



### PROJECT DETAILS

<b>Title</b>	UPDATED ENVIRONMENTAL MANAGEMENT PLAN FOR THE EXISTING BORROW PITS USED BY FIVE SEASON ELECTRICAL APPLIANCES CC TO SOURCE SAND FOR CONSTRUCTION MATERIAL & CEMENT BRICK MAKING ACTIVITIES IN THE NKURENKURU, KAVANGO WEST REGION AREA.		
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**CONTENTS PAGE**

<b>ABBREVIATIONS</b> .....	<b>III</b>
<b>1 INTRODUCTION</b> .....	<b>1</b>
1.1 OVERALL OBJECTIVES OF THE EMP .....	3
1.2 CONSULTATIONS BETWEEN FIVE SEASON ELECTRICAL APPLIANCES CC AND THE UKWANGALI TRADITIONAL AUTHORITY .....	4
1.3 STAKEHOLDER MANAGEMENT AND MITIGATION .....	5
<b>2 ROLES AND RESPONSIBILITIES</b> .....	<b>6</b>
2.1 PROPONENT'S REPRESENTATIVE .....	6
2.2 ENVIRONMENTAL CONTROL OFFICER/BORROW PIT MANAGER .....	8
2.3 THE CONTRACTOR .....	8
2.4 SAND MINING AND BORROW PIT REHABILITATION .....	9
<b>3 MANAGEMENT ACTIONS</b> .....	<b>10</b>
3.1 ASSUMPTIONS AND LIMITATIONS .....	10
3.2 APPLICABLE LEGISLATION .....	11
3.3 PROJECT LOCATION AND DESCRIPTION .....	14
3.3.1 RECEIVING ENVIRONMENT .....	15
3.3.2 Topography, Geology and Hydrology .....	17
3.3.2.1 TOPOGRAPHY AND GEOLOGY .....	17
3.3.2.2 HYDROLOGY .....	18
3.3.3 Climatic Conditions (rainfall and wind) .....	18
3.3.4 Biodiversity (Flora and Fauna) .....	18
3.4 BIODIVERSITY MANAGEMENT AND MITIGATION .....	19
3.4.1 ISSUE: GENERAL PHYSICAL DISTURBANCE OF BIODIVERSITY .....	19
3.5 BORROW PIT AREAS .....	20
3.6 SAND MINING- SOIL QUANTITIES .....	20
3.7 ENVIRONMENT AND ECONOMIC ISSUES .....	21
3.8 SAND MINING PHASE .....	22
3.9 DECOMMISSIONING PHASE .....	37
<b>4 SAND MINING IMPACT MONITORING</b> .....	<b>39</b>
<b>5 CONCLUSION</b> .....	<b>40</b>
<b>6 PENALTIES</b> .....	<b>41</b>
6.1 PENALTIES FOR THE ACTIVITIES DETAILED BELOW, WILL BE IMPOSED BY THE ECO ON THE PROPONENT AND / OR HIS SUB-CONTRACTORS. ....	41

**LIST OF FIGURES**

Figure 1: Locality map of Nkurenkuru .....	15
Figure 2: Locality map of the existing sand mining borrow pit site and cement brick making factory (HEEC, 2020). ....	16
Figure 3: Distance (>1km) of the borrow pit from the Okavango river (Google Earth, 2020). ....	17

**List of Tables**

Table 1: List of triggered activities identified in the EIA Regulations which apply to the proposed project .....	2
Table 2: Legal provisions relevant to these activities .....	11
Table 3: Sand Mining Phase Management Actions .....	22
Table 4: Decommissioning phase management actions .....	38

**ABBREVIATIONS**

AIDS	Acquired Immuno-Deficiency Syndrome
PR	Proponent's Representative
EA	Environmental Assessment
ECC	Environmental Clearance Certificate
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
EMP	Environmental Management Plan
GG	Government Gazette
GIS	Geographic Information System
GN	Government Notice
GPS	Global Positioning System
HIV	Human Immuno-deficiency Virus
I&APs	Interested and Affected Parties
NTC	Nkurenkuru Town Council
NHC	National Heritage Council
Reg.	Regulation
S	Section
TB	Tuberculosis

## 1 INTRODUCTION

This document constitutes the Environmental Management Plan (EMP) for an existing borrow pit. The borrow pit is used by the Five Season Electrical Appliances CC to source construction materials for a brick project (mainly), operating within the townlands.

Five Season Electrical Appliances CC already had an Environmental Clearance for sand mining from the same borrow pit, which has since expired and they here apply for renewal to ensure compliance to the Environmental Management Act of 2007 and EIA regulations of 2012.

To that effect, Five Season Electrical Appliances CC (Five Season Electrical Appliances CC) enlisted the services of Tortoise Environmental Consultants (TEC) to develop an Environmental Management Plan (EMP) as part of the application for the renewal of the Environmental Clearance Certificate (ECC).

The contents of this EMP will be binding on all parties with defined roles and obligations in the sand mining activities as stipulated in all sections including the attached Memorandum Of Understanding (MOU) between the engaging parties.

Five Season Electrical Appliances CC, hereinafter referred to as the proponent intends to carry out the following activities:

- **Update the Environmental Management Plan (EMP) for the existing borrow pits used by Five Season Electrical Appliances CC to source sand for construction material and cement brick making activities in the Nkurenkuru, Kavango West Region area.**

The aim of the EMP is to ensure that the sand mining by Five Season Electrical Appliances CC is conducted in accordance with the provisions of the Namibian Environmental Management Act (No. 7 of 2007) and EIA regulations of 2012 (GN: 30). The EMP provides a guideline for sand mining and recommends rehabilitation measures on how the activity should be undertaken to ensure compliance against the recommended mitigation measures to avert any possible negative impacts. The EMP also provides a monitoring framework against the recommended mitigation and rehabilitation measures.

The above is a listed activity in terms of the Environmental Management Act (No. 7 of 2007) and Environmental Impact Assessment Regulations (Government Notice No. 30 of 2012).

In terms of the Environmental Management Act (No. 7 of 2007) and Environmental Impact Assessment Regulations (Government Notice No. 30 of 2012), the following listed activities in **Table 1** were triggered by the proposed project:

**Table 1:** List of triggered activities identified in the EIA Regulations that apply to the project

<b>Activity description and No(s):</b>	<b>Description of relevant Activity</b>	<b>The portion of the development as per the project description that relates to the applicable listed activity</b>
Activity 3.1 (Mining and Quarrying Activities)	The construction of facilities for any process or activities which requires a licence, right or other form of authorisation, and the renewal of a licence, right or other form of authorisation, in terms of the Minerals (Prospecting and Mining Act), 1992.	The project includes the harvesting of sand for cement brick making & construction purposes.
Activity 3.2 (Mining and Quarrying Activities)	Other forms of mining or extraction of any natural resources whether regulated by law or not.	The project entails the extraction of sand for cement brick making & construction purposes.
Activity 3.3 (Mining and Quarrying Activities)	Resource extraction, manipulation, conservation and related activities.	The project entails the extraction of sand for cement brick making & construction purposes.

An Environmental Management Plan (EMP) is one of the most important outputs of the EA/scoping process as it synthesises all of the proposed mitigation and monitoring actions, set to a timeline and with specific assigned responsibilities. The EMP is a living document and maybe considered inconclusive. This implies that, in-addition to the information contained herein, any other relevant information gained during the actual sand mining activities, internal monitoring or auditing by MET can be added to the EMP (evolution of activities), and such changes or inclusions will be binding to Five Season Electrical Appliances CC and all contractors / sub-contractors. This EMP details the mitigation and monitoring actions to be implemented during the following phases of these developments:

- Sand Mining Phase – the period during which the proponent, having dealt with the necessary legislative and administrative arrangements, appoints a contractor to engage in the harvesting of sand from the project site to be used for construction purposes;
- Borrow Pit rehabilitation – the continual period during which the topsoil from the active borrow pit will be transported to existing borrow pits that were dug prior in the Lüderitz area and use to cover them so as to match the local topography.

