

June 2017

Environmental Assessment
(EIA) for two new 132kv
Transmission Lines from the
Kuiseb Substation, via
Walmund Substation up to and
including
the new Sekelduin Substation

Specific Environmental Management Plan



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Project Name	Environmental Assessment (EIA) for two new 132kv Transmission Lines from the Kuiseb Substation, via Walmund Substation up to and including the new Sekelduin Substation
Stage of Report	Draft to Client
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1 INTRODUCTION

1.1 BACKGROUND

The current expansion of mining, marine and industrial development in the Erongo Region has led to an escalation in the demand for electricity and as a result, the Region's transmission network has been subjected to increased pressure. NamPower need to consider strengthening the West Coast network to provide for future load growth (**Figure 1**).

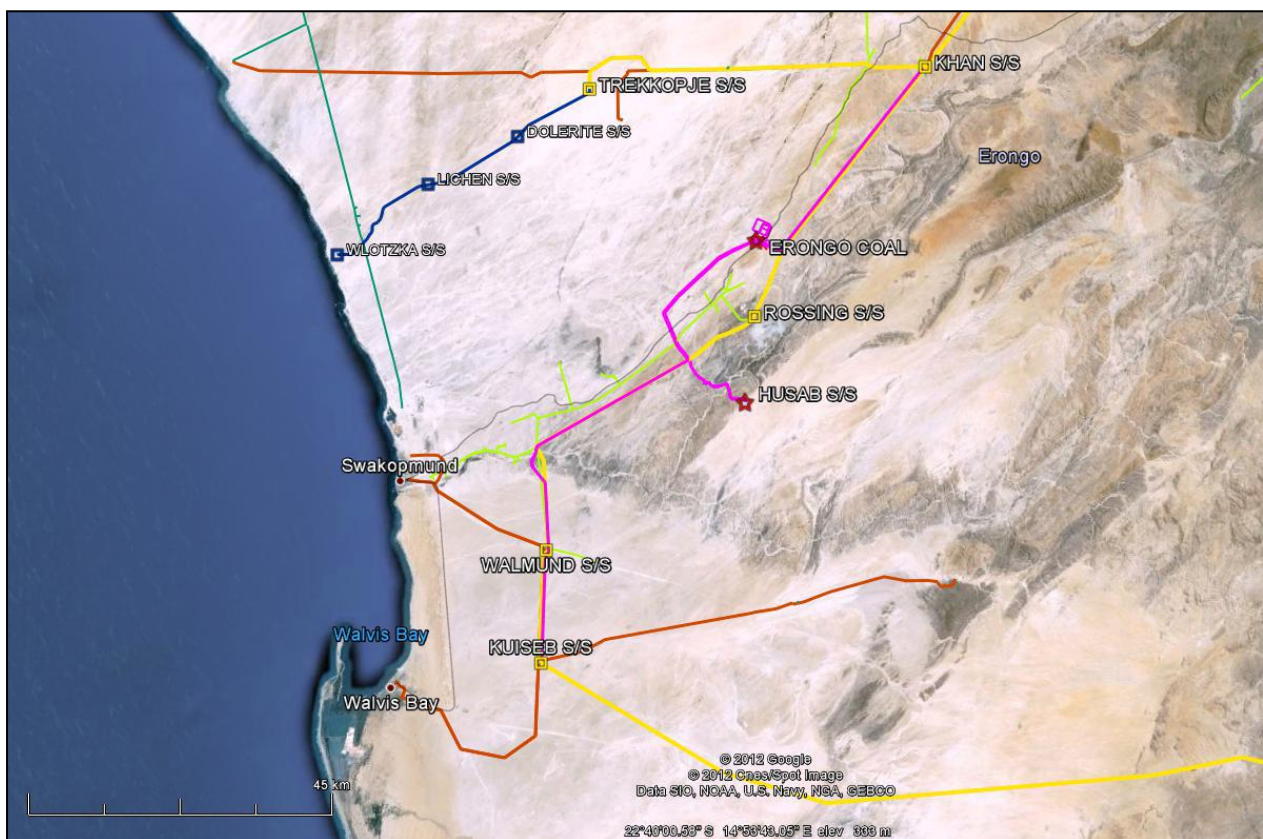


Figure 1: Existing West Coast Transmission network.

For this reason, NamPower intends constructing two new 35km 132kV transmission lines to connect the proposed new NamPower Sekelduin Substation near Swakopmund (approx. 2.7km away) with the existing Kuiseb Substation near Walvis Bay (**Figure 2**).



2 LEGAL REQUIREMENTS

Table 1 below provides the permit and other specific requirements related to the proposed transmission lines and substation.

