survey conducted from the 6th to 10th of September 2021, coupled with one-on-one engagements with community members of Onjuva village revealed that there are no visible and/ or known cultural, archaeological or heritage material within or in the vicinity of the mining claims that could be impacted by the proposed quarrying activities. The archaeological and heritage impact assessment was undertaken by experienced Archaeologists, namely, Mr. H. Nakale, both of whom are in active practice within the Republic of Namibia. The National Heritage Council also conducted a 3-day site verification of the area and did not identify nor report any resources of archaeological/ heritage significance.

The Key findings of the field-based archaeological/ heritage impact assessment are detailed under the Heritage/ archaeological impact assessment report, **Appendix D**, attached.

6 PUBLIC CONSULTATION PROCESS

The Public Consultation process aims to ensure that the following categories of persons and/ or organizations have been provided with information about the project, have been consulted and have been provided a fair opportunity to comment, provide inputs, suggestions and objections about the proposed project:

- Persons/ organizations who would potentially be affected by the project
- Persons/ organizations who would accept/ promote the project
- Persons/ organizations who would be opposed to the project
- Persons/ organizations who have previously been involved in the project or similar projects and
- Persons/ organizations who are influential in the community

Building from the consultation or engagement stage, the process provides opportunities to persons/ organizations to influence the project design and implementation so that its potential benefits could be maximized whilst potential negative impacts are being minimized.

Current best practice for consultation involves a process of continuous dialogue with the affected communities and other stakeholders as plans for the project evolve and the environmental assessment is prepared. A high level of interaction is maintained, potential and real social and environmental impacts are identified, and stakeholder needs, and concerns are discussed and wherever possible built into the planned activities of the project, including decision-making and management practices. Good consultation helps foster genuine and positive relationships with mutual respect, shared concerns and objectives between the company pursuing the development and the concerned communities.

The public participation facilitator's role is to facilitate the above process of dialogue to ensure that there is transparency, inclusivity, and accountability in decision-making and public confidence in the proposed project and its management.

6.1 Registered Interested and Affected Parties (I&APs)

At the start of the environmental assessment process, a list of stakeholders who needed to be informed about the proposed project was drawn up. As the public participation process evolved, this list was continuously updated. A complete list of the interested and Affected Parties (I&APs) identified and registered for this project can be found in **Appendix F**. The pre-identified I&APs were initially informed via email, and telephonic communication about the ESA process and the opening and closure of the public participation period during which individuals and organizations could launch concerns/ objections/ inputs until the 31ST of September 2021. During the one-on-one public consultation meeting held on 10th September 2021 at the Orupembe conservancy community camp, more I&APs were registered, and these individuals were thus included in all communications concerning the project from that point onwards.

Amongst key stakeholders identified and registered for the EA process were:

- **Central or national government:** Ministry of Environment, Forestry & Tourism; Ministry of Mines & Energy; Ministry of Agriculture & Land Reform; Ministry of Urban &Rural Development; National Heritage Council of Namibia (under the Ministry of Education, Ats & Culture)
- **Regional government:** Kunene Regional Council (head office)
- **Local authority**: Epupa Constituency Office; Sesfontein Constituency Office; Opuwo Town Council; and Orupembe Communal Conservancy
- **Government Parastatals**: NamWater (environmental section), Roads Authority (Legal & Road Network Planning Section), National Heritage Council, Namibian Chamber of Mines, National Botanical Research Institute
- **Members of the public including land/farm residents, concerned lobby groups:** As attached in **Appendix F**.

6.2 First Round of Public Consultation: Summary of Activities Undertaken

To ensure that I&APs were adequately consulted and provided with adequate timelines to provide their input, the following activities were undertaken:

- A list of pre-identified I&APs was initially compiled. This initial list included representatives from central, regional and local government institutions (ministries, regional and local authorities) as well as representatives from relevant government parastatals, non-governmental organisations (NGOs) such as the Botanical Institute of Namibia, and the concerned communal conservancy. Due to the remoteness of the concerned area, reaching out to the general community of Orupembe initially proved to be difficult, and for this reason, a decision was taken by OMAVI to drive up to site, identify key community leaders and engage such leaders together with the general community in person about the proposed project.
- A full site assessment was then carried out between 6th and 10th of September 2021, during which representatives of OMAVI were able to engage, in person, both leaders of the community as well as conservancy officers of the Orupembe communal conservancy. During this period, OMAVI was also afforded the opportunity to engage the general community of Onjuva and the broader Orupembe area through an interactive meeting which was held at the Onjuva community meeting venue on the 10th of September 2021. During this platform, additional members of the community were subsequently registered as I&APs and were subsequently added to the initial list of I&APs (provided under **Appendix E**).

- A notification email, comprising the project's Background Information Document, was then circulated on the 14th of September 2021 to all identified and registered I&APs on the 14th of September 2021. This email extended a formal invitation to formally register as I&APs and provide written input into the project. A copy of this email trait is attached to the public consultation files under **Appendix F**.
- Formal public notices announcing the proposed activities, the commencement of the EA process and extending an invitation to register as I&APs were placed in *Die Republikein, The Sun Newspaper* and *Allgemeine Zeitung* newspapers (dated 06 September 2021 and 13th September 2021, please refer to **Appendix F,** attached).
- Printed formal site notices were placed at strategic locations to help inform the public about the project. Places where such site notices were placed included the regional council office in Opuwo, Onjuva clinic, and the Orupembe marble camp site which is a prominent place for visitors to the area. Please refer to **Appendix F** for a record of these notices**.**
- The public consultation process continued until 30th September 2021, during which additional members of the public registered as I&APs on request.

6.2.1 Consultation/Public Meetings

One public consultation meeting was held at the Onjuva/ Orupembe meeting venue on the 10th of September 2021. The meeting was attended by traditional councillors of the Otjikakurukouje Traditional Authority, conservation officers of the Orupembe conservancy, and general members of the concerned community. The meeting was aimed at providing the affected communities with ample opportunity to provide inputs and express their views on the proposed activities.

- The attendance register and photographic evidence of such meeting are included in **Appendix F.**

6.2.2 Public Site Notices

As part of efforts to ensure public awareness of the project in general, site notices informing the public were placed at the following strategic locations as shown in **Figure 6.1**:

- The Kunene Regional Council office in Opuwo
- Onjuva Clinic and
- Orupembe Community camp site Office

Figure 6.1. Notices placed at various strategic locations accessible to the general public

6.3 Consultation Feedback: Key Issues, Concerns & Suggestions Raised

The key issues raised during the public participation process (PPP), through both one-on-one engagement meetings as well as through other communication platforms such as emails are summarised in **Table 6-1** below. All comments, concerns, issues, and feedback regarding significant issues received from I&APs (including authorities) have been summarised in **Table 6-1** below, and were thoroughly responded to, clarified and addressed as part of the impact assessment under Chapter 7 and the impact mitigation and/ or enhancement measures set out in the accompanying EMRP..

Table 6-1. Key issues raised during the public participation process

CATEGORY	ISSUE RAISED	RESPONSE OR RECOMMENDED MEASURE
	There are concerns around ensuring that any new waste rock and overburden stockpiles and excavations to be created over the life of	The proponent intends to practice partial land reclamation on an ongoing basis through backfilling of excavations on an ongoing basis. Furthermore, the proponent plans to fence off all quarry areas during and

CATEGORY	ISSUE RAISED	RESPONSE OR RECOMMENDED MEASURE
Rehabilitation	the proposed quarries may not be rehabilitated, thereby leaving the general landscape and biophysical environment in an eye-sore and degraded state. There are also concerns that if such excavations are not fenced off or backfilled, they would pose a significant threat to livestock and wildlife. This concern is partly triggered by the fact that the previous license holders who conducted quarrying on MC66714 have undertaken any form of rehabilitation work on the area.	after operations to ensure that they do not become a safety risk for humans and animals. As part of the proponent's commitment to rehabilitation, an annual rehabilitation budget will be allocated, and the proponent has further indicated that they would be open to having dedicated clause on quarry closure and rehabilitation in the surface lease agreement that is to be entered into between the proponent, the concerned Traditional Authority and the Orupembe conservancy
Benefits to affected communities and if any, how will these be guaranteed	The question of what tangible benefits would be guaranteed from the project over the expected life of the quarries came up. A further concern was raised by several of the Orupembe community members regarding how such benefits will trickle down to the ordinary community members and be transparently disclosed and shared through community development projects	The proponent has pledged and acknowledged their commitment to the following community benefits: • As a priority and first price rehabilitation and possible deepening of existing community boreholes and possible drilling of new boreholes which would ultimately be shared with the community for domestic water supply • Possible employment of at least 20 local people during construction and operation of the quarries, including transportation of the mined-out blocks. • Surface lease fees to the affected traditional authority and the Orupembe conservancy. To ensure transparency in the utilization of the

CATEGORY	ISSUE RAISED	RESPONSE OR RECOMMENDED MEASURE
		funds the proponent has proposed that a jointly managed account will be created between them as the quarry operators, the traditional authority and the conservancy, and transparent reporting of funds deposited and withdrawn from such account will be communicated during quarterly general community meetings during which members of the community will also have an opportunity to express any concerns they may have around regarding the operation. It is envisaged that the fees shall primarily be dedicated towards implementing other progressive community development initiatives such as: - improving facilities and increasing the size of the marble community camp site to boost income for the conservancy from tourism - increasing the capacity of the local school - Procurement opportunities to local community members such provision of security services, meat supply, haulage of diesel from Opuwo, transportation of blocks to Walvis Bay harbor - The above benefits can only be realized if a written compensation agreement is put in place between the community and the proponent prior to the commencement of any work.
Nuisance of residents from noise and increased movement of machinery	The existing marble quarry and access roads are proximal to the current community camp site and the House on the Hill	• No intrusive activities will take place before 06h00 in the morning or after 19h00. • Cutting equipment to be utilized are fitted with noise absorption canopies

CATEGORY	ISSUE RAISED	RESPONSE OR RECOMMENDED MEASURE
	accommodation facilities. As such, noise pollution and dust generation is likely to occur due to running cutting machines in the quarry as well as running mobile plant. This may adversely affect the performance of tourism in the area	and will therefore generate limited noise, within acceptable limits • The current road between the camp and the existing quarry shall be closed off and shall not be used. A new road going behind the ridge where the current quarry is must be created to ensure restricted movement of vehicles in proximity to the community camp. Frequent movement of light vehicles and trucks will certainly cause some nuisance due to noise pollution and possible dust generation. However, this could be reduced to acceptable levels with measures such as adhering to speed limits

6.4 Second Round of Public Consultation: ESA and EMP Report Review

The ESA and draft EMRP Reports were submitted to the MEFT via the provided platform (ECC Online Portal). As required, the hard copies of the final reports were also submitted to the Orupembe Communal Conservancy office via courier for their archives, and to ensure that anyone who may be interested to make copies of these documents for their record keeping has been availed that opportunity.

The significant potential impacts and issues raised which could affect the biological, physical, socio-economic and water resource environment of the project area and surrounding areas are described and assessed in the next chapter. The mitigation measures are also briefly highlighted under the respective potential impacts in the same chapter. More details pertaining to the proposed mitigation or enhancement and management measures for various potential impacts are contained in the accompanying EMRP report.

7 IMPACT IDENTIFICATION AND ASSESSMENT

The purpose of this section is to identify significant adverse impacts and issues of concern, as well as those impacts that need to be enhanced, and ultimately device pragmatic management measures. This is done to minimise risk levels associated with different adverse impacts identified while enhancing the potential value proposition from the positive impacts. The various potential impacts were identified using a broad-based transparent and inclusive approach tapping from research, as well as from scientific (intellectual) and indigenous knowledge and experience of the EAP and I&APs. Accordingly, the impacts documented herein include those identified by the independent EAP as well as those triggered by concerns and issues raised by I&APs who actively participated in the public participation process.

The potential impacts identified were then evaluated against systematic matrix criteria, to permit the risk ranking of each impact. Feasible mitigation and enhancement measures were subsequently developed, considering site specific conditions and constrains. Comments and concerns raised during the public consultation process, which partly informed the impact identification process, are documented in detailed in the Public Consultation file (**Appendix F**).

