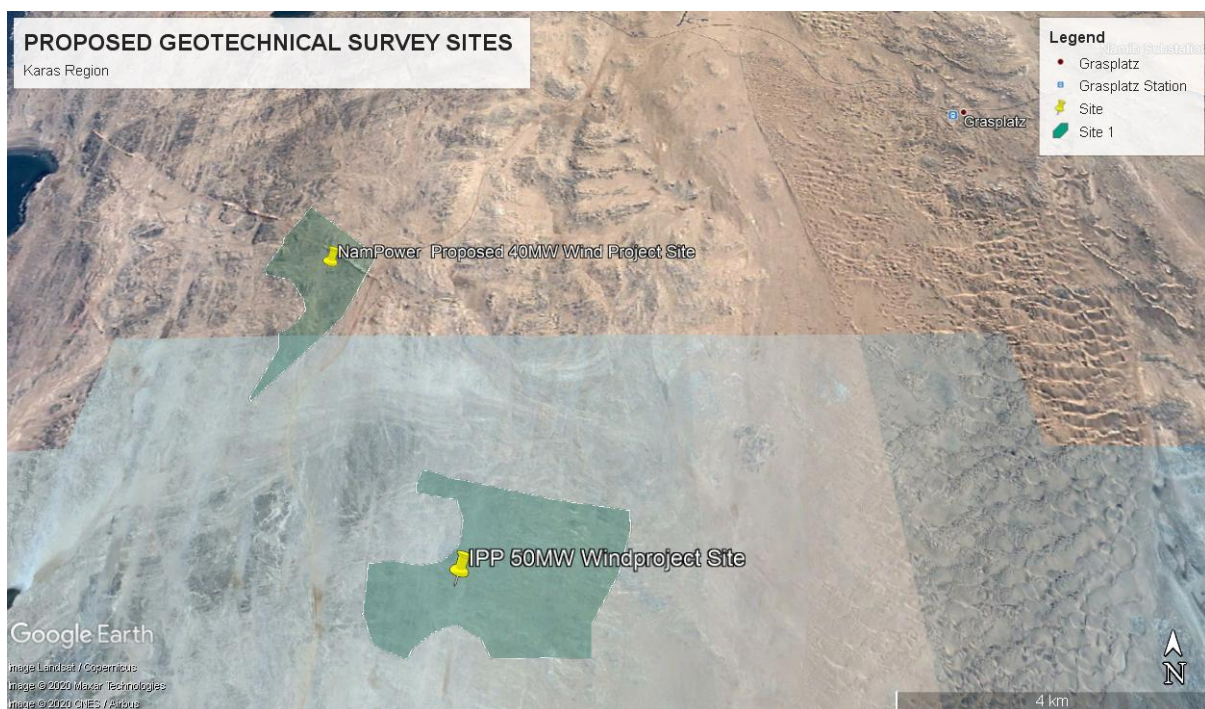


**ENVIRONMENTAL MANAGEMENT PLAN FOR THE GEOTECHNICAL
,GEOHYDROLOGICAL, TOPOGRAPHICAL SURVEY AT THE SITE FOR THE 40MW NAMPOWER AND
50MW INDEPENDENT POWER PRODUCER (IPP) WIND POWER PLANTS.**



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1. INTRODUCTION

NamPower (Pty) Ltd intends to develop two wind projects , namely a 40MW wind turbine power generation facility to be operated by NamPower and a 50MW Wind Project to be operated by an Independent Power Producer (IPP). The sites are approximately 16.5 km south of Lüderitz, located within the Speergebiet (restricted access diamond mining area) near Elizabeth Bay mine and the Tsau//Khaeb National Park . The total footprint for the two sites is approximately 1179.26 Hectares in total (427.44 hectares for the NamPower 40MW) and (751.82 hectares for the 50MW IPP wind project). The projects entails to conduct geotechnical survey at the sites earmarked for the development of the NamPower and IPP wind power plants.