Table 1: Activities requiring permits in terms of National Legislation

LEGISLATION	REQUIREMENT
Labour Act 11 of 2007	<ul style="list-style-type: none"> Regulations relating to the health and safety of employees at work are contained in GN 156/1997 (GG 1617). Must be complied with on this project.
Forestry Act No 27 of 2004	<ul style="list-style-type: none"> Provision for the protection of various plant species. A photographic index of the sensitive plant species occurring along the power line is contained in Section 3.1. A permit will be needed for removal or destruction of protected species such as <i>Lithops ruschiorum</i>. The forms can be obtained from Mr T. Uahengo in the permit office at the Ministry of Environment and Tourism, Windhoek. A period of three months should be allowed for obtaining this permit. Species and numbers/quantities involved will need to be specified.
Nature Conservation Ordinance 4 Of 1975	<ul style="list-style-type: none"> Permit needed for the removal or destruction of protected species such as <i>Aloe asperifolia</i> and <i>Lithops ruschiorum</i>.
National Heritage Act No 27 of 2004	<ul style="list-style-type: none"> No archaeological/heritage site or cultural remains may be removed, damaged, altered or excavated. Section 48 sets out the procedure for application and granting of permits, such as the permit required in the event of damage to a

Parks Regulations Dorob National Park Civil Aviation Regulations	<p>protected site occurring as an inevitable result of development. Section 51 (3) sets out the requirements for impact assessment.</p> <ul style="list-style-type: none"> Part VI Section 55 Paragraphs 3 and 4 require that any person who discovers an archaeological site should notify the National Heritage Council. Contact: Karl Aribeb (061-244 375)
	<ul style="list-style-type: none"> Regulations for access into the park and allowable activities in the park (Appendix A).
	<ul style="list-style-type: none"> According to Annex 14 of the Civil Aviation Regulations, an application needs to be submitted to this authority, since the proposed structures are within 10km from the Swakopmund and Walvis Bay Aerodromes. <p>The following people in this regard should be contacted:</p> <ul style="list-style-type: none"> Julian P. Gouws Directorate of Civil Aviation, Aerodrome Inspector, 061 702228/0812757830. Chrizelda George Walvis Bay Aerodrome Tel 0811635038 Gerhard Coetzee, Tel Swakopmund Aerodrome Tel 0811279893

3 HABITAT DESTRUCTION

3.1 DESCRIPTION

Table 2: Sensitivities relating to Flora (Source: Mannheimer, 2017) below provides the sensitivities of the area related to habitat and vegetation.

Table 2: Sensitivities relating to Flora (Source: Mannheimer, 2017)

ENVIRONMENTAL FEATURE	DESCRIPTION	SENSITIVITY	POTENTIAL IMPACT
Marble Ridge	Rocky ridges that collect fog and carry more vegetation than the surrounds, often home to plant species of concern. Impossible to rehabilitate.	Somewhat depauperate, probably due to human impacts. (This ridge is not directly along the route, but on the periphery).	Vehicle damage, including bulldozers. (See Figure 3: Sensitive marble ridge near the sekelduin substation.
Gravel Plains and drainage lines	Undulating gravel plains incised by drainage lines where most of the vegetation is concentrated.	Medium	Physical destruction of plant species of conservation concern due to vehicles or harvesting of plants or wood.
Lichen field of the northern Naukluff Plateau	Lichen field with crustose, foliose and fruticose lichens present.	High	Track damage in lichen fields may be regarded as permanent.
Biological and gypsum crusts	Distinct surface crust, with, or without, subsurface blue-green algae present.	High	Track damage to biological and gypsum crusts may be regarded as permanent.

