FRESHWATER ASSESSMENT FOR THE PROPOSED CONSTRUCTION OF A 132KV TRANSMISSION LINE FROM THE NORTH WIND ENERGY FACILITIES ON THE EASTERN PLATEAU (DE AAR 2) TO THE HYDRA SUBSTATION NEAR DE AAR, NORTHERN CAPE

MARCH 2014

Prepared for:

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EXECUTIVE SUMMARY

Longyuan Mulilo De Aar 2 North Pty Ltd proposes to construct a 132kV overhead power line in order to connect a 140MW Wind Energy Facility (North) to be developed to the east of De Aar, Northern Cape to the national transmission grid via the Hydra substation.

The proposed power line between the Hydra and the 132kV substation north east of De Aar will potentially impact on the following freshwater features:

- *Brak River which is considered to be in a moderately modified condition and of a moderate ecological importance and sensitivity*
- *Vet Laagte River, a tributary of the Brak River which is considered to be in a moderately modified condition and of a low ecological importance and sensitivity;*
- *Maatjes Fountain River, a tributary of the Brak River which is considered to be in a largely natural condition and of a moderate ecological importance and sensitivity; and*
- *Minor ephemeral tributaries of the Brak River System which are generally considered to be in a largely natural condition and of a low ecological importance and sensitivity.*

Due to the existing disturbance caused by the power lines already crossing this floodplain, the significance of the proposed route should be low provided that the following mitigation measures are implemented:

- *The new line should be located as close as possible to the existing lines and the increase in the footprint of these lines within floodplain should be minimised as far as possible.*
- *Due to the wide and erosive nature of the Brak River, the proposed transmission line should be located as far north of the river channel as possible and specifically downstream of the existing erosion control wall in the river.*
- *The existing road infrastructure should be utilized as far as possible to minimize the overall disturbance created by the proposed project, specifically within the floodplain areas and stream channels.*
- *Where access routes need to be constructed within the stream channels, disturbance of the channels should be limited and all crossings within the drainage channels or stream beds should be such that the flow within the drainage channel is not impeded. Any disturbed areas should be rehabilitated to ensure that these areas do not become subject to erosion or invasive alien plant growth.*
- *To reduce the risk of erosion, particularly within the Maatjes Fountain tributary on the hill side of the plateau, any new service/ access roads should be contoured along the steep slope or erosion protection walls constructed. Run-off over the exposed areas should be mitigated to reduce the rate and volume of run-off and prevent erosion occurring within the freshwater features and drainage lines.*

- *It is recommended that there be minimal disturbance specifically within the river channel and that no poles/towers be placed within 30m of the top of bank of the well-defined Brak and Maatjes Fountain river channels and 30m from the centre of the channel for the less defined stream crossings (Vet Laagte River and tributaries of the Maatjes Fountain River).*

- *Any contaminated runoff from the construction sites should be prevented from entering the rivers/streams. All materials on the construction sites should be properly stored and contained. Disposal of waste from the sites should also be properly managed. Construction workers should be given ablution facilities at the construction sites that are located at least 100m away from the river/stream systems and regularly serviced. These measures should be addressed, implemented and monitored in terms of the Environmental Management Plan for the construction phase.*

- *All crossings over drainage channels or stream beds after the construction phase should be rehabilitated such that the flow within the drainage channel is not impeded.*

- *Maintenance of infrastructure related to the project should only take place via the designated access routes.*

- *Disturbed areas along the access routes should be monitored to ensure that these areas do not become subject to erosion or invasive alien plant growth.*

A water use authorization application may need to be submitted to the Department of Water Affairs Northern Cape Regional Office for approval of the water use aspects of the proposed activities. It is likely that the proposed activity can be authorised by means of the General Authorisation

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1. BACKGROUND

Longyuan Mulilo De Aar 2 North Pty Ltd proposes to construct a 132kV overhead power line in order to connect a Wind Energy Facility to be developed to the east of De Aar, Northern Cape to the national transmission grid via the Hydra substation which is situated south-east of the town (Figure 1). The WEF to be developed is the 100.5MW Proposed Longyuan Mulilo De Aar 2 North WEF on the Eastern Plateau near De Aar.

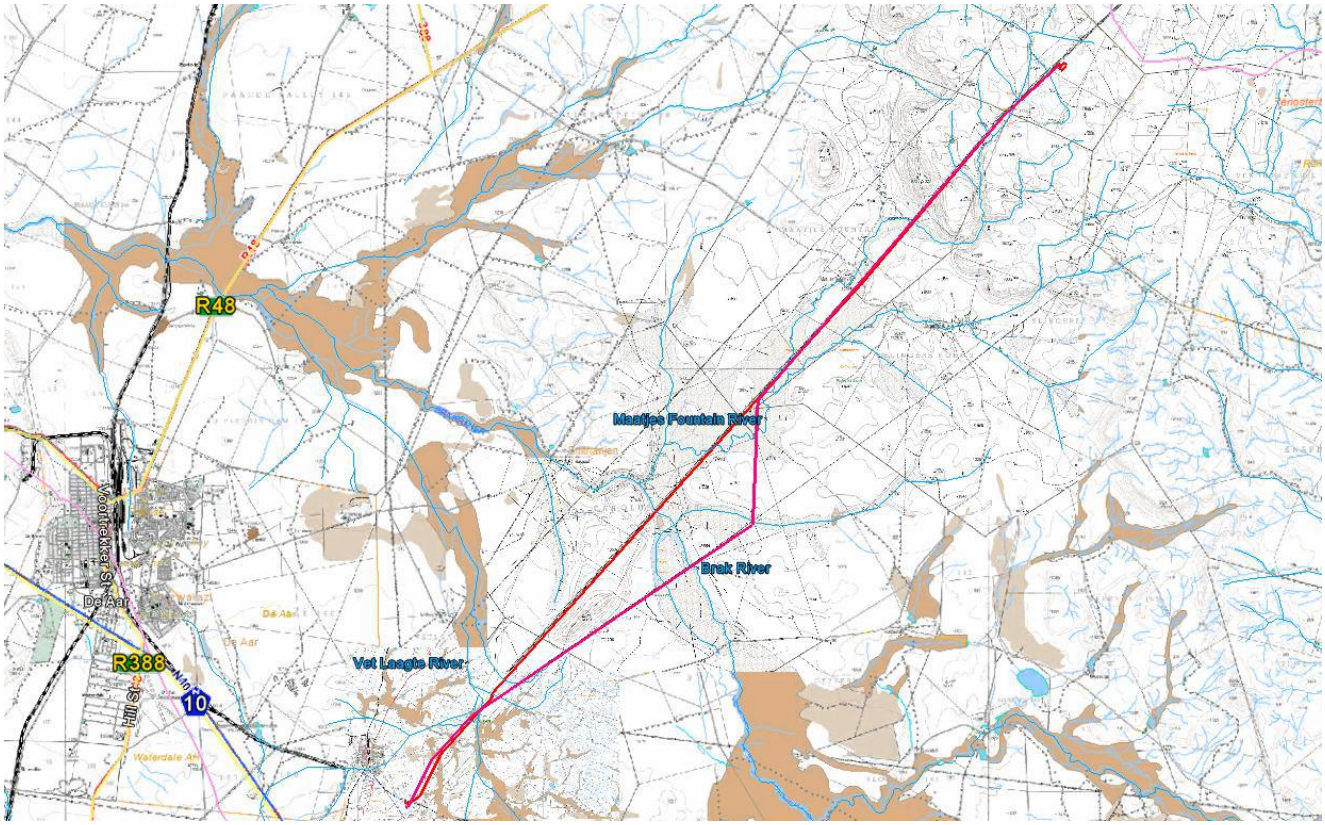


Figure 1. Locality map of the proposed transmission line (red line) and the alternative route (pink line)

2. TERMS OF REFERENCE

The specialist terms of reference for the freshwater specialist study are as follows:

Undertake the requisite field work and compile a report which includes the following aspects:

- Summary of available information pertaining to surface water (streams, dams and wetlands) in close vicinity to the sites;
- Undertake water quality and biotic assessments/ sampling for stream, wetland and dam condition assessments;

- Describe and determine importance, functionality and trophic state of the water resources;
- Assess the potential impact of the change in site hydrology (quantity) and water chemistry (quality) on any streams, dams and wetlands during the construction and operational phases;
- Evaluate (a) magnitude, frequency of occurrence, duration and probability of impacts, (b) the local, regional, and national significance of predicted impacts, (c) the level of confidence in findings relating to potential impacts, (d) the degree to which the impact can be reversed, and (e) cumulative impacts that may occur as a result of the activities which include mining and associated overburden dumping;
- Recommend mitigation measures aimed at minimising the potential negative impacts and enhancing potential positive impacts while retaining reasonable operational efficiencies;
- List additional or required permitting and/or licensing requirements; and
- Take cognisance of the Wetland Delineation Guideline Document of the Department of Water, and if applicable the DEA&DP draft guideline: "Guideline for involving biodiversity specialists in EIA processes".

3. APPROACH TO THE STUDY AND STUDY LIMITATIONS AND ASSUMPTIONS

Input into this report was informed by a combination of desktop assessments of existing freshwater ecosystem information for the study area and catchment, as well as by a more detailed assessment of the freshwater features at the various proposed sites. Aquatic Ecosystem Health assessments were carried out to provide information on the ecological condition and ecological importance and sensitivity of the river and wetland systems to be impacted. The river health and wetland health assessments were carried out using nationally developed methodologies.

The site was visited in December 2012 and again in March 2014. During the field visit, the characterisation, mapping and integrity assessments of the freshwater features were undertaken. This information/data was used to inform the potential impact of the proposed activities as well as the recommended mitigation measures.

Limitations and uncertainties often exist within the various techniques adopted to assess the condition of ecosystems. The following techniques and methodologies were utilized to undertake this study:

- Analysis of the freshwater ecosystems was undertaken according to nationally developed methodologies and was undertaken at a rapid level which was considered a suitable level of evaluation for this freshwater impact assessment.

4. USE OF THIS REPORT

This report reflects the professional judgment of its authors. The full and unedited content of this should be presented to the client. Any summary of these findings should only be produced in consultation with the authors.

5. OVERVIEW OF THE PROPOSAL

5.1. OVERVIEW OF THE STUDY AREA

The proposed transmission line starts at the Hydra substation is located approximately 10 km south-east of De Aar in the Northern Cape Province and within the boundaries of the Emthanjeni Local Municipality. The proposed route follows a north easterly direction towards Phillipstown for approximately 25.5 km. The broader landscape consists of predominantly flat lowlands which rise up to the eastern plateau to the east of De Aar. The main water features in the area consist of tributaries of the Brak River, a tributary within the Orange River System. Most of the land surrounding De Aar is undeveloped and only utilised for grazing of sheep, cattle, goats, ostriches or game such as springbok.