In compliance with the terms of the Environmental Management Act (2007), NamPower is engaged in a full environmental impact assessment (EIA) for the two Wind projects and appointed Enviro Dynamics cc as lead consultant for the wind projects and the Draft Environmental Management Plan will be added as addendum to this EMP as specialist studies were conducted.

Pararell to the process NamPower intends to undertake geotechnicals surveys at the same sites. As part of its projects development activities, prior to commencing of the actual construction works for the proposed wind projects, Nam Power needs to conduct geotechnical surveys at the respective sites.

Geotechnical survey activities are not considered to be part of the construction activities for the wind projects, but rather specific works which should be completed as part of the projects development, preparation and feasibility assessment in order to confirm underground soil conditions. It should be disclosed , that the geotechnical survey predominantly will consist of sub-soil drilling, extraction of soil samples and tests. The information obtained as outcome of the geotechnical works, will feed into the wind projects detailed technical specifications.

Table 1: Site and Project details

Site location	Tsau//Khaeb (Sperrgebiet) National Park
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2. OBJECTIVES OF THE OPERATIONAL EMP

The aim of this EMP is to detail the management actions required to implement the mitigation measures identified thereby ensuring that Geotechnical survey activities are carried out in a manner that takes cognisance of environmental protection and is in line with National legislation. This EMP has the following objectives:

- To ensure that the activities associated with the Geotechnical , geo-hydrological and topographical survey of the do not result in undue or reasonably avoidable adverse environmental impacts.
- Minimise negative impacts
- Stipulate specific actions to assist in mitigating the environmental impact of the project.

- To identify key personnel who will be responsible for the implementation of the measures and outline functions and responsibilities.
- To propose mechanisms for monitoring compliance, and preventing long term or permanent environmental degradation.

3. APPROACH TO IMPACT MANAGEMENT

Table 2: Approaches to impact management.

Avoidance	Avoiding activities that could result in adverse impacts and/or resources or areas considered sensitive.
Prevention	Preventing the occurrence of negative environmental impacts and/or preventing such an occurrence having negative impacts.
Preservation	The process of working to protect something valuable so that it is not damaged or destroyed (i.e. environmental resources)
Minimization	Limiting or reducing the degree, extent, magnitude or duration of adverse impacts through scaling down, relocating, redesigning and/or realigning elements of the project.
Mitigation	Measures taken to minimize adverse impacts on the environmental and social aspects.
Enhancement	Magnifying and/or improving the positive effects or benefits of a project.
Rehabilitation	Repairing affected resources to their original state.
Restoration	Restoring affected resources to an earlier (possibly more stable and productive) state, typically 'background' condition, where identified to be appropriate and reasonable. These resources may include soils and biodiversity.

4. POLICY AND LEGISLATIVE FRAMEWORK

Table 3: below outlines the legislative requirements which are applicable to the construction and operation of this project and a minimal.

Legislation:	Section (s) applicable:	Implications:
Environmental Management Act no 7 of 2007	Section 3	<ul style="list-style-type: none"> - All activities performed should be in line with the following principles: - Interested and affected parties should have an opportunity to participate in decision making - Polluter should pay for rehabilitation - Pollution should be minimized
EMA Regulations GN 28-30 (GG)	Listed activity:	These sections details the process to be followed in terms of producing an Environmental Assessment and this process