The rehabilitation of the active sand mine once activities have ceased and the continual rehabilitation of the existing borrow pits site is highly recommended so as to ensure that the subject area is sustainably managed and during the decommissioning phase. In-addition, the EMP does not only focus and it is not limited to the boundaries of the borrow pit, but it includes the cement brick making activities in the Nkurenkuru, Kavango West Region area and serves as the guiding tool to protecting the natural, bio-physical and socio-economic environment in the surrounding area, beyond the boundaries of the borrow pit. Because, some impacts (e.g. dust, noise, fumes, smell, wastewater, solid waste etc.) are not confined to the borrow pit boundaries; when the event occurs then some recommendations have been outlined in **Table** .

### 1.1 OVERALL OBJECTIVES OF THE EMP

The following overall environmental objectives have been set for the Five Season Electrical Appliances CC sand mining & cement brick making activities project in the Nkurenkuru, Kavango West Region area:

- To act in accordance with national legislation and standards for the protection of the environment.
- To limit potential impacts on biodiversity through the minimisation of the footprint (as far as practically possible) and the conservation of residual habitat within the mining area.

- To keep surrounding communities informed of sand mining activities through the implementation of community meetings and constructive dialogue.
- To ensure the legal and appropriate management and disposal of general and hazardous waste (fuel), through the implementation of a strategy for the minimisation, recycling, management, temporary storage and removal of waste.
- To develop, implement and manage monitoring systems to ensure good environmental performance in respect of the following: waste, air quality, noise, biodiversity and rehabilitation.

### **1.2 Consultations between Five Season Electrical Appliances CC and the Ukwangali Traditional Authority**

The EIA regulations stipulate that, for new projects, all interested and/or affected parties (I&AP's) should be informed of the proposed activity as part of the EIA Scoping and Public Participation Process (PPP). However, for existing activities, only an EMP is required and the PPP process is not mandatory. However, since the borrow site falls within the jurisdiction of the Ukwangali Traditional Authority, it is important that the land custodians are fully consulted during the development of the EMP and application for the renewal of the Environmental Clearance Certificate (ECC). Therefore, Five Season Electrical Appliances CC consulted the Ukwangali Traditional Authority's Office in Nkurenkuru in order to establish a Memorandum of Understanding (MoU) regarding the proposed continuation of the Five Season Electrical Appliances CC to extract materials from the existing borrow pit (Appendix A). The consent letter certifies that:

- Ukwangali Traditional Authority was consulted about the project,
- Ukwangali Traditional Authority assessed the existing borrow site together with the Five Season Electrical Appliances CC.
- Pegged the recommended borrow site area together with the Five Season Electrical Appliances CC
- Will ensure that Five Season Electrical Appliances CC adheres to the rehabilitation measures recommended in the EMP.

### 1.3 STAKEHOLDER MANAGEMENT AND MITIGATION

It is important that channels of communication are maintained over the project life cycle for surrounding community, the general public members, as well as the Nkurenkuru local authorities, Table 2 shows the stakeholders communication Management and Mitigation Plan.

**Table 2:** Actions relating to stakeholder communication

<b>Issue</b>	<b>Management commitment</b>	<b>Phase</b>
<b>Understanding who the stakeholders are</b>	Maintain and update, key stakeholders' needs and expectations. Ensure that all relevant stakeholder groups are incorporated.	<b>All</b>
	A representative database would include line ministries, employees, service providers, contractors, indigenous populations, local communities & traditional authorities, NGOs, shareholders, community-based organizations, suppliers and the media.	<b>All</b>
	Ensure that vulnerable groups are also considered in the stakeholder communication process.	<b>All</b>
	Record partnerships as well as their roles, responsibilities, capacity and contribution toward the development.	<b>All</b>
<b>Liaising with interested and affected parties at all phases in the mine life</b>	Devise and implement a stakeholder communication and engagement strategy.	<b>All</b>
<b>Responsibility</b>	Five Season Electrical Appliances CC's Management and Environmental Control Officer (ECO)	



## **2 ROLES AND RESPONSIBILITIES**

The proponent (Five Season Electrical Appliances CC) is ultimately responsible for the implementation of the EMP, from the sand mining phase, surrounding existing borrow pits. The proponent will delegate this responsibility as the project progresses through its life cycle. The delegated responsibility for the effective implementation of this EMP will rest on the following key individuals:

- Proponent's Representative;
- Environmental Control Officer/Borrow Pit Manager; and
- Contractor (Five Season Electrical Appliances CC).

### **2.1 PROPONENT'S REPRESENTATIVE**

Five Season Electrical Appliances CC, the proponent, should assign the responsibility of managing all aspects of this project for all development phases (including all contracts for work outsourced) to a designated member of staff, referred to in this EMP as the Proponent's Representative (PR). Therefore, Five Season Electrical Appliances CC should ensure that each and every team (its own staff, contractor / subcontractor) to be engaged in the sand mining activity should be given a copy of the EMP and an induction should be conducted with the each team before deployment and commencement of sand mining activities at the borrow pit.

Each team leader should have a copy of the EMP available at all times and should be able to furnish the EMP to MET or any other law enforcement official during the environmental audit or any other random inspection.

The proponent may decide to assign this role to one person for the full duration of these developments, or may assign a different PR to each of the project phases – i.e. one for the sand mining, one for the borrow pit rehabilitation phase. The PR's responsibilities are as follows:

Responsibility	Project Phase
Making sure that the necessary approvals and permissions laid out in <b>Table 3</b> are obtained/adhered to	Throughout the lifecycle of this project
Suspending/evicting individuals and/or equipment not complying with the EMP	<ul style="list-style-type: none"><li>• Sand Mining</li><li>• Borrow pit rehabilitation</li></ul>
Issuing fines for contravening EMP provisions	<ul style="list-style-type: none"><li>• Sand Mining</li><li>• Borrow pit rehabilitation</li></ul>

## **2.2 ENVIRONMENTAL CONTROL OFFICER/BORROW PIT MANAGER**

The PR should assign the responsibility of overseeing the implementation of the whole EMP on the ground during the on-going sand mining; borrow pit rehabilitation and Earth dam construction phases to a designated member of staff, referred to in this EMP as the Environmental Control Officer (ECO) or Borrow pit manager. The PR/Five Season Electrical Appliances CC may decide to assign this role to one person for all the activities, or may assign a different ECO for each activity. The ECO will have the following responsibilities during the sand mining and associated operational and maintenance phases of these projects:

- Management and facilitation of communication between the Proponent, PR, the contractors, and Interested and Affected Parties (I&APs) with regard to this EMP;
- Conducting regular inspections (recommended minimum frequency is once every six months) with respect to the implementation of this EMP (monitor and audit the implementation of the EMP);
- Assisting the Contractor in finding solutions with respect to matters pertaining to the implementation of this EMP;
- Advising the PR on the removal of person(s) and/or equipment not complying with the provisions of this EMP;
- Making recommendations to the PR with respect to the issuing of fines for contraventions of the EMP; and
- Undertaking an annual review of the EMP and recommending additions and/or changes to this document.

## **2.3 The Contractor**

The following are the specific responsibilities of Contractor to oversee the borrow pit operations:

- Appoint a Borrow pit Manager to oversee the daily onsite activities.
- Liaise closely with the Borrow pit Manager and ECO on any environmental management issues, incidents or emergencies.
- Ensure that the works on-site are conducted in an environmentally sensitive manner and in accordance with the requirements of the EMP at all times. Special care shall be taken to prevent irreversible damage to the environment.
- Where reasonably applicable, Five Season Electrical Appliances CC shall set up the borrow pit site in accordance with the layout of the Site Map, and must ensure all work

areas and stockpiles are located within the area as demarcated by the pegs; and in a manner that complies with the requirements of this EMP.