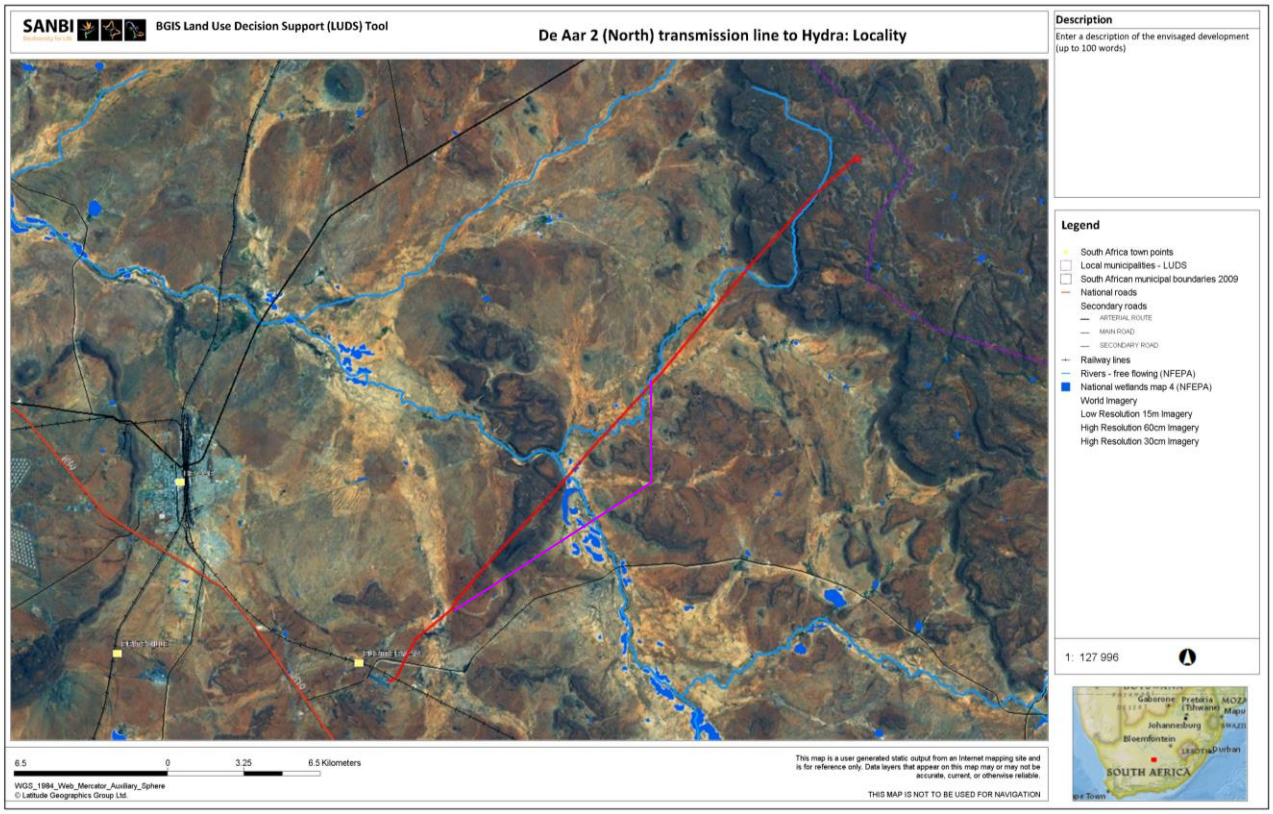


Figure 2. Locality map for the study area (SANBI Biodiversity GIS, 2014), with the proposed transmission line (red line) and the alternative route (pink line)

5.2. ACTIVITY DESCRIPTION

Longyuan Mulilo De Aar 2 North Pty Ltd proposes to construct a 132kV overhead power line in order to connect a 140MW Wind Energy Facility to the national transmission grid via the Hydra substation (Figure 1). Details of the transmission lines are provided below:

1. Route (length): Approximately 25.5km
2. Type of tower(s): – Steel monopole structure weighing approximately 1 200 kg each and vary in height from approximately 17.4 m to 21 m.
3. Tower sizes and positions: Will only be determined once the project has received Environmental Authorisation and after negotiations with landowners.
4. Tower footprint size: Ranges from 0.6 m x 0.6 m to 1.5 m x 1.5 m, with the larger footprint associated with the guyed suspension and angle strain pole used as bend/strain structures. The self-supporting structure (suspension pole) is typically used along the straight sections of the power line, while the guyed intermediate or guyed suspension and angle strain structures are used where there is a bend in the power line alignment.
5. Span between two towers: On average 200 m, but can vary between 250 m and 375 m depending on the ground profile (topography) and the terrain to be spanned.
6. Servitude width: The servitude width for a 132 kV Sub-transmission line is 31 m (15.5 m on either side of the centre line of the power line). If 2 lines it will be 21m line separation with 15.5 m either side (52m)
7. Associated infrastructure: Existing roads to be used (distances) and 4x4 jeep tracks required for access to transmission route only where no roads currently exist.
8. Alternatives:
    - Technologies – There is currently no feasible alternative technologies to connect wind energy facilities to the electrical grid.
    - Layout / spacing - An alternative route has been considered. The placement of the power line towers and any associated infrastructure will be required to be in line with the WEF technical requirements, Eskom's technical requirements, as well as with specific landowner requirements. Layout/spacing alternatives will be negotiated within the broader corridor being considered for the power lines.

5.3. LEGAL REQUIREMENTS

The following Acts, regulations and ordinances are applicable to the development:

THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT (NEMA), ACT NO. 107 OF 1998

Chapter Seven of the NEMA states that:

"Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment".

The Act also clearly states that the landowner, or the person using or controlling the land, is responsible for taking measures to control and rectify any degradation. These may include measures to:

"(a) investigate, assess and evaluate the impact on the environment;

(b) inform and educate employees about the environmental risks of their work and the manner in which their tasks must be performed in order to avoid causing significant pollution or degradation of the environment:

(c) cease, modify or control any act, activity or process causing the pollution or degradation:

(d) contain or prevent the movement of pollutants or degradation: or

(e) eliminate any source of pollution or degradation: or

(f) remedy the effects of the pollution or degradation."

NEMA BASIC ASSESSMENT REGULATIONS, GN R543 OF 2010

Activities listed in terms of Chapter 5 of NEMA in Government Notice No. R. 544, 545 and 546 trigger a mandatory Basic Assessment, or even a full scoping EIA process, prior to development.

NATIONAL WATER ACT, 1998 (NWA), ACT NO. 36 OF 1998

The purpose of the NWA is to provide a framework for the equitable allocation and sustainable management of water resources. Both surface and groundwater sources are redefined by the Act as national resources which cannot be owned by any individual, and rights to which are not automatically coupled to land rights, but for which prospective users must apply for authorisation and register as users. The National Water Act also provides for measures to prevent, control and remedy the pollution of surface and groundwater sources.

REGULATIONS REQUIRING THAT A WATER USER BE REGISTERED, GN R.1352 (1999)

Regulations requiring the registration of water users were promulgated by the Minister of the Department of Water Affairs (DWA) in terms of provision made in section 26(1)(c), read together with section 69 of the National Water Act, 1998. Section 26(1)(c) of the Act allows for registration of all water uses including existing lawful water use in terms of section 34(2). Section 29(1)(b)(vi) also states that in the case of a general authorisation, the responsible authority may attach a condition requiring the registration of such water use. The Regulations (Art. 3) oblige any water user as defined under section 21 of the Act to register such use with the responsible authority and effectively to apply for a Registration Certificate as contemplated under Art.7(1) of the Regulations.

GENERAL AUTHORISATION IN TERMS OF S. 39 OF THE NATIONAL WATER ACT, GN R 1199 OF 2009

Government Notice R1199 was issued as a revision of the General Authorisations (No. 1191 of 1999) for Section 21 (c) and (i) water uses as defined under the National Water Act (Act 36 of 1998). The revision was published and came into effect on 2009/12/18. According to the preamble to Part 6 of the National Water Act, "*This Part establishes a procedure to enable a responsible authority, after public consultation, to permit the use of water by publishing general authorisations in the Gazette...*"

"The use of water under a general authorisation does not require a licence until the general authorisation is revoked, in which case licensing will be necessary…"

The authorisation of water use activities for Sections 21 (c) - change to the bed, banks and characteristics of a water course and 21 (i) - impeding and diverting the flow, will need to be applied for. It is likely that the proposed activities will fall within the listed activities that can be Generally Authorised at the Northern Cape Regional Office of the Department of Water Affairs, however an application for authorisation of the proposed activities will need to be submitted to them for confirmation that this is the case.

6. AQUATIC SYSTEMS IN THE STUDY AREA

6.1. DESCRIPTION OF THE STUDY SITE

A. PHYSICAL CHARACTERISTICS

The proposed project is located east of the town of De Aar, in the Northern Cape Province. De Aar was established in 1903 and derives its name refers from the water-bearing arteries that occur underground. The surrounding area is characterised by wide open plains and low hills, with sparse settlements and predominately wide open spaces. The Eastern Plateau is located approximately 20km to the east of the town. The natural vegetation cover is generally dominated by sparse dwarf karroid scrub and tufted grass with bare patches of sand in between.

Figure 3. A view of the De Aar area, with the flat low-lying areas in the fore-ground and the eastern plateau in the background

B. CLIMATE

De Aar normally receives about 196mm of rain per year, mostly during autumn. The lowest rainfall (8mm) usually occurs in August and the highest (49mm) in January and March. The average midday temperatures for De Aar range from 16°C in June to 30.3°C in January. The region is the coldest during July when the mercury drops to 3°C on average during the night.

Figure 4. Average monthly rainfall for the area (Worldweatheronline.com, 2014)

C. GEOLOGY AND SOIL

The geology of the study area can be described as being underlain by flat-lying sedimentary rocks of the Karoo Supergroup, which have been intruded by innumerable sills and dykes of dolerite.

