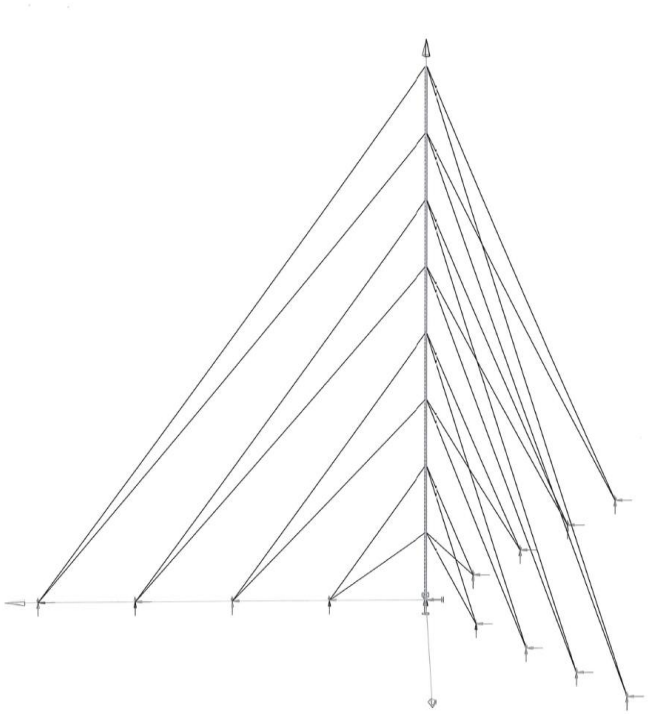
SCOPING REPORT FOR THE CONSTRUCTION AND OPERATION OF THE LUDERITZ SITE 2 WIND MAST //KARAS REGION)



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EXECUTE SUMMARY

NamPower intends to construct and commission a wind resource measurement station utilising a 100 m high steel tower. The erection of the wind mast will require 1.5 ha to accommodate the guy wire anchors that hold the mast in position and for stability. The wind resource measurement station as a meteorological mast is required to enable development of a commercial wind farm in future. This project is not for power generation but only for data collection mast to aid in quantifying the wind resource in the area.

The envisioned site is approximately 70 km from the town of Luderitz and approximately 55 km along Rotkop-Oranjemund road from the B4 national road. The site falls within the Tsau//Khaeb (Sperrgebiet) National Park which is a sensitive environment due to the Succulent Karoo biome (Biodiversity hotspot) and is within a the Diamond Mining controlled or protected area. A Consent letter for land and a letter of support for the project in relation to proposed site/project including the exact location of the wind mast were obtained from the Ministry of Environment, Forestry and Tourism, Namdeb and LEWCOR Group. LEWCOR Group are in the process of buying Elizabeth bay.

The construction phase is estimated to last between 10 and 20 days and operational phase will include quarterly access to the site for data collection and annual maintenance. Though the activities to be undertaken are not specifically listed in the Environmental Management Act (no 7 of 2007), this project does share elements with the following listed activities land use and transformation, resources removal including natural living resources, television and radio transmission masts and alternate energy programmes.

As per the Environmental Impact Assessment (EIA) Regulations, construction of the this nature and some of the operational activities NamPower will be undertaking at the site falls within a sensitive environment and therefore require clearance from the Ministry of Environment and Tourism (MET). The purpose of this document therefore is, to provide an indication of the anticipated impacts as a result of the construction and operational activities that will take place at the envisaged Wind Mast site.

DETAILS OF PROJECT STAFF

This scoping report was generated by staff permanently employed by NamPower within the Transmission Capital Projects section.

Environmental Assessment Practitioner

The Environmental Assessment Practitioner (EAP) for this site was Calvin Sisamu, a fulltime employee of NamPower for the past 4 years and 7 months as a Senior Environmentalist. Calvin , has a Batchelor's Degree level in Environmental Engineering, National Diploma in Land Management and MPhil in Environmental Management. He has been working in the environmental field since 2005, including being a Research Technician at Gobabeb Training and Research Centre, Environmental Control Officer and Radiation Safety Officer for Reptile Uranium Namibia a uranium exploration company and Environmental Compliance Officer for Swakop Uranium (Husab Mine) in the Namib Desert. The EAP has no vested interest in the outcome of the process.

