RED-DUNE CONSULTING CC

APP 002234

Environmental Management Plan For The Proposed Stone Aggregate Quarrying At An Old Quarry At Lüderitz, !Kharas Region

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PROJECT CONSULTANT	Mr. Ipeinge Mundjulu
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ABBREVIATION

AIDS	Acquired Immune Deficiency Syndrome
ANFO	Ammonium Nitrate Fuel Oils
ECC	Environmental Clearance Certificate
ECO	Environmental Compliance Officer
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
EMP	Environmental Management Plan
ESCI	Eben Smith Concrete Company Ltd
HIV	Human Immune Virus
MEFT	Ministry of Environment Forestry and Tourism
PPE	Personal Protective Equipment
SM	Site Manager

1 THE EMP

1.1 Purpose Of The Emp

This Environmental Management Plan (EMP) is a risk strategy that contains logical framework, monitoring programme, mitigation measures, and management control strategies to minimize environmental impacts. It further stipulates the roles and responsibility of persons involved in the project. These strategies are developed to reduce the levels of impacts for the construction and operation of the quarry.

1.2 Compliance To The Emp

This EMP is a legally binding document as given under the provisions of the Environmental Management Act, 2007 (Act No. 7 of 2007). The project proponent and its contractors must therefore adhere to the framework of this document.

1.3 Roles & Responsibilities

1.3.1 Environmental Compliance Officer (ECO)

This is an individual that represent the governing authority (MEFT). Depending on his/her work schedule, the ECO shall visit the site at any time for environmental inspection and monitoring

1.3.2 The Proponent

Mr. Smith, hereinafter as the “proponent” shall assume overall responsibility to ensure full implementation of the EMP.
Further the proponent must ensure to;

- Appoint a site Manager
- Ensuring that all workers are inducted on safety
- Safer working environment
- Provide workers with Personal Protective Clothing
- Monitor the employees works with regard to safety

- Ensure employees understand the guidelines of the Environmental Management Plan (EMP)
- Ensure the environment is protected and
- Maintain healthy relationship with the neighbours

1.3.3 Site Manager (SM)

The Site Manager will be responsible for the monitoring of daily operations and ensure adequate adherence to the EMP. The Site Manager should ensure that a copy of the EMP is available at project premises at all times. Further, an induction should be conducted with all employees and be made understand the provision of this EMP.

1.3.4 Employees

- Adhere to the EMP.
- Ensure to wear personal protective clothing at all time when working.
- Report worn out PPE and request for replacement.
- Adhere to the Company rules and policies.

1.3.5 Disciplinary Action

The EMP is a legally binding document. Non-compliance to the EMP may result in punitive measure to be taken against the proponent such as;

- Legal action, fines, and/or.
- Suspension of work (Through issuance of compliance order as per the EMA),
- Financial penalties.

2 THE EMP TABLE

The EMP is developed to address critical activities involved in industrial digging / mining of underground resource. The commonality of mining in general is that, it involves land clearing, removal of top soil, digging, excavation and pilling of mined materials, loading and transportation of materials.

This is a living document that is subject to amendment when the needs arise to ensure environmental protection. Thus, aspects that may not necessarily be covered during its development could be added on.

2.1 Construction Phase

Table 1. EMP during construction phase

Aspect	Impact	Mitigation objective	Mitigation measures	Monitoring indicator	Party responsible
EMP awareness	Possible negligence to implement the EMP because the employees are not aware of it	To ensure that all employees are familiar with the requirements of the EMP.	1. All employees must go through an induction course for the provision of the EMP. 2. Ensure that a copy of the EMP is kept on site and accessible 3. Staff operating specialised equipment and heavy vehicle must be properly trained and informed of the potential risks associated with their tasks 4. There must be an annual induction course for all the	Induction Minutes and Attendance Register, Signed by each and every staff member, Physical verification of the EMP on site.	Proponent and Contractors