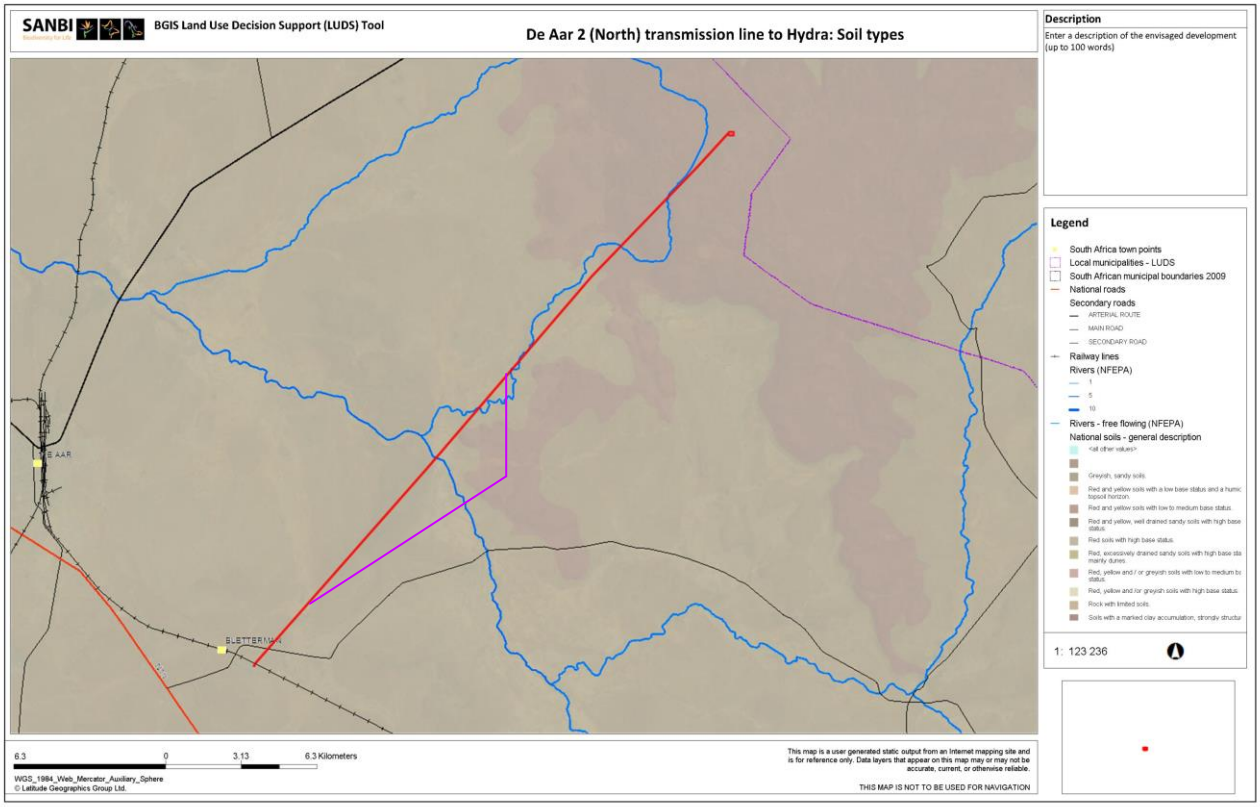


Figure 5. Soil map for the area (SANBI Biodiversity GIS, 2014), with the proposed transmission line (red line) and the alternative route (pink line)

The overlying soils for much of the area surrounding De Aar are primarily red soils of a restricted soil depth, excessive drainage, high erodibility and low fertility. The higher lying areas of the plateau are shallow with rock. These areas are water recharge areas.

D. FLORA

The study area lies near the eastern edge of the Nama Karoo biome, and is mapped according to the national vegetation types (2006) as being predominantly of the vegetation type Northern Upper Karoo (Pink areas in Figure 6) which is considered to be least threatened. The vegetation cover is generally dominated by sparse dwarf karroid scrub and tufted grass with bare patches of sand in between. The higher lying, rocky outcrops are covered by Besemkaree Koppies Shrubland (Orange areas in Figure 6) which is also considered to be least threatened. Portions of the area are in a disturbed condition, mostly as a result of livestock grazing. There is however little presence of invasive alien plants.

Along the Brak River Tributaries within the study area there is very little to no discernible riparian vegetation. The Brak River consists of a wide braided channel with pockets of wetland areas that are dominated by the common reed *Phragmites australis* (Figure 7 and 8 respectively).

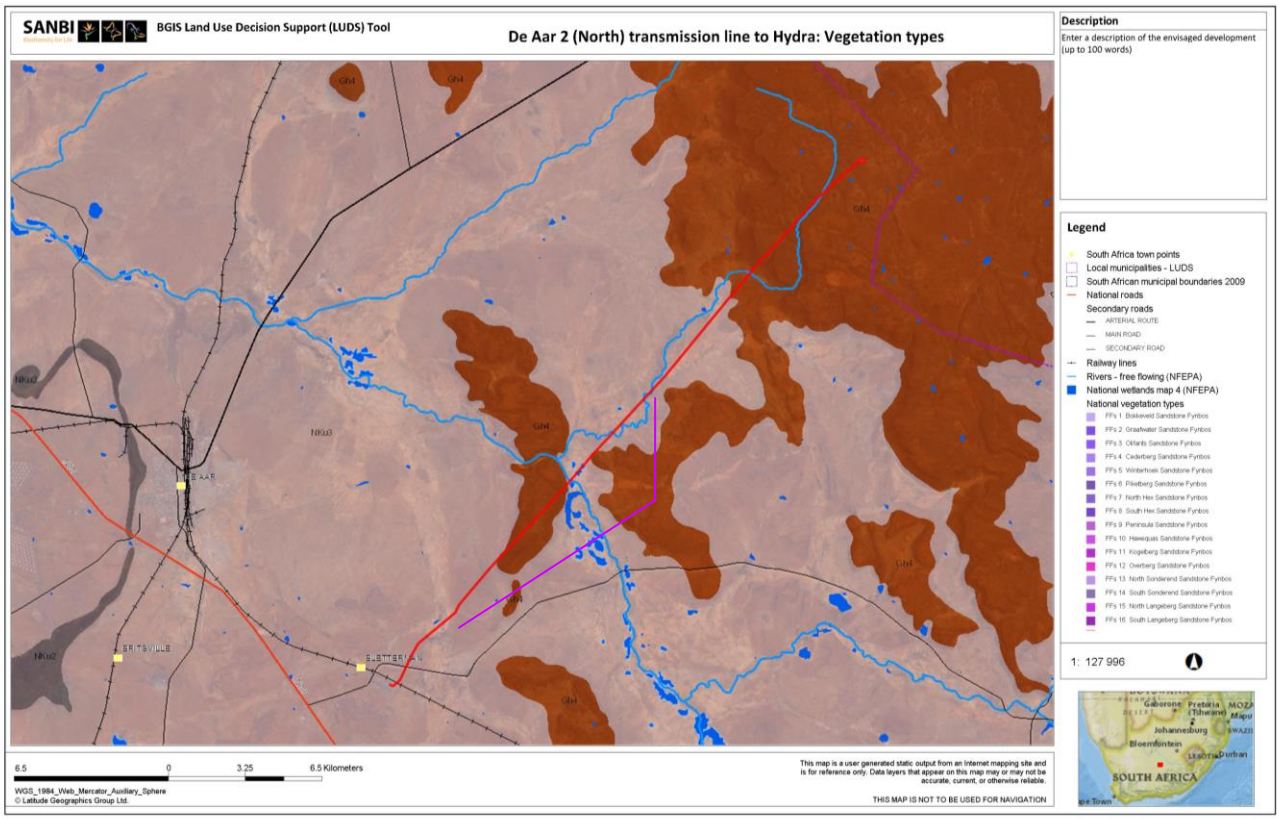


Figure 6. Vegetation map for the area (SANBI Biodiversity GIS, 2014), with the proposed transmission line (red line) and the alternative route (pink line)

E. AQUATIC FEATURES AND FAUNA

The main aquatic features within the study area are the Brak River (Figure 7), a seasonal tributary within the Orange River System and a number of its tributaries. The Brak River flows in a north westerly direction along the southern boundary of the study area with a number of its tributaries crossing the site as they flow in a southerly direction. The Brak River joins the Orange River east of Prieska. The two larger tributaries of the Brak River that will also be crossed by the proposed transmission line route are the Vet Laagte and the Maatjes Fountain streams. The Vet Laagte River drains the low lying cultivated areas to the west of the Brak River while the Maatjes Fountain River drains the western face of the plateau to the east of De Aar and the Brak River. These larger tributaries of the Brak River have well defined channels and some associated vegetation (Figures 10 to 12).

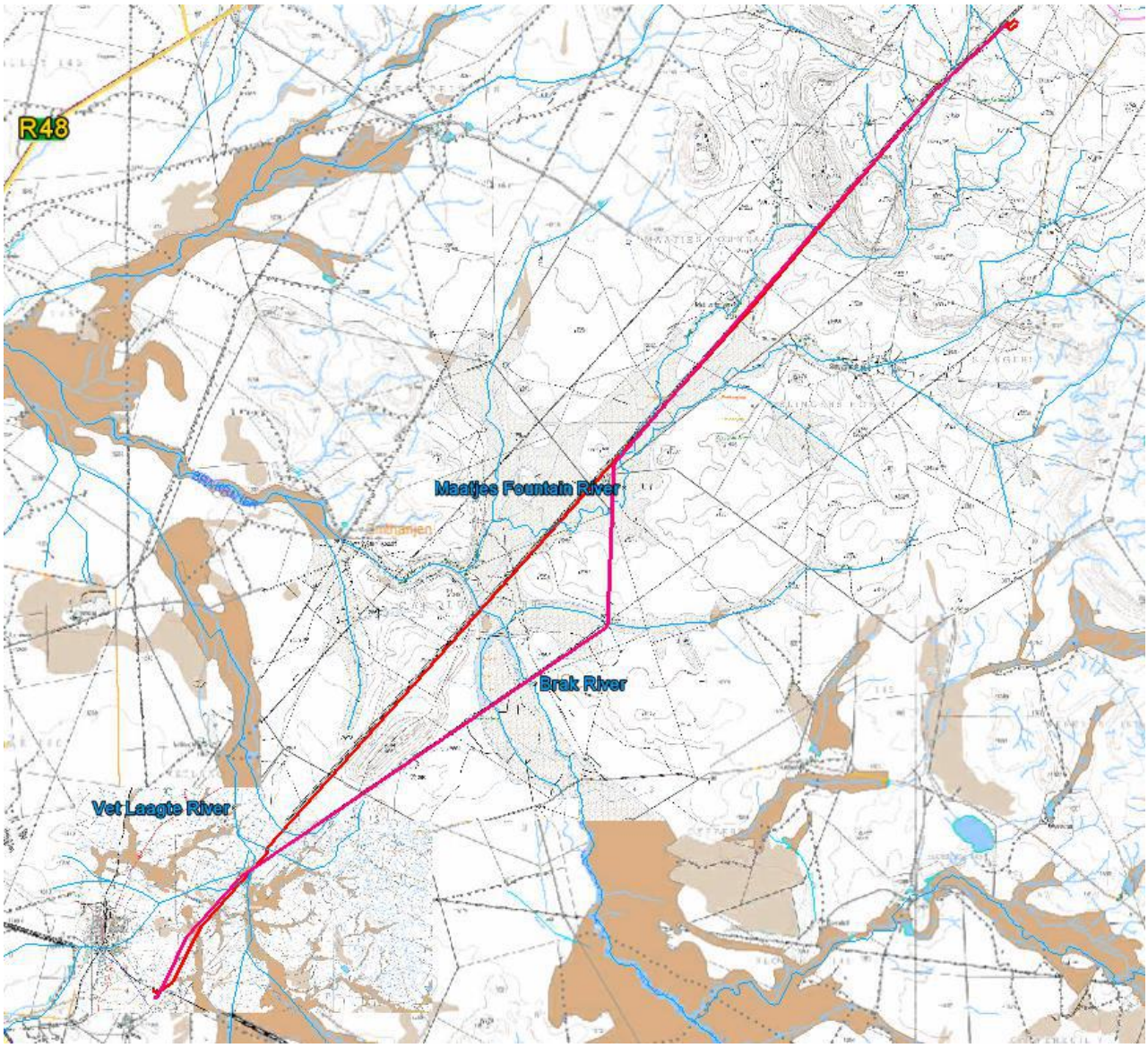


Figure 7. Water features in the study area

Most of the smaller tributaries within the study area are ephemeral and are discernible only as slightly shallow depressions with no clear associated vegetation and slightly clayey soils (Figure 13). Small, shallow instream dams have been constructed within many of these drainage channels. These rivers, streams and drainage channels are discussed in more detail in the following section.