4878) (February 2012)	5.1 6. – 9; 13; 15; 21 - 24	should be adhered to during the generation of information for this document.
Labour Act no 11 of 2007	Section 3 Section 4 Section 9 Section 39 – 42	<ul style="list-style-type: none"> - Children under the age of 16 may not be employed Forced labour may not be used during any construction activities. - Basic conditions of employment as stipulated by the law must be met. - The employer shall ensure the health and safety of all employees and non-employees on site. Employees must fulfil their duties in order to ensure their own health and safety and that of other employees and persons. Employees may leave the work site if reasonable measures to protect their health are not taken.
Water Act no 54 of 1956	Section 21 and 22 Section 23	<ul style="list-style-type: none"> - Conditions in terms of the disposal and management of effluent are to be adhered to.
Public Health Act no 36 of 1919	Section 122	<ul style="list-style-type: none"> - It is an offence to cause any form of a nuisance which includes water pollution.
Water Resources Management Act no 24 of 2004	Section 56	<ul style="list-style-type: none"> - No discharge of effluent may take place without a permit. - Effluent is defined under this Act as any liquid discharge that occurs as a result of domestic, commercial, industrial or agricultural activities.
Nature Conservation Ordinance no 4 of 1975	Section 74	<ul style="list-style-type: none"> - Protected plants may not be removed or damaged without a permit.
National Heritage Act No 27 of 2004	Section: 46, 48, 55	<ul style="list-style-type: none"> - All heritage resources are to be identified and either protected or removed/mitigated with a permit from the National Monuments Council, before any development may take place - A chance find procedure should be followed in case of discovery of a heritage resource.
Park Rules and Management Plan		<ul style="list-style-type: none"> - Park permit requirements and Park rules
Diamond Act 13 of 1999 and regulation	Regulation 13 and 14	<ul style="list-style-type: none"> - Whenever any person is required to perform a security check on an employee or a natural person in terms of section 48(l) (a) of the Act. - Access permit requirements. - Records of employees ,contractors and sub-contractors.

5. DESCRIPTION OF ACTIVITIES TO BE UNDERTAKEN

The following activities are associated with the Geotechnical ,Geohydrological, topographical surveys
Associated potential impacts:

Activity	Activity description	Associated environmental aspects and impacts
Site Establishment and clearing	<ul style="list-style-type: none">Increased vehicular movement	<ul style="list-style-type: none">Loss of biodiversitySoil and water contaminationCreation of deep tracks or additional tracks in the areaEmployment opportunities
Geotechnical , geohydrological and topographical survey	Activities: <ul style="list-style-type: none">Access road gradingMinor excavationsDrillingSoil samples extractions and tests.	<ul style="list-style-type: none">Noise emissionsDust emissionsIncreased interaction between people and biodiversity in this area.Introduction of new people in the area leading to the spread of diseases such as HIV/AIDS.Waste generation .Land surface disturbance.Loss of biodiversity .Support local economy.
General site inspection	Site inspection conducted by the technical and SHEW teams	Waste generation Improve compliance Enables identification of non – conformances and stakeholder complaints

6. ROLES AND RESPONSIBILITIES

It is the responsibility of NamPower to ensure that all management actions are carried out. The successful implementation of the EMP is, however dependant on clearly defined roles and responsibilities by several stakeholders, each fulfilling a different but vital role to ensure sound environmental management during each phase of the project.

The following roles and responsibilities have been identified as it pertains to this project:

Responsible person	Responsibilities	Phase/Activity
Project Manager	<ul style="list-style-type: none">• Is responsible for the enforcement of the EMP.• To ensure that environmental requirements are adequately covered in any external service providers contracts.• To ensure that SHE requirements are included in the tender documents sent to the contractors. A copy of this EMP should also form part of the tender documents.• To ensure that corrective actions are implemented for non-compliances• To ensure that appropriate records and information regarding compliance with environmental requirements are maintained.• To ensure that the Wind Mast remains in compliance with the requirements of this EMP, through regular communication and monitoring.• To ensure that all incidents, accidents and complaints are reported the project manager. The contractor to ensure that incidents and accidents are investigated to prevent re-occurrence.• Must ensure that the contractor remains in compliance with the requirements of this EMP, through	Geotechnical survey

