APP-003082

SUPERSAND MINING OPERATIONS IN THE FISH RIVER, MARIENTAL

UPDATED ENVIRONMENTAL MANAGEMENT PLAN

Compiled by:

Compiled for:

October 2021

Project:	**SUPERSAND MINING OPERATIONS IN THE FISH RIVER, MARIENTAL: UPDATED ENVIRONMENTAL MANAGEMENT PLAN**	
Report: Version/Date:	Final October 2021	
Prepared for: (Proponent)	Kachas Industrial T/A Supersand P O Box 265 Mariental	
Lead Consultant	Geo Pollution Technologies (Pty) Ltd PO Box 11073 Windhoek Namibia	TEL.: (+264-61) 257411 FAX.: (+264) 88626368
Main Project Team:	**André Faul** (B.Sc. Zoology/Biochemistry); (B.Sc. (Hons) Zoology); (M.Sc. (For) Conservation Ecology); (Ph.D. Medical Biosciences) **Quzette Bosman** (BA. Geography/Sociology); (BA Environmental Management)	
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Report Approval	**André Faul** Conservation Ecologist	

I GJ vd Merwe acting as the Supersand representative, hereby confirm that the information contained in this report is a true reflection of the information which the proponent has provided to Geo Pollution Technologies. All material information in the possession of the proponent that reasonably has, or may have the potential of influencing any decision or the objectivity of this report, is fairly represented in this report.

Signed at Mariental on the 30 day of November 2021.

Supersand

T63/2000
Registration Number

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1 BACKGROUND AND INTRODUCTION

Geo Pollution Technologies (Pty) Ltd was appointed by Kachas Industrial T/A Supersand, to apply for renewal of their existing environmental clearance certificate (ECC) for their sand mining operations which entails the removal of sand from the Fish River at Mariental, Hardap Region (Figure 1-1). To renew the ECC, an updated environmental management plan (EMP) (this document) was prepared for continued operations. Operations mainly involve removal of sand deposits which co-incidentally also contributes to the flood risk in Mariental. This is done by means of earth moving equipment loading sand onto trucks which transport the material to a nearby off-site storage location.

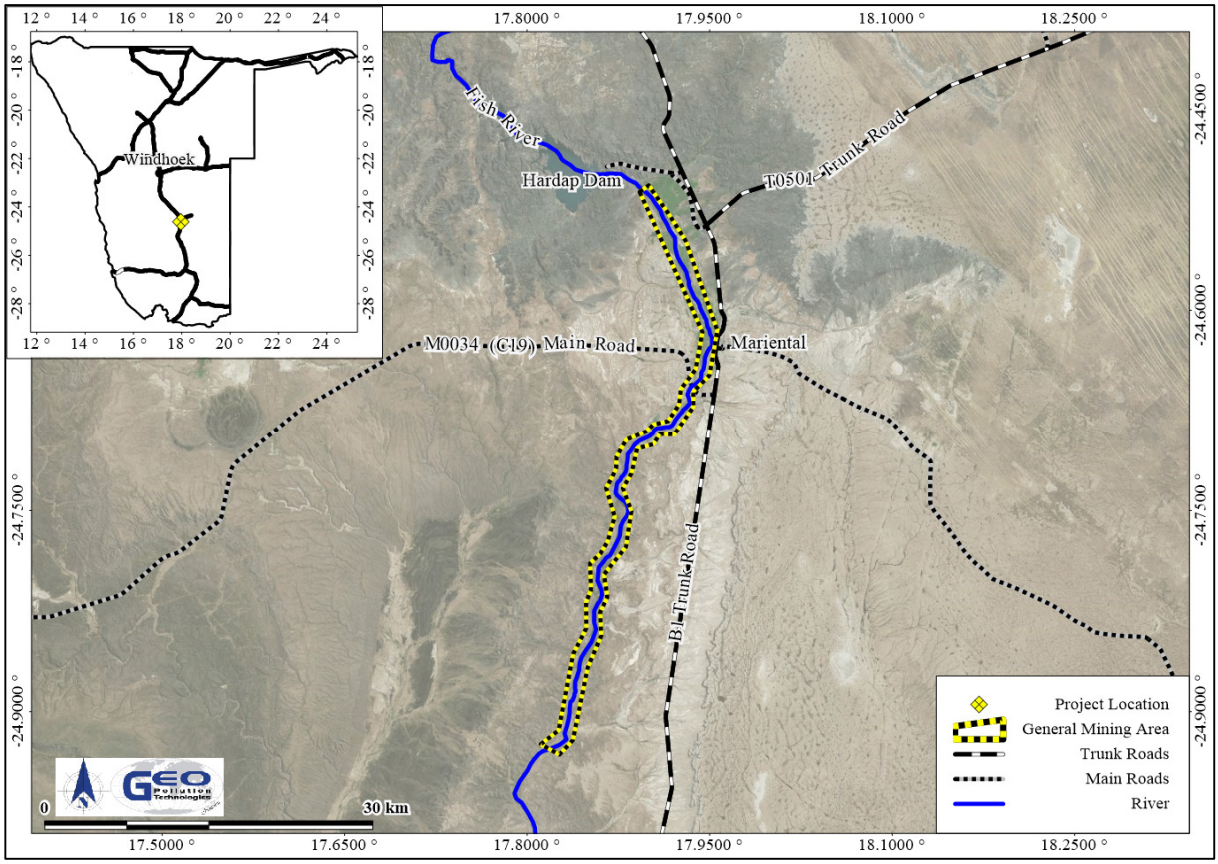

Figure 1-1. Project location

A brief risk assessment was undertaken to determine and update the potential impacts of the operational, maintenance (repairs, upgrades, replacements, etc.) and possible decommissioning phases of the operations on the environment. The environment being defined in the Environmental Management Act as "land, water and air; all organic and inorganic matter and living organisms as well as biological diversity; the interacting natural systems that include components referred to in sub-paragraphs, the human environment insofar as it represents archaeological, aesthetic, cultural, historic, economic, paleontological or social values".

Project Justification – Mariental is located along the B1 National Road (hereafter referred to as B1), the main route between Windhoek and the southern parts of Namibia and the Northern Cape Province of South Africa. It is a settlement far removed from any industrial hub such as Windhoek and Walvis Bay. Provision of the essential raw materials required in the brick making proses, the sand, is costly to transport over extended distances. Therefore, to reasonably sustain the brick making and construction activities in the area, Supersand have been mining sand from the Fish River and transporting it to the nearby brickfield. The sediments in the Fish River contains significantly less clay minerals, compared to the other smaller riverbeds in the area. This makes the Fish River sediments the best construction material near Mariental.