Aspect	Impact	Mitigation objective	Mitigation measures	Monitoring indicator	Party responsible
			workers.		
Employment / Socio-Economic advancement of local	Possible exclusion of locals / Lüderitz and Aus community from job opportunities. Unfair compensation of workers. Procurement of good and services from outside Lüderitz	To ensure local beneficiation of the project and fair labour practises	1. Ensure that all general work is reserved for local people unless in circumstances where specialized skills are required. 2. Fair compensation and labour practice as per Namibian Labour Laws must be followed 3. Ensure skill transfer to the locals 4. Use local supplier for good and service where possible	• Induction Minutes and attendance register, signed by each and every staff member, • Training certificate for machine operators, • Employee register, • Wages for employee • Complains about payment.	Proponent and Contractors
Health and Safety for employees	Job opportunities leads to new social relationship which often spread	To ensure employees health and safety at the working environment.	1. Provide awareness to the employees on dangers of HIV/AIDS, alcohol and drug abuse	• Health and Safety included and reflected in the Induction Minutes • Monitor presence of alcohol at harvesting site	Proponent and Contractors

Aspect	Impact	Mitigation objective	Mitigation measures	Monitoring indicator	Party responsible
	disease, particularly pandemic such as HIV and AID and substance abuse. Hiring off unlicenced employees to operate vehicles and special machinery pose safety risk to themselves, co-workers and public. Additionally, employees are subject to dust and		2. Provide condoms on site 3. Develop a safety plan 4. Ensure that every employee goes through an induction course about safety 5. All drivers must be in possession of appropriated driver's licenses 6. Ensure construction / operation starts from 6am-5pm only and no night operation / construction. 7. Adequate safety signs must be put at designated places. 8. Provide safe wears such as, overalls, safety boots, safety eyeglasses, Hand gloves and	• Awareness meeting attendance registers • Breathalyser report • Disciplinary reports • Physical assessment and logs of condom procurement • Complaints of health issues by employees • First aid kit available • Safety plan / pamphlets • Training minutes and • attendance register • Physical verification of PPE • Adequate protective gear for all staff • Availability of fire extinguishers and evidence	

Aspect	Impact	Mitigation objective	Mitigation measures	Monitoring indicator	Party responsible
	noise pollution as well as other occupational health and safety issues		hard hat etc to employees 9. Adhere to the Labour act, non-toxic human dust exposure levels may not exceed 5mg/m^3 for respiratory dust and 15mg/m^3 for total dust. 10. Train employees on health and safety. 11. Abide by the Occupational Health and Safety and Labour Act of Namibia and other statutory requirement such as International Labour Practise (ILO) 12. Supply adequate first aid kit 13. Supervisors must undergo	training (e.g. minutes, training pictures etc. • Availability of the first aid kit onsite • Gender based ablution facilities	

Aspect	Impact	Mitigation objective	Mitigation measures	Monitoring indicator	Party responsible
			an occupational health and first aid course, 14. Train employees on the possible health hazards to avoid potential risks 15. Supply clean drinking water to the site;		
Dust pollution from construction activities	Land clearing, digging and excavation of trenches, movement of vehicles and heavy machinery in site, concrete work, transportation of sand to site, will	To prevent dust pollution from project activities.	1. Movement of heavy vehicles must strictly be restricted on site. 2. Adhere to the minimum speed limit of 30 or 40km/hour. 3. Do not excavate and/or offload sand during heavy winds. 4. Trucks carrying sand must be	• Vehicles tracks outside access area. • On site traffic offence • Reports of dust pollution • Reports of truck transporting sand not covered / physical observation • Water spray dust suppression system • Storage area for cement bags areas.	Proponent and Contractors

Aspect	Impact	Mitigation objective	Mitigation measures	Monitoring indicator	Party responsible
	create fugitive dust which is (i) safety risk due to reduced visibility		covered. 5. Sand stock piles must be covered or regularly water sprayed with water. 6. On site where soil is loosened by vehicle movement, apply dust a suppression method such as water spraying. 7. Cement and concrete must be mixed with concrete mixers and not manually in the open. 8. Cement bags must be stored and disposed of properly and may not be shaken in the open.		