The following potential impacts have been identified:

Potential Positive Impacts:

The proposed project has the potential to employ approximately 30 - 40 local personnel on a full-time basis, which could improve livelihoods and make a positive contribution towards unemployment reduction; reduce the heavy reliance on livestock for livelihood which over the years has drastically affected many of the locals because of prolong and persistent droughts; and skills acquisition of youth in the area through the transfer of certain skills, such as the operation and maintenance of earthmoving and stone cutting machinery. Through the involvement of locals in the quarrying process, the local community is likely to recognize the monetary value of their natural resources (e.g., the geology).

During ongoing rehabilitation, opportunities for casual employment are likely to increase as the number of unskilled workers will likely increase to assist with this kind of work. Additionally, on the upside the project will, in the long run, guarantee the supply of durable and good quality dimension stone blocks to local stone processing factories in Karibib and Walvis Bay thereby ensuring the continued operation of these facilities. The potential development of a fully-fledged stone quarry in the area is expected to introduce a new wave of procurement opportunities for local businesspeople to render services such as bush clearing, cleaning, security, fencing, and meat supply. For all these to be realized, a conducive working relationship will need to be developed and maintained between the affected communities and the project proponent.

Other potential positive impacts include operating levies and surface rental fees payable to local authorities, or possible equity in the operation, as well as the rehabilitation or drilling and ongoing maintenance of local boreholes which will be shared with the community.

Potential Negative Impacts per Primary Activity:

Factually based on field observations and experience with all other mining operations in Namibia, it must be noted that the establishment of quarries for dimension stone production directly damages existing landforms because of loss of vegetation and changes to the topographical landscape. However, for socio-economic development to take place it is vital to find a balance between the preservation of natural resources and progressive sustainable development.

Table 7-1 below summarises the possible adverse impacts which may arise from the proposed activities.

Table 7-1. Potential adverse impacts per proposed primary activity

PRIMARY ACTIVITY - MOBILIZATION & SITE SET UP	
Activity/ Hazard	**Potential Impact**
Surface clearing of vegetation, landscape leveling and creation of elevated foundation platforms over the footprints of support infrastructure such as the accommodation/ office camp, block and waste rock stockpiling bays; creation and/ or expansion of access roads; borrowing of sandy material from adjacent riverbed for surface course on access roads leading to the top of the mountain/ ridge, and general mobilization plus site set up	• Potential disturbance and/ or destruction of indigenous vegetation and animal habitats at the affected sites due to surface clearing, illegal firewood collection • Formation of excavation pits in the main river channel next to the existing quarry will impend and slow down water flow during rainy seasons, and possibly expose finer layers in the riverbed. The adverse consequence of this is that the turbidity of water reaching downstream could increase because of increased fines content. Excavation pits in the riverbed will be hazardous for wildlife, domestic animals and possibly also humans. • Potential disturbance and threats to livestock and wildlife due to illegal hunting and possible poaching • Potential disturbance and alteration of soil structure due to construction works and traffic compaction, resulting in increased runoff coefficients and possible increase in erosion susceptibility • Potential injuries and fatalities of livestock and wildlife from accidental collisions with moving light and heavy vehicles during mobilization of various equipment to site • Potential noise pollution and nuisance from earthmoving machinery and trucks • Destruction of breeding grounds and nesting areas for birds due to the removal of trees

PRIMARY ACTIVITY - MOBILIZATION & SITE SET UP	
Activity/ Hazard	**Potential Impact**
	• Potential visual impact at night from lighting at the camp site since conditions are normally dark in the rural areas • Solid waste pollution due to littering and poor storage of domestic and industrial (scrap metals, oils, empty containers, used tyres) waste at the camp • Possible pollution of surface water resources due to inadequate and inappropriate sanitation facilities, and the fact that the existing quarry daylights in a major drainage channel of the nearby river systems.
PRIMARY ACTIVITY - STRIPPING, QUARRYING AND CUTTING OF SAMPLE BLOCKS	
Topsoil and overburden stripping, and actual quarrying at selected sites for the envisaged quarries	• Generation of solid waste in the form of overburden waste rock due to presence of loose surficial boulders which would need to be stripped off to access solid bedrock. In such zones there is a high risk of mixing the topsoil with boulders, which may compromise the effectiveness of later rehabilitation with topsoil cover. Additionally, permanent changes to the topography and landscape will occur because of this. • Potential generation of dust from increased vehicular flow on site and from bulk excavation works + block cutting operations to extract sample blocks • Potential disturbance of habitats for rock fauna such as reptiles at the affected sites • Potential fragmentation of faunal habitats due to stress induced by noise from foreign objects and machinery such as drilling, stone cutting ad bulk earth moving machines

PRIMARY ACTIVITY - MOBILIZATION & SITE SET UP	
Activity/ Hazard	**Potential Impact**
	• Quarrying will likely leave open holes and possibly exposed steep rock faces at the affected sites which may pose trip and fall hazards to humans, livestock and wildlife in the area if such areas are not adequately barricaded off as no entry zones and fenced off. • Introduction of harmful substances such as drilling fluids may contaminate surface and ground water during runoff and seepage if not properly managed. Such substances may further harm the environment through direct ingestion by plant roots and indirect consumption when animals and humans feed on contaminated plants, animals and water. • Possible soil contamination from hydrocarbon spillages • There are occupational Safety and Health risks to workers and the public posed by increased potential noise and dust pollution from movement of traffic in the area. • Potential slope failures of waste rock dumps and quarry side walls after heavy rains due to reduced shear strength if not properly managed • Potential disturbance and damage to unforeseen archaeological or heritage sites during stripping and quarrying operations. • Possible generation of unwanted wildfires due to negligence from smokers • Destruction of the physical landscape due to formation of quarry pits and waste rock heaps

PRIMARY ACTIVITY - MOBILIZATION & SITE SET UP	
Activity/ Hazard	**Potential Impact**
	• Possible victimization of vulnerable women and children by workers due to the high local poverty levels. The possible consequence of this would be increased HIV/ AIDS infection rates • Possible uncontrolled influx of people from surround communities in search of work opportunities at the quarry
Transportation and storage of liquid (e.g., drilling fluids, oil drums and new/ recycled diesel and hydraulic oils) and solid waste (used tyres, scrap metal, etc.) on site	• Risk of soil contamination from unintended spillages, and improper storage • General pollution and deterioration of the sites due to the presence and storage of such foreign objects
Loading and long-distance haulage of sample blocks to stone processing factories or to the port of Walvis Bay	• Possible collisions between moving plant and personnel or animals • Potential generation of noise and dust as trucks will be moving in and out of the area throughout. Excess dust generation comes with the added effect of impaired visibility • Possible fuel spills from trucks if breakdowns occur and unexpected hydraulic pipe bursts occur • Potential accidents arising from poor access road conditions • Lifting operations during loading and unloading of sample blocks can pose occupational safety hazard • Potential damage to road infrastructure if trucks are overloaded, and if roads are not regularly maintained. • Alteration and possible destruction of in situ soil structure due to traffic compaction
PRIMARY ACTIVITY - DECOMMISSIONING AND REHABILITATION	

PRIMARY ACTIVITY - MOBILIZATION & SITE SET UP	
Activity/ Hazard	**Potential Impact**
Backfilling of open excavations, spreading of topsoil over such areas and shape such sites to align with natural or surrounding landscape to the extent feasible; rip upper 0.5m of soil and close off access roads to sites where quarrying is completed; excavate contaminated soils and dispose of, in bagged form, at designated waste sites elsewhere	• Potential generation of dust and noise from earthmoving machinery • Alterations of the natural landscape and topography • Un-rehabilitated open pits and waste rock dumps will pose a safety hazard to humans and animals • Possible depression among locals upon seeing closure of the quarry operations
Fencing off and barricading of excavations.	• Inhibited free movement of fauna due to fencing • Attraction of illegal and unsafe small-scale mining where excavations are left open
Retrenchments	• Loss of income due to retrenchments, thereby possibly resulting in diminished livelihoods • Loss of income from procurement opportunities for local businesses

It is evident from the table above that the bulk of the potential adverse impacts is safety, pollution, landscape damage, and social related. These can be managed through the implementation and continuous enforcement of measures and monitoring programs outlined in the accompanying EMRP.

7.1 Impact Assessment Screening

The potential impacts identified by the Environmental Assessment Practitioner, based on both professional experience as well as feedback from consultations with the Interested and Affected Parties (I&APs), were screened through a set of questions (presented in **Figure 7.1**) to help make an informed judgement as to which impacts would require further and more detailed assessment.

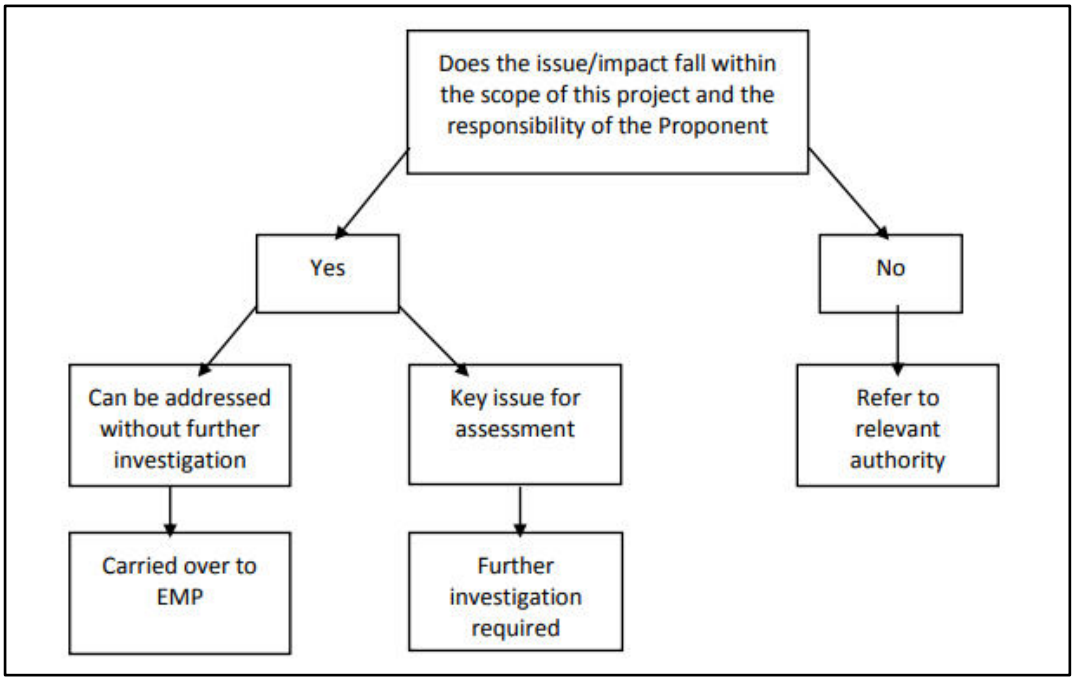

Figure 7.1. Screening process for determining key impacts

7.2 Impact Assessment Methodology

The proposed quarrying activities have been characterized as sources of impacts on the physical, floral, faunal, socio-economic, cultural, functional and usage values and components of the receiving environment. To evaluate the potential extent of these impacts, a systematic methodology was adopted to define the status, geographical extent, duration, intensity, severity (consequence), likelihood of occurrence, and significance (or risk level) of the key impacts identified. The impact evaluation stage is a key component of the Environmental Assessment process because it brings together project – specific characteristics/ activities and the changes to the receiving environment which would likely stem from the proposed activities. The impact assessment methodology considered all stages of the project's life cycle and the various scales used are summarised in **Table 7-2, Table 7-3** and **Table 7-4** below.

