AQUATIC COMPLIANCE REPORT FOR THE ESKOM JUNO GROMIS 400KV LINE 15 KM DEVIATION

MARCH 2021

Prepared By:

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1. SPECIALIST DETAILS, EXPERTISE AND DECLARATION

1.1. QUALIFICATIONS OF SPECIALIST CONSULTANT

Name: Antonia Belcher
Contact details: 53 Dummer St, Somerset West, 7130; Phone: 082 883 8055;
Email: toni@bluescience.co.za
Profession: Aquatic Scientist (P. Sci. Nat. 400040/10)
Fields of Expertise: Specialist in freshwater assessments, monitoring, and reporting
Years in Profession: 29+ years

Toni Belcher worked for the Department of Water Affairs and Forestry for more than 17 years. During this period she worked for the Directorate Water Quality Management, the Institute for Water Quality Studies, and the Western Cape Regional Office and has built up a wide skills base on water resource management and water resource quality for rivers, estuaries, and the coastal marine environment. Since leaving the Department in 2007, she has been working in her private capacity and was co-owner of BlueScience (Pty) Ltd, working in the field of water resource management and has been involved in more than 500 aquatic ecosystem assessments for environmental impact assessment and water use authorisation purposes. In 2006 she was awarded a Woman in Water award for Environmental Education and was a runner up for the Woman in Water prize for Water Research.

Professional Qualifications:

1984 Matriculation Lawson Brown High School
1987 B.Sc. – Mathematics, Applied Mathematics University of Port Elizabeth
1989 B.Sc. (Hons) – Oceanography University of Port Elizabeth
1998 M.Sc. – Environmental Management (cum laude) Potchefstroom University

Key Skills: Areas of specialisation: Aquatic ecosystem assessments, Monitoring and evaluation of water resources, Water resource legislation and authorisations, River classification and Resource Quality Objectives, River Reserve determination and implementation, Water Quality Assessments, Biomonitoring, River and Wetland Rehabilitation Plans, Catchment management, River maintenance management, Water education.

Summary of Experience:

1987 – 1988	Part-time field researcher, Department of Oceanography, University of Port Elizabeth
1989 – 1990	Mathematics tutor and administrator, Master Maths, Randburg and Braamfontein Colleges, Johannesburg
1991 – 1995	Water Pollution Control Officer, Water Quality Management, Department of Water Affairs, Pretoria
1995 – 1999	Hydrologist and Assistant Director, Institute for Water Quality Studies, Department of Water Affairs and Forestry, Pretoria
1999 – 2007	Assistant and Deputy Director, Water Resource Protection, Western Cape Regional Office, Department of Water Affairs, Cape Town
2007 – 2012	Self-employed – Aquatic Specialist
2013 – 2020	Senior Aquatic Specialist and part-owner, BlueScience
2020 – present	Self-employed– Aquatic Specialist

1.2. Declaration of Independence

I, A**ntonia Belcher,** as the appointed specialist hereby declare/affirm the correctness of the information provided or to be provided as part of the application, and that I:

- in terms of the general requirement to be independent:
  - other than fair remuneration for work performed/to be performed in terms of this application, have no business, financial, personal or other interest in the activity or application and that there are no circumstances that may compromise my objectivity; or
  - ~~am not independent, but another specialist that meets the general requirements set out in Regulation 13 of GN No. 326 have been appointed to review my work (Note: a declaration by the review specialist must be submitted);~~
- in terms of the remainder of the general requirements for a specialist, am fully aware of and meet all of the requirements and that failure to comply with any the requirements may result in disqualification;
- have disclosed/will disclose, to the Applicant, the Department and registered interested and affected parties, all material information that have or may have the potential to influence the decision of the Department or the objectivity of any report, plan or document prepared or to be prepared as part of the application;
- have ensured/will ensure that information containing all relevant facts in respect of the application was/will be distributed or was/will be made available to interested and affected parties and the public and that participation was/will be facilitated in such a manner that all interested and affected parties were/will be provided with a reasonable opportunity to participate and to provide comments;
- have ensured/will ensure that the comments of all interested and affected parties were/will be considered, recorded and submitted to the Department in respect of the application; and
- am aware that a false declaration is an offence in terms of Regulation 48 of the NEMA EIA Regulations, 2014 (as amended).