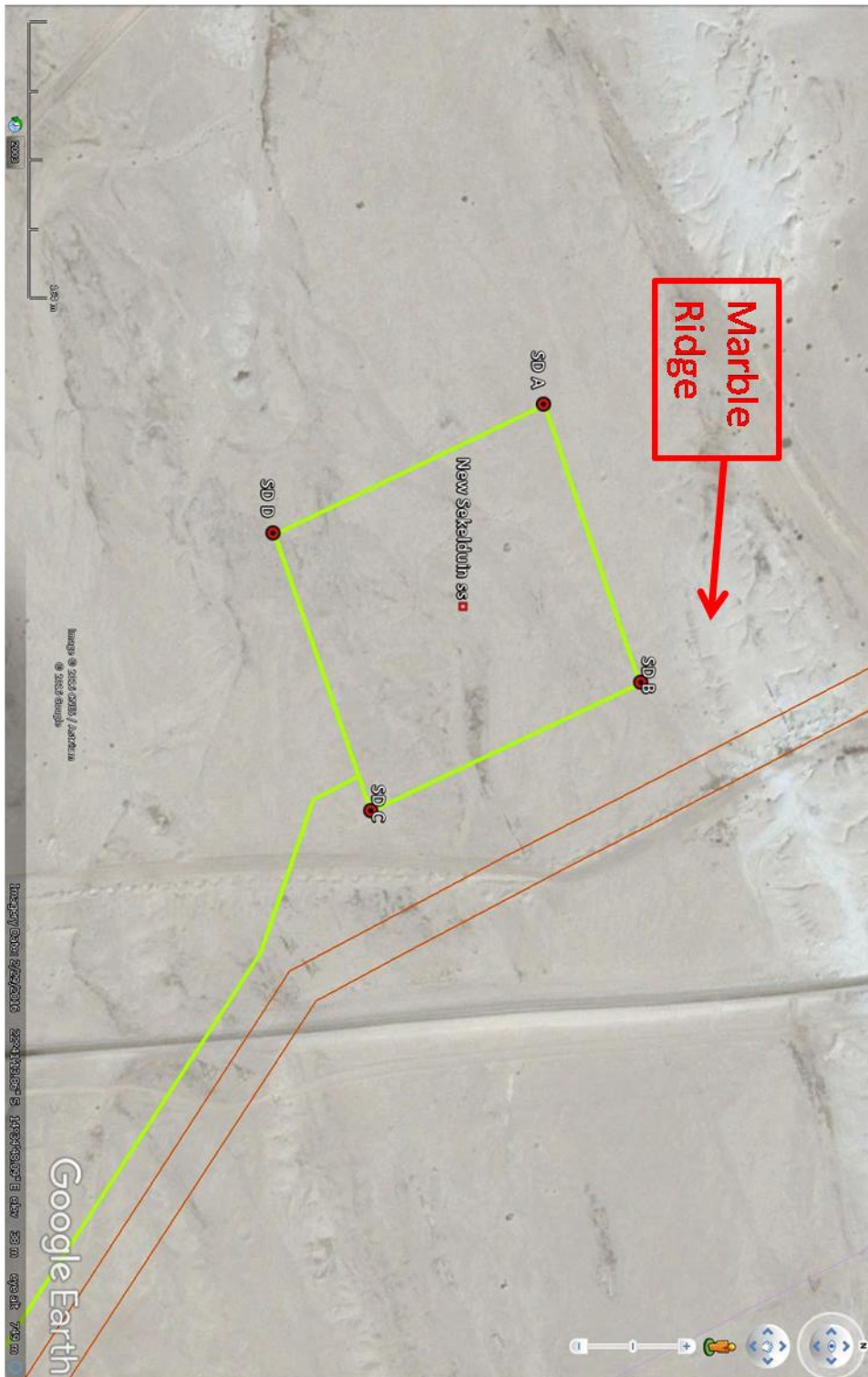


Figure 3: Sensitive marble ridge near the sekelduin substation.