Table 7-2. Methodology adopted for evaluation of potential impacts

Description of activity and potential impact(s)	Brief description of the activity/ hazard introducing the impact.
Status of impact (+ or -)	*This refers to whether the induced change will contribute positively or negatively to the affected environment*

	Positive – environment overall will benefit from the impact **Negative** – environment overall will be adversely affected by the impact **Neutral** - environment overall will not be altered
Impact Classification	*Is the impact concerned with the following:* • *SAFETY of workers, local community, and public* • *HEALTH of workers, local community, and public* • *ENVIRONMENTAL* • *IMAGE, REPUTATION or COMMUNITY RELATIONSHIPS* • *LEGAL REGULATIONS AND STANDARDS* • *FINANCIAL DAMAGE OR LOSS*
Spatial Extent of impact	*This refers to the geographical extent of the induced change* **Site specific –** limited to the directly affected site **Local** - limited to a radius of 15 km **Regional** - limited to 15 to 100 km radius **National** - limited to within the borders of Namibia **International** - extending beyond Namibia's borders
Duration of impact	*This refers to the period over which the impact is expected to last* **Very Short**-lived (<3 days) **Short-lived** (3 days – 1 month) **Medium-term** (beyond 1 month to 5 years) **Long-term** (between 5 and 20 years) **Permanent** (>20 years)
Intensity of impact	**No lasting effect** - No environmental functions and processes are affected **Minor effects** - The environment functions, but in a modified manner **Moderate effects** - Environmental functions and processes are altered to such extent that they temporarily cease **Serious effects** - where environmental functions and processes are altered such that they permanently cease and/or exceed legal standards/requirements

Significance/ Risk Level (without controls or mitigation)	*The significance/ risk level of an impact is evaluated based on its classification as per the scale below (refer also to Table 7-3):* **Negligible (Level 1)** **Minor (Level 2)** - the impact is not expected to require amendment to the project design. **Moderate (Level 3)** - the impact is expected to require modification of the project design or alternative controls. **Major (Level 4)** - the impact could have a 'no go' implication for the project unless mitigation or re-design is practically achievable **Catastrophic (Level 5)** - the impact will have 'no go' implications for the project
Proposed controls / Mitigation	Description of practical impact mitigation and/ or management measures
Significance/ Risk Level (With controls or mitigation)	*The significance/ risk level of an impact is evaluated based on its classification as per the scale below (refer also to Table 7-3):* **Negligible (Level 1)** **Minor (Level 2)** - the impact is not expected to require amendment to the project design. **Moderate (Level 3)** - the impact is expected to require modification of the project design or alternative controls. **Major (Level 4)** - the impact could have a 'no go' implication for the project unless mitigation or re-design is practically achievable **Catastrophic (Level 5)** - the impact will have 'no go' implications for the project
Confidence Level	The degree of confidence in the predictions, based on the availability of data/ information and specialist knowledge. **Low** - would indicate that further investigation is required if the impact could potentially be significant **Medium** - further investigation may be required if the impact could be significant

	High - based on the site-specific specialist knowledge and information. The impact is well understood. However, monitoring may be required to determine the effectiveness of possible mitigation measures

Table 7-3. Impact consequence and likelihood scale

CONSEQUENCE RATING	CONSEQUENCE / SEVERITY						LIKELIHOOD				
							Consequence may occur under exceptional circumstances	Consequence could occur at some time	Consequence should occur at some time	Consequence will probably occur in most circumstances	Consequence expected to occur in most circumstances
							Conceivable, but very unlikely (has not happened yet)	Has never been known to occur in the business/ area but has happened somewhere and is highly unlikely that it will happen within 20 years.	Has happened in the business/ area at some time and could happen within 10 years	Medium occurrence happens infrequently - Occurs in order of less than once per year and is likely to reoccur within 5 years	High occurrence happens frequently - Occurs in order of one or more times per year.
	SAFETY (INJURY) (Includes workers, local community, and public)	**HEALTH (DISEASES) (Includes workers, local community, and public)**	**ENVIRONMENT (Landscape, Topography, Fauna, Flora, Soils, Air Quality, Visual, Water Resources, Archaeology)**	**IMAGE & REPUTATION / COMMUNITY RELATIONSHIPS**	**LEGAL**	**FINANCIAL IMPACT**	**1 (RARE - practically impossible)**	**2 (UNLIKELY – not likely to happen)**	**3 (POSSIBLE to happen)**	**4 (LIKELY to happen at some point)**	**5 (ALMOST certain to happen)**

LEVEL 5 CATASTROPHIC	Multi Fatalities	Permanent disability with potentially lethal effects - effects form exposure may cause death to one or more persons.	Disastrous impact on the environment. Irreversible effects to flora and fauna (e.g., destruction of wetlands, pans, sensitive landscapes, soils, water resources, and etc).	Negative media coverage at internal level / Loss of multiple major customer or large proportion of sales contracts / Loss of community support / Significant negative impact on the share price	Major litigation / prosecution at corporate level / Nationalisation / loss of licence to operate	Property damage > N$ 100 million Production loss > N$ 100 million	**5**	**Moderate**	**High**	**High**	**High**	**High**
LEVEL 4 MAJOR	Single fatality or permanent disabilities (such as loss of limb, sight loss or severe disability to body functions)	Permanent non-lethal effects. Permanent effects - loss of quality of life, but not life threatening.	Severe impact on the environment. Reversible effects to flora and fauna with long term damage (1-10 years) to widespread area of significance (e.g., partly destruction of wetlands, pans, sensitive landscapes, visual and etc)	Negative media coverage at national level / Scrutiny from government and NGO's / Complaints from multiple "final" customers / Loss of major customer / Loss of community support / Negative impact on share price	Major litigation or prosecution at Division level	Property damage between N$ 2 million - N$ 100 million Production loss between N$ 2 million - N$ 100 million	**4**	**Moderate**	**Moderate**	**High**	**High**	**High**

LEVEL 3 MODERATE	Injuries that require time off work – Loss time injury – No Permanent disabilities	Serious reversible health effects that would require hospitalization	Serious impact on the environment. Reversible effects to flora and fauna, water resources, landscapes, topography, with short-medium term damage (1-5 years) to large areas of significance.	Negative media coverage at local / regional level over more than one day / Off - spec product / Community complaint resulting in social issue.	Major litigation or prosecution at Operation level	Property damage N$ 500 000.00 - N$ 2 million Production loss between N$ 500 000.00 - N$ 2 million	**3**	**Low**	**Moderate**	**Moderate**	**High**	**High**
LEVEL 2 MINOR	Medical treatment required – Treat and return to work	Adverse health effects that may require medical treatment - Treat and return to work	Moderate impact on the environment. Short term damage (<1 year) to small areas of limited significance	Complaint received from stakeholder or community / Negative local media coverage	Regulation breaches resulting in fine or litigation	Property damage N$ 20000.00 - N$ 500000.00 Production loss between N$ 20000.00 - N$ 500000.00	**2**	**Low**	**Low**	**Moderate**	**Moderate**	**High**
LEVEL 1 NEGLIGIBLE	First Aid Injury only	Little if any adverse health effects.	Minor impact on the environment. Limited damage to minimal area of low significance.	Negligible media coverage	Regulation breaches without fine or litigation	Property damage, under N$ 20000.00 Brief disruption of operation, production loss under	**1**	**Low**	**Low**	**Low**	**Moderate**	**Moderate**

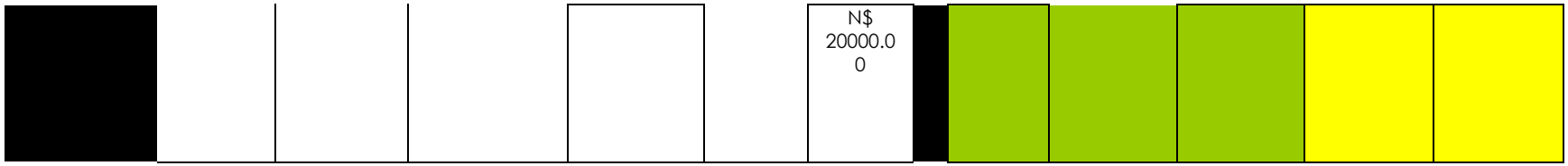

Table 7-4. Overall risk/ significance rating scale

RISK RATING	TOLERABILITY DEFINITION	COLOUR CODE
Low	**Acceptable Risk** – monitor and manage risk	
Moderate	**Substantial Risk** – implement preventive actions where practical and monitor effectiveness of actions/ measures	
Moderate to High	**Substantial Risk becoming High**	
High	**High Risk** – significant and urgent controls required, implement preventive or mitigation actions promptly and closely monitor effectiveness of control action measures	

7.3 Assessment of Impacts

The potential impacts associated with the proposed quarrying activities as described above and listed below are assessed in **Table 7-5** and **Table 7-6.**

Positive impacts:

- Knowledge transfer
- Employment and Procurement opportunities,
- Socio-economic development (local and national),
- Technical skills development and transfer, and
- Corporate Social Responsibility (CSR) and infrastructure development and improvement

Negative (Adverse) impacts:

- Soils (physical disturbance and contamination)
- Air quality, Noise,
- Occupational and Community Health & Safety,
- Visual, and Land Use,
- Waste,
- Ecological & Biodiversity,
- Water Resources (Over-abstraction and pollution),
- Socio-economic (conflict over land use, poor and non-transparent communication),
- Vehicle Traffic, and
- Archaeological & Heritage Resources.

Table 7-5. Assessment of identified impacts (Positive)

KNOWLEDGE TRANSFER AND LOCAL VALUE ADDITION	
Description of Potential Impact	**The project will support increased knowledge and value addition of local mineral resources**. Furthermore, the mineral resource information gathered during the exploration phase and eventual mining will be made available to the Ministry of Mines and Energy, which becomes a public baseline information, particularly the mining sector. The information would then be consolidated for archiving and future use a baseline for projects or educational research.
Status of impact (+ or -)	Positive
Impact Classification	Environmental and Image/ Reputation
Spatial Extent of impact	Local, Regional and National
Duration of impact	**Long term** – the impact will last during the project implementation and after cessation of the activities.
Intensity of impact	**No Lasting Effect**
Consequence Level	**Minor (Level 2)**
Likelihood	The increase in knowledge and its transfer is **Highly Probable (Likelihood = Level 5)** as the information gathered during the exploration will be utilized to plan for the quarrying and archived for after the life of the quarry. The impact will have **Level 4 Likelihood of Occurrence** as information gathering and knowledge transfer is inevitable.
Significance/ Risk Level (before no mitigation)	**Moderate**

Proposed preventive/ mitigation measures or controls	• The Proponent to ensure availability and accessibility of exploration findings to the responsible department at the Ministry of Mines and Energy (Mines Department and possibly Geological Survey of Namibia) for archiving. • Community education and awareness on mineral resources should be provided and raised, respectively. This can be made part of the quarterly community project updates.
Significance/ Risk Level (with mitigation)	**Negligible (Level 1)**
Confidence Level	**High**
EMPLOYMENT AND PROCUREMENT OPPORTUNITIES	
Description of Potential Impact	Improvement in the livelihoods of the local community through contract employment. Other opportunities will include possible procurement opportunities for the provision of different services and goods procured from different suppliers on services like local site clearing, security services, and earthmoving contractors as well as food (provision of meat products) to local companies during the site set up phase. This will include the provision of lubricants, PPE, cleaning services and external maintenance services, if necessary. The unfairness and discrimination in employment and procurement opportunities of overlooking locals for outsiders would bring conflicts.
Status of impact (+ or -)	Positive
Impact Classification	Environmental and Image/ Reputation
Spatial Extent of impact	Local, and Regional

Duration of impact	**Short-term** – the impact will last during the project implementation and ends with the cessation of the project activities.
Intensity of impact	Minor Effect
Consequence Level	**Minor (Level 2)**
Likelihood	The creation of employment opportunities and need for procured goods and services is **Highly Probable (Likelihood = Level 5)** as the Project will require human resources as well as procurement of goods and services for the functionality of the project operations (exploration and quarrying). The impact will have **Level 4 Likelihood of Occurrence** as human resources and procurement of goods and services are a necessity to the Project.
Significance/ Risk Level (before no mitigation)	**Moderate**
Proposed preventive/ mitigation measures or controls	<u>Employment opportunities:</u> • It should be mandatory to contractors to give all unskilled and semi-skilled work to be given to the locals before considering outsiders (anyone from outside Onjuva, Orupembe and immediate surrounding villages). • The anticipated work opportunities and number of positions should be announced through the local leadership at the Otjikakurukouje Traditional Authority. • The name of the prospective workers should be screened by the local leaders to verify their place of origin to ensure that the opportunities reserved for the locals are not given to outsiders. • Equal opportunities should be given to both men and women, where possible. <u>Procurement of goods and services:</u> • The procurement stage for the exploration and mining (quarrying) should follow a fair and transparent process. • Procurements for services and goods that are locally and nationally available should be open only to Namibian companies with strong local participation. A percentage of the scope should be reserved for Small-Medium Enterprise (SME) contractors who may be recruited on a sub-contract basis to build local capacity. • The business opportunities such as site clearing, cleaning services and maintenance should be given to local companies. Where necessary, joint ventures should be formed with other companies from other immediate areas to build capacity for the local company(ies).
Significance/ Risk Level (with mitigation)	**Negligible (Level 1)**