In addition to the resource provision for the construction industry, operations further assist in the cumulative and community effort to reduce the flood risk of the river along Mariental. Removal of the

sand islands in the river have long been recognised as one of the key strategies in deepening and straightening the river channel. Removal of the key, identified sand resources cumulatively assist in the river channel management. Additional benefits and spinoffs of the operations include the list below.

Potential direct benefits:

- Reliable and secure supply of sand for the local and regional construction industry,
- Maintaining employment of the current employees.

Potential indirect benefits:

- Economic growth and development of Mariental and the Hardap Region,
- Increased economic resilience of direct employees,
- Sustaining of employment of secondary industries (brick making and construction).

2 SCOPE

The scope of this assessment is to:

- Determine the potential environmental impacts emanating from the operational, maintenance and possible decommissioning activities of sand mining operations,
- Identify a range of management actions which could mitigate the potential adverse impacts to acceptable levels,
- Comply with the requirements of EMA,
- Provide sufficient information to the relevant competent authority and Ministry of Environment, Forestry and Tourism (MEFT) to make an informed decision regarding the operations, maintenance and possible decommissioning.

3 METHODOLOGY

The following methods were used to investigate the potential impacts on the social and natural environment due to the construction and operations of the facility:

1. Baseline information about the site and its surroundings was obtained from existing secondary information and the previous environmental assessment and EMP conducted for operations.
2. Potential environmental impacts emanating from the operations and decommissioning of operations were determined and possible enhancement measures were listed for positive impacts while mitigation / preventative measures were provided for negative impacts.
3. An updated environmental management plan was prepared to be submitted to the MEFT.

4 PROJECT DESCRIPTION

Sand mining activities, as being conducted by Supersand, entails the loading of sand with a front-end loader onto 10 ton tipper trucks which transport the sand to an area next to the Fish River. From this point the sand is loaded onto 30 ton trucks which transport the sand to a nearby brickfield (in Mariental) where it is used in the brick manufacturing industry. There is no infrastructure on site, except for an onsite portable (temporary) ablution facility which is provided for the operators of the front-end loaders. All vehicles are fuelled and maintained off-site. General waste produced is transported from the site daily and all vehicles are removed from the site when not in use.

Transportation of the sand is along existing haulage roads which are maintained by the Proponent. These roads further undergo dust abatement conducted by the client as and when required. All vehicles are kept in a roadworthy condition and all loads are covered when the product is moved on national roads, if and when required.

5 ADMINISTRATIVE, LEGAL AND POLICY REQUIREMENTS

To protect the environment and achieve sustainable development, all projects, plans, programmes and policies deemed to have adverse impacts on the environment require an environmental assessment, as per the Namibian legislation. The legislation and standards provided in Table 5-1 to **Error! Reference source not found.** govern the environmental assessment process in Namibia and / or are relevant to the facility.

Table 5-1. Namibian law applicable to the sand mining operations

Law	Key Aspects
The Namibian Constitution	Promote the welfare of people Incorporates a high level of environmental protection Incorporates international agreements as part of Namibian law
Environmental Management Act Act No. 7 of 2007, Government Notice No. 232 of 2007	Defines the environment Promote sustainable management of the environment and the use of natural resources Provide a process of assessment and control of activities with possible significant effects on the environment
Environmental Management Act Regulations Government Notice No. 28-30 of 2012	Commencement of the Environmental Management Act List activities that requires an environmental clearance certificate Provide Environmental Impact Assessment Regulations
The Water Act Act No. 54 of 1956	Remains in force until the new Water Resources Management Act comes into force Defines the interests of the state in protecting water resources Controls water abstraction and the disposal of effluent Numerous amendments
Water Resources Management Act Act No. 11 of 2013	Provide for management, protection, development, use and conservation of water resources Prevention of water pollution and assignment of liability Not in force yet
Local Authorities Act Act No. 23 of 1992, Government Notice No. 116 of 1992	Define the powers, duties and functions of local authority councils Regulates discharges into sewers
Public Health Act Act No. 36 of 1919	Provides for the protection of health of all people
Public and Environmental Health Act Act No. 1 of 2015, Government Notice No. 86 of 2015	Provides a framework for a structured more uniform public and environmental health system, and for incidental matters Deals with Integrated Waste Management including waste collection disposal and recycling; waste generation and storage; and sanitation
Labour Act Act No 11 of 2007, Government Notice No. 236 of 2007	Provides for Labour Law and the protection and safety of employees Labour Act, 1992: Regulations relating to the health and safety of employees at work (Government Notice No. 156 of 1997)
Atmospheric Pollution Prevention Ordinance Ordinance No. 11 of 1976	Governs the control of noxious or offensive gases Prohibits scheduled process without a registration certificate in a controlled area Requires best practical means for preventing or reducing the escape into the atmosphere of noxious or offensive gases produced by the scheduled process

Law	Key Aspects
Hazardous Substances Ordinance Ordinance No. 14 of 1974	Applies to the manufacture, sale, use, disposal and dumping of hazardous substances as well as their import and export Aims to prevent hazardous substances from causing injury, ill-health or the death of human beings
Pollution Control and Waste Management Bill (draft document)	Not in force yet Provides for prevention and control of pollution and waste Provides for procedures to be followed for licence applications

Table 5-2. Relevant multilateral environmental agreements for Namibia and the development

Agreement	Key Aspects
Stockholm Declaration on the Human Environment, Stockholm 1972.	Recognizes the need for a common outlook and common principles to inspire and guide the people of the world in the preservation and enhancement of the human environment.
1985 Vienna Convention for the Protection of the Ozone Layer	Aims to protect human health and the environment against adverse effects from modification of the Ozone Layer are considered. Adopted to regulate levels of greenhouse gas concentration in the atmosphere.
United Nations Framework Convention on Climate Change (UNFCCC)	The Convention recognises that developing countries should be accorded appropriate assistance to enable them to fulfil the terms of the Convention.
Convention on Biological Diversity, Rio de Janeiro, 1992	Under article 14 of The Convention, EIAs must be conducted for projects that may negatively affect biological diversity.

Sand mining is listed as an activity requiring an environmental clearance certificate as per the following points from Section 3 of Government Notice No. 29 of 2012:

Mining and Quarrying Activities

- 3.1 "The construction of facilities for any process or activities which requires a license, right or other form of authorisation, and the renewal of a license, right or other form of authorisation, in terms of the Minerals (Prospecting and Mining) Act, 1992". The Ministry of Agriculture, Water and Land Reform has provided permission for the sand extraction.
- 3.2 "Other forms of mining or extraction of any natural resource whether regulated by law or not." Sand is considered as a natural resource.
- 3.3 "Resource extraction, manipulation, conservation or related activities" Sand will be extracted / mined.