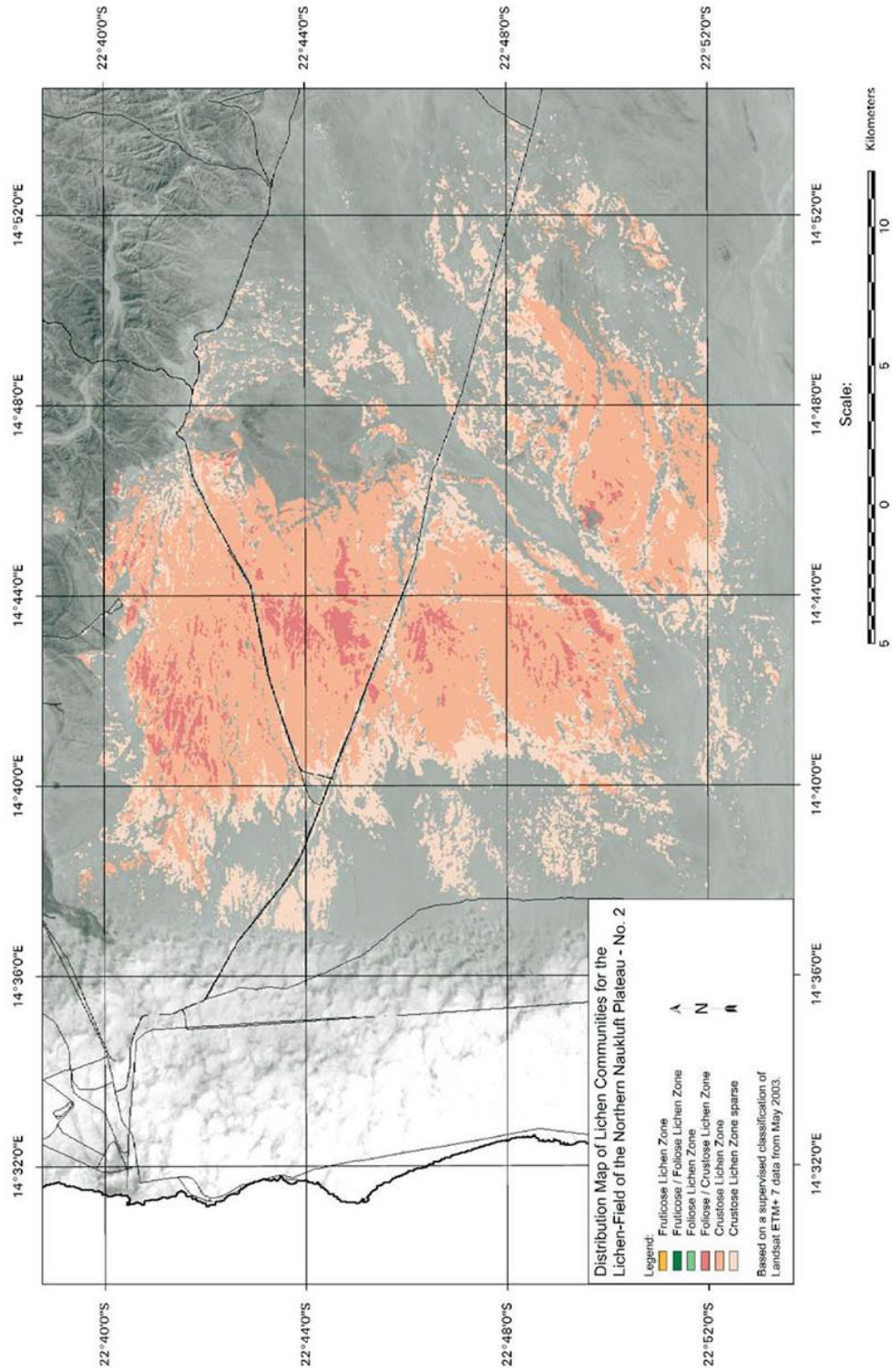


Figure 4: The Northern Naukluft Lichen Field (Shultz, 2006, cited in Mannheimer, 2017)

3.2 MITIGATION AND MANAGEMENT

MITIGATION/MANAGEMENT ACTION	RESPONSIBILITY	PROJECT PHASE
<p>The contractor should submit a track management plan to NamPower's Environmental Section for approval. As a minimum requirement the following should be contained in this plan:</p>	<p>NamPower Contractor</p>	<p>Prior to construction</p>
<ul style="list-style-type: none"> Indicate a single track that will be used during construction. The contractor will be compelled to use that track only. This should be the existing track where feasible. If not feasible, then the additional track needs to be marked and reasons given for why existing tracks cannot be used. 		
<ul style="list-style-type: none"> Only single track crossings will be allowed at drainage lines. No large permanent vegetation, e.g. <i>Acacia reficiens</i> or <i>Boscia foetida</i>, may be removed in the drainage lines. 		
<ul style="list-style-type: none"> Indicate designated turning points in the plan. On site these turning points should be clearly indicated by using wooden droppers. The area used should be constrained. 		
<ul style="list-style-type: none"> Laydown areas should be indicated. It should be minimised in size and number and should be sited in previously damaged areas as far as possible. These should be pegged out on site. 		
<ul style="list-style-type: none"> General track discipline should apply during construction: 	<p>NamPower Contractor</p>	<p>During construction</p>
<ul style="list-style-type: none"> Existing tracks should be preserved by driving slowly and carefully. An applicable speed limit of 20 km/hr should be implemented. 		
<ul style="list-style-type: none"> When turning, make use of 3-point turns instead of circular turns. 		
<ul style="list-style-type: none"> Vehicles driving along the Project Area should engage four wheel drive to prevent spinning and consequent impacts on fragile desert surfaces. 		