- Ensure that all staff remain within the boundaries of the borrow pit site, and that all works remain within the sand mining parameters as specified Site Map.
- Ensure that all site staff are adequately informed of the requirements of the EMP pertaining to their site role, and that they have attended an environmental induction session (this session must be in the form of an on-site talk and/or a written code of conduct that is clearly explained to and understood by the team).
- Ensure that any subcontractors or visitors to the site are conversant with the EMP or relevant sections of the EMP pertaining to their role on-site.
- Ensure that the site is rehabilitated in accordance within the requirements of this EMP.

#### **2.4 SAND MINING AND BORROW PIT REHABILITATION**

A contractor, in this case being the proponent, conducts the sand mining and borrow-pit rehabilitation activities at Lüderitz and is therefore automatically responsible for implementing all provisions contained within the relevant chapters of this EMP and also will be responsible for the implementation of this EMP applicable to any work outsourced to subcontractors. **Table 4** applies to contractors appointed during the sand mining phase. In order to ensure effective environmental management the aforementioned chapters should be included in the applicable contracts for outsourced work relating to the intended activities.

The tables in the following chapter (**Chapter 3**) detail the management measures associated with the roles and responsibilities that have been laid out in this chapter.

### 3 MANAGEMENT ACTIONS

The aim of the management actions in this chapter of the EMP is to avoid potential impacts where possible. Where impacts cannot be avoided, measures are provided to reduce the significance of these impacts.

The following tables provide the management actions recommended to manage the potential impacts rated in the scoping-level EA conducted for these activities. These management actions have been organised temporally according to project phase:

- Applicable legislation (**Table 3**);
- Sand Mining & borrow pit rehabilitation Management Actions (**Table 5**);
- Decommissioning phase management actions (**Table 6**).

The responsible persons from the proponents' team have assessed these commitments in detail and have committed to the specific management actions where indicated in the tables below.

#### 3.1 ASSUMPTIONS AND LIMITATIONS

This EMP has been drafted based on the scoping-level Environmental Assessment (EA) conducted for the operation and management of the sand mining activities; continual borrow pit rehabilitation at the end of the project lifecycle activities as represented in Figure 2. HEEC will not be held responsible for the potential consequences that may result from any alterations to the agreed course of action in terms of the intended activities in the Lüderitz area.

It is assumed that labourers will be sourced mostly from the Nkurenkuru Townlands area and that migrant labourers (if applicable) will be housed within established accommodation facilities in the townlands.

### 3.2 APPLICABLE LEGISLATION

There are multiple legal instruments that regulate and have a bearing on good environmental management in Namibia. Table 3 below provides a summary of the legal instruments considered to be relevant to the on-going sand mining and borrow pit rehabilitation activities and the environmental assessment process.

**Table 3: Legal provisions relevant to these activities**

LEGISLATION/POLICIES	RELEVANT PROVISIONS	RELEVANCE TO PROJECT
The Constitution of the Republic of Namibia as Amended	<p>Article 91 (c) provides for duty to guard against “the degradation and destruction of ecosystems and failure to protect the beauty and character of Namibia.”</p> <p>Article 95(l) deals with the “maintenance of ecosystems, essential ecological processes and biological diversity” and sustainable use of the country’s natural resources.</p>	Sustainable development should be at the forefront of management of the on-going activities.
Environmental Management Act No. 7 of 2007 (EMA)	<p>Section 2 outlines the objective of the Act and the means to achieve that.</p> <p>Section 3 details the principles of Environmental Management</p>	The management of this project must be informed by the EMA.
EIA Regulations GN 28, 29, and 30 of EMA (2012)	<p>GN 29 Identifies and lists certain activities that cannot be undertaken without an environmental clearance certificate.</p> <p>GN 30 provides the regulations governing the environmental assessment (EA) process.</p>	<p><b>Activity 3.1 (Mining and Quarrying Activities)</b> The construction of facilities for any process or activities which requires a licence, right or other form of authorisation, and the renewal of a licence, right or other form of authorisation, in terms of the Minerals (Prospecting and Mining Act), 1992.</p> <p><b>Activity 3.2 (Mining and Quarrying Activities)</b> Other forms of mining or extraction of any natural resources whether regulated by law or not.</p> <p><b>Activity 3.3 (Mining and Quarrying Activities)</b> Resource extraction,</p>

LEGISLATION/POLICIES	RELEVANT PROVISIONS	RELEVANCE TO PROJECT
		manipulation, conservation and related activities.
Convention on Biological Diversity (1992)	Article 1 lists the conservation of biological diversity amongst the objectives of the convention.	The on-going sand mining; borrow pit rehabilitation and Earth dam construction activities should consider the impact it will have on the biodiversity of the area.
Draft Procedures and Guidelines for conducting EIAs and compiling EMPs (2008)	Part 1, Stage 8 of the guidelines states that if a proposal is likely to affect people, certain guidelines should be considered by the proponent in the scoping process.	The EA process should incorporate the aspects outlined in the guidelines.
Namibia Vision 2030	Vision 2030 states that the solitude, silence and natural beauty that many areas in Namibia provide are becoming sought after commodities and must be regarded as valuable natural assets.	Care should be taken that the sand mining activities do not lead to the degradation of the natural beauty of the Lüderitz area.
Water Act No. 54 of 1956	Section 23(1) deals with the prohibition of pollution of underground and surface water bodies.	The pollution of water resources should be avoided during sand mining & cement brick activities.
The Ministry of Environment and Tourism (MET) Policy on HIV & AIDS	MET has recently developed a policy on HIV and AIDS. In addition it has also initiated a programme aimed at mainstreaming HIV and gender issues into environmental impact assessments.	The proponent and its contractor have to adhere to the guidelines provided to manage the aspects of HIV/AIDS. Experience with similar projects has shown that a significant health risk is created when migrant construction workers/labourers interact with local communities.
Local Authorities Act No. 23 of 1992	The Local Authorities Act prescribes the manner in which a town or municipality should be managed by the Town or Municipal Council. Sections 34-47 make provision for the aspects of water and sewerage.	Sand mining activities have to comply with provisions of the Local Authorities Act.
Labour Act No. 11 of 2007	Chapter 2 details the fundamental rights and protections. Chapter 3 deals with the basic conditions of employment.	Given the employment opportunities presented by the sand mining & cement brick making activities, compliance with the law is essential.

LEGISLATION/POLICIES	RELEVANT PROVISIONS	RELEVANCE TO PROJECT
Public and Environmental Health Act of 2015	This Act (GG 5740) provides a framework for a structured uniform public and environmental health system in Namibia. It covers notification, prevention and control of diseases and sexually-transmitted infections; maternal, ante-natal and neo-natal care; water and food supplies; infant nutrition; waste management; health nuisances; public and environmental health planning and reporting. It repeals the Public Health Act 36 of 1919 (SA GG 979).	Sand mining & cement brick making activities are to comply with these legal requirements.
Nature Conservation Ordinance No. 4 of 1975	Chapter 6 provides for legislation regarding the protection of indigenous plants.	Indigenous and protected plants have to be managed within the legal confines.
Environmental Assessment Policy of Namibia (1995)	The Policy seeks to ensure that the environmental consequences of development projects and policies are considered, understood and incorporated into the planning process, and that the term ENVIRONMENT is broadly interpreted to include biophysical, social, economic, cultural, historical and political components.	This EIA considers this term of Environment.
Minerals (Prospecting and Mining) Act, 1992 (Act 33 1 of 1992)	To provide for the reconnaissance, prospecting and mining for, and disposal of, and the exercise of control over, minerals in Namibia; and to provide for matters incidental thereto. "mineral" means any substance, whether in solid, liquid or gaseous form, occurring naturally in, on or under any land and having been formed by, or subjected to, a	The intended activity involves the mining of sand for construction purposes & cement brick making.