6 OBJECTIVES OF THE EMP

The Environmental Management Plan (EMP) provides management options to ensure impacts of the sand mining operations are minimised. An EMP is a tool used to take pro-active action by addressing potential problems before they occur. This should limit the corrective measures needed, although additional mitigation measures might be included if necessary. The EMP acts as a stand-alone document, which can be used during the various phases (operational and decommissioning) of the sand mine. All employees, contractors and sub-contractors taking part in the operational phases should be made aware of the contents of the EMP, so as to plan the relevant activities accordingly in an environmentally sound manner.

The objectives of the EMP are:

- to include all components of the sand mining operations;

- to prescribe the best practicable control methods to lessen the environmental impacts associated with the operations of the sand mine;
- to monitor and audit the performance of operational personnel in applying such controls; and
- to ensure that appropriate environmental training is provided to all operational personnel.

The Proponent could implement an Environmental Management System (EMS) similar to for example ISO 14001. An EMS is an internationally recognized and certified management system that will ensure ongoing incorporation of environmental constraints. At the heart of an ISO 14001 EMS is the concept of continual improvement of environmental performance with resulting increases in operational efficiency, financial savings and reduction in environmental, health and safety risks. An effective EMS would need to include the following elements:

- A stated environmental policy which sets the desired level of environmental performance;
- An environmental legal register;
- An institutional structure which sets out the responsibility, authority, lines of communication and resources needed to implement the EMS;
- Identification of environmental, safety and health training needs;
- An environmental program(s) stipulating environmental objectives and targets to be met, and work instructions and controls to be applied in order to achieve compliance with the environmental policy; and
- Periodic (internal and external) audits and reviews of environmental performance and the effectiveness of the EMS.

7 ASSESSMENT AND MANAGEMENT OF IMPACTS

The purpose of this section is to assess and identify the most pertinent environmental impacts that are expected from the operational, construction (upgrades, maintenance) and potential decommissioning activities of the sand mining operations. An environmental management plan based on these identified impacts is incorporated into this section.

For each impact an environmental classification was determined based on an adapted version of the Rapid Impact Assessment Method (Pastakia, 1998). Impacts are assessed according to the following categories: Importance of condition (A1); Magnitude of Change (A2); Permanence (B1); Reversibility (B2); and Cumulative Nature (B3) (see **Error! Reference source not found.**)

Ranking formulas are then calculated as follow:

Environmental Classification = A1 x A2 x (B1 + B2 + B3)

The environmental classification of impacts is provided in Table 7-2.

The probability ranking refers to the probability that a specific impact will happen following a risk event. These can be improbable (low likelihood); probable (distinct possibility); highly probable (most likely); and definite (impact will occur regardless of prevention measures).

Table 7-1. Assessment criteria

Criteria	Score
Importance of condition (A1) – assessed against the spatial boundaries of human interest it will affect	
Importance to national/international interest	4
Important to regional/national interest	3
Important to areas immediately outside the local condition	2
Important only to the local condition	1
No importance	0
Magnitude of change/effect (A2) – measure of scale in terms of benefit / disbenefit of an impact or condition	
Major positive benefit	3
Significant improvement in status quo	2

Improvement in status quo	1
No change in status quo	0
Negative change in status quo	-1
Significant negative disbenefit or change	-2
Major disbenefit or change	-3
Permanence (B1) – defines whether the condition is permanent or temporary	
No change/Not applicable	1
Temporary	2
Permanent	3
Reversibility (B2) – defines whether the condition can be changed and is a measure of the control over the condition	
No change/Not applicable	1
Reversible	2
Irreversible	3
Cumulative (B3) – reflects whether the effect will be a single direct impact or will include cumulative impacts over time, or synergistic effect with other conditions. It is a means of judging the sustainability of the condition – not to be confused with the permanence criterion.	
Light or No Cumulative Character/Not applicable	1
Moderate Cumulative Character	2
Strong Cumulative Character	3

Table 7-2. Environmental classification (Pastakia 1998)

Environmental Classification	Class Value	Description of Class
72 to 108	5	Extremely positive impact
36 to 71	4	Significantly positive impact
19 to 35	3	Moderately positive impact
10 to 18	2	Less positive impact
1 to 9	1	Reduced positive impact
0	-0	No alteration
-1 to -9	-1	Reduced negative impact
-10 to -18	-2	Less negative impact
-19 to -35	-3	Moderately negative impact
-36 to -71	-4	Significantly negative impact
-72 to -108	-5	Extremely Negative Impact

7.1 Risk Assessment and Environmental Management Plan

Various potential and definite impacts will emanate from the construction and operational phases. The majority of these impacts can be mitigated. The impacts, risk rating of impacts as well as prevention and mitigation measures are listed below.

7.2 Planning Phase

Although operations are ongoing, extraction of future resource areas are still being planned and therefore the planning phase is still applicable. However, the impacts expected as being generated during the planning phase (which is inclusive of the acquiring of the ECC) relate mostly to legal, planning and economic aspects.

During the phases of planning for future operations, construction and decommissioning of the sand mine, it is the responsibility of the Proponent to ensure they are and remain compliant with all legal requirements. The Proponent must also ensure that all required management measures are in place prior to and during all phases, to ensure potential impacts and risks are minimised. The following

actions are recommended for the planning phase and should continue during various other phases of the project:

- Ensure that all necessary permits from the various ministries, local authorities and any other bodies that governs the construction (maintenance) activities and operations of the project remains valid.
- Ensure all appointed contractors and employees enter into an agreement which includes the EMP. Ensure that the contents of the EMP are understood by the contractors, sub-contractors, employees and all personnel present or who will be present on site.
- Make provisions to have a Health, Safety and Environmental Coordinator to implement the EMP and oversee occupational health and safety as well as general environmental related compliance at the site.
- Have the following emergency plans, equipment and personnel on site where reasonable to deal with all potential emergencies:
  - Risk management / mitigation / EMP/ Emergency Response Plan and HSE Manuals
  - Adequate protection and indemnity insurance cover for incidents;
  - Comply with the provisions of all relevant safety standards;
  - Procedures, equipment and materials required for emergencies.
- If one has not already been established, establish and maintain a fund for future ecological restoration of the sand mine.
- Establish and / or maintain a reporting system to report on aspects of construction activities, operations and decommissioning as outlined in the EMP.
- Submit monitoring reports every six months to allow for future environmental clearance certificate renewal application.
- Appoint an environmental consultant to update the EMP and apply for renewal of the environmental clearance certificate prior to expiry. Bi-annual monitoring report will be required by the Ministry of Environment, Forestry and Tourism for the renewal of the ECC.