MITIGATION/MANAGEMENT ACTION	RESPONSIBILITY	PROJECT PHASE
<ul style="list-style-type: none"> Large vehicles should have right of way and light vehicles should leave the road (at the designated areas) to allow for an oncoming heavy vehicle to pass. 		
<p>Construction and maintenance staff should be educated and informed of their environmental obligations. Include contractual penalty clauses for contractors that stray from the established track.</p>	NamPower, Contractor	Before and during construction
<p>Damage outside of the designated areas should not be allowed. In instances where this is unavoidable (and after obtaining approval from NamPower) tracks should be planned carefully, keeping the type of vehicles that will be using those tracks and activities to be performed along those tracks in mind so as to prevent unnecessary or double tracks.</p>	Contractor With approval from NamPower	During construction
<p>In instances where additional damage outside of the designated areas is unavoidable, rehabilitation should be carried out as a last resort:</p> <ul style="list-style-type: none"> Compacted areas should be ripped by using picks, brooms and rakes, avoiding parallel furrows that will promote erosion. The disturbed area should be remodelled to, as far as possible, resemble previous conditions and fit in with the adjacent landscape Soil and gravel should be raked from adjacent areas to try and recreate the same texture and look as surrounding areas. Stones should be redistributed with rakes so that the surface texture resembles the surroundings. Where applicable, surfaces should be swept using brooms to fill in the spaces between the stones with the fine sand and to remove visible borders and edges. In order to prevent re-disturbance of rehabilitated tracks, physical barricades (e.g. rocks or sign boards) should be implemented as an interim deterrent. 	Contractor With approval from NamPower	In the final stages of construction

MITIGATION/MANAGEMENT ACTION	RESPONSIBILITY	PROJECT PHASE
<ul style="list-style-type: none"> The pylon sites should be carefully surveyed and placed prior to construction. Movement should only occur within those designated areas. The marble ridge north of the Sekelduin substation is designated a 'no-go area'. No construction vehicles or staff or any movement or whatsoever is to be allowed in that area. 	NamPower and the contractor	Before construction
<ul style="list-style-type: none"> Construction crews should be housed in Swakopmund or Walvis Bay. 	Contractor	Before and during construction, during maintenance
<ul style="list-style-type: none"> Harvesting of plants and firewood is forbidden. 	Contractor	Before and during construction, during maintenance
<ul style="list-style-type: none"> It is prohibited to remove any vegetation within 100m from a drainage line. Drainage lines should therefore be treated with the utmost respect since this is where sparse vegetation in the area is concentrated. Vehicle movement near and in drainage lines should be limited to crossing them in areas where there are already tracks. 	Contractor	Before and during construction, during maintenance

3.3 MONITORING

MITIGATION/MONITORING ACTION	RESPONSIBILITY	SCHEDULE
Fixed point photography, done along sections where compliance is important (such as the lichen field and the marble risge) and at other random but fixed points.	NamPower	Prior to construction
These points should be reassessed by the environmental section of NamPower.	NamPower	Once before, during and after the construction and decommissioning phases

4 BIRDS

4.1 DESCRIPTION

The specialist study for this EIA provides a list of species potentially at risk from the proposed transmission line. Of these, 14 are considered priority species and include Ludwig's Bustard, Maccoa Duck, Martial Eagle, Great and Lesser Flamingo, Black-necked Grebe, Rüppell's Korhaan, Gray's Lark, Great White Pelican, Namaqua Sandgrouse, South African Shelduck, Cape Shoveler, Black-chested Snake-Eagle, and the Lappet-Faced Vulture.

The potential impact with the key significance related to birds is collisions of birds with the power lines leading to bird mortalities. Habitat destruction and poaching is also of concern and management measures in this regard have been provided in the previous section.

Figures 5 and 6 below show where along the power lines are the drainage lines where potential bird collisions are particularly of concern.



Figure 5: Three major drainage lines (green markers: 1a to 1b; 2a to 2b; 3a to 3b) running south-north from Kuiseb Substation to Walmund Substation on the proposed power line route (based on a Google earth map, in African Conservation Services, 2017.)

June 2017

Transmission Lines Kuiseb to the new Sekelduin substation via Walmund substation
Specific Environmental Management Plan (EMP)