LEGISLATION/POLICIES	RELEVANT PROVISIONS	RELEVANCE TO PROJECT
	geological process, excluding -(c) subject to the provisions of subsection (2), soil, sand, clay, gravel or stone (other than rock material specified in Part 2 of Schedule 1) if they are bona fide required for purposes of – (i) agriculture, building works, fencing or road making; (ii) the manufacture of bricks and tiles;	
Soil Conservation Act 6 of 1969 Ministry of Agriculture, Water and Forestry	This Act covers the prevention and combating of soil erosion; the conservation, improvement and manner of use of the soil and vegetation; and the protection of water sources	Soils should not be polluted or left un-rehabilitated.

### 3.3 PROJECT LOCATION AND DESCRIPTION

Nkurenkuru is strategically located alongside the Kavango River linking the Kavango West region with Kavango East, Ohangwena and Oshikoto regions, as depicted in the locality map below. This is essential and economically viable since the other raw materials needed for cement brick making such as cement from Ohorongo cement near Otavi; quarry stones from Henning Crushers in Tsumeb are in reasonable proximity.

The existing borrow pit from which Five Season Electrical Appliances CC has been sourcing construction material from the borrow pit in context for the past 8 years (dating back to 2012) falls under the jurisdiction of the Uukwangali Traditional Authority and is located on the outskirts approximately 12 km outside of the town of Nkurenkuru in close proximity to Kahenge, in the Kavango West region, Namibia. The proponent is in possession of a lease agreement with the Uukwangali Traditional Authority enabling them to harvest the sand from the allocated portion. Five Season Electrical Appliances CC are therefore applying to resume operations in the area (**Appendix A**). Therefore, the approval of this application can ensure the continued sustainable management of the sand mining site.





**Figure 2:** Locality map of the existing sand mining borrow pit site and cement brick making factory (HEEC, 2020).

The sand is harvested from a site located approximately 12 km outside of the town of Nkurenkuru in close proximity to Kahenge depicted in Figure 2 above.

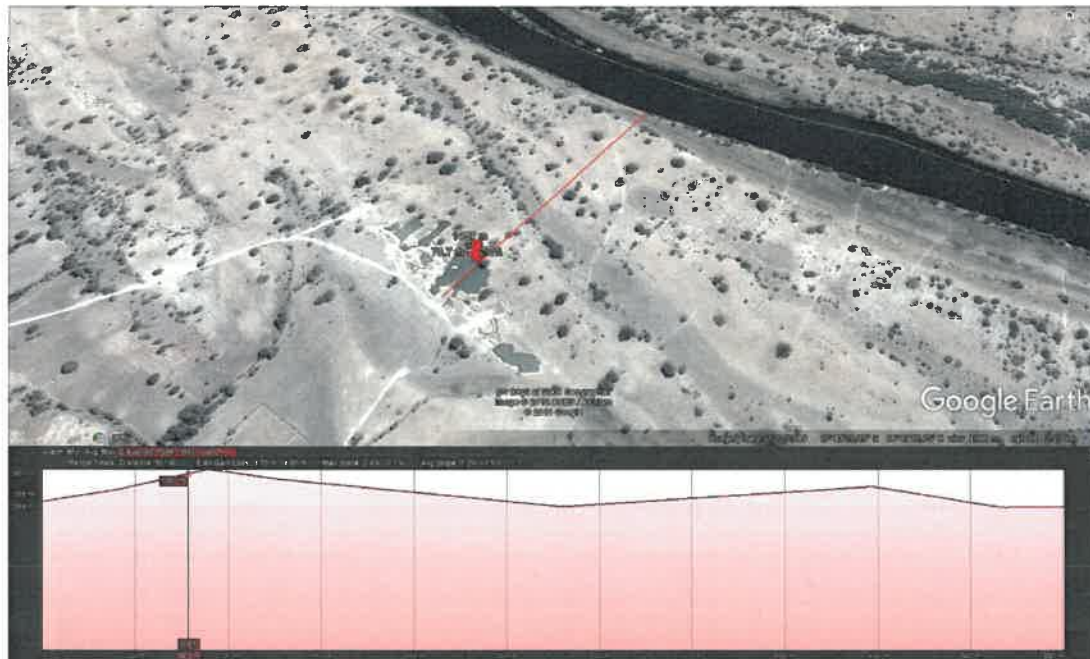


Figure 3: Distance (>1km) of the borrow pit from the Okavango river (Google Earth, 2020).

### 3.3.2 Topography, Geology and Hydrology

#### 3.3.2.1 Topography and Geology

The topography of the Kavango Region is noticeably flat and is mostly made up of swamps, floodplains, wetlands and woodlands. The main hydrological feature of the Kavango Region is the Okavango River. The Cuito River, a tributary, joins the Kavango River from Angola at Dirico, so flow volumes are greater downstream of this point. Apart from this difference, hydrological features of the upstream section are similar, but not identical, to the aforementioned description. One important difference is the timing of flooding and the contribution of each tributary.

Surface soils across the Kavango Region, like in Caprivi, are completely dominated by sand. At deeper levels of more than one metre are layers of clays, conglomerates, sands, silts and calcretes that originate from wetter climates in the geological past.

Small scale variations in soil type occur, with areas close to the Okavango River containing fine sediments (silt, clay and fine sands) deposited during floods, and other sporadically-distributed areas rich in calcium carbonate. The more clayey soils are slightly more fertile than sands, and they are mostly cultivated. However, all soils in the Kavango generally have low fertility (Mendelsohn & el Obeid 2006).

### 3.3.2.2 Hydrology

The major surface water feature in the Nkurenkuru Township is the Kavango River. This river receives roughly all of its water from catchment areas in Angola (*Stubenrauch Planning Consultants, 2011*). Namibia contributes almost no water to the Kavango River, despite the fact that it travels for roughly 415 km within the country (Obeid & Mendelsohn, 2001). This limited input is due to a number of factors.

The Okavango River experiences its highest water from January to May, with the peak in April, in response to summer rain falling in the upstream catchment and making its way downstream. Water in the Cuito is delayed by a longer period and peaks in about May (Mendelsohn & Obeid 2003).

Very little water is extracted from the river on the Namibian side due to the limited water reticulation infrastructure. The majority of the water extracted is utilized by the Namibia Development Corporation (NDC) and government farms, mainly downstream of Rundu, and to supply the town of Rundu itself (Obeid & Mendelsohn, 2001). Limited water is extracted for use in the Nkurenkuru Township (*Stubenrauch Planning Consultants, 2011*).

### 3.3.3 Climatic Conditions (rainfall and wind)

The climate in Nkurenkuru is referred to as a local steppe climate. There is little rainfall throughout the year. The temperature here averages 23.0 °C. The average annual rainfall is 588 mm. The least amount of rainfall occurs in June. Rainfall occurs mostly in the summer months from November to March, with the highest rainfall experienced in the month of January.

### 3.3.4 Biodiversity (Flora and Fauna)

#### 3.3.4.1 Flora

Kalahari woodlands are widespread in the Kavango Region and in places where there are dunes, woodlands alternate with thin strips of grassland representing the lowest levels of the inter-dune valleys (Mendelsohn & Obeid 2003). The Kalahari woodlands are variable from place to place in their species composition and community structure, some places being quite open, others densely wooded with tall trees and little under-storey, others having mostly medium-sized trees and lots of undergrowth.