F. LAND USE

Much of the study area is largely undeveloped and utilised for dryland agriculture (Figure 8 and consists of some homesteads with the veld being used for grazing of sheep, cattle as well as goats, ostriches and game such as springbok. The closest urban area is De Aar, with the township of Nonzwakazi located east of the town. Smaller towns of Britstown, Philipstown, Hanover and Richmond occur within a 65km radius of De Aar.

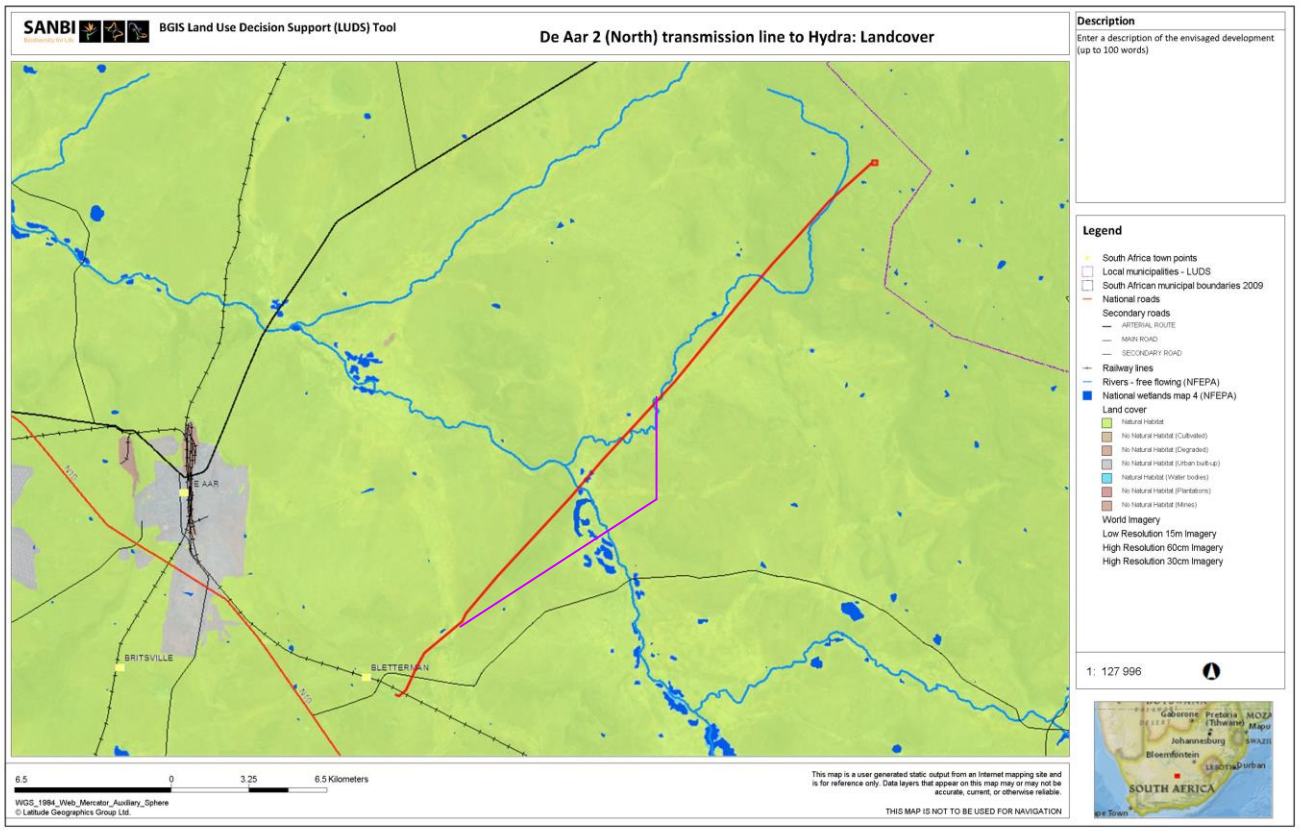


Figure 8. Land cover map for the area (SANBI Biodiversity GIS, 2014), with the proposed transmission line (red line) and the alternative route (pink line)

G. FRESHWATER BIODIVERSITY AND CONSERVATION

Figure 9 is the Freshwater Ecosystem Protected Areas (FEPA) map for the study area. FEPAs are strategic spatial priorities for conserving freshwater ecosystems and associated biodiversity. FEPAs were determined through a process of systematic biodiversity planning and were identified using a range of criteria for serving ecosystems and associated biodiversity of rivers, wetlands and estuaries.

Both tributaries of the Brak River within the study area have been identified as upstream catchments to the downstream reach of the Brak River, which is a FEPA river. In upstream catchments it is important that the rivers be managed in such a manner to ensure no degradation occurs in the downstream FEPA river. The Brak River both upstream and downstream of the study area contains wetland areas within its floodplain that have been mapped as wetland clusters. The proposed activities take place outside of these areas.

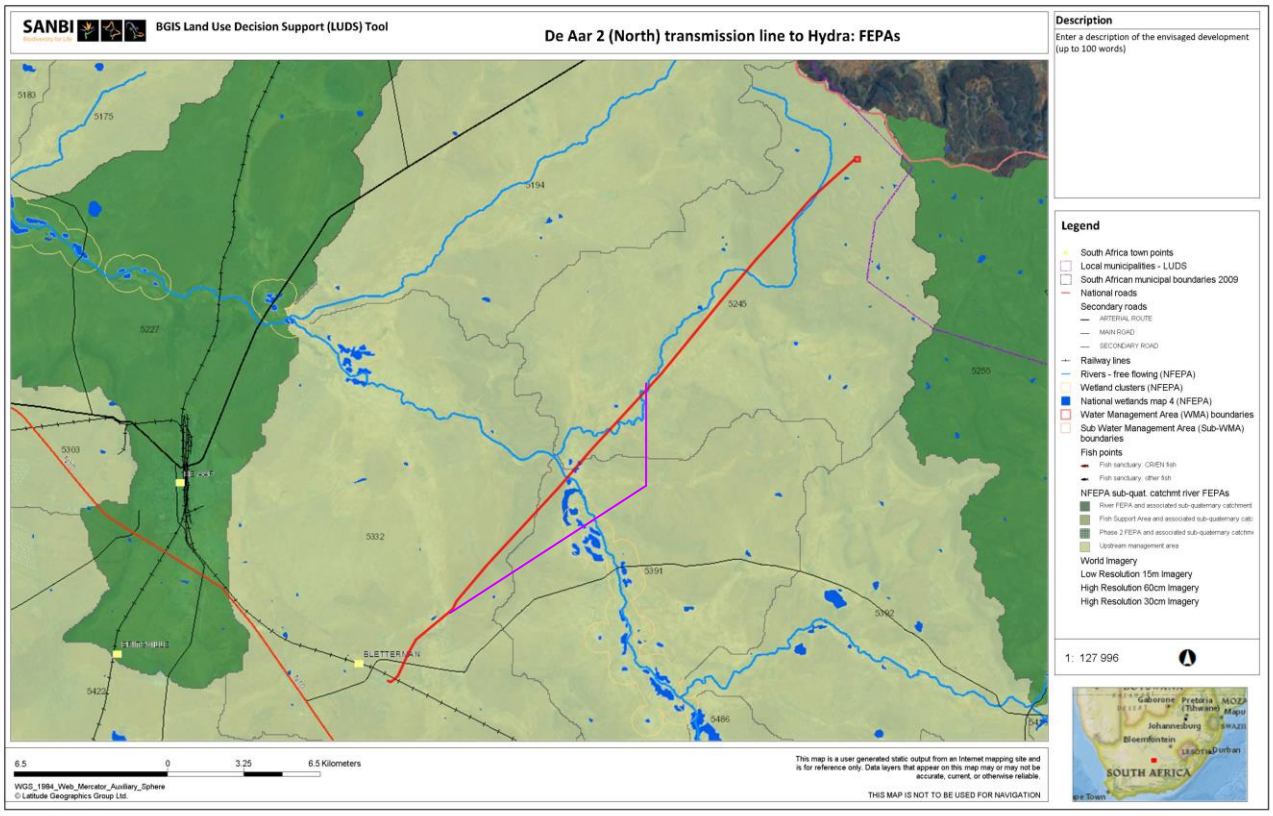


Figure 9. Freshwater Ecosystem Priority Areas for the study area (SANBI Biodiversity GIS, 2014), with the proposed transmission line (red line) and the alternative route (pink line)

6.2. FRESHWATER ASSESSMENT OF THE STUDY AREA

The Index for Habitat Integrity (IHI) and a Site Characterisation were used to provide information on the ecological condition of the Brak River and its tributaries within the study area.

A. RIVER CLASSIFICATION

In order to assess the condition and ecological importance and sensitivity of the rivers in the study area, it is necessary to understand how the rivers might have appeared under unimpacted conditions. This is achieved through classifying rivers according to their ecological characteristics, in order that it can be compared to ecologically similar rivers.

River typing or classification involves the hierarchical grouping of rivers into ecologically similar units so that inter- and intra-river variation in factors that influence water chemistry, channel type, substratum composition and hydrology are best accounted for. Any comparative assessment of river condition should only be done between rivers that share similar physical and biological characteristics under natural conditions. Thus, the classification of rivers provides the basis for assessing river condition to allow comparison between similar river types. The primary classification of rivers is a division into Ecoregions. Rivers within an ecoregion are further divided into sub-regions.

Ecoregions are groups of rivers within South Africa, which share similar physiography, climate, geology, soils and potential natural vegetation. For the purposes of this study, the ecoregional classification presented in Department of Water Affairs and Forestry in 1999, which divides the country's rivers into ecoregions, was used. The river assessed lies within the Nama Karoo Ecoregion, with the characteristics as described in Table 1.

Sub-regions (or geomorphological zones) are groups of rivers, or segments of rivers, within an ecoregion, which share similar geomorphological features, of which gradient is the most important. The use of geomorphological features is based on the assumption that these are a major factor in the determination of the distribution of the biota. Table 2 provides the geomorphological features of the streams assessed.

Table 1. Characteristics of the Nama Karoo Ecoregion (Dominant Types In Bold)

Main Attributes	Description
Terrain Morphology: Broad division	Plains; Low Relief**; Plains Moderate Relief; Lowlands; Hills and Mountains; Moderate and High Relief;** Open Hills, Lowlands; Mountains; Moderate to High Relief; Closed Hills; Mountains; Moderate and High Relief
Vegetation types	Eastern Mixed Nama Karoo; Upper Nama Karoo; **Bushmanland Nama Karoo;** Orange River Nama Karoo
Altitude (m a.m.s.l)	300-1700
MAP (mm)	0 to 500
Rainfall seasonality	Late to very late summer to Winter

Main Attributes	Description
Mean annual temp. (°C)	12 to 20
Median annual simulated runoff (mm) for quaternary catchment	<5 to 60

B. RIVER/SITE CHARACTERISATION

The Brak River and its two tributaries within the study area, hereafter referred to as the Vet Laagte and Maatjes Fountain tributaries, have predominantly sandy substrate in the west (Brak and Vet Laagte) and sand/rock substrate in the east (Maatjes Fountain). The rivers drain shrubland vegetation in an area with a very low rainfall. As a result, the water flowing in these rivers tends to be saline, turbid and seasonally flowing.