Date: 3 Febuary 2021

Name of company: -

Signature of the specialists: 

2. INTRODUCTION

An Environmental Authorisation was issued to Eskom for a 400 kV powerline between Juno and Gromis. After the approval, Eskom determined that they would need to undertake a 15 km deviation around the Tronox Mine near Nuwerus in the Western Cape. This Aquatic Compliance Report is intended to inform the authorisation process for the proposed deviation. The deviation entails crossing the Groot-Goerap River and following a path that runs parallel between the river and Klein Goerap River before crossing the Groot Goerap River again. Both rivers are tributaries of the Sout River (Figure 1). A wetland assessment was undertaken in 2017 for the first deviation that was approved that was located on the western side of the Groot Goerap River.

Figure 1: Locality map for the proposed Eskom powerline diversion under consideration

Table 1: Key water resources information related to the proposed activities

Descriptor	Name / details	Notes
Water Management Area (WMA)	Berg-Olifants	
Catchment Area	Sout River	
Quaternary Catchment	F60B and F60D	
Present Ecological state	B (Largely natural)	DWA 2012 for the Sout and Groot Goerap Rivers (Appendix A)
Ecological Importance and Sensitivity	Ecological Importance – High Ecological Sensitivity –High	
Recommended Ecological Category	B (Largely natural)	
Latitude	31°12'58.39"S	Upstream location of proposed transmission line over the Groot Goerap River
Longitude	18° 0'8.30"E	
Latitude	31°11'47.21"S	Downstream location of proposed transmission line over the Groot Goerap River
Longitude	17°56'54.10"E	

3. SCOPE OF WORKS AND METHODOLOGY

3.1 TERMS OF REFERENCE

The following terms of reference were compiled for this assessment:

An Aquatic Specialist Assessment is to be undertaken as part of the Basic Assessment Process for the 15km deviation required to the Juno-Gromis 400kV power line. This 15km deviation is located near Nuwerus within the Matzikama Local Municipality, West Coast District in the Western Cape. The original route of the powerline, which was approved to traverse land owned by Tronox Mine, now requires a deviation to avoid this portion of land as a result of the prospecting drilling results. The scope of works will be as follows:

1. *Desktop Assessment of proposed activities and the associated aquatic systems:* Conduct a review of existing studies, reports, and data for the area and the detail on the proposed activity. Desktop assessment of any aquatic features within 500 meters of the proposed route using past assessments of the area. The assessment will include:

    a. Identification and delineation of the aquatic features;

    b. Identification of any freshwater areas and or aquatic biota within the area assessed that are of high biodiversity conservation importance and sensitivity that could potentially be affected by the development activities;

    c. A description of the ecological characteristics of the aquatic ecosystems, their present ecological status, ecological importance, and sensitivity and recommended ecological condition and

    d. Any other aspects as spelled out in the Terms of Reference for this specialist freshwater investigation.

2. *Impact and Risk assessment, and compilation of report:*

   a. Evaluate the proposed activities and the potential aquatic impacts and propose mitigation measures. Describe the potential impacts and the significance of those impacts for the project life cycle stages, according to the assessment, ranking, weighting, and scaling criteria as laid out in the EIA Regulations and Terms of Reference for the project. Evaluate the potential impact of the activities against regional conservation targets.

   b. Undertake a Department of Water and Sanitation Risk Assessment as input into the Water Use Authorisation application and requirements.

   c. Write up findings and recommendations for EIA amendment process and water use authorisation. The full specialist report will take cognizance of, and comply with, the substantive content requirements outlined within the protocols for assessment and reporting of environmental impacts on aquatic biodiversity, March 2020.

3.2. METHODOLOGY, ASSUMPTIONS AND LIMITATIONS OF THE STUDY

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 site. The study was visited for a single day in June 2016 and the watercourses were assessed in the winter rainfall period. More recent photographs of the watercourses in the area were taken in December 2020. Due to the low rainfall of the area and the low level of activities taking place in the area. This approach is considered adequate to provide input into this assessment.