Aspect	Impact	Mitigation objective	Mitigation measures	Monitoring indicator	Party responsible
Noise pollution	Noise pollution is expected from the movement of heavy machineries, digging and excavating of trenches and concrete mixing. This is site specific, hence affecting mostly employees.	To prevent noise pollution from project activities.	1. All vehicles and machinery must be well serviced. 2. Switch off engine off vehicles when not in use. 3. Drive at 30-40 km/h while on site. 4. Apply health and safety mitigation measures provided above.	• Vehicle service books. • Onsite traffic offense	Proponent and Contractors
Biodiversity	Clearing of top soil will destroy all vegetation and habitat for the animals.	To protect biodiversity	1. Endangered vegetation should be relocated. 2. Do not kill any animal found onsite. 3. Do not destroy nests if found on site.	• Reports of relocation • Reports of animal killed • Reports of nest destroyed	Proponent and Contractors

Aspect	Impact	Mitigation objective	Mitigation measures	Monitoring indicator	Party responsible
Waste Generation	Construction activities will produce construction wastes such as building rubbles, used oil cans drums, metals, and household solid and liquid waste	To manage waste generated by the project	1. Maintain good housekeeping on site. 2. Designate a storage area for building rubbles. 3. Provide skip bins for construction waste. 4. Provide labelled household waste drums for household solid waste. 5. Used oil, grease and lubricants cans must be collected in appropriate drums and disposed of at an approved site 6. Ensure separate ablution facilities for men and women.	• Physical verification of skip bins and labelled waste drums • Designated area for building rubbles • Report of waste disposal at approved sites • Physical verification of gender separated ablution facilities.	Proponent and Contractors

Aspect	Impact	Mitigation objective	Mitigation measures	Monitoring indicator	Party responsible
Land degradation and pollution **Surface and Ground water Pollution**	Uncoordinated movement of heavy vehicles and uncoordinated land clearing could lead to soil erosion. Possible spill and leakages of fuel and lubricants from vehicle and machinery could pollute the soil and eventually the ground water resource.	To prevent land degradation, soil erosion and potential pollution of water resources.	1. Fuelling of heavy vehicles on site must be well coordinated at designated places 2. Stationary vehicles must be provided with drip tray to capture oil, lubricants and hydraulic fluid leakages 3. All vehicles and machinery must be well serviced to avoid leakages 4. Provide and train on oil spill emergency response 5. Servicing of vehicles and machinery must take place at designated sites	• Physical observation of drip trays, oil marks etc • Vehicles service report / service books • Training report on emergency response • Reports of disposal of contaminated soils	Proponent and Contractors
Heritage Resources	Lüderitz has a rich ancient history as	To prevent damage to heritage material and	1. Employee must be trained on the possible find of heritage	• Training records and signed attendance registers	Proponent and Contractors

Aspect	Impact	Mitigation objective	Mitigation measures	Monitoring indicator	Party responsible
	well as dark history of colonialism. In areas around Lüderitz, it is possible to stumble on heritage and archaeological materials during digging and excavating that could be destroyed if precaution measure are not taken.	archaeological materials.	and archaeological material in the area; 1. Implement a chance find and steps to be taken for heritage and archaeological material finding (Heritage (rock painting and drawings), human remains or artefacts) are unearthed by; i. Stopping the activity immediately ii. Informing the operational manager or supervisor iii. Cordoned of the area with a danger tape and manager to take		

Aspect	Impact	Mitigation objective	Mitigation measures	Monitoring indicator	Party responsible
			appropriated pictures. 2. Manager/supervisor must report the finding to the following competent authorities, National Heritage Council of Namibia (061 244 375) National Museum (+264 61 276800) or the National Forensic Laboratory (+264 61 240461).		
Hazards	Reduced visibility of slow-moving construction vehicles and heavy machinery may lead to accident	To prevent all the type of hazards	1. All heavy vehicles must have a rotating flushing light installed for visibility. 2. Ensure that all vehicle are well serviced and roadworthy. 3. Tipper trucks carrying concrete stones and sand for	• Physical verification of rotating flushing light • Service books for the vehicles • Tipper trucks with load compartment having a cover.	Proponent and Contractors

Aspect	Impact	Mitigation objective	Mitigation measures	Monitoring indicator	Party responsible
			construction must be covered to avoid flying stock and dust.		