From the Site Characterisation assessments, the geomorphological and physical characteristics of the tributaries can be classified as shown in Table 2.

Table 2. Geomorphological and Physical features of the Brak River as well as the Vet Laagte and Maatjes Fountain tributaries of the Brak River

River	Brak River	Vet Laagte Tributary	Maatjes Fountain Tributary
Geomorphological Zone	Foothill rivers in the Upper Karoo Geomorphic Province		
Lateral mobility	Unconfined		Semi-Confined
Soils	Alluvial soils	Red, well-drained	Shallow soils over rock
Channel form	Complex	Simple and complex in places	
Channel pattern	Multiple thread	Single and multiple thread: low sinuosity	
Channel type	Mixed (alluvium dominating)		Bedrock, Silt/clayey with pebbles
Channel modification	Moderate modification (farming into riparian zone and some alien vegetation encroachment)		Moderate to low modification
Hydrological type	Seasonal		Seasonal/ephemeral
Ecoregion	Nama Karoo		
DWA catchment	D62D		
Vegetation type	Northern Upper Karoo shrubland with Besemkaree Koppies Shrubland in places	Northern Upper Karoo shrubland	Northern Upper Karoo shrubland in the lower reaches and Besemkaree Koppies Shrubland in the upper reaches
Rainfall region	Autumn		

C. INDEX OF HABITAT INTEGRITY

The evaluation of Index of Habitat Integrity (IHI) provides a measure of the degree to which a river has been modified from its natural state. This assessment was undertaken for the Brak River and its two main tributaries, the Vet Laagte and Maatjes Fountain within the study area (Tables 3 and 4). The methodology (DWAF, 1999) involves a qualitative assessment of the number and severity of anthropogenic perturbations on a river and the damage they potentially inflict upon the system. These disturbances include both abiotic and biotic factors, which are regarded as the primary causes of degradation of a river. The severity of each impact is ranked using a six-point scale with 0 (no impact), 1 to 5 (small impact), 6 to 10 (moderate impact), 11 to 15 (large impact), 16 to 20 (serious impact) and 21 to 25 (critical impact).

The IHI assessment is based on an evaluation of the impacts of two components of the rivers, the riparian zone and the instream habitat. Assessments are made separately for both components, but data for the riparian zone are interpreted primarily in terms of the potential impact on the instream component.

The estimated impact of each criterion is calculated as follows:

Rating for the criterion/maximum value (25) x weight (percent)

The estimated impacts of all criteria calculated in this way are summed, expressed as a percentage and subtracted from 100 to arrive at an assessment of habitat integrity for the instream and riparian components respectively. The total scores for the instream and riparian zone components are then used to place the habitat integrity of both in a specific habitat category.

BRAK RIVER

The Brak River is relatively wide (ranging from about 30m to approximately 1000m in channel wide) that consists of a main channel with incised banks and an associated floodplain with secondary channels that are the remnants of old river channels, formed as the river has migrated within the alluvial floodplain.

Figure 10. The Brak River near the proposed power line route

Vegetation cover within the main channel comprises predominantly of common reeds (*Phragmites australis*) while the floodplain consists of low growing shrubs and grasses. A distinct riparian zone is not clearly discernible (Figure 10).

VET LAAGTE TRIBUTARY:

The Vet Laagte Tributary originates to the south west of Hydra at Hartebeest Hoek and flows in a north easterly direction to the Brak River where it joins the river north of De Aar. The river flows within a wide eroded multi-channel for much of its length. A number of erosion control structures as well as some small instream dams have been built within the river channel. It is clear however that within the lower reaches of the river, it overtops its banks in high flows and fills a floodplain surrounding the river. The vegetation within the lower reaches near the proposed power line route consists of grasses and Karoo shrubland, with patches of wetland areas dominated by sedges (Figure 11).

Figure 11. Vet Laagte tributary of the Brak River near Hydra

MAATJES FOUNTAIN TRIBUTARY

Maatjes Fountain Tributary originates on the western portion of the escarpment and flows in a southerly then south westerly direction to join the Brak River just upstream of the proposed power line crossing over the Brak River. The river within the study area is a foothill stream and consists largely of a rock/alluvium substrate with some instream vegetation (grasses) and indistinct riparian vegetation (Figure 12).

Figure 12. The Maatjes Fountain tributary of the Brak River on the plateau

A number of minor tributaries drain the surrounding catchments of the Brak, Vet Laagte and Maatjes Fountain rivers. The streams are in general shallow drainage channels with indistinct riparian vegetation (Figure 13) that only flow for short periods of time following rainfall events.

Figure 13. The ephemeral stream within the Brak River system at Maatjes Fountain

The results from the habitat integrity assessments are shown in Tables 3 and 4.

Table 3. Index of Habitat Integrity Assessment results and criteria assessed in the Brak River and its tributaries within the study area: Instream Habitat

Instream Criteria	Weight	Brak River	Vet Laagte Tributary	Maatjes Fountain Tributary	Minor tributaries
Water abstraction	14	8	8	6	2
Flow modification	13	7	9	4	3
Bed modification	13	7	11	5	4
Channel modification	13	5	6	4	3
Water quality	14	10	5	3	2
Inundation	10	4	7	3	2
Exotic macrophytes	9	0	0	0	0
Exotic fauna	8	0	0	0	0
Solid waste disposal	6	4	3	1	0
Category		**C**	**C**	**B**	**A/B**

Table 4. Index of Habitat Integrity Assessment results and criteria assessed in the Brak River and its tributaries within the study area: Riparian Habitat

Riparian Criteria	Weight	Brak River	Vet Laagte Tributary	Maatjes Fountain Tributary	Minor tributaries
Water abstraction	13	6	8	6	2
Inundation	11	4	7	3	2
Flow modification	12	7	9	4	3
Water quality	13	10	5	3	2
Indigenous vegetation removal	13	7	5	4	3
Exotic vegetation encroachment	12	9	3	2	2
Bank erosion	14	11	8	10	5
Channel modification	12	5	6	4	3
Category		**C/D**	**C**	**B**	**A/B**

Within the study area, the habitat of the Brak and Vet Laagte Rivers are considered to be moderately modified and the Maatjes Fountain Tributary largely natural. The minor tributaries within the area are also in general still in a largely natural condition. The riparian habitat of the rivers, streams and drainage channels are slightly more impacted as a result of surrounding farming activities.

D. ECOLOGICAL IMPORTANCE AND SENSITIVITY (EIS)

The EIS Assessment (Table 5) considers a number of biotic and habitat determinants surmised to indicate either importance or sensitivity. The determinants are rated according to a four-point scale (Table 7). The median of the resultant score is calculated to derive the EIS category (Table 6).

Table 5. Results of the EIS assessment for the Brak River and its tributaries

Biotic Determinants	Brak River	Vet Laagte Tributary	Maatjes Fountain	Minor tributaries
Rare and endangered biota	0	0	0	0
Unique biota	0	0	0	0
Intolerant biota	0	0	1	0
Species/taxon richness	1	1	1	1
Aquatic Habitat Determinants				
Diversity of aquatic habitat types or features	2	1	1	1
Refuge value of habitat type	2	1	2	1
Sensitivity of habitat to flow changes	2	2	2	2
Sensitivity of flow related water quality changes	2	2	2	2
Migration route/corridor for instream and riparian biota	2	2	2	2
National parks, wilderness areas, Nature Reserves, Natural Heritage sites, Natural areas, PNEs	0	0	0	0
RATINGS	1.1	0.9	1.1	0.7
EIS CATEGORY	**Moderate**	**Low**	**Moderate**	**Low**

Table 6. Ecological importance and sensitivity categories (DWAF, 1999)

EISC	General description	Range of median
Very high	Quaternaries/delineations that are considered to be unique on a national and international level based on unique biodiversity (habitat & species diversity, unique species, rare and endangered species). These rivers (in terms of biota and habitat) are usually very sensitive to flow modifications and have no or only a small capacity for use.	>3-4
High	Quaternaries/delineations that are considered to be unique on a national scale based on their biodiversity (habitat diversity, species diversity, unique species, rare and endangered species). These rivers (in terms of biota and habitat) may be sensitive to flow modifications but in some cases may have substantial capacity for use.	>2-≤3
Moderate	Quaternaries/delineations that are considered to be unique on a provincial or local scale due to biodiversity (habitat diversity, species diversity, unique species, rare and endangered species). These rivers (in terms of biota and habitat) are not usually very sensitive to flow modifications and often have substantial capacity for use.	>1-≤2
Low/ marginal	Quaternaries/delineations that are not unique on any scale. These rivers (in terms of biota and habitat) are generally not very sensitive to flow modifications and usually have substantial capacity for use.	≤1

Table 7. Definition of the four-point scale used to assess biotic and habitat determinants presumed to indicate either importance or sensitivity

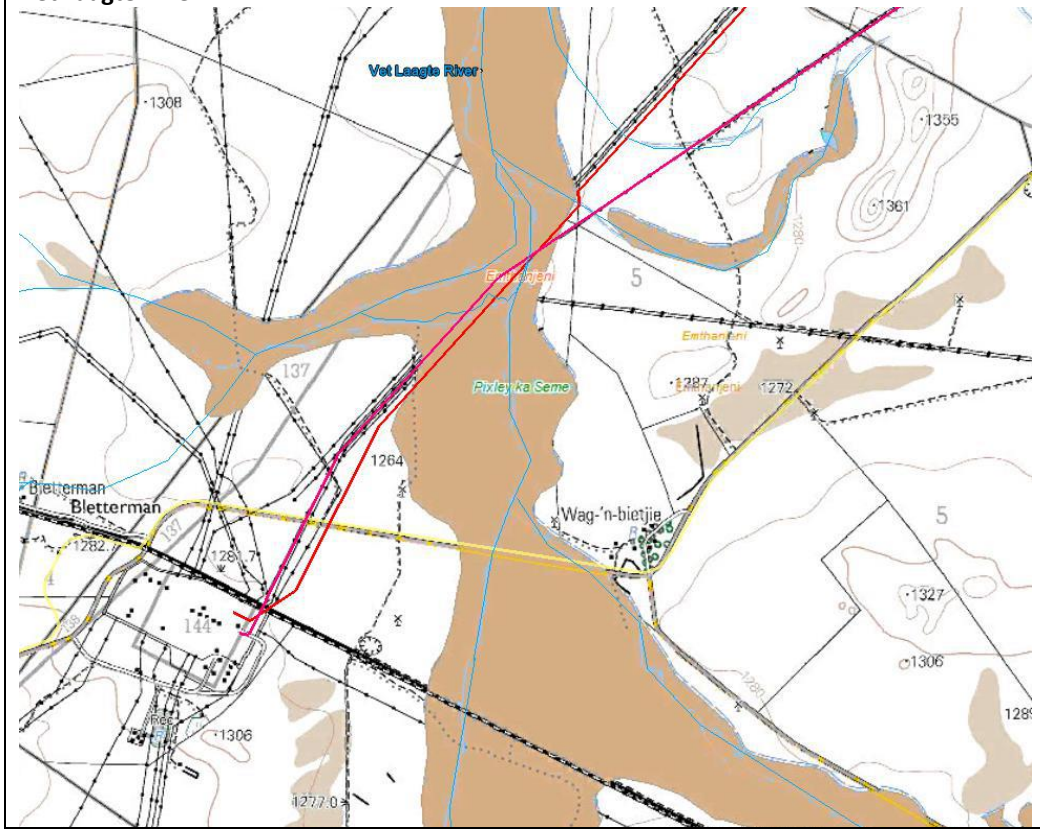
Scale	Definition
1	One species/taxon judged as rare or endangered at a local scale.
2	More than one species/taxon judged to be rare or endangered on a local scale.
3	One or more species/taxon judged to be rare or endangered on a Provincial/regional scale.
4	One or more species/taxon judged as rare or endangered on a National scale (i.e. SA Red Data Books)

The rivers within the study area are considered to be of a moderate to low Ecological Importance and Sensitivity.