These variations are small-scale and not significant to the environmental assessment. The dominant trees that occur in this woodland (not in order of predominance) are kiat (*Pterocarpus angolensis*), teak (*Baikiaea plurijuga*), syringa (*Burkea africana*), silver terminalia (*Terminalia sericea*), mangetti (*Schinziophyton rautanenii*), false mopane

(*Guibourtiacolesperma*), camelthorn (*Acacia erioloba*), marula (*Sclerocaryabirrea*), and weeping wattle (*Peltophorum africanum*). In places there are small stands of makalani palms (*Hyphaenepetersiana*).

Typical trees found mostly on site are Large Kiat (*Pterocarpus angolensis*) which is mostly found in Kavango woodlands and camelthorn (*Acacia erioloba*). Grass grows between trees and shrubs in the woodlands, and certain types of tall strong grasses (mainly *Eragrostis pallens*) are harvested for thatching. Omiramba support good grazing fodder for livestock, particularly the lawn grass *Cynodondactylon*.

Swamps and floodplains alongside the Okavango River host reeds, sedges and grasses depending on their degree of saturation and how frequently they are inundated. Reeds growing in areas that are regularly (annually) flooded and on the margins of permanent water are an important resource used by local people (Mendelsohn & el Obeid, 2003).

#### 3.3.4.2 Fauna

Due to the clearing of much of the natural vegetation along the Okavango River, most of the wildlife that used to occur along the Okavango River has now disappeared. The bulk of the remaining wildlife is now concentrated in the Mahango Game Reserve, Caprivi Game Park and Khaudum Game Park. Mahango Game Reserve now has the highest concentration of large mammals in Namibia as well as the greatest bird diversity in the country (Mendelsohn & el Obeid, 2006).

### 3.4 BIODIVERSITY MANAGEMENT AND MITIGATION

#### 3.4.1 ISSUE: GENERAL PHYSICAL DISTURBANCE OF BIODIVERSITY

The EMP covers the following broad topics: physical destruction of biodiversity and related functions, impacts on environment as an ecological driver, and general disturbances to biodiversity.

**Table 4:** Physical disruption of biodiversity - link to phase and activities

Issue	Management commitment	Phase
Physical disruption to biodiversity by Staff	Undertake a relocation and plant storage before the start of any clearing if there is any endangered/protected plant species found on site. Prepare the base camp and ablution facilities at already disturbed areas. The Principle of zero tolerance to killing and collecting of biodiversity i.e. no poaching (including collection of firewood) will be allowed and poaching offenders will be prosecuted. Remove and store topsoil for later rehabilitation of vegetation	All

Issue	Management commitment	Phase
	Forbid off-road driving during hauling operations Restrict the movement of the vehicles on demarcated track only Prohibit illegal fishing Do not allow domestic animals such as cat and dogs in the area of sand mining. Enforce a speed limit of 60km/hr. All species with a conservation and or protection status should be identified, clearly marked and preserved (by at least 50%)	
		Sand mining
Physical disruption to biodiversity infrastructures	Barricade the areas of operations to ensure that animals have no access to sand mining areas.	All
	Upon completing sand mining activities, initiate restoration program including areas that were only impacted during topsoil stock piling activities.	Operation, decommissioning and closure
Emergency	Certain instances of injury to animals may be considered emergency situations. These will be managed in accordance with the Five Season Electrical Appliances CC emergency response procedure. Conduct a safety induction program to all the employees before commencing duties.	All
Responsibility	Five Season Electrical Appliances CC Management and Environmental Control Officer (ECO)	

### 3.5 Borrow pit areas

The existing borrow pit measures 1 000m X 140 m as prescribed in the consent letter attached (Appendix A).

### 3.6 Sand mining- soil quantities

At present, the existing borrow pit covers an area of approximately 6.02 hectares with an average depth of 1.5 meters. It is estimated that the Five Season Electrical Appliances CC has been extracting about 4 x 15 m<sup>3</sup> / day. The table below presents the estimated projections of material to be extracted by the Five Season Electrical Appliances CC from the borrow pit.

**Table 5: Estimated sand mining quantities from the borrow pit since 2012**

Year	Estimated volumes to be sourced	Escavated depth
2012 – 2019	4 x 15 m <sup>3</sup> / day	1.8 m – 2.5

**Table 6: Future sand mining Projections from the borrow pit**

Year	Estimated volumes to be	Recommended
	sourced	depth (Maximum)
2019 – 2022	4 x 15 m <sup>3</sup> / day	2.0 m

As part of mitigation, it is relatively easier to rehabilitate a shallower borrow pit, than a deeper one. In other words, rehabilitation of the borrow pit becomes more difficult with increasing depth. As presented in Table 6, it is therefore recommended that the depth of the borrow pit **should not exceed 2 meters**, to aid natural rehabilitation through sand deposits by wind, which is prevalent in Nkurenkuru and surrounding areas.

The boundary demarcation with visible markings is very important for monitoring, as it enables the Environmental Compliance Officer (ECO) to monitor if the contractor has been operating within the approved site or not.

It also enables monitoring of environmental (particularly, biodiversity) impacts within the borrow pit operational area as compared to the surrounding area outside the operational area, which acts as a control.

### 3.7 Environment and Economic Issues

Namibia's economy is highly dependent on a healthy environment. Sand mining is the removal of sand from their natural configuration. Mining of sand is essential to the construction sector of the country, due to the fact that it is one of the essential raw materials needed for cement brick making. However, the sand mining activities whether at a large or small scale is inherently disruptive to the environment. Environmental problems occur when the rate of extraction of sand exceeds the rate at which natural processes generate these materials. It is thus necessary to ensure that rehabilitation of the borrow pits occur soon after the sand mining activities cease so as to restore the environment to its natural state.

Balancing the demands of economic development (such as sand mining or mining in general) with the demands of maintaining biological diversity can be a challenge. Therefore, it is of utmost importance that the environment and development sectors should work together and identify synergies in order to ensure that natural resources are harvested in an acceptable and sustainable manner.

Development takes place on land (in the environment) and hence the quest for economic development requires a trade-off with certain parts of the environment in-order for the development to be realized. Meaning, for development to take place, some part of the environment will be affected. Therefore, it is of utmost importance that such impacts are mitigated as guided by the EMP. The following tables prescribe the management actions to be taken at each phase of the sand mining activities.



### 3.8 SAND MINING PHASE

The PR should ensure that the management actions detailed in **Table 8** below should be adhered to during the operation of the sand mining activities and should be undertaken together with the mitigation measures in **Table 4**.

**Table 8: Sand Mining Phase Management Actions**

Aspect	Management Actions
Environmental Incidents	<ul style="list-style-type: none"> <li>• The ECO on site shall maintain a register of all environmental incidents occurring as a result of the activities associated with the project. Environmental incidents that shall be recorded include (but are not limited to):               <ul style="list-style-type: none"> <li>➤ Fires;</li> <li>➤ Drowning;</li> <li>➤ Accidents (e.g. traffic);</li> <li>➤ Spills of hazardous materials, contaminating soil or water resources;</li> <li>➤ Non-compliances with applicable legislation; and</li> <li>➤ Non-compliances with this EMP.</li> </ul> </li> <li>• Environmental incident reports shall include (as a minimum) a description of the incident, the actions taken to contain any damage to the environment, personnel, or the public, and the actions taken to repair / remediate any such damage.</li> <li>• Additional measures shall be prescribed that may be required to remediate damage resulting from the incident and / or to prevent similar incidents occurring in the future.</li> </ul>