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1. INTRODUCTION

NamPower intends to construct and commission a wind resource measurement station utilising a 100 m high steel tower. The erection of the wind mast will require 1.5 ha to accommodate the guy wire anchors that hold the mast in position and for stability. The envisioned site is approximately 70 km from the town of Luderitz and approximately 55 km along Rotkop-Oranjemund road from the B4 national road.

The site falls within the Tsau//Khaeb (Sperrgebiet) National Park which is a sensitive environment due to the Succulent Karoo biome (Biodiversity hotspot) and is within a the Diamond Mining Area controlled or restricted area. The study area falls within the minimal disturbance zone indicating high biodiversity importance area as per the rezoning of the Tsau//Khaeb(Sperrgebiet) National Park and borders special value zone and Development and infrastructure zone (MET, 2019). It is important to note that there is an existing track proposed to utilised during the project and there is an existing Radio Receiver adjacent to the proposed site.

The wind resource measurement station is required to enable development of a commercial wind farm in future. It is important to state that this project to construct the wind mast is not for power generation purposes but a data collection mast to aid in quantifying the bankable wind resource in the area. The data for this environmental assessment was sourced from EIAs conducted in the area and was supplemented by a site visit on 5th of September 2019. The site visited included the Directorate of Wildlife and Parks and NamPower representatives. In addition, data from various smaller, internal projects were also used such as the Rotkop Wind Mast situated approximately 55km from the proposed site.

The purpose of this document therefore is, to provide an indication of the anticipated impacts as a result of the construction and operational activities that will take place at the envisaged Wind Mast site.