2.2 Operational phase

Table 2. EMP during operational phase

Aspect	Impact	Mitigation objective	Mitigation measures	Monitoring indicator	Party responsible
EMP awareness	Same as during construction	Same as during construction	Same as during construction	Same as during construction	Proponent
Employment / Socio-Economic advancement of local	Same as during construction	Same as during construction	Same as during construction	Same as during construction	Proponent
Health and Safety for employees	Same as during construction	Same as during construction	Same as during construction	Same as during construction	Proponent
Dust pollution from quarrying activities	Blasting, digging and excavation, crushing, stock piling of aggregate and rock dust, transportation of aggregated and	To ensure employees health from dust particulates, ensure employees and public safety from blasting activities	1. Applying dust suppression measures such as water sprays at crushing point and on conveyor belts 2. Spray water on stock piles of aggregate and rock dust 3. Where possible, rock dust stock piles must be covered	• Vehicles tracks outside access area. • On site traffic offence • Reports of dust pollution • Reports of truck transporting sand not covered / physical observation	Proponent

Aspect	Impact	Mitigation objective	Mitigation measures	Monitoring indicator	Party responsible
	rock dust, movement of vehicles and heavy machinery in site will produce excessive dust. which is a, (i) safety risk due to reduced visibility	and movement of heavy vehicles	4. Movement of heavy vehicles must strictly be restricted on site. 5. Adhere to the minimum speed limit of 30 or 40km/hour. 6. Do not excavate and/or offload sand during heavy winds. 7. Trucks carrying concrete stones must be covered. 8. On site where soil is loosened by vehicle movement, apply dust a suppression method such as water spraying.	• Water spray dust suppression system • Storage area for cement bags areas.	

Aspect	Impact	Mitigation objective	Mitigation measures	Monitoring indicator	Party responsible
Noise pollution	Noise pollution is expected from blasting, crushing, and movement of heavy machineries, digging and excavating of blasted rocks and screening of aggregate. Many are site specific hence affecting mostly employees.	To minimize noise emission from project activities.	1. Use approved contractor to undertake blasting. 2. Blasting procedures should be undertaken within national prescribed manner 3. All vehicles and machinery must be well serviced . 4. Switch off engine off vehicles when not in use. 5. Drive at 30-40 km/h while on site. 6. Apply health and safety mitigation measures provided above	• Licenses of blasting contractor • Report of blasting • Warning evidence of blasting • Vehicle service books. • Onsite traffic offense	Proponent

Aspect	Impact	Mitigation objective	Mitigation measures	Monitoring indicator	Party responsible
Waste Generation	Quarry operation will Overburn materials, used oil cans drums, metals, worn out vehicle and machinery parts, household solid and liquid waste	To manage waste generation from the project activities.	1. Store the overburden appropriately to be used during rehabilitation 2. Maintain good housekeeping on site. 3. Designate a storage area broken spares and worn-out parts. 4. Provide labelled household waste drums for household solid waste. 5. Used oil, grease and lubricants cans must be collected in appropriate drums and disposed of at an approved site	• Physical verification of skip bins and labelled waste drums • Designated area for building rubbles • Report of waste disposal at approved site • Physical verification of gender separated ablution facilities.	Proponent

Aspect	Impact	Mitigation objective	Mitigation measures	Monitoring indicator	Party responsible
			6. Ensure separate ablution facilities for men and women.		
Land degradation and pollution. Surface and Ground water Pollution	Same as during construction	Same as during construction	Same as during construction	Same as during construction	Proponent
Heritage Resources	Lüderitz has a rich ancient history as well as dark history of colonialism. In areas around Lüderitz, it is possible to stumble on heritage and	To protect the heritage and archaeological materials	1. Employee must be trained on the possible find of heritage and archaeological material in the area; 2. Implement a chance find and steps to be taken for heritage and archaeological material finding (Heritage (rock	Training records and signed attendance registers	Proponent

Aspect	Impact	Mitigation objective	Mitigation measures	Monitoring indicator	Party responsible
	archaeological materials during blasting, digging and excavating that could be destroyed if precaution measure are not taken.		painting and drawings), human remains or artefacts) are unearthed by; i. Stopping the activity immediately ii. Informing the operational manager or supervisor iii. Cordoned of the area with a danger tape and manager to take appropriated pictures. Manager/supervisor must report the finding to the following competent authorities, National Heritage Council of Namibia (061 244		