During the site visit in 2016, characterisation and integrity assessments of the freshwater features were undertaken. These assessments were reviewed based on the recent imagery, observations, and activities taking place in the area The DEA Screening Tool, SANBI Biodiversity GIS, CapeFarmMapper, and Freshwater Biodiversity Information System websites were also consulted to identify any constraints in terms of aquatic biodiversity conservation importance. This information/data was used to inform the water resource protection-related recommendations.

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:

- The river health assessment was carried out using DWS developed methodologies. These assessments were carried out to provide information on the ecological condition and ecological importance and sensitivity of the watercourses impacted;

- The guideline document, “A Practical Field Procedure for the Identification and Delineation of Wetlands and Riparian Areas” document, as published by DWAF (2005) was followed for the delineation of the riparian and associated wetland areas;

- The ecological importance and sensitivity assessment was conducted according to the guidelines as developed by DWAF (1999); and
- The species mentioned in this report do not comprise a comprehensive list of all species which occur at the site. They are mentioned for descriptive purposes. Where a category is placed in parentheses after an alien species name it indicates the National Environmental Management: Biodiversity Act (Act 10 of 2014): Alien and Invasive Species List category which has been assigned to that species.

The level of aquatic assessment undertaken was considered to be adequate for this study. No additional site assessments are deemed to be required.

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 PROJECT AND STUDY AREA

5.1. DESCRIPTION OF THE STUDY AREA

The study area is located on the undulating lowland Coastal Plain within southern Namaqualand in the Western Cape Province. The area under assessment falls within the catchment of the Sout River that lies between the N7 highway in the east and the Atlantic coastline in the west. It is a relatively dry and undeveloped area that is drained by a few seasonal and ephemeral streams.

The area has a Mediterranean climate and normally receives about 113mm of rain per year, mostly during winter. The lowest rainfall (0mm) occurs in January and the highest (22mm) in June. The average midday temperatures range from 18.4°C in July to 29.5°C in February.

The topography comprises low hills with the general slope and surface water runoff in a westerly direction towards the coastline. The mainland use is predominantly stock farming, with some small settlements and the Tronox Namakwa sands mining operation at Brand-se-Baai.

The underlying geology consists largely of deep quaternary aeolian sands (red or yellow) West Coast Group. These sands cover marine sediments and granite gneisses. In the interior, Namaqualand Klipkoppe comprise of granites and gneisses that form domes and rock sheets. The soils comprise largely of well-drained sandy soils for much of the low-lying coastal zone while the interior consists of shallow soils on rock.

The natural vegetation type in the area is a mix of Namaqualand Sand Fynbos, Strandveld, Inland Duneveld, and Coastal Duneveld occurring. The vegetation types are associated with the deep red yellowish aeolian sand overlying marine sediments and granite gneisses.