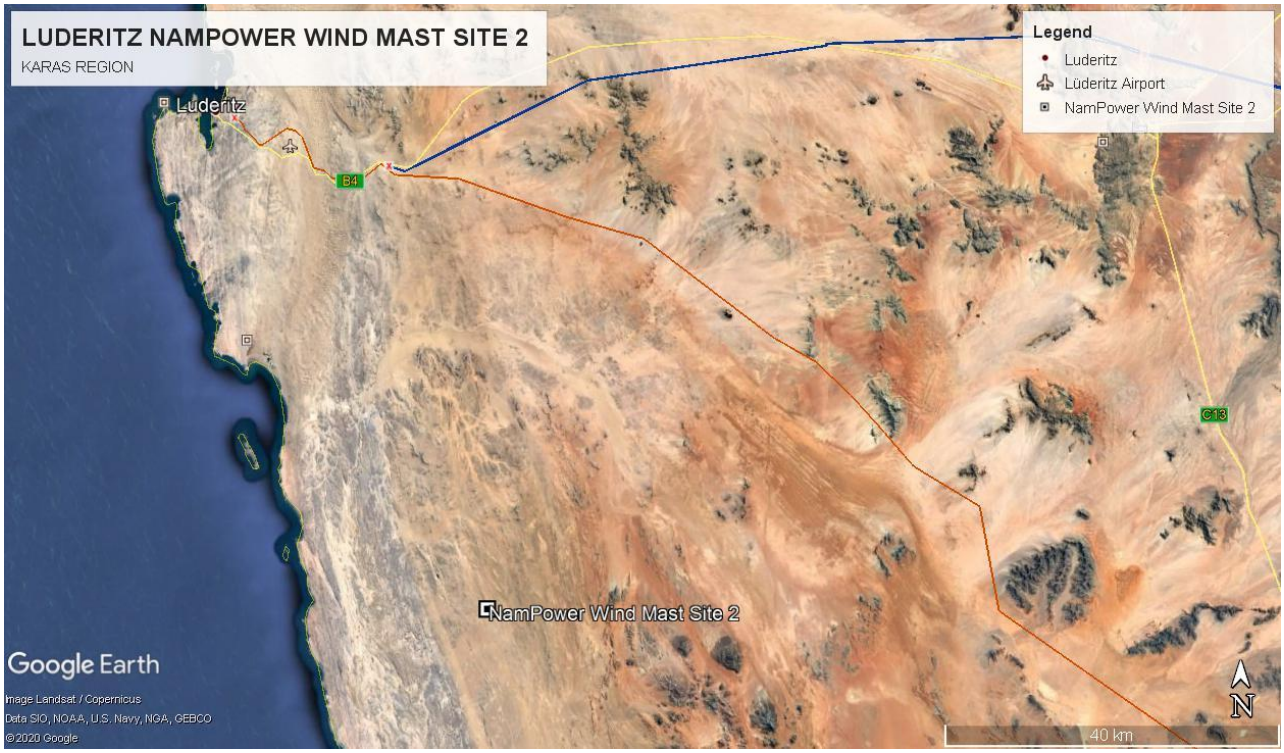

Figure 1: Proposed site indicated as Site 2 Wind Mast in the map in relation to the surrounding area.

2. PROPOSED PROJECT ACTIVITIES

The best wind resource in Namibia is located in the coastal area surrounding Lüderitz and the Elizabeth Bay area. A desktop site selection study was conducted to identify the ideal site for the planned project and taking into consideration the land use map of the Tau//Khaeb National Park and involving key stakeholders such as MET, Namdeb and LEWCOR Group.

The proposed site falls within the Managed Resource Use area. Access to the site is via existing Rotkop-Oranjemund road. It is proposed that before and after construction photographic evidence is captured and recorded.

(a) CONSTRUCTION PHASE

The Wind Resource Measurement Station will comprise of a lattice tower, stabilized by anchored guy-wires and mounted with the listed measurement sensors at heights. The lattice will be assembled and fitted with the sensor assemblies prior to erection. The data acquisition system, power supply and satellite communication module will be installed closer to the base of the lattice tower.

Civil works will be carried using standard digging equipment depending on the soil conditions at the site. Materials and equipment will be delivered to site using tri-axle heavy duty vehicles and stored at the site, where necessary.The base of the mast will be fenced , while the guy rope anchors won't be enclosed.

Table 1: Anticipated construction phase activities.

General Identifiers	Description
Location	• Latitude: • Longitude:
Site elevation	• ±120 m
Wind Mast Footprint (Land Size)	• 1.5 ha (Mast and Guy wire anchors included)
Type of Infrastructure	• Electronic and mechanical sensors mounted on a steel tower with steel wire supports in concrete anchors.
Duration of project	• Site works and commissioning will be done within 20 Days.
Estimate of Number of people to be involved.	• Approximately 15 including NamPower and contractor employees.
Activities to be carried out on site	• Approximately 100m access track to be created and to be connected to the existing Wolf Bay Road. • Minor excavations for guy wire anchors. • Concrete pouring into excavations. • Assembly of the mast tower. • Installation of sensors. • Commissioning and testing of the measurement station. • No crane shall be used for the erection of the tower.
Needs and desirability of the project.	• The wind resource measurement station is required to enable development of a commercial wind farm.

Site Rehabilitation	The site will be left tidy and area reinstated where necessary as per the Environmental Management Plan.

Table 2 : The main equipment to be installed for the wind resource measurement station is as follows:

Offered Item	**Purpose /**
Temperature Sensor: NRG 110S	**Ambient Temperature measurement** (at a height within 10 m of the primary anemometer and a back-up sensor at 2 m above ground level.)
Relative Humidity Sensor: RH5X	**Relative humidity measurement** (at a height within 10 m of the primary anemometer and a back-up sensor at 2 m above ground level.)
Anemometers: NRG Class I, incl. IEC 61400-12 Calibration	**Wind speed measurement (including wind gust)** at minimum 4 levels (i.e. 100 m (x2), 80 m, 60 m, 40 m) as per IEC 61400-12-1
Pyranometer: HUKSEFLUX SR11	**Global Horizontal Irradiance (GHI) measurement** (at a height of approximately 2 m above ground level)
Wind Vanes: NRG 200M, incl. IEC 61400-12 Calibration	**Wind direction measurement** (at minimum 3 levels at a height within 10 m of the primary anemometer (i.e. 90 m (x2), 70 m, 50 m) as per IEC 61400-12-1)
Barometric Pressure Sensor: NRG BP20	**Barometric pressure measurement** (at a height within 10 m of the primary anemometer and at a height of approximately 2 m above ground level)
Data Logger: NRG Symphonie PRO, with USB Cable and 2G SD Card	**Data acquisition and storage** (at the base of the mast tower)
Enclosure: NRG Symphonie Shelter Box	**Protection and security** (at the base of the mast tower)