	regular communication and monitoring.	
NamPower SHEW	<p>To ensure that all requirements with regards to this EMP are fulfilled.</p> <ul style="list-style-type: none"> • To assist the Project Manager in ensuring that the contractor remains in compliance with this EMP. • Provides SHEW inductions to NamPower and contractor employees as well other stakeholders working or visiting the site. • Organize and implement monitoring and audit functions, in consultation with the Project Manager. • Document and communicate monitoring, audit and inspection findings to project manager. • Communicate the final inspection report to the Project manager on contractor compliance to the EMP before the project close-off and final payment is made to the contractor. 	Geotechnical ,geohydrological, topographical survey
Contractor	<ul style="list-style-type: none"> • Is responsible for the implementation of the EMP • To appoint as SHE officer responsible for the implementation of this EMP. • To ensure that all tasks undertaken under the scope of work, are in accordance both with NamPower's SHEW policies and procedures as well as to the requirements of this EMP. • Ensure staff members are regularly trained and awareness built relating to environmental and social management. 	Geotechnical ,Geohydrological, Topographical survey.

	<ul style="list-style-type: none"> • To ensure that all incidents, accidents and complaints are reported the project manager. The contractor to ensure that incidents and accidents are investigated to prevent re-occurrence. • Ensuring that all employees receive a SHEW induction before the start of the project. • Ensuring that the work being done does not create a nuisance within the immediate surroundings of the site. 	
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7. ENVIRONMENTAL MANAGEMENT PLAN (EMP) FOR THE GEOTECHNICAL ,GEOHYDROLOGICAL,TOPOGRAPHICAL SUVERY.

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	Phase/ Activity	RSEPNOSIBLE PERSON
Personnel and Environmental awareness	<ul style="list-style-type: none"> • All employees both internal and external to receive environmental awareness training prior to the start of the project. • All employees are to be made aware of their individual roles and responsibilities in achieving compliance with the EMP. • Environmental toolbox talks to be conducted by the contractors and records to kept onsite. • The Contractor shall take all necessary precautions against trespassing on private properties; • Warning signs must be placed on and around the site as per the Occupational, Health and Safety requirements; • The contractor will be responsible for his own security arrangements and shall comply will all site security instructions; • Basic firefighting equipment must be available on site; 	Geotechnical Geohydrological, topographical survey.	Project manager Contractor Safety Health ,Environment and Wellness Department representative(S HEW)

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	Phase/ Activity	RSEPERSONIBLE PERSON
	<ul style="list-style-type: none"> PPE to be provided and well maintained at contractor's camp; and All incidents should be reported to ECO, investigated, documented and kept in safety file. The contractor to have a full time environmental officer as part of the project. 		
Environmental Management plan for the Wind Projects 40MW and 50MW.	<ul style="list-style-type: none"> Mitigations stipulated in the EMP for the Wind Project for the two respective sites must complied with at all times. 	Geotechnical Geohydrological, topographical survey.	
Park Rules and Other Requirements	<ul style="list-style-type: none"> Park rules to be adhered at all times. Illegal harvesting and poaching is prohibited. Mining area Induction and permit requirements to be adhered to all the time. Work closely with Parks representative in the identification of special plants onsite. 	Geotechnical Geohydrological, topographical survey.	Project manager Contractor Safety Health ,Environment and Wellness Department representative.
Vegetation	<ul style="list-style-type: none"> Plant material may not be collected and removed from site Areas with a high density of vegetation growth shall be avoided when access routes are planned. Protected and endemic plants shall be identified within the proposed site and along the access route and Ministry and Environment, Forestry and Tourism Luderitz Office or Botanical Garden to be consulted for guidance. Rehabilitation must be carried out prior to the contractor leaving the site and in the manner prescribed in this document 	Geotechnical Geohydrological, topographical survey.	Contractor Safety Health ,Environment and Wellness Department representative.