Confidence Level	**High**
SOCIO-ECONOMIC DEVELOPMENT (LOCAL, REGIONAL AND NATIONAL)	
Description of Potential Impact	the project has potential to contribute towards broader regional and national developmental goals through the injection of capital investments, license fees, surface lease fees, and government revenue realised through various forms of taxes including export duties, income tax, etc. The demand for the mined and eventual processed dimension stone blocks globally may potentially attract investment not just for the project area but elsewhere outside the project site area where the dimension stone deposit may occur. More investors may develop interests to invest further in the Namibia's exploration and mining sector.
Status of impact (+ or -)	Positive
Impact Classification	Environmental and Image/ Reputation, Legal Regulations and Standards
Spatial Extent of impact	Local, Regional and National
Duration of impact	**Short-term** – the impact will last during the project implementation and ends with the cessation of the project activities.
Intensity of impact	Minor Effect
Consequence Level	**Minor (Level 2)**
Likelihood	The payment of license fees, land use fees and government revenues are **Highly Probable (Likelihood = Level 5)** as the Proponent is obliged by the relevant laws to pay these fees and revenues (during exploration and quarrying). These fees and revenues will contribute to the local, regional and national economic development. The impact will have **Level 4 Likelihood of Occurrence** as the respective fees and revenues will need to be paid accordingly.
Significance/ Risk Level (before no mitigation)	**Moderate**

Proposed preventive/ mitigation measures or controls	• The Proponent to ensure compliance with their project's requirements by the Namibia Revenue Agency and Ministry of Mines and Energy by paying Value Added Tax (VAT) and mineral license levies/revenues, respectively.
Significance/ Risk Level (with mitigation)	**Negligible (Level 1)**
Confidence Level	**High**
TECHNICAL SKILLS DEVELOPMENT AND TRANSFER	
Description of Potential Impact	The project will contribute towards potential technical skills development and skills transfer (such as operation of heavy earthmoving machinery, rock blade and saw cutters) to young community members.
Status of impact (+ or -)	Positive
Impact Classification	Environmental and Image/ Reputation
Spatial Extent of impact	Local, and Regional
Duration of impact	**Long-term** – the impact will outlive the life cycle of the project because the skills developed and transferred will remain with the young people and use it to look for employment (opportunities) elsewhere even after the closure of the quarry.
Intensity of impact	Minor Effect
Consequence Level	**Minor (Level 2)**

Likelihood	The skills development and transfer are **Highly Probable (Likelihood = Level 5)** as the Proponent will have to train and transfer skills to the young employees to enable functionality and project productivity with uninterrupted operations owing to sufficient skilled personnel. The impact will have **Level 4 Likelihood of Occurrence** as the employees will be trained on how to successfully and safely operate and handle machinery and equipment onsite during exploration for quarrying.
Significance/ Risk Level (before no mitigation)	**Moderate**
Proposed preventive/ mitigation measures or controls	• The Proponent should ensure that the hired unskilled and semi-skilled are trained and intellectually capacitated to work with little to no supervision while onsite. • Priority should invest in the skills development of local young members of the community, especially the young men and women where possible.
Significance/ Risk Level (with mitigation)	**Negligible (Level 1)**
Confidence Level	**High**
CORPORATE SOCIAL RESPONSIBILITY (CSR) AND INFRASTRUCTURE DEVELOPMENT AND IMPROVEMENT	
Description of Potential Impact	The Project has potential to assist local communities with projects through a trust fund aimed at uplifting the communities, especially children and the youth as well as the Conservancies such Orupembe. Furthermore, the Project would potentially contribute indirectly towards the maintenance and rehabilitation of local infrastructures such as community water supply boreholes, etc.
Status of impact (+ or -)	Positive
Impact Classification	Environmental and Image/ Reputation, Legal Regulation and Standard
Spatial Extent of impact	Local, and Regional

Duration of impact	**Short-term** – the impact will last during the project implementation and ends with the cessation of the project activities.
Intensity of impact	Minor Effect
Consequence Level	**Minor (Level 2)**
Likelihood	The CSR is **Probable (Likelihood = Level 4)** and expected but some Proponents do not keep their words to this commitment. However, if properly implemented, the local communities would greatly benefit in project funded or assisted by the Project. The impact will have **Level 4 Likelihood of Occurrence** as the Proponent will be obliged to positively invest in the communities they are operating in through financial, technical and or in other form is assistance needed while in the area.
Significance/ Risk Level (before no mitigation)	**Moderate**
Proposed preventive/ mitigation measures or controls	• The Proponent should ensure that the hired unskilled and semi-skilled are trained and intellectually capacitated to work with little to no supervision while onsite. • Priority should honour CSR commitment to the communities by investing in community projects, such as water supply, donations, funding some of the children education or tertiary studies for local aspiring students, where possible.
Significance/ Risk Level (with mitigation)	**Negligible (Level 1)**
Confidence Level	**High**

Table 7-6. Assessment of identified impacts (Adverse/Negative)

IMPACTS ON SOILS (PHSYICAL DISTURBANCE AND CONTAMINATION)

Description of Potential Impact	Soil degradation (including change in soil structure) will result from soil disturbance caused by heavy machinery (e.g., front-end loaders) and tipper trucks; stripping of top and sub-surface soils; soil compaction by traffic on existing and new access roads; loss of original soil depth and volume; degradation of stockpiled topsoil due to erosion from runoff or wind; and contamination of soils by drilling fluid residues and hydrocarbon spills Soil erosion will result from loosening of soil because of earthworks, removal of vegetation to clear the working sites, increased surface runoff due to surface compaction, and concentrated water flow along erosional gullies resulting from open excavations.
Status of impact (+ or -)	Negative
Impact Classification	Environmental and Image/ Reputation
Spatial Extent of impact	Site Specific and Local
Duration of impact	**Long term** – the structure and depths of soils will be altered for a long time if management controls/ measures are not effectively implemented. However, certain impacts such as soil contamination by hydrocarbon spills would have a short to medium-term impact if such spillages are effectively cleaned up regularly and proper hydrocarbon handling and management measures are put in place.
Intensity of impact	Minor effects
Consequence Level	**Moderate (Level 3)**
Likelihood	Changes in soil structure and soil degradation due to bulk excavation, traffic compaction are **Highly Probable (Likelihood = Level 5)** as removal of vegetation and disturbance of top and sub-surface soils are inevitable Soil pollution due to drilling fluid residues and hydrocarbon spills will have a **Level 4 Likelihood of Occurrence** as oil pipe bursts can occur anytime.

	Soil erosion will have a **Level 3 Likehood of Occurrence** as the main eroding agent would likely be water, which is generally scarce in the area due to the low mean annual rainfall of the area.
Significance/ Risk Level (before no mitigation)	**Moderate** to **High**
Proposed preventive/ mitigation measures or controls	• Minimize footprint area of drilling and test quarrying operations, and therefore limiting the disturbance footprint to a minimal area as much as possible • Minimize soil contamination through containment and handling of potential pollutants (e.g., oils, drilling fluids) • Implement soil conservation measures (e.g., proper placement and stockpiling of clean soils and overburden material, maintaining soil fertility of topsoil stored for future reclamation and rehabilitation works) • Ensure that the overall thickness of soils placed during reclamation and rehabilitation is consistent with surrounding undisturbed areas and future land use • Design test quarries and access track roads such that their slopes are battered to an appropriate gradient for rehabilitation • Schedule quarrying works in such a manner that it does not coincide with periods of heavy rainfall to the extent practical • Avoid creation of new access roads to the extent practical • Always make use of emergency spill trays underneath all machinery • Avoid mixing of topsoil (which is typically rich in seeds) and sub-surface soils during stripping and stockpiling. Topsoil will have to be removed cautiously and safely stockpiled in a designated area for later use in rehabilitation work
Significance/ Risk Level (with mitigation)	**Moderate**
Confidence Level	**High**
IMPACTS ON CHANGES IN LAND USE	
Description of Potential Impact	The low laying areas are currently used as settlement areas with isolated homesteads and extensive savannah grazing land primarily for small stock (goats) and during the rare rainy period limited wildlife such as Springboks and Ostriches. Conversely, the high lying mountainous terrains (koppies) are generally free of human occupation and contain limited grass for grazing. Some of the succulent shrubs on these mountains are however also consumed by small livestock. The project infrastructures (e.g., project campsite, small new access roads, target drilling and test quarrying sites) will require surface clearing of vegetation, ground levelling and excavation or backfilling (e.g., in riverbeds with thick sands), top and sub-surface soil stripping and development of topsoil and overburden boulder stockpiles. These activities will certainly reduce (but to

	a limited extent due to the extent of the project activities) the amount of available grazing land; and consequently, alter the part of the area's current land-use from small stock farming to a combination of small stock grazing land and limited stone test quarrying.
Status of impact (+ or -)	Negative
Impact Classification	**Environmental** and **Community Relationships** (as the proposed activities may partly compete for space or conflict with small stock farming if the former is not properly managed as outlined in the accompanying EMRP)
Spatial Extent of impact	**Site Specific** to **Local**
Duration of impact	**Medium term** because test sites created during prospecting will be limited in extent and will therefore be easy to reclaim or rehabilitate. Access tracks created for prospecting purposes will equally be of limited extent and can easily be rehabilitated to facilitate vegetation growth by closing off access to unsuccessful sites and ripping traffic compacted topsoil to facilitate natural recovery of vegetation
Intensity of impact	**Minor effects**
Consequence Level	**Moderate (Level 3)**
Likelihood	**Possible to happen (Level 3)**
Significance/ Risk Level (before no mitigation)	**Moderate** – largely because the spatial extent of sites to be affected is limited within the Mining Claims' boundaries
Proposed preventive/ mitigation measures or controls	Complete prevention of this impact will not be possible; however, the extent of the impact can be minimized by ensuring that changes in land use are confined to the footprints of the access track roads, the exploration camp, and targeted test quarrying sites. Further control measures to reduce the risk of this impact include the following: • The project activities should target areas that are at least 400 m from existing homesteads and boreholes to minimize land use change close to sites of human settlement • Use existing access roads and avoid creation of new access roads to the extent practical. This will minimize the footprint of areas to be disturbed • Place/ position the exploration camp(s) closer to target sites for drilling and test quarrying

	• The project Proponent must promptly communicate any foreseeable conflicts with farming or human settlement activities to avoid compromising relationship with the affected communities.
Significance/ Risk Level (with mitigation)	**Low** – largely due to the localized extent of the proposed activities
Confidence Level	**High**
IMPACTS ON TOPOGRAPHY AND LANDSCAPE	
Description of Potential Impact	Changes in landscape topography will result from the creation of spatially constrained test quarries in bedrock, stripping and stockpiling of overburden coupled with levelling of ground at the proposed exploration camp site. The creation of excavations in the ground will pose a safety hazard to the public, workers, subsistence farmers (particularly children) and animals in the affected areas
Status of impact (+ or -)	Negative
Impact Classification	**Environmental Image, Reputation and Community Relationships Safety**
Spatial Extent of impact	**Site Specific** to **Local**
Duration of impact	**Medium –term –** at sites where prospecting is unsuccessful and rehabilitation is implemented soon after prospecting, impacts will be medium-term **Long-term –** where prospecting is successful and decisions to undertake continuous quarrying are taken, impacts would be long-lived
Intensity of impact	**Minor effects**
Consequence Level	**Moderate (Level 3)**