Symphonie iPackACCESS \ BGAN M2M Satellite	**Data Transmission** (at the base of the mast tower)
Camera Surveillance System	**Visual Surveillance** (at the base of the mast tower)
Solar Module SD030	**Battery charging** (at the base of the mast tower)
Charging Regulator 12V	**Battery charging control** (at the base of the mast tower)
Batteries, 12 V 33Ah Sealed Lead Acid	**Electricity storage and supply** (at the base of the mast tower)

After the electro-mechanical assembly and the erection of the tower are complete, commissioning and testing of the Wind Resource Measurement Station will be conducted.

(b) OPERATIONAL ACTIVITIES PHASE

The following **operational activities** will be carried out on site and have also been considered for the purpose of this document:

(a) Data collection and download.
(b) Maintenance of the Wind Mast , NamPower will maintain the s Wind Mast Station to ensure its reliability of data collected.
(c) General site inspection to be carried out by the technical and Safety ,Health , Environment and Wellness Departments in line with the Environmental Management Plan quarterly to annual basis.

It is important to note that all environmental issues will be taken into account from the onset of the project to ensure environmental best practice is incorporated during the construction and operational phase.

3. SITE DESCRIPTION

The site is located at in the Tsau//Khaeb (Sperrgebiet) National Park and approximately 55km along Rotkop-Oranjemund road from B4 National road. The study area falls within the minimal disturbance zone indicating high biodiversity importance area as per the rezoning of the Tsau//Khaeb(Sperrgebiet) National Park and borders special value zone and Development and infrastructure zone (MET, 2019).

The footprint of the proposed wind mast monitoring station and stay wires is approximately 1.5 ha. According to (Schneider and Walmsley ,2004),the Sperrgebiet is an area where extensive diamond mining has taken place since the early 20th century. For security reason it has been an access –restricted area since that time. It is important to note also that the area boasts pristine landscape and is part of an area of globally significant endemic biological diversity, the Succulent Karroo biome. The tourism sector has an increasing demand for the Sperrgebeit and this has resulted in the Ministry of Environment and Tourism producing a land use plan for the area which contains recommendations for future land use options and also provides for various zones within the Sperrgebeit with adequate protection and conservation status.

Figure 2: NamPower Representative with Ministry of Environment, Forestry and Tourism during the site visit in September 2019.

Figure 3: Rotkop- Oranjemund road entrance along B4 national Road.

3.1 Existing Infrastructure in the area

There is an existing Namdeb Radio receiver in close proximity to the proposed site , an existing access track and road will be utilised to access the site. No new access track will be required. The proposed site is approximately 5km from the Rotkop-Oranjemund road.

Figure 4: Existing Tower and Radio Receiver adjacent to the proposed site.

3.2 Soil and topography

The Sperrgebeit environment is fragile and characterised with aridity (Schneider and Walmsley 2004). The study area is mostly sand valley and slightly undulating land surface. Barnard (1998:24) describes the soil in this area as weakly developed and shallow. Vegetation cover will generally be sparse because the soil will not be able to provide plants with sufficient water or nutrients.

Figure 5: Surrounding area

The potential soil impacts in the study area is that the soils in the area are susceptible to erosion and compaction, therefore the disturbance of the soil surface in the vicinity of the wind mast , must be minimised to prevent wind erosion. The footprint of the construction area must be kept small as much as possible and existing access road are to be utilised at all times to avoid off road tracks. The project footprint area should not be cleared entirely and the guy wire anchors must be placed in such a way that surface disturbance is minimised and the site should be rehabilitated after the construction phase.