Aspect	Impact	Mitigation objective	Mitigation measures	Monitoring indicator	Party responsible
			375) National Museum (+264 61 276800) or the National Forensic Laboratory (+264 61 240461).		
Hazards	Blasting may cause vibration and flying rocks, Reduced visibility from dust emission, slow-moving construction vehicles and heavy machinery may lead to accident	To prevent hazards and safety risk	1. Warn public and employee on blasting times. 2. Blasting site / areas must be free of people. 3. Use approved contractor to undertake blasting 4. All heavy vehicles must have a rotating flushing light installed for visibility. 5. Ensure that all vehicle are well serviced and roadworthy.		Proponent

Aspect	Impact	Mitigation objective	Mitigation measures	Monitoring indicator	Party responsible
			6. Tipper trucks carrying aggregates and rock dust must be covered to avoid flying stock and dust.		

2.3 Decommissioning and Rehabilitation Phase

After the life of a quarry, or any downturn event that may necessitate the closure of the quarry, it is important that the quarry areas is rehabilitated appropriately to ensure safety avoid land degradation to the environment, hence a need for a closure plan.

A closure plan is a detailed document that forms part of the Environmental Management Plan. This plan will be a guiding framework for the provisions of rehabilitation and for long term management and monitoring and maintenance of the quarry pit. The closure plan for this project was formulated through the consideration of closure objectives and the implementation of proposed mitigation measure for identified risks. It is recommended that the rehabilitation process must be progressive, which considers rehabilitation at depleted site as it is suitable due to following reasons;

- Reduces health and safety risk
- Reduces risk of soil erosion
- Improves top soil conservation
- Reduces an eye shore of pit

2.3.1 Closure plan

2.3.1.1 Staff awareness of the closure plan

Staff must be well inducted of the closure plan during operation and implement progressive rehabilitation.

2.3.1.2 Fencing of the area

During operation, the quarry site must be fenced off to prevent health and safety risk of public and animals.

2.3.1.3 Site Clean up

All foreign material brought during the operation must be removed. There must not be burying of waste material in the pit. All contaminated soils must be removed and disposed of to appropriate site

2.3.1.4 Trimming and Shaping of the pit

The final rehabilitation must ensure that the borrow pit does not have sharp angles of corners that may cause soil erosion. Trimming and shaping of the pit should follow industry practise as provided for by the competed authority. Provision must be made, such as cut-off drain for the permanent drainage to ensure smooth run-off (to make provision for (1:50 flood event). The cut off drain would be appropriate for this pit, where a deliberate drainage structure would be designed to collect storm water flow into the pit. This should be constructed on the side of the catchment area.

2.3.1.5 Waste material / Overburden

Overburden must be used during contouring or placed back into the pit.

2.3.1.6 Compaction of disturbed surrounding

The surrounding disturbed area from the movement of heavy vehicle must be compacted to prevent wind erosion. The compacted soil must be shallowly ripped to allow regrowth of vegetation.

2.3.1.7 Access roads

Access road that were made for this operation and no longer necessary, must be rehabilitated. The surface of these roads must be ripped to enable regrowth of vegetation.

3 CONCLUSION AND RECOMMENDATIONS

3.1 Conclusions

The scope of this project was guided by site visit information, and comprehensive literature review to determine possible environmental impacts and the possible mitigation measure to the impacts concerning this project. Red-Dune believes that, analysis based on the collected information sufficiently addresses the environment and socio-economic aspects of the project.

3.1.1.1 Impact analysis ranking

The impact on vegetation during construction was found to be sever since clearing of the surface will be indiscriminate. However, vegetation on site is found in the vast areas of the Namib desert hence the destruction impact will not be severe after mitigation. While, the animals, possible crawling animals and birds will naturally move. There are no established animal habitats such as nests.

3.1.1.2 Contribution to socio-economics

The economy of Lüderitz is expected to grow substantially due to offshore oil discoveries and green hydrogen project. This will propel development of associate service industries which will require aggregate materials for construction. Henceforth, the project will critically support Lüderitz local economy as well as the national economy. The Environmental Management Plan must be the logical framework for the project to mitigate environmental risks.

3.2 Recommendations

Red-Dune recommends to the approving authority for the approval of the project and issuance of the Environmental Clearance Certificate.