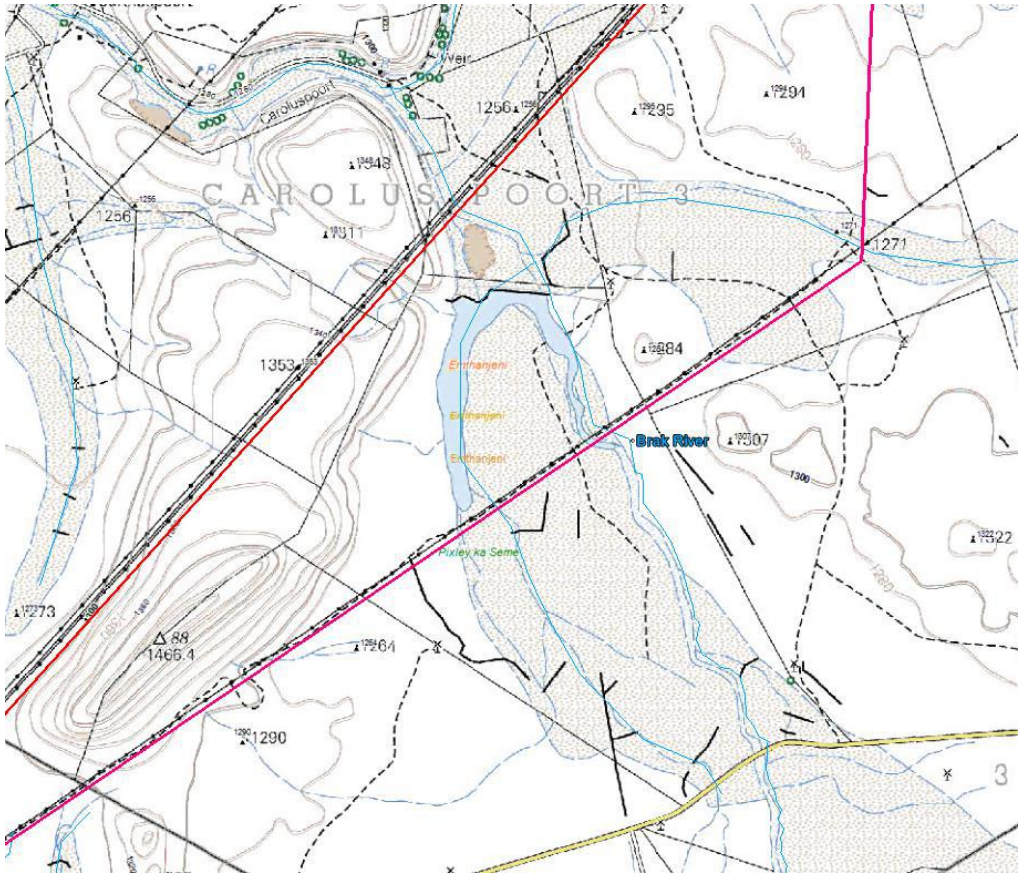
6.3 ASSESSMENT OF THE POTENTIAL IMPACTS OF PROPOSED TRANSMISSION LINE ROUTE AND THE ALTERNATIVE ROUTE

The sections of the proposed route that was assessed are discussed in the following table:

Table 8. Assessment of Proposed Activities at each of the Farms within the Study Area

Map	Comment
Vet Laagte River : 	Approximately 2.5 km north-east of the Hydra Substation, the proposed power line crosses the Vet Laagte River. The proposed route for the transmission line is located adjacent to a number of existing power lines. The ecological condition of the river is considered to be moderately modified while its ecological importance and sensitivity is low. The tributary flows within a poorly defined channel and has a wide floodplain onto which the river regularly spills its banks. At the point where the line will cross the floodplain, a low erosion control wall has been constructed across the channel. Due to the existing disturbance caused by the power lines already crossing this floodplain, the significance of the proposed route should be low provided that the new line is located as close as possible to the existing lines and the increase in the footprint of these lines within floodplain is limited as far as possible. The disturbed area should be rehabilitated after construction is completed. The existing access route for the existing transmission lines should preferably be utilized to minimize the potential disturbance of the area. Either of the proposed transmission line routes will not have a substantial difference in terms of the potential impact on the Vet Laagte River and its associated floodplain.

Brak River:

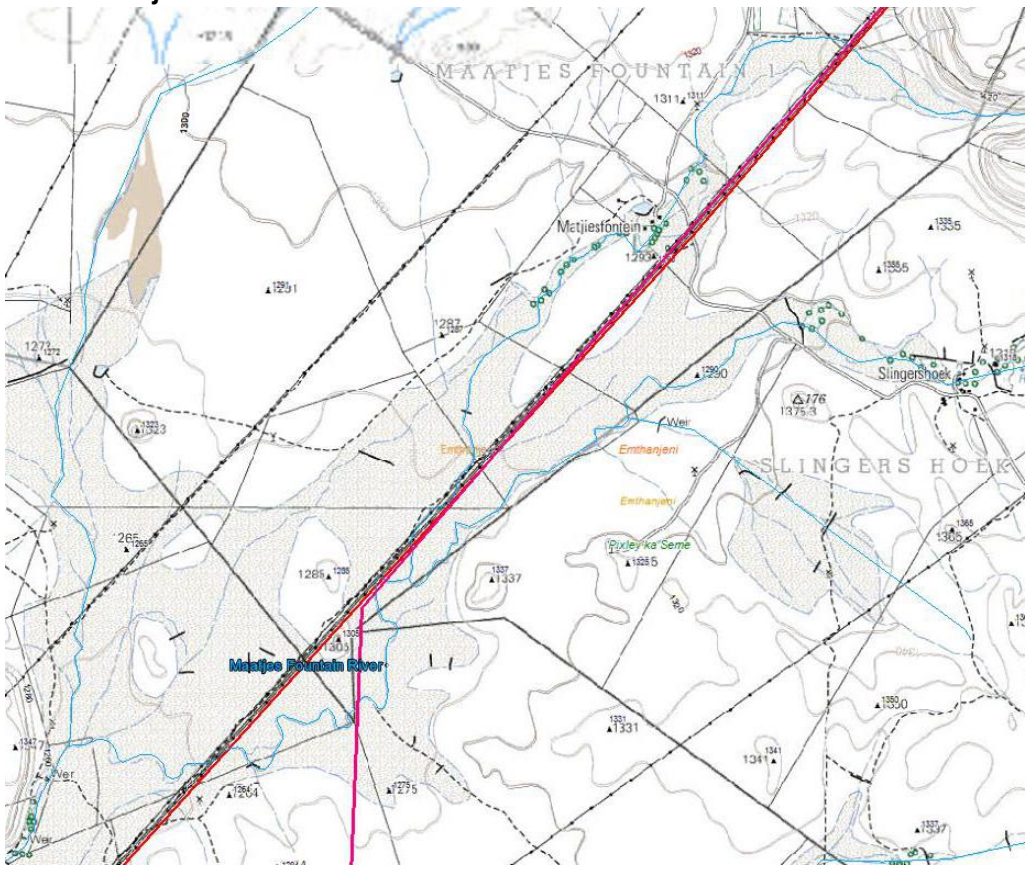


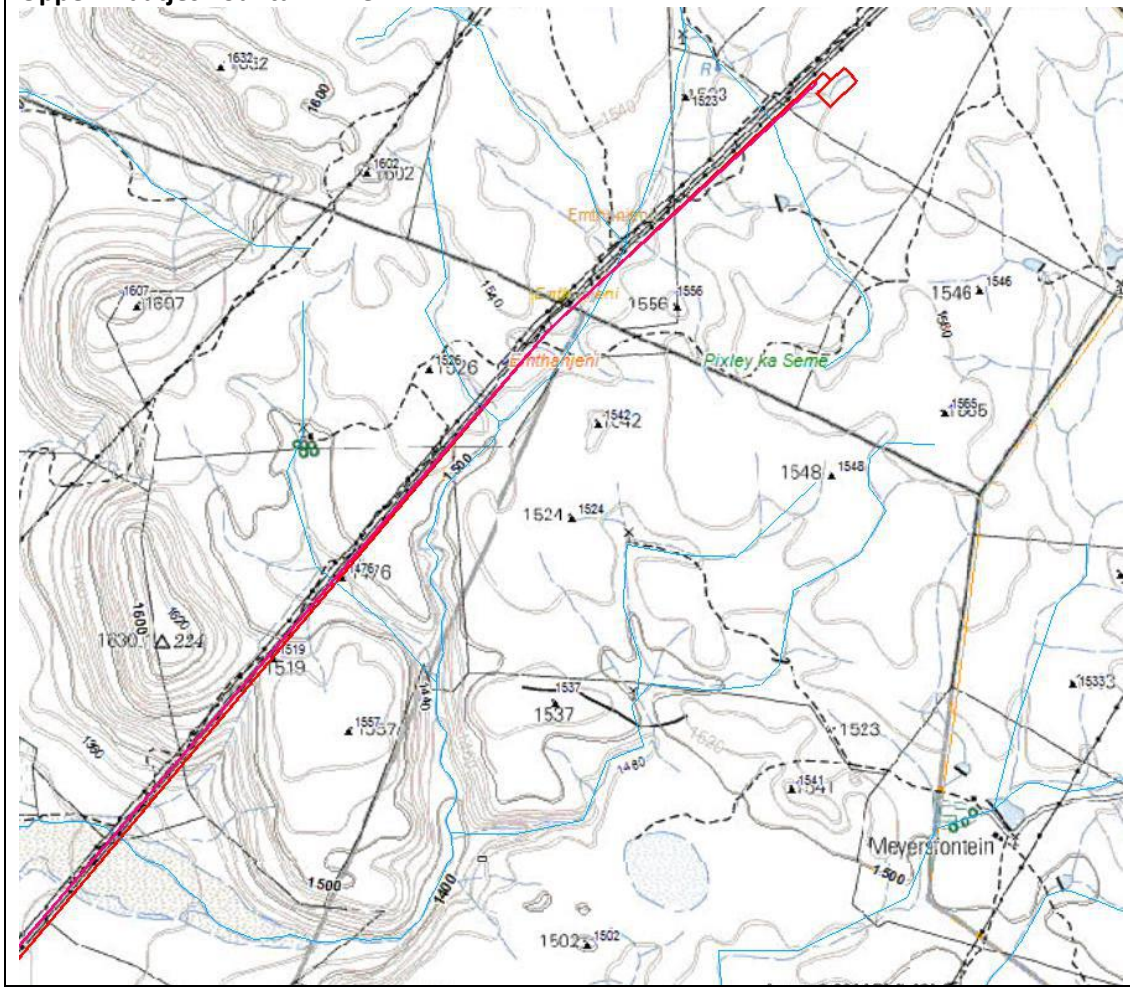
The Brak River flows through a wide eroded multi-channel approximately 10km north-east of the Hydra Substation. The river is in a moderately modified ecological condition with a moderate ecological importance and sensitivity. As for the Vet Laagte River crossing, the proposed route for the transmission line is located adjacent to a number of existing power lines. The significance of the line crossing the river and associated floodplain is deemed to be low provided that the recommendations below are implemented.