3.3 Biodiversity

The succulent Karoo ecosystem is the most diverse desert system in the world. There is high plant particularly succulent diversity. According to (MET, 2014) some 1050 species are known to occur in the park, nearly 25% of the entire flora of Namibia on less than 3% of land area of the country. It is for this reason that succulent Karoo is listed amongst the world's 25 biodiversity hotspots. The area is identified as an important plant area for Nambia. According to (Burke and Mannheimer,2004) Sperrgebeit is undoubtedly one of Namibia 's prime plant diversity. During the site visit mostly Bushman Candle dwarf plants and Salsola dwarf plants were observed in the area. To minimise impacts the Ministry of Environment and Tourism or Botanical Garden should be consulted during site establishment to identify protected species that should be avoided in the area or plants requiring relocation.

According to (MET, 2014), the park has a rich but poorly studied diversity of animal life. These include 80 terrestrial ,some 35 coastal and marine birds have been recorded and about 120 terrestrial bird species have been recorded, almost 100 reptiles species and 16 frog species and a great number of insects and other invertebrates, probably 90% or more of the invertebrates yet undescribed to science.

Figure 6 : Typical plants in the surrounding area.

Consequently the proposed site and surrounding areas host significant biodiversity composition, structure and processes, therefore the design and implementation of the project should consider appropriate mitigation measures to mitigate impacts. For example, where possible guy wire anchors should be placed where there are no plants to avoid damaging or clearing plants. The greatest concern with regards to the fauna in the area is the possible interaction between birds and the mast, especially the guy ropes. These issues are mostly related to power line interactions with birds, but due to the fact that the mast will consist of a fair number of guy ropes, similar interactions may be experienced therefore bird monitoring should be considered. Speed limits and safety signs along the Rotkop- Oranjemud road should be adhered to at all times to avoids collisions or driving over reptiles. It is proposed that before and after construction photographic evidence is captured and recorded.

3.4 Climate

The median annual rainfall varies between about 15 and 70mm, is highly unpredictable and rainfall events are equally unlikely in all months of the year. Winter, summer rains occur in the area and Coastal fog plays an important role in the moisture regime of many organisms. EnviroDynamics, 2013 states that Winds are often very strong and occur throughout the year, mainly from the south, although warm north-easterly winds occur sporadically during winter. The north-easterly winds can turn into dust storms condition that can cause damage.

The footprint of the construction area must be kept small as possible to minimise surface distance. The bigger the disturbed area the more dust can be generated onsite due to loose soil or surface. Wind speed during construction must be monitored onsite, to ensure that during high wind no work activities should be conducted on site for personnel safety reasons and environmental factors such dust and poor visibility.

3.5 Visual resource

The natural landscape , when viewed from the perspective of a tourist, can be associated with a serene sense of place. The proposed Wind mast will change the visual environment given the height of the Wind Mast tower at 100m and the aviation warning light may cause some disturbance at night. The other consideration is that tower may interfere with the safe movement of air traffic in the area by introducing a potential obstacle to pilots flying at low levels. The site is remote and away from potential receptors except for the Rotkop-Oranjemund road users.

Therefore the visual impact is largely dependent on the sensitivity of the views and related perspective of visual receptors. The weather conditions such as fog, wind in the area also might play a role in reducing the visual impact of the tower. Application for the wind mast was submitted to Namibia Civil Aviation in May 2020 for approval.

3.6 Archelogy

Archaeological sites provide a snapshot of the past with regards to the way humans lived and interacted with their environments. The area falls within an historically Diamond mining area and some artefacts of historical importance may still be located in the area. Therefore chance finds procedures should be implemented in case of any chance find.

3.7 Socio-Economic Environment

The closest human settlement to the site is Luderitz and Oranjemund, no human habitation is currently taking place on any other site in close proximity to the proposed site. Lüderitz's population is approximately 15,137 and the economy of Luderitz depends heavily on the local fishing industry and the port. The expansion of the waterfront, increased passenger liners and the Crayfish Festival and other tourism activities have contributed to the growth of Lüderitz.