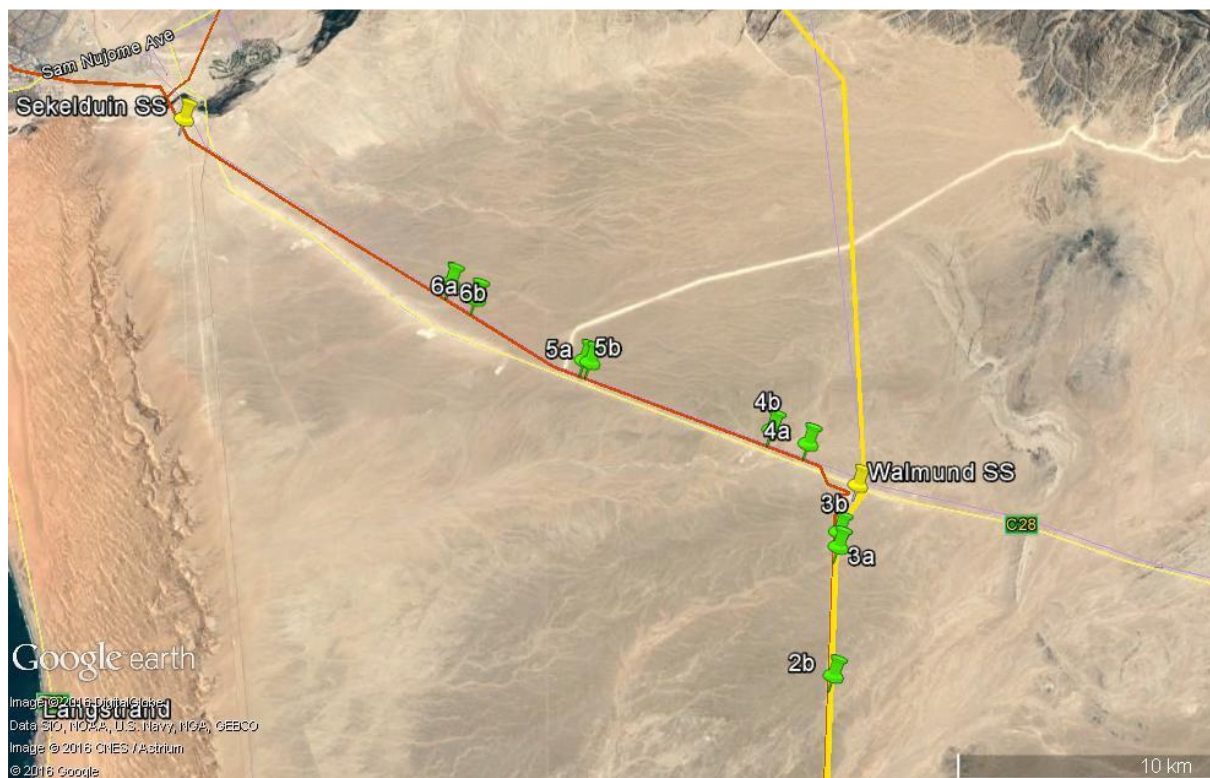


Figure 6: Three major drainage lines (green markers: 4a to 4b; 5a to 5b; 6a to 6b) running north-westwards from Walmund Substation to Sekelduin Substation on the proposed power line route (based on a Google earth map, given African Conservation Services, 2017).

4.3 MITIGATION AND MANAGEMENT

MITIGATION/MONITORING ACTION	RESPONSIBILITY	SCHEDULE																		
<p>The six major drainage lines, as indicated in Figure 5 Figure 6, should be proactively marked as both a diurnal and nocturnal mitigation for collisions. Marking should be done according to the GPS coordinates given below, as well as a further 0.3-0.5 km on either side. The design should comprise alternating Ribe flappers (Figure 7) alternating with large Double Loop Bird Flight Diverters (BFDs; made by Preformed Line Products [PLP]; Figure 8) in order to increase the visibility of the line. The BFDs should be alternating black and white. For the Kuiseb-Walmund line, marking should take place on the westernmost power line on the earth (OPG) wire at 10 m; and for the Walmund-Sekelduin line, on both the northern and southern earth wires.</p>	<p>NamPower</p>	<p>Planning phase Construction</p>																		
<p>Kuiseb Substation to Walmund Substation</p> <table border="1" data-bbox="193 965 981 1099"> <tbody> <tr> <td>1</td> <td>22.906181S 14.723931E</td> <td>22.885016S 14.725327E</td> </tr> <tr> <td>2</td> <td>22.866377S 14.726574E</td> <td>22.811626S 14.730116E</td> </tr> <tr> <td>3</td> <td>22.783626S 14.731961E</td> <td>22.780422S 14.732167E</td> </tr> </tbody> </table> <p>Walmund Substation to Sekelduin Substation</p> <table border="1" data-bbox="193 1196 981 1323"> <tbody> <tr> <td>4</td> <td>22.761107S 14.725409E</td> <td>22.757977S 14.716969E</td> </tr> <tr> <td>5</td> <td>22.742375S 14.674425E</td> <td>22.741885S 14.673187E</td> </tr> <tr> <td>6</td> <td>22.727933S 14.647807E</td> <td>22.724506S 14.641929E</td> </tr> </tbody> </table>			1	22.906181S 14.723931E	22.885016S 14.725327E	2	22.866377S 14.726574E	22.811626S 14.730116E	3	22.783626S 14.731961E	22.780422S 14.732167E	4	22.761107S 14.725409E	22.757977S 14.716969E	5	22.742375S 14.674425E	22.741885S 14.673187E	6	22.727933S 14.647807E	22.724506S 14.641929E
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6	22.727933S 14.647807E	22.724506S 14.641929E																		
<p>Before construction starts, inspect proposed power line routes for any signs of nests (raptors, ground-nesting species such as Ludwig's Bustard, Gray's Lark and other species). If possible try to avoid disturbing breeding birds.</p>	<p>NamPower Contractor</p>	<p>Prior to construction</p>																		
<p>Enforce anti-poaching measures strictly (for birds and also other fauna), and this should be emphasised during induction to contractors. If there is reason to believe poaching may be taking place, enlist the services of the Ministry of Environment and Tourism or the police to investigate further</p>	<p>NamPower, Contractor</p>	<p>Throughout the whole project</p>																		
<p>Promote on-going awareness about the negative impacts of disturbance, especially to breeding birds; and of poaching.</p>	<p>NamPower, Contractor</p>	<p>Throughout the whole project</p>																		