The tributary flows within a well-defined channel and has a wide floodplain onto which the river spills its banks with secondary channels within the floodplain. Upstream of where the line will cross the floodplain, an erosion control wall has been constructed across the channel. Due to the existing disturbance caused by the power lines already crossing this floodplain, the significance of the proposed route should be low provided that the new line is located as close as possible to the existing lines and the increase in the footprint of these lines within floodplain is limited as far as possible.

It is recommended that there be minimal disturbance specifically within the river channel and that no poles/towers be placed within 30m of the top of bank of the well-defined river channel. The existing access route for the existing transmission lines should preferably be utilized to minimize the potential disturbance of the area. It is also recommended due to the wide and erosive nature of the Brak River that the proposed transmission line be located as far north of the river channel as possible and specifically downstream of the existing erosion control wall in the river. The disturbed area should be rehabilitated after construction is completed.

The proposed transmission line route (red line) is likely to have a lesser impact on the Brak River and its associated floodplain than the alternative route (pink line) as it crosses the river where the floodplain is narrower and downstream of an erosion control wall in the river.

Lower Maatjes Fountain River: 	The proposed transmission line route within the Maatjes Fountain River crosses the river at approximately 12km north-east of the Hydra Substation and one of its tributaries at approximately 14km and again at about 20km north-east of the substation. The Maatjes Fountain River is considered to be in a largely natural ecological condition while its ecological importance is moderate. The river flows within a well-defined channel but also has a wide floodplain within its lower reaches and has secondary channels within the floodplain. The channel of the tributary is smaller and less defined. Due to the existing disturbance caused by the power lines already crossing this floodplain, the significance of the proposed route should be low provided that the new line is located as close as possible to the existing lines and the increase in the footprint of these lines within floodplain is minimised as far as possible. It is recommended that there be minimal disturbance specifically within the river channel and that no poles/towers be placed within 30m of the top of bank of the well-defined Maatjes Fountain River channel or 30m from the centre of the channel for the tributary crossings. The existing access route for the existing transmission lines should preferably be utilized to minimize the increase in the disturbance within the stream channels and floodplain. The disturbed area should be rehabilitated after construction is completed. The two alternative transmission line routes will have very similar potential impacts on the Maatjes Fountain River system.

Upper Maatjes Fountain River: 	The final, approximately 4.5 km of the north-eastern portion of the proposed route is located largely on the plateau. The freshwater features here consist of the upper foothill stream reach of the Maatjes Fountain Tributary which is still largely natural in its upper reaches but of a moderate ecological importance and sensitivity. Within this section of the proposed route it will cross the tributaries of the Maatjes Fountain River in four places Due to the existing disturbance caused by the power lines already crossing the streams, the significance of the proposed route should be low provided that the new line is located as close as possible to the existing lines and the increase in the footprint of these lines within floodplain is minimised as far as possible. It is recommended that there be minimal disturbance specifically within the river channels and that no poles/towers be placed within 30m of the centre of the channels for the tributary crossings. The existing access route for the existing transmission lines should preferably be utilized to minimize the increase in the disturbance within the stream channels and floodplain. The disturbed area should be rehabilitated after construction is completed. The potential impacts of the two alternative transmission line routes will on the Maatjes Fountain River system will be the same.

7. OVERALL DESCRIPTION AND ASSESSMENT OF POTENTIAL IMPACTS

7.1 DESCRIPTION AND ASSESSMENT OF IMPACTS OF PROPOSED ACTIVITIES

This section provides an assessment of the overall potential impacts to freshwater ecosystems that are likely to be associated with the proposed activities. The impact assessment and recommended mitigation measures relate to the proposed routing and associated activities for the construction and operation of the overhead transmission lines, as described in Section 5.2 of this report.

IMPACT OF OVERHEAD POWER LINES

CONSTRUCTION PHASE ACTIVITIES

Nature of Impact: Construction activities would include the construction of concrete foundations for each monopole structure as well as possible jeep track surface access roads alongside the line where roads do not already exist. Activities during the construction phase of the project could thus be expected to result in some disturbance of vegetation cover along the proposed route and where, access routes need to cross freshwater features, some disturbance to the bed and banks of the river, stream or drainage features.

Significance of impacts without mitigation: Due to the existing disturbance caused by the power lines already crossing this floodplain, the significance of the construction of the transmission line along the proposed route would be medium to low.

Proposed mitigation: The new line should be located as close as possible to the existing lines and the increase in the footprint of these lines within floodplain is minimised as far as possible. It is recommended that, due to the wide and erosive nature of the Brak River, the proposed transmission line be located as far north of the river channel as possible and specifically downstream of the existing erosion control wall in the river. The disturbed area should be rehabilitated after construction is completed.

It is recommended that there be minimal disturbance specifically within the river channel and that no poles/towers be placed within 30m of the top of bank of the well-defined Brak and Maatjes Fountain river channels and 30m from the centre of the channel for the less defined stream crossings (Vet Laagte River and tributaries of the Maatjes Fountain River).

Any contaminated runoff from the construction sites should be prevented from entering the rivers/streams. All materials on the construction sites should be properly stored and contained. Disposal of waste from the sites should also be properly managed. Construction workers should be given ablution facilities at the construction sites that are located at least 100m away from the river/stream systems and regularly serviced. These measures should be addressed, implemented and monitored in terms of the Environmental Management Plan for the construction phase.

Significance of impacts after mitigation: A localized, short-term impact will still occur during the construction phase; however, the overall significance of the impact on the aquatic ecosystems is expected to be low.

OPERATION PHASE ACTIVITIES

Nature of Impact: An impact of very limited significance is expected on the drainage characteristics of the Brak River and its tributaries along the proposed power line route after the construction phase provided that the recommendations provided for the Construction and Operation Phase of the project are implemented.

Significance of impacts without mitigation: A localized longer term impact of very low intensity that is expected to have a low overall significance in terms of its impact on the identified aquatic ecosystems in the area.

Proposed mitigation: All crossings over drainage channels or river and stream beds after the construction phase should be rehabilitated such that the flow within the drainage channels is not impeded or the likelihood for erosion to take place is not increased. Maintenance of transmission lines should only take place via the designated access routes.

Significance of impacts after mitigation: A localized, long-term impact will still occur during the operation phase; however, the overall significance of the impact on the aquatic ecosystems is expected to be a very low.

IMPACT OF THE ACCESS ROUTES:

CONSTRUCTION PHASE ACTIVITIES

Nature of Impact: A short term impact of low significance is expected at the access route crossings over the identified rivers, streams or drainage channels during the construction phase. The major impacts associated with the possible access roads relate to loss of habitat within drainage channels and riparian areas, loss of indigenous vegetation within riparian zones and possible invasive alien plant growth as well as the potential for flow and water quality impacts and the direct impacts on the soil (erosion of river and drainage channels).

Significance of impacts without mitigation: A localized shorter term impact of medium to low intensity that is expected to have a low to very low overall significance in terms of its impact on the identified aquatic ecosystems in the area, depending on the amount of new roads that would need to be constructed within the freshwater features.

Proposed mitigation: The existing road infrastructure should be utilized as far as possible to minimize the overall disturbance created by the proposed project, specifically within the floodplain areas and stream channels. Where access routes need to be constructed within the stream channels, disturbance of the channels should be limited and all crossings within the drainage channels or stream beds should be such that the flow within the drainage channel is not impeded. Any disturbed areas should be rehabilitated to ensure that these areas do not become subject to erosion or invasive alien plant growth.

To reduce the risk of erosion, particularly within the Maatjes Fountain tributary on the hill side of the plateau, any new service/ access roads should be contoured along the steep slope or erosion protection walls constructed. Run-off over the exposed areas should be mitigated to reduce the rate and volume of run-off and prevent erosion occurring within the freshwater features and drainage lines.

Significance of impacts after mitigation: A localized, short-term impact will occur during the construction phase; however, the overall significance of the impact on the aquatic ecosystems is expected to be a very low impact.

OPERATION PHASE ACTIVITIES

Nature of Impact: An impact of limited significance is expected at the access route river crossings of rivers, streams or drainage lines after the construction phase. The major impacts associated with the access roads during the operation phase relate to disturbance to the instream and riparian habitat of the freshwater ecosystems along the designated routes and the associated erosion potential.

Significance of impacts without mitigation: A localized longer term impact of low intensity that is expected to have a low to very low overall significance in terms of its impact on the identified aquatic ecosystems in the area.

Proposed mitigation: Maintenance of infrastructure related to the project should only take place via the designated access routes. Disturbed areas along the access routes should be monitored to ensure that these areas do not become subject to erosion or invasive alien plant growth.

Significance of impacts after mitigation: A localized, longer-term impact will occur during the operation phase; however, the overall significance of the impact on the aquatic ecosystems is expected to be a very low.

CUMULATIVE IMPACT OF THE OVERALL PROJECT ACTIVITIES ON FRESHWATER ECOSYSTEMS

Land use in the area surrounding De Aar currently consists of livestock farming. Due to the arid nature of the area, the carrying capacity of the land is low and livestock numbers in general are low. The land and climate are also not conducive to the cultivation of crops and pastures and the surface and groundwater tends to be brakish and available mostly during the wet winter months. Current land and water use impacts

on the Brak River and its tributaries are low. Due to the ephemeral character of the surface water systems, they are also slow to recover from any impacts.

A number of power projects have been proposed in the area surrounding De Aar, particularly towards the east and south east where they can link up with the existing Hydra substation and transmission lines. The nature of these projects allows them to have minimal impact on the surface water features with the correct mitigation measures (as are recommended in this report). Most importantly to limit the disturbance of the freshwater habitats and to mitigate and manage storm water runoff impacts.

Most of the proposed activities for this project occur along existing transmission line routes and provided the construction and operation activities of the project remain contained within the allocated areas and any disturbed areas within the freshwater features rehabilitated, the overall impact should be limited and of a low significance.