Likelihood	**Almost certain to happen (Level 5)**
Prevention	Complete prevention of this impact will not be possible unless the no go option is chosen
Significance/ Risk Level (before no mitigation)	**High**
Proposed mitigation measures or controls	• Implement ongoing rehabilitation practices, e.g., by reclaiming and rehabilitating unsuccessful test quarries immediately and associated access roads • Minimize safety risks to workers, the public and animals, as well as conflicting relationships with communities by fencing off active and preserved test quarry sites, and putting danger tapes around such sites • Target sites with exposed bedrock to the extent practical to avoid creation of overburden dumps • Where practical excavate test quarries adjacent to abandoned trenches created by small scale miners to minimize the extent of landscape and topography disturbance • Where deeper test quarries are created to extract sample blocks practice rockface blinding by placing natural waste rock material against exposed test quarry faces • Communicate to affected communities which specific sites will be left open for continuous quarrying so that they are aware to avoid walking/ driving to such sites or herding their livestock near such sites
Significance/ Risk Level (with mitigation)	**Low**
Confidence Level	**High**
IMPACTS ON VEGETATION	
Description of Potential Impact	Fragmentation of floral habitats due site clearing over footprints of the proposed exploration camp, access roads, targeted drilling and test quarrying sites, and topsoil plus overburden stockpile areas Fragmentation and deforestation from collection of firewood and veld fires due to increased human population in the area Fall of dust from dust emissions arising from moving traffic and excavation works may adversely affect vegetation close to the disturbance sites through blinding. This impact is likely to be limited as prospecting will target areas with little to no soil cover on areas of white marble and pink speckled black granitoid interest are largely covered with boulders and little soil which is usually the primary source of dust
Status of impact (+ or -)	Negative

Impact Classification	**Environmental**
Spatial Extent of impact	**Site Specific** to **Local**, but may extend to **Regional** scale in case of uncontrolled veld fires
Duration of impact	**Long term** because even though prospecting is only planned for the next 3 years, cleared vegetation is unlikely to recover completely within the next 5 to 10 years, especially at the test quarry sites and along active access roads
Intensity of impact	**Moderate** as vegetation over disturbance footprints will be removed completely for the duration of the proposed prospecting activities
Consequence Level	**Moderate (Level 3)**
Likelihood	**Almost certain to happen (Level 5)**, except impacts due to veld fires
Prevention	Complete prevention of this impact will not be possible
Significance/ Risk Level (before no mitigation)	**High**
Proposed mitigation measures or controls	• Avoid illegal wood gathering by enforcing harsh measures to workers for non-compliance • Rescue any endemic species that may be destroyed by the proposed activities and donate them to registered nurseries • Make minor deviations to existing access roads to avoid areas of thick and/ or sensitive vegetation • Formulate and implement suitable and appropriate operational management guidelines for the cleared areas. Incorporated in the guidelines are the progressive rehabilitation measures. These should be considered: - Post closure land-use measures and/or establishment of self-sustaining indigenous vegetation. - Erosion management measures • No muddy and dirty equipment should be brought onto site as this is likely to carry seed of alien species • *The Colophospermum mopane* tree which is a protected species in Namibia occurs on some of the white marble and black granitoid ridges targeted for prospecting and eventual quarrying (mining). During drilling and test quarrying the removal of this species should therefore be avoided. Alternatively, if removal is necessary, a Permit to remove such tree should be applied for and obtained from MEFT's Forestry Directorate.

Significance/ Risk Level (with mitigation)	**Low**
Confidence Level	**High** – this impact was studied in detail through the accompanying ecological/ biodiversity study
IMPACTS FROM SOLID AND LIQUID WASTE	
Description of Potential Impact	Solid waste will be generated in and close to working areas (e.g., drilling and test quarries, and the exploration camp); in areas where maintenance of machinery will be carried out; in sites where used parts, oils, grease, pipes, wastewater and scrap metal will be stored; and from onsite support infrastructure such as container offices (e.g., paper waste). Such solid waste can cause littering, soil and water pollution, visual degradation, fatality to animals and health hazards.
Status of impact (+ or -)	Negative
Impact Classification	**Environmental Health Image/ Reputation**
Spatial Extent of impact	**Site Specific**
Duration of impact	**Medium term** as per the current exploration plan of up to 3 years
Intensity of impact	**Minor effects**
Consequence Level	**Minor (Level 2)**
Likelihood	**Likely to happen at some point (Level 4)**
Prevention	Prevention can be achieved if littering is forbidden; site staff are disciplined for non-compliance; adequate and safe storage space is provided for the storage of solid waste, used oils/ grease and scrap metals
Significance/ Risk Level (before no mitigation)	**Moderate**

Proposed mitigation measures or controls	• Ensure regular removal of general waste to an approved waste fill area in or close to Opuwo • Recycling or disposal to an approved hazardous or industrial waste site in or close to Opuwo • The only wastewater will be domestic sewage and water used for washing industrial and domestic equipment, which should be treated and re-used as far as practical e.g., for dust suppression • Ensure provision of adequate waste skips at all working sites, exploration and mining (quarryin) camp • Fence off areas where such waste is stored to eliminate possible contact with domestic and wild animals
Significance/ Risk Level (with mitigation)	**Low**
Confidence Level	**High**
IMPACTS ON ECOLOGY AND BIODIVERSITY: INDIGENEOUS FAUNA (REPTILES, MAMMALS, BIRDS)	
Description of Potential Impact	Wildlife and domesticated animals are likely to be adversely impacted through displacement from footprints of the sites to be disturbed, fragmentation of floral habitats, potential fatalities due to contaminated surface water, road kills through collisions, undesired contact with litter and other toxic substances, and possible poaching. Domesticated and wildlife movement restrictions due to increased movement of vehicles and increased noise levels can induce stress. Potential loss of breeding sites for birds due to removal of trees and shrubs on the mountains. Potential fatalities from collisions with vehicles (road kills).
Status of impact (+ or -)	Negative
Impact Classification	**Environmental Image/ Reputation**
Spatial Extent of impact	**Site-specific**: On and proximal to footprints of affected sites (e.g., access roads and immediate surrounds, drilling and test quarry sites, exploration camp)
Duration of impact	**Medium to long term** – Impacts will persist over the lifespan of the project, which now is about 3 years (i.e., medium-term) in line with the validity period of the Mining Claims. However, impacts associated with some of the sites such as test quarry sites where exploration yields positive results are likely to persist for longer
Intensity of impact	**Minor** as most wild animals will likely migrate away from the affected sites and dwell elsewhere not too far from their original places of residence
Consequence Level	**Moderate (Level 3)**

Likelihood	**Possible to happen (Level 3)**
Prevention	Complete prevention of this impact will not be possible
Significance/ Risk Level (before no mitigation)	**Moderate –** because incidences such as poaching, vehicle-animal collisions (road kills), poisoning of animals due to reckless storage of contaminants has not been known to occur in the business within the last 10 years
Proposed mitigation measures or controls	• Prevent animal access to exploration and mining camp or active sites through fencing • Enforce speed limits and traffic control measures to minimise the risk of road kills • Prevent illegal hunting and trapping by enforcing harsh non-compliance measures to workers • Prevent creation of hazards by means of good "housekeeping" and prevention of litter • Any animal fatalities should be recorded, and the causes established and remedied for monitoring purposes • Avoid disturbance of vulture and other bird nests (if any) during the breeding season • Avoid activities close to large trees near the base of the mountains • Cap or seal off drill holes to prevent small mammals from getting trapped
Significance/ Risk Level (with mitigation)	**Low**
Confidence Level	**High**
DUST IMPACT ON AIR QUALITY	
Description of Potential Impact	Generation of excessive dust could result from site preparation earthworks, test quarrying activities, and vehicular traffic on access roads. Toxic emissions such as carbon monoxide will also increase in the area due to increased number of vehicles and machinery. The generated dust will reduce visibility across the site and adversely impact on the respiratory well-being of personnel working or resided near the source areas. Additionally, photo-transpiration efficiency of the surrounding vegetation may be hampered. Dusty vegetation specifically their leaves are less palatable to grazing or browsing animals, and therefore availability of edible pasture for animals may be diminished. If air quality dust levels exceed the acceptable thresholds stipulated in relevant standards such as SANS 1929: South African National Standard: Ambient Air Quality are consistently exceeded with no effort to remediate, then there could be legal implications for the project Proponent.
Status of impact (+ or -)	Negative

Impact Classification	**Safety, Health, Legal, Image/ Reputation Environmental Financial**
Spatial Extent of impact	**Site Specific** and possibly **local** depending on the mobility of solid particulates and prevailing weather (wind speed, wind direction, precipitation, etc) conditions. Typically dust from quarrying activities affects areas within 2 – 3 km of the source, beyond which air quality conditions normalize. For dust generated from site preparation earthworks (bulk excavation work) and test quarrying activities on very windy days could travel further than 15km because the source is generally fixed, is a single vector to the affected site and will not move unlike the dust generated from moving traffic on dirt access roads. Flora whose functioning will be adversely affected by dust cover are those directly downwind.
Duration of impact	**Medium term** as the dust generating activities will be ongoing throughout the exploration program, which now is capped to 2 years (i.e., the validity period of mining claims, with a possibility of renewal). Dust from unrehabilitated access roads and quarrying sites could be **Long term**.
Intensity of impact	**Minor effects** as air quality conditions will be altered temporarily for the period of these dust generating activities and until such time that natural vegetation in cleared areas recovers to a reasonable extent
Consequence Level	**Major (Level 4)**
Likelihood	**Almost certain to happen (Level 5)**
Prevention	• Complete prevention of dust generation from the proposed activities is inevitable
Significance/ Risk Level (before no mitigation)	**High** Stripping, bulk excavation and test quarrying activities will adversely change the ambient air quality and visibility conditions that often prevail. Hauling trucks and light vehicles will create dust plumes and toxic emissions trailing behind them, but this will be limited by speed restrictions. The impact is persistent for the duration of the exploration program, and most likely after the end of exploration if inadequate rehabilitation is implemented due to the increased footprint of areas with no vegetation. There could be financial loses (e.g., damage to vehicles, plant and animal fatalities) due to collisions arising from poor visibility conditions.
Proposed mitigation measures or controls	• Stockpile loose top and sub-surface soils in designated areas away from places of residence • Avoid clearing vegetation unnecessarily or too far in advance of test quarrying • Place crushed gravel with less fines on access roads close to homesteads to minimize dust levels • Drill machines must be fitted with dust filters • Ensure minimum travel distances between working areas and stockpiles • Consider the utilization of reasonable amount of water to suppress dust on problematic site areas.