Aspect	Management Actions
Traffic	<ul style="list-style-type: none"> <li>• Ensure that road junctions have good sightlines.</li> <li>• Limit the type of vehicle (heavy trucks) allowed on site.</li> <li>• Adhere to the speed limit. If permissible, caution signs and 40 km/hr signs shall be placed at regulation distance from heavy vehicle crossing signs at the intersections of the access tracks and the main B4 road to Lüderitz.</li> <li>• Designate no-drive zones.</li> <li>• Implement traffic control measures where necessary by keeping a number plate register of all vehicles harvesting sand at the site and restricting access to authorised contractors.</li> </ul>
Borrow pits/Sand mining area	<ul style="list-style-type: none"> <li>• Sand should be sourced from a borrow pit with a valid ECC.</li> <li>• The mining area must be clearly demarcated by means of a perimeter stock-proof fence with a lockable gated entrance.</li> <li>• Sand mining and resultant operations shall only take place within this demarcated area.</li> <li>• A detailed photographic record of the demarcated areas, prior to any mining activities, shall be taken. These records are to be kept by the Proponent and PR for reference purposes during the rehabilitation of the site.</li> <li>• There will be '<b>No unauthorised access</b>' signs at the borrow pit gates until the earth dam is open for public use.</li> </ul>

Aspect	Management Actions
	<ul style="list-style-type: none"> <li>• Excess material may also be spoiled in open borrow pits around the Lüderitz Townlands as part of the rehabilitation process.</li> </ul>
EMP training	<p>All workers at the site are to undergo EMP training that should include as a minimum the following:</p> <ul style="list-style-type: none"> <li>• Explanation of the importance of complying with the EMP.</li> <li>• Discussion of the potential environmental impacts of the intended sand mining and earth dam construction activities.</li> <li>• Employees' roles and responsibilities, including emergency preparedness and response requirements.</li> <li>• Explanation of the mitigation measures that must be implemented when particular work groups carry out their respective activities.</li> <li>• The potential consequences of departure from specified operating procedures; and rewards for enhancing mitigation measures or avoiding negative environmental effects.</li> </ul>
Fauna and Flora	<ul style="list-style-type: none"> <li>• Prevent the destruction of protected tree species.</li> <li>• Encourage the regrowth and regeneration of trees with exposed roots at the site.</li> <li>• The excavation of the sand should incorporate existing trees<sup>1</sup>.</li> </ul>

<sup>1</sup>a "tree" is defined as an indigenous woody perennial plant with a trunk diameter  $\geq 150$  mm

Aspect	Management Actions
	<ul style="list-style-type: none"> <li>• The Contractor should compile a Tree Management Plan which should include the following as a minimum: <ul style="list-style-type: none"> <li>○ Trees if not already accounted for in an existing Geographic Information System (GIS), should be surveyed, co-ordinates/location incorporated into the Contractor's GIS, marked with paint (or other means so as to be readily visible) and protected;</li> <li>○ Trees, which are impossible to conserve, need to be identified and their location recorded on a map;</li> <li>○ The Contractor should apply to the traditional authority for a permit to remove these trees.</li> <li>○ A list should be compiled of all trees to be removed detailing the location of the tree, the species as well as which trees will be planted to replace these. The nursery where these trees will be sourced from should also be included;</li> <li>○ Each tree that is removed needs to be replaced with an indigenous tree species;</li> <li>○ Some of these trees can be obtained at the nearest Rundu forestry office. Assistance can be sought from this forestry office regarding nearby nurseries where additional trees may be bought.</li> </ul> </li> <li>• Only a limited width +/- 5 m on the side of the access roads may be partially cleared of vegetation.</li> <li>• Workers are prohibited from collecting wood or other plant products on or near the site.</li> </ul>

Aspect	Management Actions
	<ul style="list-style-type: none"> <li>• No alien species may be planted on or within the existing site.</li> <li>• Prevent contractors from collecting wood and veld food such as amphibians, migrating birds, etc. during the sand mining phase.</li> <li>• Prevent contractors from fishing in the sea or catching aquatic species without valid fishing permits.</li> </ul>
Lay-down areas and materials camp	<p>Suitable locations for the contractors lay-down areas and materials camp should be identified with the assistance of the PR and the following should be considered in selecting these sites:</p> <ul style="list-style-type: none"> <li>• The areas designated for the services infrastructure should be used as far as possible.</li> <li>• Second option should be degraded land.</li> <li>• Avoid sensitive areas (e.g. wetlands/rivers/drainage lines)</li> </ul>
Hazardous waste	<ul style="list-style-type: none"> <li>• All heavy-duty vehicles and equipment on site should be provided with a drip tray.</li> <li>• All heavy-duty delivery vehicles should be maintained regularly to prevent oil leakages.</li> <li>• Maintenance and washing of vehicles should take place only at a designated workshop area.</li> <li>• Spilled cement and/or concrete (wet or dry) should be treated as hazardous waste and disposed of by the end of each day in the appropriate hazardous waste containers.</li> </ul>

Aspect	Management Actions
	<ul style="list-style-type: none"> <li>All hazardous substances (e.g. fuel etc.) or chemicals should be stored in a specific location on an impermeable surface that is bunded - with a volume of 120 % of the largest single storage container or 25 % of the total storage containers, whichever is greater.</li> </ul>
Surface and Ground Water Impacts	<ul style="list-style-type: none"> <li>It is recommended that sand harvesting takes place outside of the rainy season in order to limit erosion &amp; flooding on site and surface water pollution.</li> <li>No dumping of waste products of any kind in or in close proximity to surface water bodies.</li> <li>Heavy duty vehicles should be kept out of any surface water bodies and the movement of vehicles should be limited where possible to the existing access roads and tracks.</li> <li>Contaminated runoff from the sites should be prevented from entering the surface water bodies.</li> <li>Workers should be given ablution facilities at the sites that are located at least <b>30 m</b> away from any surface water and regularly serviced.</li> <li>Washing of personnel or any equipment should not be allowed on site.</li> </ul>
Topsoil	<ul style="list-style-type: none"> <li>When excavations are carried out, topsoil<sup>2</sup> should be stockpiled in a demarcated area and used in profiling and rehabilitating of the open borrow pits in the surrounding areas in Lüderitz.</li> </ul>

<sup>2</sup> Topsoil is defined here as the top 150mm of surface material, which accounts for the seedbank.

Aspect	Management Actions
	<ul style="list-style-type: none"> <li>• Stockpiled topsoil should be used to rehabilitate post-harvesting degraded areas and/or other nearby degraded areas within the Lüderitz townlands.</li> </ul>
Soil Erosion	<ul style="list-style-type: none"> <li>• Clear the vegetation of the project area in phases during the sand mining period in order to keep the soil more compacted as well as to limit overall disturbance to the area over time.</li> <li>• It is recommended that most sand harvesting takes place outside of the rainy season in order to limit potential flooding and the run off of loose soil causing further erosion.</li> <li>• Appropriate erosion control structures must be put in place where soil may be prone to erosion.</li> <li>• Checks must be carried out at regular intervals to identify areas within the site where erosion is occurring. Appropriate remedial actions are to be undertaken wherever erosion is evident.</li> </ul>
Rehabilitation	<ul style="list-style-type: none"> <li>• Upon completion of the sand mining phase consultations should be held with the local community/property owner(s) regarding the post-sand mining use of remaining excavated areas (if applicable) and to identify priority areas.</li> <li>• Sand at the site should be levelled so it can be reclaimed for other purposes once the sand mining has ceased and rather than leaving the borrow pit open which will pose a threat to people and animals in the area.</li> </ul>