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	Phase/ Activity	RSEPNOSIBLE PERSON
	<ul style="list-style-type: none"> A speed limit of 30 km/h shall be maintained on site Trucks and larger vehicles shall have a designated turning point 		
No Go Zones	<ul style="list-style-type: none"> New impacts to these habitats shall be avoided at all costs Project workers shall be informed of the sensitive aspects of these habitats to avoid aimless wandering around on these sites. With the extended nature of this project even the impact of human footprints over a long period of time can have a significant impact on sensitive habitats. 		
Health and Safety Management	<ul style="list-style-type: none"> All staff should undergo a general health and safety induction. Only medically fit personnel to be employed. Enforce general health and safety rules onsite Develop and implement an occupational health and safety system that comprises key elements such as risk assessment and safe working procedure. All work activities to be done under the supervision of a competent person. Personal protective equipment must be worn by all employees and contractors. Employees must receive proper training before receiving PPE. Erect physical barriers to ensure there is no unauthorised access to site. Maintain an incident and complaint register. All unattended open excavations shall be adequately demarcated (fencing shall consist of a minimum of three 	Geotechnical Geohydrological, topographical survey.	Project manager Contractor Safety Health ,Environment and Wellness Department representative.

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	Phase/ Activity	RSEPONSIBLE PERSON
	<p>strands of wire and made clearly visible).</p> <ul style="list-style-type: none"> Adequate protective measures must be implemented to prevent unauthorised access to and climbing of partly constructed towers and protective scaffolding. No firearms shall be permitted on Site. 		
Noise	<ul style="list-style-type: none"> Given the remote location of the proposed site, noise level will not be a concern . EMP to be update if condition changes. 	Geotechnical Geohydrological, topographical survey.	Project manager Contractor
Dust Management	<ul style="list-style-type: none"> Control dust in the during drilling and extraction of soil samples e.g by wetting the surface if necessary. Excavation, handling and transport of erodible materials shall be avoided under high wind conditions or when a visible dust plume is present. Dust generation from all activities will be minimised wherever possible. A maximum speed limit of 20 km/h will be enforced to control dust emissions, and minimize incidents onsite. Transport of material will ensure measures to prevent fugitive dust emissions. Dust suppression measures shall be implemented if necessary. Dust may be controlled by damping of the road with water when necessary to minimise nuisance dust. Machinery and equipment will be maintained in good working 	Geotechnical Geohydrological, topographical survey.	Project manager Contractor

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	Phase/ Activity	RSEPONSIBLE PERSON
	order in order to minimise exhaust fumes		
Resources Efficiency	<ul style="list-style-type: none"> Minimise water use Avoid wasteful use of materials Source goods and services locally where possible Minimise the generation of waste by applying the waste hierarchy. 	Geotechnical Geohydrological, topographical survey.	Project manager Contractor
Waste Management	<ul style="list-style-type: none"> The site to be kept free of waste. No burning, burying or dumping of any waste materials, vegetation, litter or refuse shall be permitted onsite. Labelled waste bins with lids must be provided onsite for all waste streams and ensure that waste is disposed at nearest approved waste disposal site. Ensure that waste segregation is done at source. Hazardous waste shall be disposed of at a registered waste disposal site. Safe disposal certificates for hazardous waste must be kept in the SHE file. No material shall be left on site that could be of harm to humans and animals. Broken, damaged and unused nuts, bolts and washers shall be picked up and removed from site. Waste shall be removed from site on a daily basis and disposed of at the appropriate waste management site Hazardous waste shall be disposed of at the location indicated by the Town Council of Luderitz. Record shall be kept of all hazardous waste disposed of. No waste material shall remain on site once the project has been completed. 	Geotechnical Geohydrological, topographical survey.	Project manager Contractor