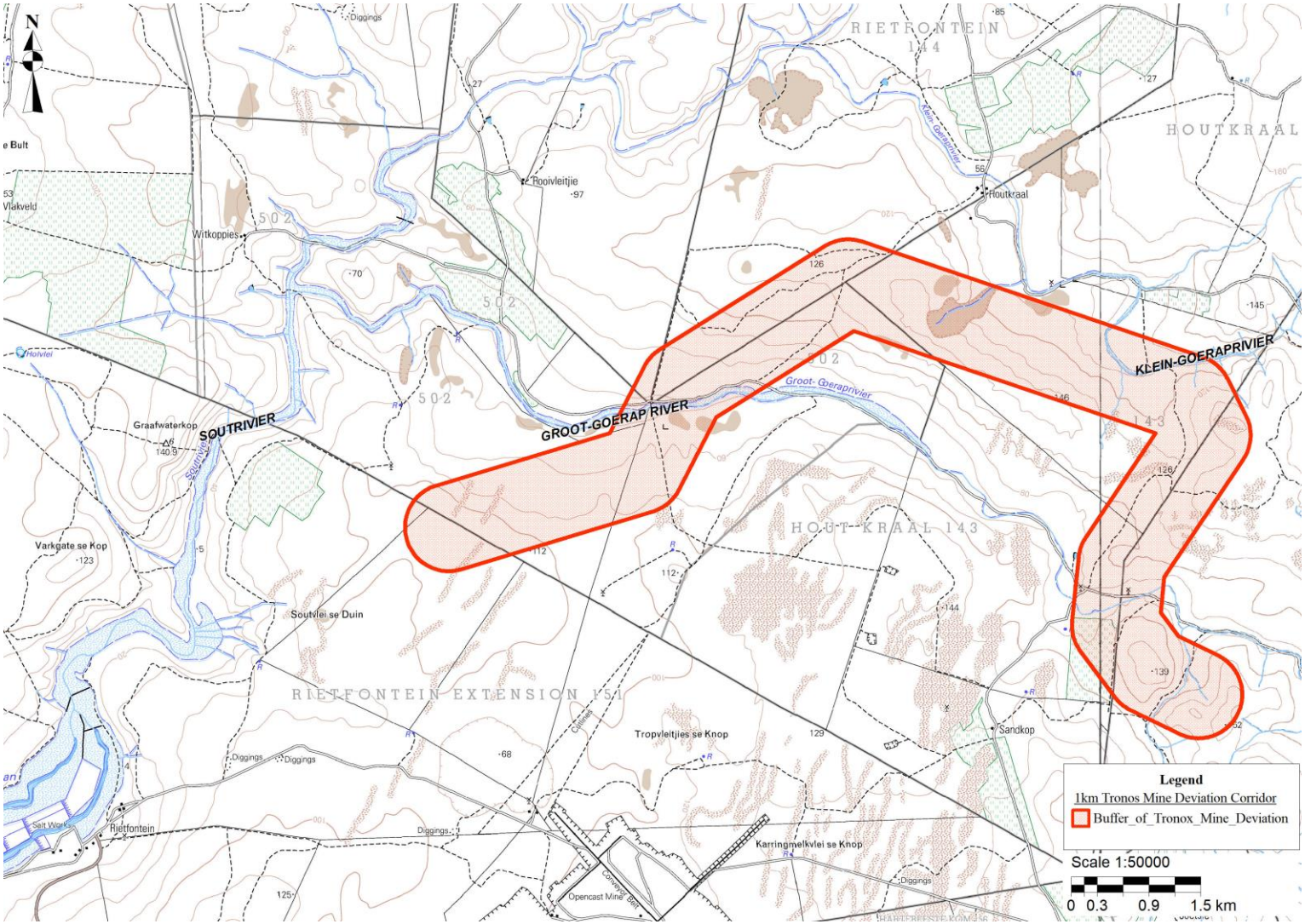

Figure 2: **A topographical (2816DA) map of the study area, indicating the locality of the proposed amended Eskom corridor**

The vegetation types consist of low species-rich shrubland. The vegetation is still largely natural in the higher-lying and more remote areas, with a moderate modification of the natural vegetation in the lower-lying farmlands and small towns. The vegetation types are listed as Least Threatened.

5.2. ACTIVITY DESCRIPTION

An additional 15km deviation to the 400kV transmission powerline route is being applied for which traverses Tronox Mine Namakwa Sands, which is located near Nuwerus within the Matzikama Local Municipality, West Coast District in the Western Cape. After the receipt of favorable prospecting results, Eskom is required to deviate around the Tronox Mine area, which will result in a proposed 15km deviation to the east of the 2017 approved deviation. The proposed 15km deviation falls outside of the 2017 EA authorised corridor, increasing the length of the powerline. A Basic Assessment (BA) process (as it falls within a Strategic Transmission Corridor) is therefore required.