	• Ensure that all vehicles and machinery are maintained in good working condition and that they are serviced on regular basis • Ensure that all vehicles are switched off when stationary – no vehicles should be idling for extended periods • Enforce speed limits of 50 km/ hour, and lower proximal to places of residence • Avoid stripping and bulk excavation activities on very windy days • Train personnel to always wear personal protection equipment • Test personnel health at regular intervals and implement dust monitoring from the start of exploration by means of installing simple dust fallout buckets 500m, 1km and 2km down-wind of key exploration target areas • Provide a complaint register on site where complaints can be made. This register should enable effective communication of complaints where these are reasonably addressed. All complaints regarding air quality should be adequately investigated and actions taken to reduce the impact in a timely manner should it be required • Implement and maintain a Dust and Emission Management Plan which provides clear details on preventing, maintaining and improving the air quality in terms of site-specific activities. This plan could possibly incorporate a dust fallout monitoring programme should it be evident that dust emissions is a problem • Avoid burning of waste material on site • Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable
Significance/ Risk Level (with mitigation)	**Moderate**
Confidence Level	**Moderate** • Dust monitoring program must be implemented right from the start of stripping and test quarrying to monitor dust levels close to places of residence and in the open veld. Control sites for monitoring must also be set up in areas far from active or targeted sites to establish ambient air quality conditions
NOISE IMPACTS FROM TEST QUARRYING AND MOVING VEHICLES	
Description of Potential Impact	Noise will be generated from drilling and test quarrying activities as well as from moving vehicles. The magnitude of this nuisance factor will depend on the proximity of the exploration sites and access roads to places of residence and sensitive animal habitats, and on operational factors such as working times. The proposed activities will potentially contribute to the cumulative effects of traffic noise in areas within 2 – 3 km from targeted exploration and quarrying sites. Hence the homesteads located close to the targeted project sites will be adversely affected. The noise may also result in forced migration of wild fauna such as birds and mammals in the affected areas. The impacts also include noise exposure and possible hearing loss on machine operators, if there is no wearing of proper ear protection equipment (personnel protective equipment). If ambient noise levels consistently exceed the recommended accepted highest threshold values stipulated in relevant standards such as South African National Standard

	(SANS) – Code of Practice, SANS 10103:2008, and no effort is being made to remediate that, then there could be legal implications for the project Proponent.
Status of impact (+ or -)	**Negative**
Impact Classification	**Safety** **Environmental** **Legal**
Spatial Extent of impact	**Site specific** and **Localized** (due movement of traffic)
Duration of impact	• Drilling and movement of vehicles and machinery – 12 hours/day x 6 days/week • **Medium term** (pending renewal of the Mining Claims and subsequent validity period)
Intensity of impact	**Minor Effects** – certain environmental functions and processes could be temporarily altered in vicinity of active areas for example due to forced migration of fauna.
Consequence Level	**Minor (Level 2)**
Likelihood	**Likely to happen at some point (Level 4)**
Prevention	Noise creation cannot be prevented completely and will occur and should be mitigated as best as possible.
Significance/ Risk Level (no mitigation)	**Moderate**

Proposed mitigation measures or controls	• Regular maintenance of drilling / quarrying and earth moving machinery should maintain noise to acceptable levels for operators and the public. • Standardized noise measurements should be carried out on individual equipment at the delivery to site to construct a reference data-base, and regular checks carried out to ensure that equipment is not deteriorating and to detect increases which could lead to an increase in the noise impact over time and increased complaints. • The activities are to take place during daytime (07h00 to 17h00) only to minimise nuisance to residents. Periods of silence during the day may be necessary. • When working in areas within 500m of homesteads silencers should be fitted and maintained on diesel powered equipment and vehicles • Train personnel to adhere to operational procedures that reduce the occurrence and magnitude of individual noisy events • Leave as much vegetation in the surrounding as possible to act as noise buffers • Keep communities informed of planned drilling and blasting, earth moving and test quarrying schedules through fortnightly radio announcements through the traditional authorities. • Keep a logbook of noise complaints and implement remedial actions promptly as far as practical • Install portable noise monitoring devices at the crusher site as well as in all working areas (weigh bridge, stockpile bags, next to haul roads) and calibrate all equipment by fitting noise suppressors to ensure compliance to acceptable noise levels. The noise monitors should be installed at least 1.2m above ground and at least 4m away from any surface. In procuring the noise monitoring devices the proponent must ensure that their specifications comply with SANS 10103:2008, ISO 9613-2:1996 (Acoustics − description, measurement, and assessment of environmental noise) and ISO 6395:2008 (Earth Moving Machinery − Determination of sound power level − Dynamic test conditions). The acceptable noise levels according to SANS 10103:2008 are summarized below for guidance:

	•

Type of District	Equivalent Continuous Rating Level ($L_{Req.T}$) for Noise (dBA)					
	Outdoors			Indoors, with Open Windows		
	Day-night $L_{R,dn}$ [1)]	Day-time $L_{Req,d}$ [2)]	Night-time $L_{Req,n}$ [2)]	Day-night $L_{R,dn}$ [1)]	Day-time $L_{Req,d}$ [2)]	Night-time $L_{Req,n}$ [2)]
a) Rural districts	45	45	35	35	35	25
b) Suburban districts with little road traffic	50	50	40	40	40	30
c) Urban districts	55	55	45	45	45	35
d) Urban districts with one or more of the following: workshops; business premises; and main roads	60	60	50	50	50	40
e) Central business districts	65	65	55	55	55	45
f) Industrial districts	70	70	60	60	60	50

Note: Daytime: 06:00 to 22:00, Night-time: 22:00 to 06:00.

1) Equivalent continuous rating levels that include corrections for tonal character and impulsiveness of the noise and the time of day.

2) Equivalent continuous rating levels that include corrections for tonal character and impulsiveness of the noise.

Significance/ Risk Level (with mitigation)	**Low**
Confidence Level	**High**

IMPACTS ON SURFACE WATER RESOURCES	
Description of Potential Impact	There is not much surface water in the area, but runoff does occur during heavy rainy seasons. Potential contamination of surface water will result from: reduced quality of runoff and seepage water from test quarrying excavations, stockpiles of top soil and waste rock dumps; accidental discharge of effluent from drilling and domestic activities; accidental discharge/ spillage of grease, oil, and other hydrocarbon from working machinery and storage facilities; the use of water for equipment lubrication and cooling; erosion from open access roads and open excavations resulting in the mobilisation of loosened sediments into small streams and rivers. Additionally plumes of oily and/ or greasy water can have adverse visual and reputational impacts for the project.
Status of impact (+ or -)	**Negative**
Impact Classification	**Environmental** **Health** **Image/ reputation** **Legal**
Spatial Extent of impact	**Local to Regional –** as active streams can flow over long distances, thereby carrying pollutants with to other areas
Duration of impact	**Medium Term** – this will depend on the 2-year of Mining Claims (once they are renewed). Contaminants may however stay in the water stream for a long time
Intensity of impact	**Minor effects** - except during sporadic periods of heavy rains
Consequence Level	**Moderate (Level 3)**
Likelihood	**Possible to happen (Level 3)**
Prevention	• Prevention of surface water pollution due to hydrocarbon spillages is possible if stringent measures are implemented • Complete prevention of surface water pollution due to mobilization of loosened sediments is not possible
Significance/ Risk Level	**Moderate**

(no mitigation)	
Proposed mitigation measures or controls	• Ensure that all targeted drilling and test quarrying activities will not encroach any significant water sources traversing the project site. To ensure this during the exploration stage, buffers of 100m shall be maintained around main channels and tributaries, and if the project proceeds to mining phase such buffers must be delineated more accurately using the predicted extent of the 1% annual exceedance probability (i.e., the 1 in 100-year) flood event. • Maximise the recycling and reuse of external water during drilling and test quarrying operations. This will minimise water demand from the external sources • Establish water quality control procedure involving regular sampling and quality testing at sites downstream of active sites • Keep clean water away from test quarrying, drilling and exploration camp sites using simple diversion channels • Store effluent wastewater in designated septic tanks at the exploration site and regularly drain this by hiring a registered wastewater management entity • Apply erosion controls such avoiding leaving open excavations in streams and riverbeds to minimize sediment runoff • Make use of emergency spillage trays at all active sites to minimize risk of surface water contamination from hydrocarbon spillages
Significance/ Risk Level **(with mitigation)**	**Low**
Confidence Level	**High**
IMPACTS ON GROUNDWATER	
Description of Potential Impact	Groundwater in the project site is the main source of water for both human and animal consumption. For this reason, the value of this resource cannot be overlooked. Potential contamination of groundwater by residues of drilling fluids, fuels and oils from vehicles and machinery used at drilling and test quarrying sites; spillage and subsequent infiltration of hydraulic fluids or domestic wastewater (e.g., effluent from project camp kitchen and toilets). Other potential sources of groundwater contamination may include seepage of wash water from vehicles. Where test quarries are relatively deep and intercept the water table, groundwater will be adversely impacted by dewatering of such pits and possible contamination from hydrocarbon spillages from the cutting equipment.
Status of impact **(+ or -)**	**Negative**

Impact Classification	**Environmental** **Community Relationships** **Health**
Spatial Extent of impact	**Site specific** due to the spatially discrete nature of drilling and test quarrying sites During exploration no groundwater abstraction will take place as all water will be carted to the project site from Opuwo or any out of area water supplying source. Hence, groundwater levels nor the cone of depression will be affected by the project activities. However, where groundwater is intercepted by drilling or test quarrying activities, the quality of the groundwater may be adversely affected.
Duration of impact	If groundwater is intercepted, then potential for contamination will exist for as long as the exploration activities continue
Intensity of impact	**No lasting to Minor effects**
Consequence Level	**Minor (Level 2)**
Likelihood	**Not likely to happen (Level 2)**
Significance/ Risk Level **(with no mitigation)**	**Low**
Proposed mitigation measures or controls	• Due to the shallow nature (<30 m) of the planned drilling and test quarrying activities, it is highly unlikely that any groundwater will be intercepted during. Hence why the impacts on groundwater resources are perceived to be low. • If any groundwater is intercepted in test quarries, pump, store and reuse such water • Maintain all vehicles to prevent spills of oils, hydraulic fluids, etc • No effluent water should be discharged into the environment. Effluent and sewage water from the exploration camp should be collected in septic tanks and regularly collected by designated sewage management entity for safe discharge at a suitable location in Opuwo • Bund all hazardous liquid storage installations such as the trailer mounted diesel tank • Baseline groundwater quality measurements should be established right before the commencement of the planned activities by sampling groundwater from existing domestic boreholes. During exploration, groundwater samples should be collected every 6 months from existing boreholes (within a 2km radius) for quality testing at one of the local laboratories and monitoring. Water quality tests to be performed shall include pH, electrical conductivity, total dissolved solids, turbidity, salinity, hardness, total hydrocarbons, alkalinity, major ions (such as Ca, Mg, Na, K, Nitrate, CO3, HCO3,

Cl, SO4) and metals (such as Mn, Pb, Zn, Fe) as per Namibia's Department of Water Affairs' requirements for water supplies for drinking water and for wastewater treatment and discharge

- Any wastewater (effluent) to be discharged into the environment would require an Article 21 Permit from the Minister of Agriculture, Water and Land Reform, and such effluent shall comply with the following minimum standards before being released into the environment:

TABLE 5 GENERAL STANDARDS FOR ARTICLE 21 PERMITS (EFFLUENTS)

Determinants	Maximum allowable levels
pH	5,5% – 9,5%
Dissolved oxygen	A saturation of at least 75%
Typical faecal coli counted/100ml	No typical coli should be
Temperature	35 C
Chemical oxygen demand	75 mg/l
Oxygen absorbed	10 mg/l
Biological oxygen demand	no value given
Total dissolved solids	Not more than 500 mg/l than
	the TDS' of the inlet water
Total suspended solids	25 mg/l
Sodium	Not more than 90 mg/l
Sodium concentration of the inlet water	
Fats, oil and grease	2,5 mg/l (!gravimetric method)
Chlorine, residual	0,1 mg/l as Cl
Free and saline ammonia	10 mg/l as N
Arsenic	0,5 mg/l as As
Boron	1,0 mg/l as B
Chromium, hexavalent	0,05 mg/l as Cr (VI)
Chromium, total	0,5 mg/l as Cr
Copper	1,0 mg/l as Cu
Lead	1,0 mg/l as Pb
Sulphide	1,0 mg/l as S
Fluorine	1,0 mg/l as F
Zinc	5,0 mg/l as Zn
Phenolic compounds	0,1 mg/l as phenol
Cyanide and related compounds	0,5 mg/l as CN

Significance/ Risk Level (with mitigation)	**Low**
Confidence Level	**High**
IMPACTS FROM NON-EXPLORATION / NON-MINING (QUARRYING)WASTE	
Description of Potential Impact	These impacts will result from the presence of: • general waste such as food scraps • Recyclable waste such as steel cans • Green waste such as cleared vegetation • Used and not fit for purpose personal protective equipment • Used machinery spares (e.g. oil and air filters, tyres, batteries, etc) • Wooden pallets • Scrap metals • Waste oils, grease, oily water
Status of impact (+ or -)	**Negative**
Impact Classification	**Environmental** **Health** **Safety** **Image/ Reputation**
Spatial extent of Impact	**Site Specific**
Duration of Impact	**Medium term –** in correspondence with the validity period of the Mining Claims of 2 years(once renewed)
Intensity of impact	**Minor effects**
Consequence Level	**Moderate (Level 3)**
Likelihood	**Almost certain to happen (Level 5)**