Figure 7: Example of a fluorescent black and white flapper (made by Ribe), as both a diurnal and nocturnal mitigation for collisions (Source: African Conservation Services, 2017).

Double Loop Bird Flight Diverter

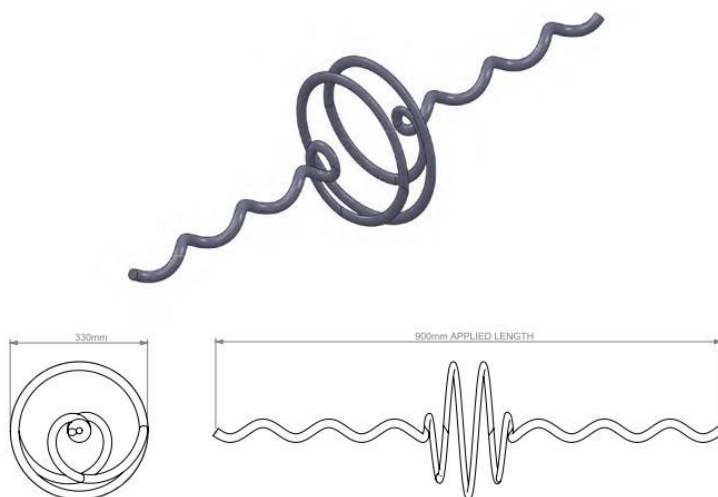


Figure 8: Double Loop Bird Flight Diverter (BFD) made by Preformed Line Products, as a mitigation for collisions (Source: African Conservation Services, 2017).

4.4 MONITORING

The following monitoring should be initiated by NamPower, supported by the NamPower-NNF Strategic Partnership.

MITIGATION/MONITORING ACTION	RESPONSIBILITY	SCHEDULE
Ensure that the entire power line route and the substation site are monitored in an acceptable way for any signs of bird mortalities resulting from the construction and operation of the line.	NamPower	Regular dedicated monitoring patrols should be carried out once a month for at least the first year after construction, and thereafter at least once per quarter.
Record all bird mortalities on a standardised form, with the GPS coordinates and power line structure and other details, and photographs of the carcass (especially the head of the bird), power line structure and general habitat; forward a copy of each report to the NamPower/NNF Strategic Partnership for further investigation.	NamPower	As above.
Monitor the effectiveness of mitigation measures; retrofit further mitigation if further problem areas are identified, and replace devices as and when necessary.	NamPower	As necessary
Monitor perching activities of live birds on power line structures. Include space for such sitings on the above form and report with the above initiative.	NamPower	As above schedule.

5 VISUAL IMPACT

During the planning phase, an appropriate colour should be chosen for the Sekelduin Substation which blends with the environment. It is recommended that a colour with a blue hue be selected, since these colours are less obtrusive.

6 STAKEHOLDER COMMUNICATION

Appendix B contains the stakeholders list of the project.

An application needs to be submitted to the Civil Aviation Authority since the proposed transmission lines are within 10km from the closest Aerodrome. This applies to the proposed Kuiseb and Sekelduin ends of the line, i.e. for Walvis Bay and Swakopmund Aerodromes.

The following people in this regard should be contacted:

1. Julian P. Gouws Directorate of Civil Aviation, Aerodrome Inspector, 061 702228/0812757830.
2. Chizelda George Walvis Bay Aerodrome Tel 0811635038
3. Gerhard Coetzee, Tel Swakopmund Aerodrome Tel 0811279893

The following parties should be contacted when construction for the project will start:

- Ministry of Environmental and Tourism: Parks and Wildlife Management Swakopund
- NamPower-NNF Partnership
- Erongo Regional Council

Close contact is to be kept with these parties throughout construction. MET is the competent authority, and it is crucial that they be kept abreast of progress. Should any concerns arise from any of the parties, or any new parties, this needs to be addressed timeously and through an appropriate grievance process.