7.3 Construction and Operational Phases

The definition of construction as per the Environmental Management Act and its regulations, include care and maintenance activities. Therefore, aspects of the construction phase are foreseen to continue through the operational phase. Most of the impacts initiated in the construction have been carried forward into the operational phase. Some of these impacts have been further developed (such as potential impacts on the groundwater). Potential impacts as well as related prevention and mitigation measures are detailed in Section 7.5.

7.4 Decommissioning Phase

Decommissioning of operations not foreseen within the next 10 years. However, the Proponent should formulate a closure strategy which may be planned and provided for during the operational phase. During the decommissioning phase, operations will be scaled down as works are prepared to be closed. Once all operations have seized and the related social and labour closure considerations implemented, the Proponent may finalise rehabilitation efforts where required. As no closure plan has been drafted yet, no specific potential impacts could be identified. However, general anticipated impacts and residual impacts have been listed. Additional closure activities include the continuous monitoring of various environmental parameters. Such monitoring initiatives should be included in the closure strategy while the environmental management plan for this phase will have to be reviewed prior to the time of decommissioning, to incorporate any new legislation, requirements and environmental constraints. The aims of the decommissioning phase will only be achieved once all sand resources, which pose a flood risk, have been removed and all mining areas rehabilitated (cleared and levelled) ensuring an open and clear river channel.

7.5 Assessed Impacts

A description of anticipated impacts resulting from current and proposed activities is presented below. Impact ratings are provided for relevant phases while prevention, mitigation and monitoring requirements conclude each impact description.

7.5.1 Developing Project Feasibility and Permitting

Continual development of the project feasibility has various impacts on the social, political and economic spheres of the environment. The acquisition of various permits for the operations generates information and directs planning initiatives. Permit requirements and acquisition further requires certain activities to be performed and related capital expenditure. Therefore planning activities contribute to diversification of the revenue flow generated through the project.

Infrastructure maintenance on a local and regional scale, such as roads and railway line maintenance, may further have a potential impact on the feasibility of the project. Product movement will be hampered if infrastructure is not maintained. Continual communication with the related authorities should be maintained and included in regional planning aspects. Maintenance of the infrastructure will enable the project to continue contributing to the National Development Goals of Vision2030.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Planning	The acquisition of various permits	2	1	2	3	3	16	2	Definite
Indirect Impacts	Contribution to national planning related to service delivery infrastructure requirements and National development goals	2	1	2	3	3	16	2	Probable

Desired Outcome: To contribute to the sustainable development of natural resources through interactive planning and partnership with authorities, neighbours and related industry.

Actions

Enhancement:

- Namibian companies to assist in permit acquisition.
- Facilitate information sharing, with the public and authorities.
- Maintain communication and interaction with key parastatals and ministries such as the, Regional Council, Roads Authority, Ministry of Environment, Forestry and Tourism and the Ministry of Agriculture, Water and Land Reform.

Responsible Body:

- Proponent
- Contractors / Consultants

Data Sources and Monitoring:

- Record should be kept of all communication with neighbours or members of the community.
- Record should be kept of all communication with all authorities, parastatals and ministries.
- Record all activities related to permit acquisition.

7.5.2 Plans and Aspirations for the Future of the Affected or Surrounding Community

Sand mine planning, in terms of moving along the river channel to the various resources, should be communicated to employees, neighbours and affected parties. Similarly, any significant reduction in operations should be communicated to such parties. This will contribute to a sustainable relationship between the Proponent and the local community. Although community engagement will remain mainly on a local scale, engagement with various governmental agencies such as Ministry of Agriculture, Water and Land Reform and Mariental Town Council, will raise the level of engagement up to a regional level. When clear communication is achieved between all parties, aspirations and plans for future development may be much more defined, realistic and achievable.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
All phases	Communicating with neighbours and affected parties	1	1	2	2	2	6	1	Definite
	Communication with governmental agencies	2	1	2	2	2	12	2	Probable
Indirect Impacts	Plans and aspirations of the future of neighbours and affected parties	1	1	2	2	3	7	1	Probable

Desired Outcome: To contribute to positive and sustainable community cohesion and contribute to realistic and achievable development.

Actions

Enhancement:

- Appoint a community liaison officer who will be responsible to communicate with neighbours and affected parties.
- Communicate timeously (well in advance) to all employees, any reduction in operations or any matters relating to or affecting employment security.
- Facilitate information sharing regarding any major pollution or contamination event, with the neighbours and authorities.
- Maintain communication and interaction with key parastatals and ministries such as the Regional Council, Roads Authority, Ministry of Environment, Forestry and Tourism, Ministry of Agriculture, Water and Land Reform and Mariental Town Council.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Record should be kept of all communication with neighbours or members of the community.
- Record should be kept of all communication with all authorities, parastatals and ministries.
- Record all communication made with neighbours and affected parties regarding operational events such as blasting or operational deviations.

7.5.4 Skills, Technology and Development

During various phases of the project, training has been and will be provided to a portion of the workforce. Training is conducted to enhance efficiency within different components of sand mining and value addition activities. Skills are further transferred to the unskilled workforce for general tasks. Improvement of people and technology are key to economic development as well as operational feasibility. All employees receive emergency and evacuation plan training while the supervisors and identified employees have first-aid training.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	Technological development and transfer of skills	1	2	3	3	3	18	2	Probable
Daily Operations	Technological development and transfer of skills	1	2	3	3	3	18	2	Definite
Indirect Impacts	Enhanced employability of workforce	2	1	3	3	3	18	2	Definite

Desired Outcome: To see an increase in skills of local Namibians, as well as development and technology advancements in the industry.

Actions

Enhancement:

- If the skills exist locally, contractors must first be sourced from the town, then the region and then nationally. Deviations from this practice must be justified.
- Skills development and improvement programs to be made available as identified during performance assessments.
- Employees to be informed about parameters and requirements for references upon employment.
- The proponent must employ Namibians where possible. Deviations from this practise should be justified appropriately.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- Record should be kept of training provided.
- Ensure that all training is certified or managerial reference provided (proof provided to the employees) inclusive of training attendance, completion and implementation.

7.5.5 Change in Land Use and Earning Potential

Change in land utilisation and related economic productivity was initiated with the construction phase. The land use being conducted, has led to revenue generation and contributed to the local, regional and national economy. The earning potential of the project area has been increased. In addition, the flow of revenue was altered as there is a difference and increase in employment, purchasing of goods and use of services. The impact is foreseen to continue having a positive impact on the economic sphere of the environment.