Significance/ Risk Level (with no mitigation)	**High**
Proposed mitigation measures or controls	• General waste including used PPE will be stored on site in designated bins and regularly collected for transportation to waste facility in Opuwo (upon prior agreement of waste disposal with the Town Council). • Recyclable waste will be stored on site in designated bins and regularly collected for transportation to designated waste facility in Opuwo (upon prior waste disposal agreement with the Town Council)) • Following clearing, vegetation removed shall be stockpiled and burnt on site. Due care shall be taken by the site supervisor ensure that such fires are well contained to avoid unwanted veld fires • Used wooden pallets will be collected and temporarily stored on site for possible reuse. Pallets that are not fit for reuse shall be transported to waste storage facility in Opuwo or possibly used for firewood by the exploration and quarrying crew • Scarp metals will be temporarily stored at the project site, in a fenced off area, prior to removal by a licensed scrap metal recycling contractor on a regular basis • Waste liquids (oils, grease, sludge) will be collected and stored in designated tightly sealed containers on site and ultimately removed by a licensed recycling contractor on a regular basis • Used tyres will be collected in designated waste bins and transported off site by a licensed contractor
Significance/ Risk Level (with mitigation)	**Low**
Confidence Level	**High**
OCCUPATIONAL HEALTH AND SAFETY IMPACTS	
Description of Potential Impact	The potential impacts on human safety resulting from project activities could include occupational accidents and injuries; vehicle accidents; exposure to extreme weathers; trips and fall on uneven terrain; adverse health effects from dust generation, emissions and noise; threat to human safety and damage to property from emergency and veld fires; continuous exposure to disease vectors such as mosquitos; and contact with hazardous materials such diesel and hydraulic fuels. Where deeper test quarries are created there may be risk of side wall collapse if side walls are unstable. Under circumstances where disabilities and/ or fatalities occur, there may be legal action and or financial implications to the project Proponent
Status of impact (+ or -)	**Negative**

Impact Classification	**Health** **Safety** **Reputation/ Community relationships** **Legal** **Financial**
Spatial Extent of impact	**Site specific**
Duration of impact	**Variable (from Very short-lived** to **Permanent)**
Intensity of impact	**Variable (from Minor** to **Serious Effects)**
Consequence Level	**Moderate (Level 3) –** consequence level not high because of the limited number of workers and moving machinery required during the exploration phase
Likelihood	**Likely to happen at some point (Level 4)**
Prevention	Prevention of the above impacts can be enhanced through the implementation of the following measures: ✓ Having user-friendly Operational procedure manuals ✓ Offering adequate Health and safety training to new personnel and visitors ✓ Continuous enforcement of stringent housekeeping rules ✓ Colour coding areas, pipes, equipment and substances ✓ Training and enforcement of the use of safe working procedures and permits to work ✓ Having an emergency response plan for all occupational and working sites ✓ First aid treatment training to employees on site ✓ Daily safety reminders, meetings and/or drills ✓ Develop a risk register and conduct a comprehensive risk assessment prior to commencement of exploration and eventual quarrying activities ✓ If test quarry walls are higher than 5 m the proponent must ensure they regularly consult a geotechnical professional to check the stability and integrity of such walls.
Significance/ Risk Level (without controls or mitigation)	**High**

Proposed controls / Mitigation	• Procedures for dealing with injuries or accidents must be in place and all contact details for emergency personnel available. Zanite Investment's safety and emergency response manual must be applied. Such manuals must be developed based on statutory requirements stipulated under the Labour Act. • As per the Labour Act (Act 6 of 1992) and SABS 10083 (2004) workers will need to be protected against dust and noise in the workplace. SABS 10083 (2004) requires that noise levels in the workplace (as defined and measured in accordance with that standard) should not exceed 70 to 85 dBA. If this limit is reached, then a noise zone must be declared. A noise zone has special requirements for protective equipment and for training of exposed personnel. • Dust will be released into the air at test quarrying, soil stockpile sites and access roads. SABS 1929 (2005) provides the following standards for PM10 particulate matter: - The daily limit for the protection of human health over a 24hour period is 75 µg/m^3 - The annual limit for a calendar year is 40 µg/m^3 - Workers must go for regular (bi-annual) health check-ups to ensure that these targets are met. In addition, continuous dust monitoring must be implemented - Water brought to site for human consumption must comply with acceptable water quality specifications provided in Section 21 of the Water Act (Act 54 of 1956) of the Republic of Namibia • Record and report all health and safety incidences • The following features of the project's design and management will reduce risk of mosquitos breeding on the project site: - Used tyres that may be generated on site, that could contain pooled water and act as breeding ground for mosquitos, will be transported to designated waste disposal sites in Opuwo regularly
Significance/ Risk Level (with controls or mitigation)	**Low**
Confidence Level	**High**
POTENTIAL SECURITY ISSUES	
Description of Potential Impact	• Potential increase in livestock theft and illegal wildlife hunting due to more people being in the area • Potential compromise on security of nearby homesteads of the affected communities
Status of impact (+ or -)	**Negative**

Impact Classification	**Community Relationship**
Spatial Extent of impact	**Local** (Project communities and settlements)
Duration of impact	**Medium Term –** i.e., for as long the exploration and quarrying (mining) is ongoing
Intensity of impact	**Minor effects**
Consequence Level	**Major (Level 4)**
Likelihood	**Unlikely to happen (Level 2)**
Prevention	Prevention is possible if stringent security and non-compliance actions are enforced
Significance/ Risk Level (without controls or mitigation)	**Moderate**
Proposed controls / Mitigation	• Make compliance to Zanite Investment's security and no theft tolerance policy a condition of employment • Enforce stringent measures/ actions for non-compliance • The management of Zanite Investment must work with leaders of the affected communities and the two Communal Conservancies (Orupembe ad Epupa) to monitor and take decisive action against any illegal hunting or theft activities • Enforce reporting of theft and other security related incidences
Significance/ Risk Level (with controls or mitigation)	**Low**
Confidence Level	**High**
VISUAL IMPACTS AND LIGHTING	
Description of Potential Impact	Compromise on the scenic value of the project site may arise from changes to the topography and physical landscape due to open excavations, removal of blocks from the mountain/koppies side, top and sub-surface soil stockpiles, stockpiles of waste rock, widening of access track roads, as well as the presence of machinery and stationary containers in the area. Since the project site is in a rural setting, lighting at night could also add to visual impacts as such lighting would be visible from far. Due to the intervening topography and vegetation between the project site and sensitive receptors (e.g., the C35, D3704 and D3707 gravel roads), the project is not anticipated to be visible from major viewing locations except from the limited number of homesteads in the area (local communities).

Status of impact (+ or -)	**Negative**
Impact Classification	**Environmental** **Image/ Reputation/ Community Relationships**
Spatial Extent of impact	**Localized**
Duration of impact	**Medium-term** (presence of containers, machinery, and increased lighting at night) to **Long** (un-rehabilitated sites resulting from the removal of dimension stone blocks, and new access tracks)
Intensity of impact	**Moderate Effects**
Consequence Level	**Moderate (Level 3)**
Likelihood	**Possible to happen (Level 3)**
Prevention	• Prevention of the scenic impacts is not possible.
Significance/ Risk Level (without controls or mitigation)	**Moderate**
Proposed controls / Mitigation	• Ensure that there are no elevated overburden dumps or final voids post-test quarrying and actual quarrying • Drilling sites will be progressively rehabilitated to create landscape like the surrounding undisturbed areas. • Unsuccessful test quarrying sites will equally be rehabilitated progressively • As far as is practical no vegetation will be removed unnecessarily. Where new access roads are to be constructed, the methods should be low intensive and possibly use manpower and not machines for clearing. • Test quarries where exploration results are positive shall be battered to safe angles or possibly turned into temporary earth dams with gently sloping sides in preparation for the development and subsequent quarrying. • Care shall be taken to ensure that all rehabilitated areas are like the immediate environment in terms of visual character, vegetation cover and topography and any negative visual impacts will be rectified to the satisfaction of the MEFT officials. • Exploration and actual mining should be limited to the sides of the koppies not overlooking the district roads. This is to prevent the visual impact on tourists and travellers alike on the D3704 and D3707 due the contrasting landscape from block removals.

Significance/ Risk Level (with controls or mitigation)	**Low**
Confidence Level	**Medium –** Recovery rates of vegetation in once cleared sites are unknown and will need to be established during the quarrying phase through a well formulated vegetation recovery monitoring program.
IMPACTS ON LAND USE (LAND USE CONFLICT ISSUES)	
Description of Potential Impact	Currently the project site is primarily used for agricultural (mainly small stock farming) purposes and biodiversity conservation. Introducing the third aspect (i.e., exploration and actual quarrying) may lead to conflict in so far as land use is concerned because whilst faming and nature conservation aim to preserve vegetation and ambient natural conditions, the project activities on the other hand will inevitably involve modifications to the bio-physical character of the project site area through the creation of access roads; stripping and overburden removal activities; generation of dust and noise; frequent movement of machinery; introduction of scarred landscapes; transportation of sample blocks and water by trucks on roads that are often busy with tourists; and possibly fencing off of selected sites where exploration yields positive results. Collectively, this could introduce conflict between the subsistence farmers, communities or conservancies and the quarrying company (Proponent). The impacts are typically aggravated by poor and transparent communication to the affected communities, and prolonged unresolved conflict can result in retaliation by affected communities with consequent damage to equipment or even vehicles.
Status of impact (+ or -)	**Negative**
Impact Classification	**Community Relationships** **Legal** **Financial Loss**
Spatial Extent of impact	**Site Specific**
Duration of impact	**Medium-term** – in alignment with the validity period of the Mining Claims (when renewed) which is 2 years
Intensity of impact	**Variable (Minor to Serious effects),** depending on how well managed the relationship between Zanite Investment and the affected communities are managed from commencement of exploration into the actual quarrying phase.

Consequence Level	**Major (Level 4)**
Likelihood	**Possible to happen (Level 3)** – due to the conflicting nature of the land use activities conflict between the affected communities/ conservancies and Zanite Investment will possibly occur
Prevention	Prevention is not entirely possible due to the inherent conflicting nature of the land uses, but the conflict can be minimized and managed to acceptable levels if the mitigation/ management measures below are actioned
Significance/ Risk Level (without controls or mitigation)	**High**
Proposed controls / Mitigation	• From the onset the project proponent must ensure that they maintain transparent and inclusive communication channels with the leadership (of Otjikakurukouje Traditional Authority) and communities of Orupembe and Onjuva as well as the two communal conservancies (Orupembe and Epupa) • Local government (e.g., the traditional authorities, leaders of the 2 conservancies and constituency councillors) must assume a leadership role in coordinating and promptly attending to any conflicts that arise between the affected communities and the project Proponent • The management of Zanite Investment must honour all promises made during to the affected communities during the public consultation meetings held in so far as creation of employment and procurement opportunities to locals, rehabilitation of community boreholes, and possible assistance or partnerships with small-scale miners are concerned
Significance/ Risk Level (with controls or mitigation)	**Moderate**
Confidence Level	**High**
IMPACTS ON HERTIAGE/ ARCHAEOLOGICAL RESOURCES	
Description of Potential Impact	Any archaeological/ heritage/ historic sites of importance within the Mining Claims that are damaged or destroyed would constitute an impact on the heritage of Namibia. The procedure of 'chance finds' is to be followed where no known sites of importance are recorded for the MCs' area.

Status of impact (+ or -)	**Negative**
Impact Classification	**Environmental** **Image** **Legal** **Financial loss**
Spatial Extent of impact	**Site specific**
Duration of impact	**Permanent**
Intensity of impact	**Minor effect**
Consequence Level	**Level 4 (Major)**
Likelihood	**Possible**
Prevention	Impacts of this nature can be avoided if the site locations are known. Where exact locations are not known, the risk of disturbance or complete destruction can be achieved by using spotters during excavation, test quarrying and actual quarrying. Continuously documenting the locations of new discoveries can also help prevent future disturbance.
Significance/ Risk Level (without controls or mitigation)	**High**
Proposed controls / Mitigation	• A 'chance find' of any potential heritage site should be communicated to the police and the National Heritage Council of Namibia. If activities occur at the location where a 'chance find' has been made, then the activities should cease until the necessary authorities have visited the site and provided the go ahead to proceed with activities. • Use spotters during shallow excavation works • Survey the spatial extent and exact locations of know sites • Consider hiring a part time qualified Archaeologist during the exploration stage to help in identifying potentially unknown/unrecorded heritage resources on the koppies and ensure their protection.
Significance/ Risk Level	**Moderate (as some sites will likely to remain unknown)**

(with controls or mitigation)	
Confidence Level	**Medium -** Knowledge of the whereabouts of any other archaeological/ heritage sites remain unknown.
PUBLIC PERCEPTION	
Description of Potential Impact	It is not possible to apply the assessment table to this issue. Public perceptions just need to be managed through the establishment and optimization of transparent and inclusive communication channels such as quarterly progress meetings with the communities, having accessible complaints register on site and regularly reviewing and taking actions to pertinent complaints.