Aspect	Management Actions
	<ul style="list-style-type: none"> <li>• In the event that no post-operation uses are requested, all excavated/degraded areas need to be rehabilitated as follows:               <ul style="list-style-type: none"> <li>○ Excavated areas may only be backfilled with clean or inert fill. No material of hazardous nature (e.g. sand removed with an oil spill) may be dumped as backfill.</li> <li>○ Rehabilitated excavated areas need to match the contours of the existing landscape.</li> <li>○ The rehabilitated area should not be higher (or lower) than nearby drainage channels. This ensures the efficiency of revegetation and reduces the chances of potential erosion.</li> <li>○ Topsoil is to be spread across excavated areas evenly.</li> <li>○ Deep ripping of areas to be rehabilitated is required, not just simple scarification, so as to enable rip lines to hold water after heavy rainfall.</li> <li>○ Ripping should be done along slopes, not up and down a slope, which could lead to enhanced erosion.</li> </ul> </li> </ul>
HIV/AIDS and TB awareness	<ul style="list-style-type: none"> <li>• The Contractor should approach the Ministry of Health and Social Services to co-opt a health officer to facilitate HIV/AIDS and TB education programmes periodically on site during the project operation.</li> <li>• A wellness program should be initiated to raise awareness on health issues, especially the impact of sexually transmitted diseases.</li> </ul>



Aspect	Management Actions
	<ul style="list-style-type: none"> <li>• Provide free condoms in the workplace and to local community throughout project operation.</li> <li>• Facilitate access to Antiretroviral medication</li> <li>• Personnel should not overnight at the sand mining site, but only the security personnel.</li> </ul>
Road safety	<ul style="list-style-type: none"> <li>• Demarcate roads clearly.</li> <li>• Off-road driving should not be allowed.</li> <li>• All vehicles that transport materials to and from the site must be roadworthy.</li> <li>• Drivers that transport materials should have a valid driver's license and should adhere to all traffic rules.</li> <li>• Loads upon vehicles should be properly secured to avoid items falling off the vehicle.</li> <li>• Limit and control the number of access points to the site.</li> <li>• The road leading to the sand harvesting site should be properly maintained so as to reduce dust emissions when heavy vehicles travel on them.</li> <li>• Consideration should be given to possibly tar the road leading to the sand harvesting site which could reduce dust emissions onsite.</li> </ul>
Safety around work sites	<ul style="list-style-type: none"> <li>• Excavations should be left open for the shortest time possible.</li> </ul>

Aspect	Management Actions
	<ul style="list-style-type: none"> <li>• Excavate short lengths of trenches and box areas for services or foundations in a manner that will not leave the trench unattended for more than 24 hours.</li> <li>• Demarcate excavated areas and topsoil stockpiles with danger tape.</li> <li>• Provide additional warning signage in areas of movement and in “no personnel” areas where workers are not active.</li> <li>• Borrow pits are to be fenced-off with stock-proof perimeter fencing.</li> <li>• Work areas must be set out and isolated with danger tape on a daily basis.</li> <li>• All materials and equipment are to be stored only within set out and demarcated work areas.</li> <li>• Only sand mining personnel will be allowed within these work areas.</li> <li>• 2 fire extinguishers should be available at fuel storage areas.</li> <li>• Comply with all waste related management actions stated above in this table.</li> </ul>
Ablutions	<ul style="list-style-type: none"> <li>• Separate toilets should be available for men and women and should clearly be indicated as such.</li> <li>• Portable toilets (i.e. easily transportable) should be available at every construction site: <ul style="list-style-type: none"> <li>○ 1 toilet for every 15 females.</li> <li>○ 1 toilet for every 30 males.</li> </ul> </li> </ul>

Aspect	Management Actions
	<ul style="list-style-type: none"> <li>○ Sewage needs to be removed on a regular basis to an approved (municipal) sewage disposal site. Alternatively, sewage may be pumped into sealable containers and stored until it can be removed.</li> <li>○ Workers responsible for cleaning the toilets should be provided with latex gloves and masks.</li> </ul>
Open fires	No open fires may be made anywhere on site.
General health and safety	<ul style="list-style-type: none"> <li>● A fully stocked first aid kit should permanently be available on-site as well as an adequately trained member of staff capable of administering first aid.</li> <li>● All workers should have access to the relevant personal protective equipment.</li> <li>● Sufficient potable water reserves should be available to workers at all times.</li> <li>● No person should be allowed to smoke close to fuel storage facilities or portable toilets (if toilets are chemical toilets – the chemicals are flammable).</li> <li>● No workers should be allowed to drink alcohol during work hours.</li> <li>● No workers should be allowed on site if under the influence of alcohol.</li> </ul>
Dust	<ul style="list-style-type: none"> <li>● A watering truck should be used on gravel roads with the most heavy vehicle movement especially during dry and windy conditions. However, due consideration should be given to water restrictions during times of drought.</li> </ul>

Aspect	Management Actions
	<ul style="list-style-type: none"> <li>• The use of waterless dust suppression means (e.g. lignosulphonate products such as Dustex) should be considered.</li> <li>• Cover any stockpiles with plastic to minimise windblown dust.</li> <li>• Dust protection masks should be provided to workers if they complain about dust.</li> <li>• During high wind conditions the contractor must make the decision to cease works until the wind has calmed down.</li> </ul>
Noise	<p>Work hours should be restricted to between <b>08h00 and 17h00</b> where excavation involving the use of heavy equipment, power tools and the movement of heavy vehicles is less than 500 m from residential areas. If an exception to this provision is required, all residents and business owners within the <b>500 m</b> radius should be given 1 week's written notice.</p>
Recruitment of labourers	<p>The Contractor should compile a formal recruitment process including the following provisions as a minimum:</p> <ul style="list-style-type: none"> <li>• Adhere to the legal provisions in the Labour Act No. 11 of 2007 for the recruitment of labour (target percentages for gender balance, optimal use of local labour and SME's, etc.).</li> <li>• Recruitment should not take place at the sand mining site.</li> <li>• Ensure that all sub-contractors are aware of recommended recruitment procedures and discourage any recruitment of labour outside these agreed upon procedures.</li> </ul>

Aspect	Management Actions
	<ul style="list-style-type: none"> <li>• All contractors should give preference in terms of recruitment of sub-contractors and individual labourers to those who are qualified and from the project area and only then look to surrounding towns.</li> <li>• Clearly explain to all job-seekers the terms and conditions of their respective employment contracts (e.g. period of employment etc.) – make use of interpreters where necessary.</li> </ul>
Communication plan	<p>The Contractor or PR should draft a Communication Plan, which should outline as a minimum the following:</p> <ul style="list-style-type: none"> <li>• How Interested and Affected Parties (I&amp;APs), who require on-going communication for the duration of the operation period, will be identified and recorded and who will manage and update these records;</li> <li>• How these I&amp;APs will be consulted on an on-going basis;</li> <li>• Make provision for grievance mechanisms – i.e. how concerns can be lodged/ recorded and how feedback will be delivered as well as further steps of arbitration in the event that feedback is deemed unsatisfactory.</li> </ul>
General communication	<ul style="list-style-type: none"> <li>• The PR must appoint an ECO to liaise between the Contractor, I&amp;APs and Five Season Electrical Appliances CC management.</li> <li>• The Contractor shall at every bi-monthly site meeting report on the status of the implementation of all provisions of the EMP.</li> </ul>

Aspect	Management Actions
	<ul style="list-style-type: none"> <li>• The Contractor should implement the EMP awareness training as stipulated above in this table.</li> <li>• The Contractor must list the I&amp;APs of the project and their contact details with whom on-going communication would be required for the duration of the contract. This list, together with the Communication Plan must be agreed upon and given to the PR before operation commences/resumes.</li> <li>• The Communication Plan, once agreed upon by the Developer, shall be legally binding.</li> <li>• A copy of the EMP must be available at the site office and should be accessible to all I&amp;APs.</li> <li>• Key representatives from the above mentioned list need to be invited to attend monthly site meetings to raise any concerns and issues regarding progress to rehabilitate the excavated areas and surrounding borrow pits.</li> <li>• The Contractor should liaise with the proponent regarding all issues related to community consultation and negotiation before operation commences/resumes.</li> <li>• A procedure should be put in place to ensure that concerns raised have been followed-up and addressed.</li> </ul>