The related economic productivity of the current land use, will reach its full potential during the operational phase while the decommissioning phase will not share in such impact. However no post-closure land use has been identified since the goal of operations is to clear sand resources from the active river channel.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	Change and increase of earning potential and flow of revenue	2	2	2	2	1	20	3	Definite
Daily Operations	Change and increase of earning potential and flow of revenue	3	2	2	2	1	30	3	Definite
Indirect Impacts	Increased economic resilience potential for state, private and industry parties	3	2	2	2	2	36	4	Probable

Desired Outcome: Contribution to local and national treasury as well as sustain a stable earning potential for employees and industry.

Actions

Enhancement:

- The proponent must employ local Namibians where possible.
- Maintain value addition activities for the life of operations where possible.
- Investigate profitable post-closure land use possibilities.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Ensure all taxes and governmental levies (where required) are paid.
- All social security and related documentation kept on file.
- Financial auditing

7.5.6 Revenue Generation and Employment

Sand mining (as opposed to no economic related activity) has led to changes in the way revenue is generated and paid to the local and national treasury. Revenue generated from the area has been increased, not only by sand mining operations, but also in the value addition activities conducted off site. This include primarily brick making. Operations have provided stable employment for the area for almost 10 years. Such employment contributes significantly to the economic resilience of the employees as well as the town. Employment is sourced locally while skilled labour/contractors may be sourced from other regions. The sand mine further contributes to the transport sector as well as the construction industry at large. The impact is foreseen to have a positive impact on the economic and social sphere of the environment. Once the sand mine is decommissioned, there will be a change and probable loss in revenue generation, flow and employment. Possible revenue generating activities should be considered by the Proponent closer to the decommissioning phase.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	Employment and contribution to local economy	2	2	2	2	2	24	3	Definite
Daily Operations	Employment and contribution to local and national economy	3	2	2	2	2	36	4	Definite
Indirect Impacts	Decrease in unemployment, contribution to associated industry	3	1	2	2	3	21	3	Definite

Desired Outcome: Contribution to local and national treasury and provision of employment to local Namibians.

Actions

Enhancement:

- All capital investment as required for machinery and maintenance to be invested into local or regional Namibian business sector.
- The proponent must employ local Namibians where possible.
- If the skills exist locally, employees must first be sourced from the town, then the region and then nationally.
- Deviations from this practice must be justified.
- Post-closure land-use options to be considered by the Proponent.
- Adherence to all Namibian law relating to revenue generation and employment generation.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Bi-annual summary report based on employee records.
- Financial auditing

7.5.7 Demographic Profile and Community Health

Operations have been ongoing for such a long time that current operations will not create a change in the demographic profile of the local community. Community health may be exposed to factors such as communicable disease like HIV/AIDS and alcoholism/drug abuse, associated with uneducated financial expenditure. An increase in foreign people in the area (potential job seekers) may potentially increase the risk of criminal and socially/culturally deviant behaviour. However, the Proponent is not the only employer in the area and therefore potential impacts on the demographic profile, is largely cumulative. The sand mine and related value addition operations have experienced criminal activities on site and have adopted measures to discourage such activities.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	Exposure to social ills related to uneducated financial expenditure or criminal intent.	2	-1	1	1	2	-8	-1	Probable
Daily Operations	Exposure to social ills related to uneducated financial expenditure or criminal intent	2	-1	1	2	2	-10	-2	Probable
Indirect Impacts	The spread of disease, increase of criminal and deviant social and destructive behaviour.	2	-1	2	2	2	-12	-2	Probable

Desired Outcome: To prevent the spread of communicable disease and prevent / discourage socially deviant or criminal behaviour.

Actions:

Prevention:

- Employ primarily local people from the area, deviations from this practice should be justified appropriately.
- Adhere to all municipal by-laws relating to environmental health.
- Prohibit substances abuse on the site.
- Adopt an open-door policy to reporting of socially deviant or destructive behaviour related to employment duties.
- Provide a safe protocol for the report or whistle-blowing of criminal activities.
- Implement a reward system for excellence in conduct and employment.
- Educational programmes for employees on HIV/AIDs and general upliftment of employees' social status.
- Appointment of reputable contractors.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Bi-annual summary report based on educational programmes and training conducted.
- Bi-annual report and review of employee demographics.
- Records kept of all socially deviant, destructive or criminal reports received.

7.5.8 Traffic

No increase in traffic to and from the site is foreseen for the immediate future of operations. The majority of material moved from site is transported by tipper trucks. The Proponent has upgraded and existing access road next to the river of the easy movement of trucks years ago. This initiative is considered to have decreased congestion and decreased the risk of incidents and accidents, especially along the national and district routes, since the trucks rarely travel on them. Operations have therefore, to a great extent, reversed initial impacts on the traffic. There still however remain risks associated with the transport of commodities to and from the site. These risks include collision and incident risks (such as break-downs).

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Daily Operations	Increase traffic, road wear and tear and accidents/incidents	1	-2	2	2	2	-12	-2	Probable
Indirect Impact	Increase traffic, road wear and tear and accidents/incidents	1	-2	2	2	2	-12	-2	Probable

Desired Outcome: Minimum impact on traffic and no transport or traffic related incidents.

Actions

Prevention:

- Access points onto any district road should suitably strengthened according to the requirements of the Roads Authority, to accommodate the current traffic load
- Erect clear signage for access points to operational areas. Such signs should be erected for any other entrance which may be used in the future along any public road (access point).
- All contractors or employees driving heavy motor vehicles should have appropriate training and qualifications to operate such vehicles.
- All vehicles to be roadworthy and appropriately licensed.
- All trucks should have their loads covered with a suitable covering to prevent fly-off rocks, sand and debris

Mitigation:

- If any traffic impacts are expected, traffic management should be performed to prevent these.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Any complaints received regarding traffic issues should be recorded together with action taken to prevent impacts from repeating itself.
- A report should be compiled every 6 months of all incidents reported, complaints received, and action taken.

7.5.9 Health, Safety and Security

Every activity associated with operations is reliant on human labour and therefore exposes them to health and safety risks. Activities such as the operation of machinery and handling of the material, poses risks to employees. Employees will be exposed to elevated levels of dust and noise. Security risks are related to unauthorized entry, theft and sabotage. Dust from the site is not considered to pose a health or safety risk to surrounding communities. However, dust from the road has the potential to affect surrounding properties. Aspects and management measures related thereto is discussed in Section 7.5.11.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	Physical injuries, exposure to dust and criminal activities	1	-2	3	3	1	-14	-2	Possible
Daily Operations	Physical injuries, exposure to dust and criminal activities	1	-2	3	3	1	-14	-2	Possible

Desired Outcome: To prevent injury, health impacts and theft.