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	Phase/ Activity	RSEPONSIBLE PERSON
	<ul style="list-style-type: none"> Surplus concrete may not be dumped indiscriminately on site, but shall be removed from site when nearing completion of the different stages of work. Concrete trucks shall not be washed on site unless adequate washing and concrete collection facilities be introduced to site. Bins and containers must be made available by the contractor for the storage of construction waste. No burning of cleared vegetation shall be allowed on site. 		
Wastewater management	<ul style="list-style-type: none"> Water containing environmental pollutants shall be collected and removed from site. No waste water runoff or uncontrolled discharges from the site/working areas shall be permitted. Mobile toilets or septic tanks should be used and be regularly emptied. 	Geotechnical Geohydrological, topographical survey.	Project manager Contractor
Cultural resource	<ul style="list-style-type: none"> Any chance finds must be reported to NamPower environmental section and National Heritage Council. In an event of discovery of human remains or other artefacts the work shall cease. A professional archaeologist is to be consulted and carry out investigation. 	Geotechnical Geohydrological, topographical survey.	Project Manager SHEW Contractor
Protection and handling of fauna on site.	<ul style="list-style-type: none"> The contractor must ensure that the site is kept clean and free of rubbish that could potentially attract animal pests, and that rubbish bins are scavenger proof. The contractor must report problem animals or vermin to the SHEW. Avoid areas with Brown Hyena dens. 	Geotechnical Geohydrological, topographical survey.	Project Manager Contractor SHEW

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	Phase/ Activity	RSEPONSIBLE PERSON
	<ul style="list-style-type: none"> The contractor may under no circumstances make use of pesticide or poison to control unwanted animals. Workers should be educated so as not to kill any fauna found onsite. The footprint of disturbance should be kept to a minimum No hunting or trapping is permitted along the alignment. Excavations must be checked on a regular basis for any signs of wildlife which may have fallen in. 		
Backfilling	<ul style="list-style-type: none"> The test pits to be closed and backfilled where sufficient material is available. 		
Site Rehabilitation	<ul style="list-style-type: none"> Progressive rehabilitation in the form of backfilling of overburden, topsoil management. A post construction inspection 1 week before the Contractor has moved off site. SHEW to sign site close off or take over certificate once remedial corrective action is implemented. 	Construction and Decommissioning Phase	Project Manager SHEW Contractor

8. ENVIRONMENTAL MONITORING AND AUDITING

Environmental monitoring, audits and inspections must be conducted by SHEW personnel and SHE representatives during construction and operational phases. The environmental monitoring and audits conducted at the substation will cover all management procedures and the requirements of this plan. It is proposed that before and after photographic evidence is captured and recorded.

9. NON-CONFORMANCE PROCEDURES DURING OPERATIONS

In the event of non-compliance the following recommended process shall be followed:

- Non-compliances will be identified during inspections or audits carried out by the SHEW Section and reported to the Area superintendent or project manager for corrective actions.
- Project manager shall notify the both internal and external employees about the non-compliance
- Corrective and preventative actions must be implemented on an agreed timeframes
- Follow – up inspections shall be conducted to assess whether the corrective and preventative actions were implemented effectively.

NamPower has the right to ban any employee from the site, which have not attended a SHEW induction, until the time that they receive induction. NamPower also has the right to stop all activities if it is found that a gross violation of the EMP is taking place.

10. SUB-CONTRACTOR MANAGEMENT

The contractor shall in writing inform its sub-contractors and issue them a copy of this EMP and SHE Plan. Sub-contractors shall indicate in writing their commitment to comply with these plans. The Contractor has the overall responsibility of ensuring that all its sub-contractors comply with both plans.

11. DOCUMENTATION, RECORD KEEPING AND REPORTING PROCEDURES

The following documents must be kept on site in an accessible place, and maintained by the Contractor and district personnel:

- Copy of the Environmental Clearance Certificate
- SHE file
- Induction records;
- Environmental monitoring and inspection reports
- Site Locality Plan
- Site instructions

- Records of the quantities of general and hazardous waste generated on site and disposal certificates or details of volumes of waste recycled
- Water consumption

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- Incidents and accidents (spills, impacts, complaints, legal transgressions)
 - Corrective and preventive actions taken to rectify incidents and accidents.

12. CONCLUSIONS AND RECOMMENDATIONS

The purpose of this document is to provide guidelines for environmental best practice during the surveys. This document shall be seen as part of the all contracts related to the geotechnical survey.