Aspect	Management Actions
	<ul style="list-style-type: none"> <li>• All people on the I&amp;APs list should be informed about the availability of the complaints register and associated grievance mechanisms in writing by the PR prior to the commencement of site activities.</li> </ul>
Archaeology	<ul style="list-style-type: none"> <li>• Should a heritage site or archaeological site be uncovered or discovered during the sand harvesting or earth dam construction phase of the project, a “chance find” procedure should be applied in the order they appear below: <ul style="list-style-type: none"> <li>○ If operating machinery or equipment stop work;</li> <li>○ Demarcate the site with danger tape;</li> <li>○ Determine GPS position if possible;</li> <li>○ Report findings to the site foreman;</li> <li>○ Report findings, site location and actions taken to superintendent;</li> <li>○ Cease any works in immediate vicinity;</li> <li>○ Visit find site and determine whether work can proceed without damage to findings;</li> <li>○ Determine and demarcate exclusion boundary;</li> <li>○ Site location and details to be added to a Geographic Information System (GIS) for field confirmation by archaeologist;</li> <li>○ Inspect site and confirm addition to sand mining site GIS;</li> <li>○ Advise the National Heritage Council (NHC) and request written permission to remove findings from work area; and</li> </ul> </li> </ul>

Aspect	Management Actions
	<ul style="list-style-type: none"> <li>○ Recovery, packaging and labelling of findings for transfer to National Museum.</li> <li>● Should human remains be found, the following actions will be required: <ul style="list-style-type: none"> <li>○ Apply the chance find procedure as described above;</li> <li>○ Schedule a field inspection with an archaeologist to confirm that remains are human;</li> <li>○ Advise and liaise with the NHC and Police; and</li> <li>○ Remains will be recovered and removed either to the National Museum or the National Forensic Laboratory.</li> </ul> </li> </ul>

### 3.9 DECOMMISSIONING PHASE

The decommissioning of the sand mining site is envisaged in the near future so as to use this land parcel for alternative uses as deemed suitable when the event occurs and some recommendations have been outlined in **Table 9** below.



**Table 9: Decommissioning phase management actions**

<b>Environmental Feature</b>	<b>Management Actions</b>
Deconstruction activity	Many of the mitigation measures prescribed for the sand mining activities ( <b>Error! Reference source not found.</b> above) would be applicable to some of the decommissioning activities. These should be adhered to where applicable.
Rehabilitation	In the event that decommissioning is deemed necessary, excavations need to be rehabilitated according to the management actions laid out in <b>Table 8</b> above.

#### 4 SAND MINING IMPACT MONITORING

Once an Environmental Clearance has been issued, the proponent should set up a sand mining monitoring points, as per the following guideline:

- a) Set up sand mining Monitoring Points (MP's)
- b) Preferably, a minimum of 4 MP's points (1 in each corner of the borrow pit),
- c) Mark / peg all each MP with visible marking (e.g. metal rod / pole),
- d) Take GPS coordinates for each MP
- e) Take pictures of the borrow pit, at ninety degrees (90°) from each MP towards the borrow pit, *before the commencement* of the sand mining activities
- f) Repeat point (e) at *mid-term (half-way)* through the sand mining project,
- g) Repeat point (e) at *the end* (when sand mining at the particular point has been completed
- h) Keep the photo records and Print all pictures taken from e – g for monitoring purposes.
- i) The photo records will enable all stakeholders (ECO, MET, Contractor etc) to the overall impacts of sand mining. This information will be crucial for the review and renewal of the EC license after three (3) years.

The following must be kept in mind when planning with rehabilitation in mind:

- The Five Season Electrical Appliances CC management should restore the area to the photographic images of its undisturbed state once the sand mining project is completed.
- Take into account that the same material that end up as the final surface cover be the same as previously there.
- How will the landform fit into the natural landscape?
- The shape and contours and colours of the refilling material should be natural and blend in to the best resemblance of the original scenery making sure that the new land form will not have undesirable attributes such as steep slopes thereby making it prone to erosion.
- The soil and plant materials removed must be stored at an onsite nursery and used for rehabilitation as a first approach while the seeding method is a second option to ensure a fool proof approach in approaching the restoration efforts.

In order to undertake rehabilitation the following should be considered:

- Remove all temporary infrastructures and waste;
- Clean up all solid waste pollution including litter, rubble and separate all recyclables;
- Restore the habitat so that plants can re-colonise it;
- If topsoil and plant onsite nursery storage proves feasible this can also be spread on the topsoil on disturbed areas;
- Replant areas with the original *Salsola nollothensis* plant species in the area since it might take a long time to recover without assistance.

Common problems during rehabilitation that require certain interventions are:

- Compacted soil;
- Unsuitable physical and chemical condition of the soil (for instance salts that have been brought up from deep in the ground during excavation).

## 5 CONCLUSION

The EMP has identified and recommended measures to be adopted by Five Season Electrical Appliances CC to manage the sand mining activities as well as measures to ensure that the borrow pit is rehabilitated. In-addition, the EMP prescribes site closure measures that are considered both legally compliant and environmentally acceptable.

The borrow pit has been used by Five Season Electrical Appliances CC since 2012 (about 8 years) and it remains an important source of construction material for mainly brick production. Five Season Electrical Appliances CC would like to conform the Environmental Management Act of 2007 and EIA regulations of 2012 and hereby commits itself to abide to the recommended mitigation and rehabilitation measures as prescribed in this Environmental Management Plan (EMP).

Five Season Electrical Appliances CC further acknowledges that the borrow pit falls under the jurisdiction of the Uukwangali Traditional Authority and is located on the outskirts approximately 12 km outside of the town of Nkurenkuru in close proximity to Kahenge, in the Kavango West region, Namibia. The proponent is in possession of a lease agreement with the Ukwangali Traditional Authority enabling them to harvest the sand from the allocated portion. (Appendix A).

It is recommended that an Environmental Control Officer monitors the preparation, operational, rehabilitation and closure of the borrow pit in-order to ensure that the mitigation and rehabilitation measures prescribed in the EMP are adhered to.

## 6 PENALTIES

### 6.1 Penalties for the activities detailed below, will be imposed by the ECO on the Proponent and / or his Sub-Contractors.

a)	Any employees, vehicles, or things related to the Contractor's operations operating outside the designated boundaries or a "no-go" area.	N\$ 5,000
b)	Persistent and un-repaired oil leaks from machinery.	N\$ 2,000
c)	Persistent failure to monitor and empty drip trays timeously.	N\$ 2,000
d)	The use of inappropriate methods for refuelling, resulting in spillages.	N\$ 2,000
e)	Deliberate lighting of illegal fires on site.	N\$ 2,000
f)	Employees not making use of the site ablution facilities.	N\$ 2,000
g)	Unauthorised removal of vegetation.	N\$ 10,000
h)	Hunting, trapping and collection of animals (per unit taken).	N\$ 20,000
i)	Failure to implement specified noise controls.	N\$ 2,000
j)	A spillage, pollution, fire or any damage to the environment resulting from negligence on the part of the Proponent.	N\$ 25,000
k)	Damage to vegetation or ground arising from equipment leaving designated haul or access routes.	N\$ 25,000
<b>Responsibility</b>		Five Season Electrical Appliances CC Management and Environmental Control Officer (ECO)

For each subsequent similar offence the penalty shall be doubled in value to a maximum value of **N\$ 50,000.00**. The ECO shall be the judge as to what constitutes a transgression in terms of this clause.

**APPENDIX B- PHOTO PLATE OF THE CURRENT SITUATION AT THE EXISTING BORROW PITS & CEMENT BRICK FACTORY.**



