Actions

Prevention:

- Clearly label dangerous and restricted areas as well as dangerous equipment and products.
- Use proper dust collection systems and filters.
- Equipment must be locked away on site and placed in a way that does not encourage criminal activities (e.g. theft).
- Provide all employees with required and adequate personal protective equipment (PPE).
- Ensure that all personnel receive adequate training on operation of equipment / handling of hazardous substances and PPE, especially the importance of dust masks.
- All health and safety standards specified in the Labour Act should be complied with.
- Implementation of a maintenance register for all equipment and hazardous substance storage areas.
- Adopt and implement all emergency procedures which may be announced by the Government of Namibia (for example, such as per the Covid19 pandemic).
- Selected personnel should be trained in first aid and a first aid kit must be available on site. The contact details of all emergency services must be readily available.
- Implement and maintain an integrated health and safety management system, to act as a monitoring and mitigating tool, which includes: colour coding of pipes, operational, safe work and medical procedures, permits to work, emergency response plans, housekeeping rules, MSDS's and signage requirements (PPE, flammable etc.).
- Strict security that prevents unauthorised entry.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- Any incidents must be recorded with action taken to prevent future occurrences.
- All to be educated in safety hazards around the site.
- Reports of safety inspections of the operating areas as well as machinery to be kept on file.

7.5.10 Fire

Construction and operational activities may increase the risk of the occurrence of fires. Operation of mechanical, fuel and electrical machinery increases the risk of fire on site. However, no fuel, or large volumes of hydrocarbon material is kept at the active sand mining sites. Operational areas are devoid of most combustible material while operating machines are removed from each other, thereby reducing the spread of potential fire which may occur. Similarly operational activities are located away from electrical powerlines, as well as higher voltage power lines.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	Fire risk	1	-1	2	2	1	-5	-1	Probable
Daily Operations	Fire risk	1	-1	2	2	1	-5	-1	Probable

Desired Outcome: To prevent property damage, possible injury and impacts caused by explosions or uncontrolled fires.

Actions:

Prevention:

- Open fires should not be allowed at the site.
- Fire precautions and fire control must be present at the site.
- In addition to this, all personnel have to be sensitised about responsible fire protection measures.
- A holistic fire protection and prevention plan is needed. This plan must include an emergency response plan and firefighting plan.
- Ensure all chemicals, lubricants and flammable agents are stored according to Material Safety Data Sheet (MSDS) instructions.
- Maintain regular site, mechanical and electrical inspections and maintenance.
- Fire-fighting training to be provided to staff.
- Use appropriate electrical equipment and wiring methods.
- Control smoking (designated smoking areas), open flames, and sparks.
- Control mechanical sparks and friction and ensure mechanical parts are maintained and efficiently lubricated.
- Maintain firefighting equipment, good housekeeping and personnel training (firefighting, fire prevention and responsible housekeeping practices).

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- A register of all incidents must be maintained. This should include measures taken to ensure that such incidents do not repeat themselves.
- A report should be compiled every 6 months of all incidents reported. The report should contain dates when fire drills were conducted and when fire equipment was tested and training given.

7.5.11 Air Quality

During construction and operations, dust is generated through a variety of activities. Movement of material, travelling of vehicles and machines are some of the main dust generating activities. Dust may impair visibility along roads, pose health risks due to inhalation of suspended particulate matter, or inhibit plant health through settling on vegetation. Greenhouse gas emissions are only related to vehicles on site and are negligible in terms of the airshed quality. No other substance which may impact the air quality is released on site. The geological formations are not linked to any naturally occurring hazardous substance such as asbestos or galena. Therefore the extraction of the material will not result in related health risks.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	Excessive dust generated from construction activities	2	-1	2	2	2	-12	-2	Definite
Daily Operations	Excessive dust generated from operational activities	2	-1	2	2	1	-10	-2	Definite

Desired Outcome: To prevent health impacts and minimise dust generation.

Actions

Prevention:

- Personnel issued with appropriate masks where excessive dust is present.
- A complaints register should be kept for any dust related issues and mitigation steps taken to address complaints where necessary e.g. dust suppression.
- No excavation to be conducted in excessively windy conditions.
- All sand conveyed onto tar roads, should be removed to prevent excessive dust which may impair vision.
- Dust suppression on haul roads and maintenance of such system to be conducted.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- Any complaints received regarding dust should be recorded with notes on action taken.
- On site dust monitoring to be conducted.
- All information and reporting to be included in a bi-annual report.

7.5.12 Noise

Unusual and increased noise levels relate mainly to the transportation of the sand which may present a nuisance to affected and adjacent receptors. Additional noise generating activities are related to machine handling of material (and related warning signals) and movement of tipper trucks between the sand mining site and the off-site storage location. The natural topography shields some of noise generated on site (in the river channel), from the neighbours, mostly located east of the site. Operations have the potential to alter the background noise of neighbouring receptors.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	Excessive noise generated from construction/maintenance activities	1	-2	2	2	1	-10	-2	Probable
Daily Operations	Noise generated from the operational activities	1	-2	2	2	1	-10	-2	Probable

Desired Outcome: To prevent any nuisance and hearing loss due to noise generated.

Actions

Prevention:

- Personnel working in noisy environments must be issued with hearing protectors.
- No mining operations to be conducted after dark, on Sundays or on public holidays.
- Follow World Health Organization (WHO) guidelines on maximum noise levels (Guidelines for Community Noise, 1999) to prevent hearing impairment.
- The WHO limits noise levels to an average of 70 dB over a 24 hour period with maximum noise levels not exceeding 110 dB during the period in order to prevent hearing loss.
- All machinery must be regularly serviced to ensure minimal noise production.
- Noise dampers to be fitted on machines where suitable.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- WHO Guidelines.
- Maintain a complaints register.
- Bi-annual report on complaints and actions taken to address complaints and prevent future occurrences.

7.5.13 Waste Production

Various waste streams are produced during the construction and operational phase. Waste presents a contamination risk and when not removed regularly may become a fire and/or health hazard. Waste water, rubble and any other waste products not being contained may be washed from the site during rainfall events. All domestic waste is removed from the project area by the Proponent.

According to current operations, all vehicles and machines are washed and serviced on impermeable surfaces equipped with an oil / water separator. Vehicles on site are equipped with drip trays and maintenance records of all vehicles and machines are kept to ensure optimal running of equipment. Any hazardous waste is supplied to a waste management company. The site is kept neat and tidy at all times and no waste has ever been burned or buried on site by Supersand. All waste is contained within the waste management area and removed on a regular bases. All domestic waste is discarded at the Municipal waste facility. No waste related complaints have been received.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	Waste production, littering, illegal dumping, contaminated materials	1	-2	2	2	2	-12	-2	Definite
Daily Operations	Waste production, littering, contaminated materials	1	-2	2	2	2	-12	-2	Definite

Desired Outcome: To reduce the amount of waste produced, and prevent contamination, pollution and littering.