7.2. SUMMARY OF ASSESSMENT OF POTENTIAL IMPACTS OF THE PROPOSED ACTIVITIES:

CONSTRUCTION PHASE:

Potential impact on freshwater features	Proposed transmission lines
Nature of impact:	Disturbance of habitat and possibly impedance/diversion of flow at river, stream or drainage crossings
Extent and duration of impact:	Localised short term impacts
Intensity of Impact	Medium to Low
Probability of occurrence:	Probable depending on the extent of construction activities within stream bed
Degree to which impact can be reversed:	High
Irreplaceability of resources:	Moderate to Low
Cumulative impact prior to mitigation:	Low
Significance of impact pre-mitigation	Very low
Degree of mitigation possible:	Very low
Proposed mitigation:	The new line should be located as close as possible to the existing lines and the increase in the footprint of these lines within floodplain should be minimised as far as possible. It is recommended that, due to the wide and erosive nature of the Brak River, the proposed transmission line be located as far north of the river channel as possible and specifically downstream of the existing erosion control wall in the river. The disturbed area should be rehabilitated after construction is completed. It is recommended that there be minimal disturbance specifically within the river channel and that no poles/towers be placed within 30m of the

	top of bank of the well-defined Brak and Maatjes Fountain river channels and 30m from the centre of the channel for the less defined stream crossings (Vet Laagte River and tributaries of the Maatjes Fountain River). Any contaminated runoff from the construction sites should be prevented from entering the rivers/streams. All materials on the construction sites should be properly stored and contained. Disposal of waste from the sites should also be properly managed. Construction workers should be given ablution facilities at the construction sites that are located at least 100m away from the river/stream systems and regularly serviced. These measures should be addressed, implemented and monitored in terms of the Environmental Management Plan for the construction phase.
Cumulative impact post mitigation:	Very Low to negligible impact
Significance after mitigation	Very Low

Potential impact on freshwater features	Proposed access routes (where existing roads are not in place)
Nature of impact:	Disturbance of habitat and possibly impedance/diversion of flow at river, stream or drainage crossings, as well as potential to increase erosion along drainage channels
Extent and duration of impact:	Localised short term impacts
Intensity of Impact	Medium to Low
Probability of occurrence:	Probable where existing roads cannot be utilised
Degree to which impact can be reversed:	High
Irreplaceability of resources:	Moderate to Low
Cumulative impact prior to mitigation:	Low
Significance of impact pre-mitigation	Low
Degree of mitigation possible:	Very low
Proposed mitigation:	The existing road infrastructure should be utilized as far as possible to minimize the overall disturbance created by the proposed project, specifically within the floodplain areas and stream channels. Where access routes need to be constructed within the stream channels, disturbance of the channels should be limited and all crossings within the drainage channels or stream beds should be such that the flow within the drainage channel is not impeded. Any disturbed areas should be rehabilitated to ensure that these areas do not become subject to erosion or invasive alien plant growth. To reduce the risk of erosion, particularly within the Maatjes Fountain tributary on the hill side of the plateau, any new service/ access roads should be contoured along the steep slope or erosion protection walls constructed. Run-off over the exposed areas should be mitigated to reduce the rate and volume of run-off and prevent erosion occurring

	within the freshwater features and drainage lines.
Cumulative impact post mitigation:	Very Low
Significance after mitigation	Very Low

OPERATION PHASE ACTIVITIES:

Potential impact on freshwater features	Proposed transmission lines
Nature of impact:	Disturbance of habitat and possibly impedance/diversion of flow at river, stream or drainage crossings
Extent and duration of impact:	Localised longer term impacts
Intensity of Impact	Low
Probability of occurrence:	Probable to unlikely
Degree to which impact can be reversed:	High
Irreplaceability of resources:	Moderate to Low
Significance of impact pre-mitigation	Very low
Cumulative impact prior to mitigation:	Low
Degree of mitigation possible:	Very low
Proposed mitigation:	All crossings over drainage channels or stream beds after the construction phase should be rehabilitated such that the flow within the drainage channel is not impeded. Maintenance of power lines should only take place via the designated access routes.
Significance after mitigation	Very Low
Cumulative impact post mitigation:	Very Low impact

Potential impact on freshwater features	Proposed access routes
Nature of impact:	Disturbance of habitat and possibly impedance/diversion of flow at river crossings, as well as potential to increase erosion along drainage channels
Extent and duration of impact:	Localised longer term impacts
Intensity of Impact	Low
Probability of occurrence:	Probable to unlikely
Degree to which impact can be reversed:	High
Irreplaceability of resources:	Medium to Low
Significance of impact pre-mitigation	Very Low
Cumulative impact prior to mitigation:	Low
Degree of mitigation possible:	Very low

Proposed mitigation:	Maintenance of infrastructure related to the project should only take place via the designated access routes. Disturbed areas along the access routes should be monitored to ensure that these areas do not become subject to erosion or invasive alien plant growth.
Significance after mitigation	Very Low
Cumulative impact post mitigation:	Very Low

8. CONCLUSIONS AND RECOMMENDATIONS

The proposed power line between the Hydra and the 132kV substation north east of De Aar will potentially impact on the following freshwater features:

- Brak River which is considered to be in a moderately modified condition and of a moderate ecological importance and sensitivity
- Vet Laagte River, a tributary of the Brak River which is considered to be in a moderately modified condition and of a low ecological importance and sensitivity;
- Maatjes Fountain River, a tributary of the Brak River which is considered to be in a largely natural condition and of a moderate ecological importance and sensitivity; and
- Minor ephemeral tributaries of the Brak River System which are generally considered to be in a largely natural condition and of a low ecological importance and sensitivity.

Due to the existing disturbance caused by the power lines already crossing this floodplain, the significance of the proposed route should be low provided that the following mitigation measures are implemented:

- The new line should be located as close as possible to the existing lines and the increase in the footprint of these lines within floodplain should be minimised as far as possible.
- Due to the wide and erosive nature of the Brak River, the proposed transmission line should be located as far north of the river channel as possible and specifically downstream of the existing erosion control wall in the river.
- The existing road infrastructure should be utilized as far as possible to minimize the overall disturbance created by the proposed project, specifically within the floodplain areas and stream channels.
- Where access routes need to be constructed within the stream channels, disturbance of the channels should be limited and all crossings within the drainage channels or stream beds should be such that the

flow within the drainage channel is not impeded. Any disturbed areas should be rehabilitated to ensure that these areas do not become subject to erosion or invasive alien plant growth.

- To reduce the risk of erosion, particularly within the Maatjes Fountain tributary on the hill side of the plateau, any new service/ access roads should be contoured along the steep slope or erosion protection walls constructed. Run-off over the exposed areas should be mitigated to reduce the rate and volume of run-off and prevent erosion occurring within the freshwater features and drainage lines.

- It is recommended that there be minimal disturbance specifically within the river channel and that no poles/towers be placed within 30m of the top of bank of the well-defined Brak and Maatjes Fountain river channels and 30m from the centre of the channel for the less defined stream crossings (Vet Laagte River and tributaries of the Maatjes Fountain River).

- Any contaminated runoff from the construction sites should be prevented from entering the rivers/streams. All materials on the construction sites should be properly stored and contained. Disposal of waste from the sites should also be properly managed. Construction workers should be given ablution facilities at the construction sites that are located at least 100m away from the river/stream systems and regularly serviced. These measures should be addressed, implemented and monitored in terms of the Environmental Management Plan for the construction phase.

- All crossings over drainage channels or stream beds after the construction phase should be rehabilitated such that the flow within the drainage channel is not impeded.

- Maintenance of infrastructure related to the project should only take place via the designated access routes.

- Disturbed areas along the access routes should be monitored to ensure that these areas do not become subject to erosion or invasive alien plant growth.

A water use authorization application may need to be submitted to the Department of Water Affairs Northern Cape Regional Office for approval of the water use aspects of the proposed activities. It is likely that the proposed activity can be authorised by means of the General Authorisation.

9. REFERENCES

Department of Water Affairs and Forestry. (1999). *Resource Directed Measures for Protection of Water Resources. Volume 3: River Ecosystems Version 1.0*. Resource Directed Measures for Protection of Water Resources, Pretoria, South Africa.

Department of Water Affairs and Forestry. (2005). *River Ecoclassification: Manual for Ecostatus Determination (Version 1)*. Water Research Commission Report Number KV 168/05. Pretoria.

Driver, Nel, Snaddon, Murray, Roux, Hill. (2011). Implementation Manual for Freshwater Ecosystem Priority Areas. Draft Report for the Water Research Commission.

ANNEXURE A: DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

	(For official use only)
File Reference Number:	12/12/20/
NEAS Reference Number:	DEAT/EIA/
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2010

PROJECT TITLE

Freshwater Assessment for the Proposed construction of a 132kV transmission line from the Longyuan Mulilo De Aar 2 North Wind Energy Facility to the Hydra Substation near De Aar, Northern Cape

Specialist:	Toni Belcher		
Contact person:	T. Belcher		
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Project Consultant:	Aurecon		
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Telephone:	+27 21 526 6034	Fax:	
E-mail:	Simon.Clark@aurecongroup.com		

The specialist appointed in terms of the Regulations_

I, Antonia Belcher, declare that --

General declaration:

- I act as the independent specialist in this application
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of section 24F of the Act.

Signature of the specialist:

BlueScience

Name of company (if applicable):

24 March 2014

Date:

ATTACHED CURRICULUM VITAE:

Full Name	Antonia Belcher
Profession	Aquatic Ecologist and Environmental Management (P. Sci. Nat. 400040/10)
Contact details	60 Dummer Street, Somerset West, 7139; Telephone: 082 883 8055

RELEVANT WORK EXPERIENCE:

Due to my involvement in the development and implementation of the River Health Program in the Western Cape, I have been a key part of the team that has undertaken six catchment or area wide 'state-of-river' assessments as well as routine monitoring and specialised assessments of rivers and wetlands in all the major catchments for the Western Cape.

RELEVANT PROJECT EXPERIENCE FOLLOWS:

2012. Freshwater Screening Assessment for the proposed solar energy facility on Portion 3 of Farm 18 (Onder Rietvlei) in the District of Aurora

2012. Freshwater Assessment for the Proposed Mulilo Photovoltaic Energy Facilities near De Aar

2012. Freshwater Assessment for the Proposed Mulilo Wind Energy Facilities near De Aar

2012. Freshwater Assessment for the Proposed De Aar Solar One PV Power Project

2012. Freshwater Review of the Proposed Augrabies Photovoltaic Power Project at Farm Rooipad 15 Portion 9, Augrabies, Northern Cape Province

2012. Freshwater Assessment for the Proposed Wind and Solar Energy Facilities near Springbok

2013. Freshwater Constraints Assessment for the Proposed Wind Energy Facilities on near Aberdeen, Western Cape

2013. Assessment of the freshwater features on the Konstabel Solar PV farm near the town of Touwsrivier

2013. Freshwater Assessment for the Proposed Mulilo Photovoltaic (Solar) Energy Facilities on Du Plessis Dam Farm near De Aar, Northern Cape

2013. Freshwater Assessment for the Proposed Mulilo Photovoltaic (Solar) Energy Facilities on Badenhorst Dam Farm near De Aar, Northern Cape

2013. Desktop Freshwater Assessment: Proposed Outeniqua Wind Farm, near Uniondale in The Western Cape