The construction team will be based in Luderitz. As with most parts of Namibia, HIV/Aids is also a significant issue in Lüderitz, therefore awareness sessions must be conducted with construction team prior to the start of the project as part of Safety ,Health and Environmental Induction.

4. PROJECT RATIONAL AND ALTERNATIVES

The Environmental Management Act no 7 of 2007, requires that alternatives for each proposed project needs to be evaluated in order to provide assurance that the decision to develop made by the proponent was carefully considered. Alternative sites were considered , taking into consideration the Tsau//Khaeb (Sperrgebeit National Park's Zonation map and existing road close to the proposed site. The no build option has implications on the ability of Namibia to diversify its electricity generation base and capacity and may hinder the country from embarking on wind generation projects. The true extent of this hindrance can only be determined once the full potential for wind generation in Namibia is understood.

5. LEGAL REQUIREMENTS

All actions going forward should take cognisance of the relevant laws in order to ensure that the project remains within the scope of the law. The following legislation applies as it pertains to the rezoning of any property within Namibia:

The *table 1* provides a summary of the main pieces of national legal requirements which needs to be taken into consideration when the impacts of this proposed project is evaluated and the Environmental Management Plan is developed.

Table 4: Legislation applicable to the proposed development .

Legislation:	*Section applicable:*	*Implications:*

Environmental Management Act no 7 of 2007	• Section 3
	• Section 27
	• Section 33 onwards
	• Section 57
		• All activities performed should be in line with the following principles:
		  ○ Interested and affected parties should have an opportunity to participate in decision making
		  ○ Listed activities should be subject to an EIA
		  ○ Polluter should pay for rehabilitation
		  ○ Pollution should be minimised
		• Environmental assessments should be carried out for listed activities. The proposed activity can be classified under the following range of activities:
		  ○ Land use and transformation
		• These sections details the process to be followed in order to obtain a clearance certificate
		• All existing listed activities must obtain a clearance certificate within one year of the law coming into affect (February 2013). Therefore, all existing activities which can be considered a listed activity should apply for clearance.

EMA Regulations GN 28-30 (GG 4878) (February 2012)	• Listed activity: 5.1 • 6 – 9; 13; 15; 21 -24	• This activity can be considered a rezoning of property from Undetermined to civic • These sections details the process to be followed in terms of producing an Environmental Assessment, and this process should be adhered to during the generation of information for this document

Legislation:	*Section applicable:*	*Implications:*
Diamond Act 13 of 1999 and regulation	• Regulation 13 and 14	• Whenever any person is required to perform a securoty check on an employee or a natural person in terms of section 48(I) (a) of the Act. • Records of employees, contractors and sub-contractor.
Civil Aviation Act 6 of 2016	• 55(c)	• Regulations relating to Safety and Security.
Labour Act no 11 of 2007	• Section 3 • Section 4 • Section 9	• 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
	• Section 39 - 42	• 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	• Conditions in terms of the disposal and management of effluent are to be adhered to • Any person causing pollution to a water source shall be guilty of an offence
Soil Conservation Act no 76 of 1969	• Section 4	• Institutions may be ordered by the relevant Minister to construct soil conservation works when and where necessary.
Public Health Act no 36 of 1919	• Section 122	• It is an offence to cause any form of a nuisance
Water Resources Management Act no 24 of 2004	• Section 56	• 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

Legislation:	*Section applicable:*	*Implications:*
Fertilizer,farm feeds,agricural remidies and stock remmedies act 36 of 1947	• Section 9 and 18	• To regulate or prohobit the importation ,sale,aquisation,disposal or use of fertilisers ,farm feeds,agriculrural remedies and stock remedies.
National Heritage Act 27 of 2004	•	• All archaeological and paleontological objects belongs to the State.
Forestry Act 12 of 20001	• Section 22:	• A person must have the authority in terms of this Act, except for surveyed erven as defined in section 1 of the Local Authorities Act, to cut, destroy or remove: • i) vegetation which is on a sand dune, drifting sand or on any gully unless the reason for doing so is done for the purpose of stabilizing the sand or gully; or • ii) any living tree, bush or shrub growing within a hundred meters of a river, stream or water course.