Actions

Prevention:

- Waste reduction measures should be implemented and all waste that can be re-used / recycled must be kept separate.
- Ensure adequate disposal and storage facilities are available.
- Waste collection points to be clearly demarcated and maintained.
- Hazardous waste storage facilities (such as for old oil, rags, etc.) should be on an impermeable layer.
- Ensure waste cannot be blown away by wind.
- Prevent scavenging (human and non-human) of waste.
- No dumping of waste should be allowed on site.
- Temporary ablution facilities should be erected on site.
- Staff to receive training on waste handling and the principles of reduce, reuse and recycle as well as hazardous waste.
- Solid waste should be disposed of regularly and at appropriately classified disposal facilities, this includes hazardous material (empty chemical containers, contaminated rugs, paper water and soil).
- See the material safety data sheets available from suppliers for disposal of contaminated products and empty containers.
- Liaise with the municipality regarding waste and handling of hazardous waste where required.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- A register of hazardous waste disposal should be kept. This should include type of waste, volume as well as disposal method/facility.
- Any complaints received regarding waste should be recorded with notes on action taken.
- All information and reporting to be included in a bi-annual report.

7.5.15 Ecosystem and Biodiversity Impact

Removing of sediment from the river, may change the localised habitat in some areas along the river, should mining be conducted haphazardly. Pooling and sedimentation (and erosion) may result from mining operations. Personnel working on site may use the opportunity to illegally hunt or trap animals. Plant material may not be collected such wood for fire making purposes.

The majority of habitats associated with the site have been impacted and altered. The river system has been changed considerably from the pristine state with reeds presenting a community challenge in terms of river channel management. The nature of the operational activities is such that the probability of creating a habitat for flora and fauna to establish is low, apart for primary species establishment. Some large trees have established on the banks of the river and on established sand islands.

- Habitat destruction and disturbance of fauna and flora. Disturbances may range from dust, noise, movement, vibration, lighting and poaching. Destruction refers to the physical removal / damage of habitats.
- Due to the disturbance of habitats, the ecosystems integrity is compromised on the site. However, the degraded and invaded system may be enhanced by the cumulative impact of rehabilitating the river channel.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	Impact on fauna and flora. Loss of biodiversity and habitat	3	-1	3	3	2	-24	-3	Definite
Daily Operations	Impact on fauna and flora. Loss of biodiversity	3	-1	3	3	2	-24	-3	Improbable

Desired Outcome: To avoid pollution of, and additional impacts on, the ecological environment. To preserve large tree and protected plant species.

Actions.

Prevention:

- Mitigation measures related to waste handling and the prevention of groundwater, surface water and soil contamination should be adopted.
- All staff should be trained in identifying any sensitive plant species which may occur on site.
- All employees must be informed of the value of biodiversity. Rules and regulations regarding the illegal harvesting of natural resources from the surroundings must be made clear and the disciplinary steps that will be followed against perpetrators must be issued in writing and form part of the employees' contracts.
- Mining must be limited to the riverbed and sandbanks outside of the tree line. Soil should be sloped at an angle of less than 35 ° from the mined area to the base of the treeline (or any tree).
- Overburden (where applicable) must be stored in such a way as to prevent the unnecessary destruction of the environment surrounding the river (i.e. either in mined out areas or in areas still to be mined). The return of overburden to the mined out areas is essential in restoration of the areas.
- All mined out areas must immediately be rehabilitated and restored as close as possible to its original state.
- Excavation or mining may not expose the roots of the vegetation in any watercourse, especially native woody species.

- Avoid scavenging of waste by fauna.
- The establishment of habitats (by primary and invader species) at the mining site should be prevented. Regular clearing of invader species should be conducted to prevent spread of such species across the site and onto neighbouring properties.
- Any sighing of protected species should be documented.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Invader species eradication to be reported on.
- All information and reporting to be included in a bi-annual report.

7.5.16 River Morphology and Erosion

Removing sediment and established sand deposits may alter the flow regime of the river which may result in a change of the river morphology. This may be aggravated by the fact that less sand deposits may occur due to the upstream damming (Hardap Dam). However, deepening and straightening of the river at this point, was identified as one of the objectives in reducing the flood risk of the town. Therefore, achieving a changed river morphology is considered to be a good impact, on condition that it not impact existing infrastructure such as channels, roads and bridges. Removal of sediment and a changed river morphology may lead to erosion and incision of the banks of the river. If such incision and cut-back extensively developed, it may threaten the integrity of infrastructure. .

In addition, historic illegal and indiscriminate mining conducted by third parties, has resulted in a variety of impacts including erosion, turbidity, sedimentation and pooling. These factors all contribute to the cumulative impact on the change of the river morphology and micro aquatic habitats.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Daily Operations	Change in river morphology	2	-2	2	2	1	-20	-3	Probable
Indirect Impact / Cumulative	Erosion and incision cut-back (which may damage infrastructure)	2	-3	2	2	2	-36	-4	Definite

Desired Outcome: To protect all existing infrastructure components against possible erosion cut-back.

Actions

Prevention:

- The excavation of sand may not take place within 200 metres upstream or downstream from any infrastructure developed river bank areas or bridge.
- No mining to be conducted within a buffer of 4.2 km downstream of the Hardap Dam Wall.
- Systematic strip mining of the sand deposits to be conducted. Limit in-stream mining methods to bar-skimming. Adopt a systematic approach at a specific depth and width to prevent new blockages being formed or holes being made.
- Removal of sand islands and sand banks within the riverbed or channel only. No sand mining to be conducted on the banks of the river, or in a manner which may divert or slow down the flow of water in the river during floods when water is released from the Hardap Dam.
- Mining to be scheduled in such a manner that the sand islands which pose the greatest flood risk, should be mined first.
- All unused material to be uniformly levelled across the riverbed (not left in heaps around the site).
- Concentrate in-stream extraction activities to minimise area of disturbance. No mining to be conducted deeper that the original depth of the river (prior to the building of the Hardap Dam). Consideration should be awarded to the 1972 riverbed survey.
- A buffer zone of sand to be retained next to the riverbed of at least 1.5 metres
- The river bed must be kept as smooth as possible to reduce turbulent flow.
- Piles of unused material (soil, boulders plant material) (moveable material) which have previously been left in mined out areas should be flattened along the riverbed (even out).

Responsible Body:

- Proponent

- Contractors

Data Sources and Monitoring:

- Continued mapping of mining area by recording GPS coordinates.