7.4 Decommissioning and Closure

The decommissioning phase refers to the cessation of all exploration activities as well as the removal and/ or rehabilitation of any sites which will not be utilized or developed during the continuous quarrying phase. It is of paramount importance to admit that disturbance of the earth's surface by any form of intrusive exploration and eventual mining (quarrying) activity will result, at least to some spatial extent, in complete removal of existing vegetation and disturbance or modification of habitats over the disturbed area. The impacts of this usually are significant, but localized to the disturbed footprint, and the overall geographical extent of the impact is dictated by the intensity of the intrusive exploration activity and the sensitivity and recovery rate of the receiving environment. Regardless of the preceding factors, the resultant impacts on the environment can be lessened by planning and executing such activities with closure in mind.

The objectives of decommissioning and closure for a prospecting and mining project such as this are to:

- Ensure that sites where exploration results point towards the absence of good quality rock for dimension stone are fully rehabilitated and restored to a safe and similar, to the extent practical, state as the immediate surroundings. Where restoration to the original state is not practically achievable due to budgetary constraints or lack of sufficient material for backfilling, such excavations can be battered to safe angles and turned into water dams for extra storage during periods of heavy rains and runoff.
- Ensure that sites that are developed for continuous quarrying are always kept safe throughout the quarrying phase.
- Comply with relevant regulatory requirements and attain regulatory consensus on the successful closure and rehabilitation of the Project area.
- Comply with the demands of the affected communities as far as site restoration and rehabilitation are concerned, and maintain a positive public image
- Execute restoration and rehabilitation works on an ongoing basis during the operations, and in a cost-effective manner as much as possible whilst achieving the primary socio-economic and developmental objectives of the Project
- Produce a final landform that is stable and one which aesthetically blends into the surrounding landscape, yet as far as possible does not impede possible future land uses.
- Remove the machinery, equipment and containers that will not be required for the quarrying phase, and

- Relocate the accommodation camp closer to sites where exploration works yielded positive results and continuous quarrying is likely to take place soon after.

7.5 Site Rehabilitation

The Proponent shall keep the disturbed areas to a minimum; trees and other vegetation should not be removed unless necessary; selective test quarrying should be adopted so that the entire site is not cleared and affected at once; backfilling and rock shading should be practiced while exhausted areas should be closed to the extent practical before opening new ones.

7.5.1 Planning for Rehabilitation

Each drilling and test quarrying site will typically have distinct characteristics which would ultimately influence the procedures to be adopted in the rehabilitation program. These characteristics may be obvious but critical differences are often only identified by careful assessment of various factors for each site. The envisaged post-exploration and quarrying land-use will also typically influence the rehabilitation procedure to be implemented.

The generic best-practice rehabilitation measures as recommended by the Minerals Council of Australia (2015), which appropriate modifications, will apply to most disturbed areas and they are as follows:

1. **Making Safe:** After planning for rehabilitation, the first step is to clean up the site and make the area to be rehabilitated safe. For this project this shall involve the following:
    - Removal of drilling and blade saw cutting equipment from the site; sealing of drill holes, backfilling of excavations, and spreading of topsoil, ripping and closure of access roads if the site will not be subjected to continuous quarrying. Alternatively, if continuous quarrying is likely to take place, leave excavations open but fence off the site throughout the quarrying phase. Safely, park and stored all machinery and equipment at the exploration and quarrying camp.
    - Removal of all industrial and domestic solid and liquid waste by a licensed contractor for disposal at approved sites in Opuwo. Care is required with residual toxic or hazardous materials including contaminated packaging and containers
2. **Pollution Control**: Progressive rehabilitation will be implemented to stabilize disturbed areas as quickly as practical and to limit erosion, soil degradation, poisoning of fauna, and pollution of water sources. Collectively, this shall involve the following:
    - Restricting clearing to areas essential for the testing work required

- Minimizing length of time disturbed soil is exposed
- Diverting run-off from undisturbed areas away from the working areas to avoid possible contamination

3. **Topsoil Management**: The site rehabilitation strategy may include the following measures which are designed to minimize the loss of topsoil material, which must be spread over rehabilitated areas to promote successful vegetation establishment:
    - Minimize the length of time that topsoil material is stockpiled.
    - Contour rip to encourage rainfall infiltration and minimise run-off.
    - Respread topsoil material in even layers at a thickness appropriate for the landform and land capability of the area to be rehabilitated.
    - Construct contour banks in accordance with the applicable landform design criteria to limit slope lengths and control run-off by avoiding soil compaction.
    - stockpiles shall be in areas away from drainage lines or windy areas to minimise the risk of soil and wind erosion.
    - Rehabilitated areas of returned topsoil will be ripped to about 1 m depth, with care taken not to bring subsurface materials to the surface (e.g., large rocks). Ripping should only be sufficient to allow equipment to work efficiently. Ripping along slopes should be along contour to encourage runoff infiltration and minimize erosion.

The full details of the rehabilitation plan for this project are covered in the accompanying EMRP.

8 CONCLUSIONS

8.1 Overall summary of the Results of Impact Assessment

Table 8-1 provides a summary of the impact assessment results from Chapter 7. For each potential environmental impact or issue, the residual risk or significance level is stated. Where further investigations are deemed necessary to better understand the risk associated with a specific impact, this is indicated in the third column of the table.

Table 8-1. Summary of potential impacts or issues

Potential Impact	Residual Significance Level (post mitigation)	Aspects requiring further investigation or monitoring
Impacts of slope instability in test quarries	Moderate	Regularly conduct slope stability assessments in test quarries deeper than 5m by a geotechnical specialist
Impacts on soil degradation and erosion	Moderate	None
Impact on land use change	Low	None
Impact on topography and physical landscape	Low	None
Impacts on vegetation	Low	Monitor the rate of vegetation re-establishment or recovery
Impacts on Indigenous Fauna	Low	Develop a record of all mammals, birds, insects, and reptiles observed. Also record all animal fatalities
Impacts on Air Quality	Moderate	Implement dust fall out monitoring on commencement of exploration
Impacts of noise & vibrations from quarry	Low	Design of drilling and quarrying equipment -The use of dust suppressing agent (by sprinkling water on problematic surfaces/areas)
Impact on Surface Water	Low	Monitor water quality in tributaries downstream of drilling and test quarrying sites
Impacts on Groundwater	Low	Periodic water quality testing and monitoring in existing boreholes (within a 2km radius)

Potential Impact	Residual Significance Level (post mitigation)	Aspects requiring further investigation or monitoring
Impacts from non-exploration waste	Low	None
Impacts on Occupational Health and Safety	Low	Keep a record of medical results for workers
Potential Security Issues	Low	Establishment of access control points; Enforce in Conditions of Employment
Visual Impacts	Low	None
Impacts on Heritage/ Archaeological Sites	Moderate	Implement chance find practice
Impacts from Land use conflict	Moderate	Review complains launched on a quarterly basis and develop a log of issues that persistently resurface

8.2 Environmental Economics Criteria

A final qualitative assessment is considered in terms of the criteria used in the field of Environmental Economics. These criteria are explained by Stauth (1983), namely:

- the *Efficiency criterion*,
- the *Equity criterion*, and
- the *Intergenerational Equity criterion*.

Efficiency: A project is efficient if it brings about a net benefit to society. If a certain number of people are made better off without anyone else being made worse off, then a project is considered efficient in environmental economics terms.

The project is expected to bring about significant socio-economic benefits to the area of Onjuva, Orupembe, mainly in the form of employment and procurement opportunities once it proceeds to the quarrying phase. Increased spending power of employees will further help local business to pick up, which will further contribute to the economy of the Kunene Region. Taxes from Zanite Investment to the Namibian Government will benefit the country in the form of tax revenues.

The efficiency of the project could be enhanced if local contractors and sub-contractors are hired to provide secondary services such as cleaning, cooking, plumbing and electrification of working areas, removal of solid and liquid waste from site, and transportation of sample blocks to processing facilities in Karibib or Walvis Bay.

Equity: The equity criterion relates to the distribution of costs and benefits in the affected society. A project is equitable if it brings about a situation whereby inequality levels are reduced, and livelihoods are improved.

The project will benefit local people without disadvantaging them in any way. Locals will not suffer any displacement or loss of land or be subject to adverse health and safety conditions. The distribution of benefits will be extended from the exploration to the mining (quarrying) phase. This is true because the Proponent is likely to retain the same workforce from exploration stage to continue to the quarrying stage. The direct benefits will include remuneration to employees, surface lease to the traditional authority as possibly the Orupembe Conservancy, while indirect benefits would include increased work opportunities in supporting industries and services.
The distribution of benefits could be greatly enhanced if secondary support services are outsourced to local contractors. The creation of small businesses would provide opportunities for people to also learn about business management skills.

Intergenerational Equity (or Sustainability): This criterion considers the economic impacts on future generations – i.e., it extends the considerations of equity to future generations. Thus, a project should be able to make the present generation better off without making future generations worse off. It should be able to provide benefits to future generations without degrading the resource base that the society depends on for its wellbeing. It has been established by Zanite Investment, through the completed desktop study work, that the raw materials of white marble and pink speckled black granitoid within the project site generally occur in abundance, and only a small fraction will be exploited over the lifetime of the envisaged quarry operation.

The project poses no significant threats to human health, the health of domestic livestock or wildlife and birds, provided that the proposed control (mitigation) measures are effectively implemented.

8.3 Closing Remarks

The aim of this environmental scoping assessment was to identify the potential impacts associated with the proposed exploration drilling, test quarrying and quarrying white marble and pink speckled black granitoid on three Mining Claims (No. 66714, 66731 & 66733) in Onjuva Village, assess their significance/ risk level, and recommend practical mitigation measures. The public and all directly affected stakeholders were consulted as required by the EMA and its 2012 EIA Regulations (Section 21 to 24). The public was informed via newspapers advertisements in three local newspapers; site/public notices placed at key accessible locations (such as Onjuva Clinic, Orupembe Community campsite Office. The communication to identified and registered I&APs was also done via emails (for those with email addresses) and SMSs. The potential impacts identified therefore took account of those identified by the EAP as well as issues and concerns raised by the I&APs through the various communication platforms.

A one-on-one interaction session (consultation meeting) was scheduled and held at the Onjuva. The main attendees of the meeting were traditional councillors of the Otjikakurukouje Traditional Authority, conservation officers of the Orupembe Conservancy, and general members of the concerned community. The interested and affected parties provided their inputs and raised all concerns and issues on the proposed project activities. These inputs and concerns were captured and documented in the accompanying Issues and Response Trail (**Appendix F**). The concerns and comments received from the public and the local community members formed the basis for this report as well as the accompanying EMRP.

Overall, due to the spatially constrained nature of the proposed activities, supplemented by the brownfield nature of the site (owing to historical small-scale quarrying) and moderate sensitivity of the project area, the potential environmental and socio-economic effects are limited and can practically be reduced to acceptable levels upon implementation of the various mitigation measures provided herein and as action plans in the EMRP. Additionally, it is envisioned that the disturbed footprints from access roads, drilling, test quarrying and actual quarrying are not expected to cause irreversible harm to the environment. The drill holes, access roads and test quarries can be fully rehabilitated, would re-vegetate after rainfall seasons if the proposed measures are implemented as suggested in this report.

Based on this and the residual risk or significance level of the impacts identified after implementing the proposed mitigation measures, it is recommended that an Environmental Clearance Certificate can be issued for the proposed activities on the Mining Claims; with conditions that the various impact management and mitigation/ enhancement measures outlined in this report as well as in the accompanying EMRP are fully implemented and their effectiveness monitored during the implementation phase.

9 REFERENCES LIST

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