6. PUBLIC CONSULTATION

Following the identification of site, the following stakeholders were identified, notified and consulted:

- Ministry of Environment and Tourism (Directorate of Wildlife and Parks)
- Namdeb
- Namibian Civil Aviation Authority (application was submiited).
- LEWCOR Group

Copies of the communication documentation between the proponent and the relevant stakeholders are contained in appendixes C. It is the responsibility of NamPower to work closely with the stakeholders throughout the construction and operation to minimise any impacts and manage cordial relations with stakeholders.

7. IMPACT ASSESSMENT AND PRIORITISATION

During the preconstruction and construction phases, it does offer direct and indirect employment opportunities in the receiving communities. However, minor negative impacts in the form of visual intrusion, loss of biodiversity ,dust and noise pollution especially during the preconstruction, construction, operation and rehabilitation phases will be experienced.

The construction phase will take up to 20 Days . As per standard practice, it is expected that the existing access roads will be used.

Table 5 : below provides a list of the anticipated aspects and impacts for this project during construction and operation as well as the type of impacts, duration of these impacts and extent of the listed impacts.

Aspect	Impacts	Type of impact	Duration	Extent
	Construction Phase			
Increased vehicle movement and off tract	• Soil surface disturbance and visual integrity of the area • Disturbance of animals and vegetation	Negative	Long term	Local
Habitat fragmentation	• Animal movement may be restricted	Negative	Long-term	Local
Ecological and biodiversity loss	• Loss of biodiversity.	Negative	Long term	Local
Waste generation	• Increased amount of general and hazardous waste to be managed by NamPower.	Negative	Short term	Local
	• Potential visual impacts as a	Negative	Short term	Local

Aspect	Impacts	Type of impact	Duration	Extent
	result of littering and windblown material			
Dust	• Increased nuisance and health impacts as a result of dust.	Negative	Short term	Local
Noise pollution	• Low noise levels	Negative	Short term	Local
Health and safety	• Injuries to employees	Negative	Short term	Local
Periodic short term influx of people	• Inflow of money to the area	Positive	Short term	Local
Periodic and short term influx of People				
Periodic and short term influx of people in the area	• Increased poaching • Possible HIV/AIDS infections	Negative	Short/Long term	Local
	Operational Phase			
Interference with air traffic	• Airplane collisions with the tower	Negative	Long term	National
Generation of credible national and	• Potential of identifying opportunities	Positive	Long term	National

Aspect	Impacts	Type of impact	Duration	Extent
commercial weather data	for wind resource			
Bird collisions with guy ropes	• Loss of biodiversity	Negative	Long term	Local
Waste generation	• Waste to be managed by NamPower throughout phases.	Negative	Short term	Local
Creation of jobs	• Maintenance of Wind mast equipment.	Positive	Long/short term	Local
Inflow of investment	• Growth in the economy of Lüderitz If data to be collected is bankable	Positive	Long term	Regional/National

8. MANAGEMENT AND MITIGATION

The mitigation measures for the impacts listed above have been discussed in detail in the Environmental Management Plan for this project.

9. TERMS OF REFERENCE-DETAILED ASSESSMENT

Based on the impacts identified in this document, it is the opinion of the author that a detailed impact assessment is not required for this project. Changes to the environment and impacts will be minimal and fleeting in nature and therefore do not warrant the expense of further assessments.

Therefore, detailed assessments have not been planned for this specific development at this present time, but if required by the relevant authorities it is recommended that the recommended specialist assessments be carried out for technical purposes only.

Based on the findings stated previously and current conditions on site, no other specialist input is deemed necessary for this project.

10. CONCLUSION

Based on the evidence produced during the scoping process, it is very unlikely that this project will have significant adverse impacts on the environment. NamPower is confident that this high level scoping report and Environmental Management Plan for the Wind Mast meets the requirements of the Environmental Management Act and will enable the Ministry of Environment and Tourism to make an informed decision on the acceptability of the Lüderitz Wind Mast at the proposed site.

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