7 ARCHAEOLOGY

7.1 DESCRIPTION

During the previous study conducted by Dr John Kinahan in this area, a few archaeological sites were found in close proximity to the proposed project area. The sites consist of outcrops, which provided temporary impoundments of water in natural rock hollows – an important resource for pre-colonial hunter-gatherer communities. These sites are not archaeological occupation sites and are therefore not considered particularly significant. It nonetheless provides evidence of human activity in the area and Kinahan (2012) therefore states that there is a moderate possibility that new archaeological sites will be exposed in the course of construction work. The study of 2012 is also applicable to this current study.

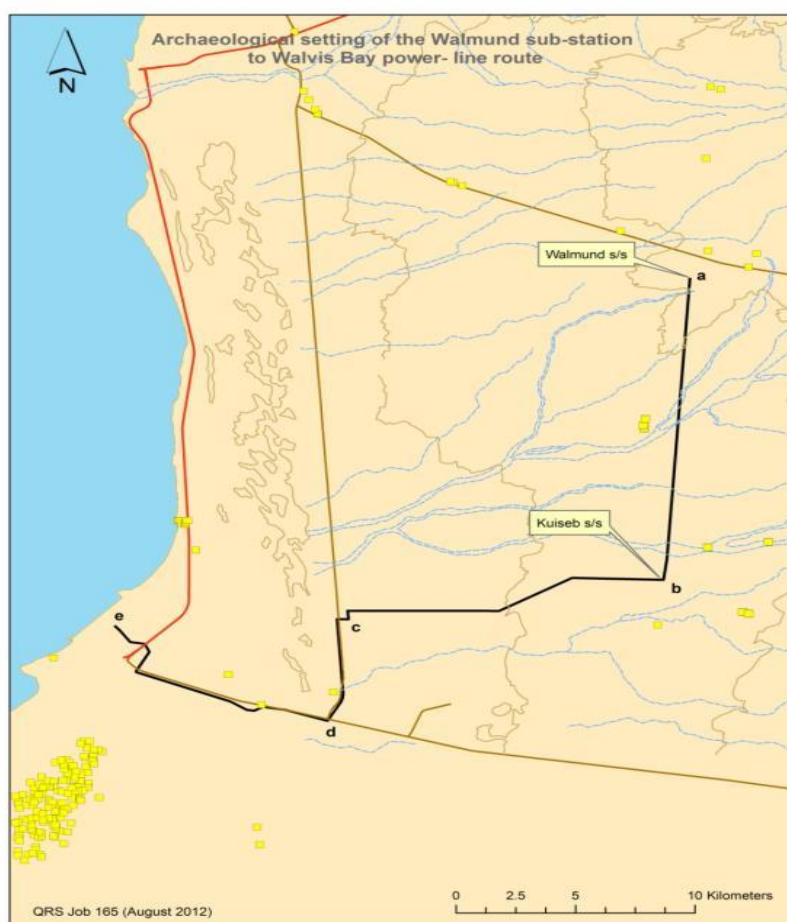


Figure 9: Location of nearby archaeological sites in relation to the proposed power line route.

7.2 MITIGATION AND MANAGEMENT

MITIGATION/MONITORING ACTION	RESPONSIBILITY	SCHEDULE
<p>Should a heritage site or archaeological site be uncovered or discovered during the construction phase of the project, a "change find" procedure should be applied. The details of this procedure are highlighted below:</p>	NamPower	When necessary.
<ul style="list-style-type: none"> • If operating machinery or equipment stop work • Identify the site with flag tape • Determine GPS position if possible • Report findings to foreman 	Person identifying archaeological or heritage material	
<ul style="list-style-type: none"> • Report findings, site location and actions taken to superintendent • Cease any works in immediate vicinity 	Foreman	
<ul style="list-style-type: none"> • Visit site and determine whether work can proceed without damage to findings • Determine and mark exclusion boundary • Site location and details to be added to project GIS for field confirmation by archaeologist 	Super intendant	
<ul style="list-style-type: none"> • Inspect site and confirm addition to project GIS • Advise the National Heritage Council (NHC) and request written permission to remove findings from work area • Recovery, packaging and labelling of findings for transfer to National Museum 	Archaeologist	
<p>Should human remains be found, the following actions will be required:</p> <ul style="list-style-type: none"> • Apply the change find procedure as described above. • Schedule a field inspection with an archaeologist to confirm that remains are human. • Advise and liaise with the NHC and Police • Remains will be recovered and removed either to the National Museum or the National Forensic Laboratory. 	Archaeologist NHC Police	When necessary.