7.5.17 Groundwater Soil and Surface Water Contamination

Leakages from earthmoving vehicles and possible breakdowns resulting in accidental fuel, oil or hydraulic fluid spills may cause contamination of the groundwater, soil or surface water (during rainfall, flood or water release events).

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Construction	Contamination from hazardous material spillages and hydrocarbon pollution	2	-1	2	2	1	-10	-2	Probable
Daily Operations	Contamination from hazardous material spillages and hydrocarbon pollution	2	-1	2	2	1	-10	-2	Probable

Desired Outcome: To prevent the contamination of water and soil.

Actions

Prevention:

- No servicing or maintenance of machines to be conducted within pit areas.
- All machines, equipment and waste to be removed from pit areas prior to rainfall events.
- Hydrocarbon fuel spills to be remediated and significant spills to be logged on an incident register.
- Polluted soil and building rubble must be transported away from the site to an approved and appropriately classified waste disposal site.
- All vehicles must be serviced and maintained regularly.
- Spill control by making use of drip trays if there is a need to repair machinery on site. All hydrocarbon based waste must be removed from site and disposed of at a recognised hazardous waste disposal facility.
- Any polluted soil or water to be treated as a hazardous waste.
- The procedures followed to prevent environmental damage during service and maintenance, and compliance with these procedures, must be audited and corrections made where necessary.
- Proper training of employees must be conducted on a regular basis.

Mitigation:

- All spills or any contamination within the quarry pit area to be cleaned immediately to prevent contamination of groundwater resources.
- Consult relevant MSDS information and a suitably qualified specialist where needed.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- Maintain MSDS for hazardous chemicals.
- Report all spills or leaks to management and initiate clean-up immediately.
- Maintain a register of all incidents on a daily basis. This should include measures taken to ensure that such incidents do not repeat themselves.

7.5.18 Air Quality and Visual Impact

Operations within the river channel are mostly shielded by the river bank vegetation and therefore not as visible to nearby residents. Haulage trucks are however very evident and also create dust. Such dust plumes may be visible to residents and receptors further away from haulage roads. In addition, dust may settle on nearby vegetation (farmers' crops as part of the Hardap Scheme). Dust on vegetation may create a habitat for some micro fauna, some of which are harmful to crops. Layers of dust may also impact crops' ability to photosynthesise. Dust within and around the river is highly cumulative may not only be attributed to the operations of the Proponent. General driving of residents and farmers, farming activities (tractors and soil preparation) construction and illegal mining conducted during windy periods increase dust levels significantly.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Daily Operations	Aesthetic appearance and integrity of the site, increased dust on and beyond the site	2	-1	2	2	3	-14	-2	Definite
Indirect Impact	Habitat creation and reduction in crop performance.	2	-2	2	2	2	-24	-3	Probable

Desired Outcome: To minimise dust creation and aesthetic impacts associated with the operations.

Actions

Prevention:

- Reduced haulage activity during very windy periods.
- Dust abatement measures to be employed during high production periods.
- Ensure rehabilitation of mined out areas in order to improve aesthetic appearance.
- The area where the removal of sand takes place shall be left clean and in a neat condition so that the view of the river is not blemished at any time.
- Regular waste disposal, good housekeeping and routine maintenance on infrastructure will ensure that the longevity of structures are maximised and a low visual impact is maintained.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- A report should be compiled every 6 months of all complaints received related to aesthetic appearance of the site.

7.5.20 Loss of Paleontological, Historical and Archaeological Resources

Archaeologically or culturally important sites or resources discovered during miming operations may be damaged. However, should any resources be discovered, chance find procedures as detailed by a related specialist should be followed. No impacts are expected as the project area was previously disturbed by anthropogenic activity.

Project Activity / Resource	Nature (Status)	(A1) Importance	(A2) Magnitude	(B1) Permanence	(B2) Reversibility	(B3) Cumulative	Environmental Classification	Class Value	Probability
Daily Operations	The discovery /destruction of archaeologically, paleontological or culturally important sites.	1	-2	3	3	1	-14	-2	Improbable

Desired Outcome: To prevent the damage to, or destruction of, any archaeological, paleontological or culturally important (heritage) resources.

Actions

Prevention:

- If such a site or any other archaeologically important artefact is found during the development phase any work in that area must be halted and the relevant authorities must be informed. These include; the Namibian Police and the National Monuments Council.
- Mining may only continue at that location once permission has been granted from the relevant authorities.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Documenting of any incidents related to heritage, archaeological or paleontological resources.

7.5.21 Cumulative Impact

Cumulative impacts are those potential impacts which in itself may not be considered significant, however when considered as a collective may be significant. Some of the identified impacts may be at a regional scale.

- Sustainable and long term employment (positive),
- Contribution to local and regional economy (positive),
- Dust (negative), and
- Waste production (negative).

Desired Outcome: To minimise all cumulative impacts associated with the operations.

Actions

Mitigation:

- Addressing each of the individual impacts as discussed and recommended in the EMP would reduce the cumulative impact.
- Reviewing biannual reports for any new or re-occurring impacts or problems would aid in identifying cumulative impacts. Planning and improvement of the existing mitigation measures can then be implemented.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Create a summary report based on all other impacts to give an overall assessment of the impacts of the operational phase.

8 CONCLUSION

The operations of Supersand play a positive economic role in the Hardap Region due to the provision of commodities as well as the contribution to sustaining livelihoods of secondary industries and related employees. The use of the land for extraction of sand and construction stone has a beneficial role in generating income in the region and providing raw materials crucial to the construction industry. In addition, the removal of sand islands, when conducted according to best practise, reduces the flood risk of the town.

Operational related impacts must be mitigated by implementing strict monitoring and control methods. All permits and approvals must be obtained from relevant ministries or authorities for the operations of the sand mine. Pollution prevention measures should be adequate to prevent incidents that may potentially pollute groundwater and surface water. Health, safety and security regulations should be adhered to in accordance with the regulations pertaining to relevant laws and standards.

The EMP should be used as an on-site reference document during all phases of the mining operations. Parties responsible for transgression of the EMP should be held responsible for any rehabilitation that may need to be undertaken. Should the Directorate of Environmental Affairs (DEA) of the MEFT find that the impacts and related mitigation measures, which have been proposed in this report, are acceptable, an environmental clearance certificate may be renewed to the Proponent. The environmental clearance certificate issued, based on this document, will render it a legally binding document which should be adhered to. Focus should be placed on Section 7, which includes an EMP for this project. It should be noted that the assessment process's aim is not to stop the activity, or any of its components, but to rather determine its impact and guide sustainable and responsible development as per the spirit of the EMA.