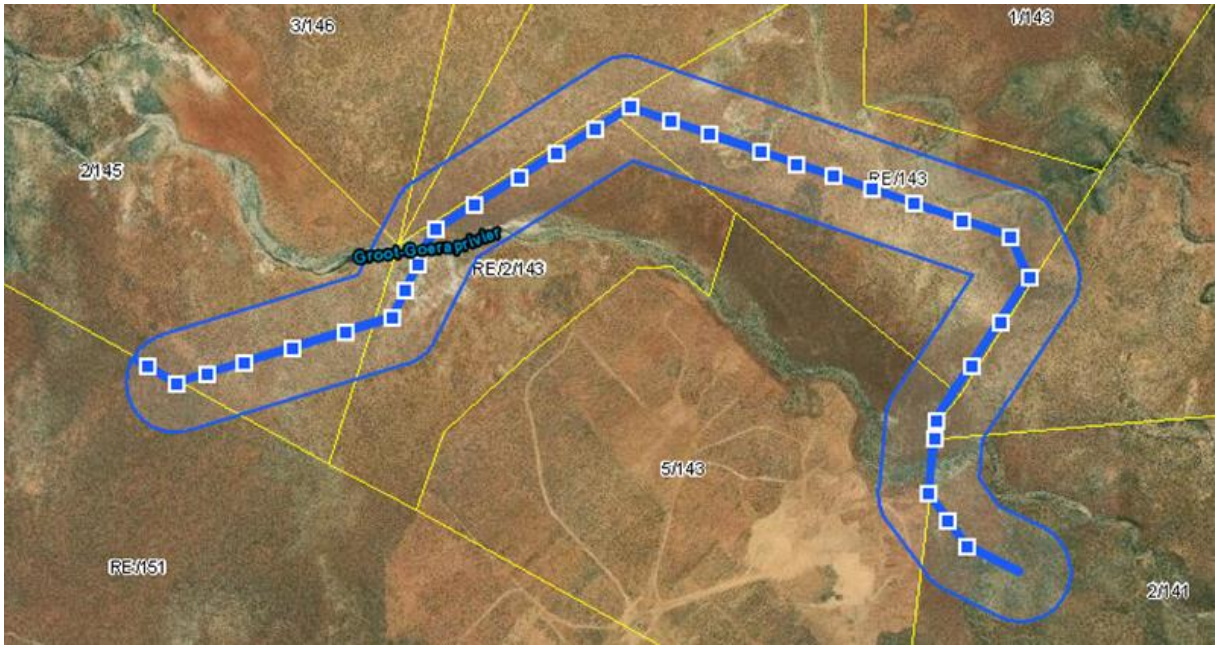

Figure 3: Proposed diversion of the approved Eskom Juno Gromis corridor with the location of the towers shown

5.3. DESCRIPTION OF AQUATIC FEATURES AND FAUNA

The Sout River System consists of the Sout River itself and three main tributaries, the Klein-Goerap, Groot-Goerap, and the Vorsbrak. The river is still in a good condition with the only impacts on the river being agricultural activities in the upper reaches of the system and salt mining at the river mouth. The proposed transmission line will cross the Groot Goerap River twice. The rivers in the area are all non-perennial lowland systems that only tend to flow for short periods following local rainfall events. The associated vegetation is thus largely terrestrial and the substrate sand with bedrock (Figure 4).

Figure 4. Views of the Sout, Klein-Goerap, and Groot-Goerap rivers within the wider the study area

Where distinct riparian vegetation does occur along the larger watercourses, it has been mapped as Namaqualand Riviere vegetation. The vegetation type occurs along the Groot Goerap, Klein Goerap, and Sout Rivers in the study area. This vegetation type occupies the riverbeds and banks of intermittent rivers, throughout Namaqualand and is described as comprising of a complex of alluvial shrubland (*Suaeda fruticosa, Zygophyllum morgsana, Ballota africana*) with patches of tussock graminoids (Mucina & Rutherford 2006). It is considered a Least Threatened vegetation type.

There are seven frog and toad species known to occur within the study area. Flow in the Sout River System is however ephemeral and would thus only support amphibians that are accustomed to ephemeral pools such as the Desert Rain Frog *Breviceps macrops*, Namaqua Rain Frog *Breviceps namaquensis,* and Karoo Toad *Vandijkophrynus gariepensis*.

5.4. AQUATIC BIODIVERSITY IMPORTANCE AND SENSITIVITY AREAS

In the Department of Environment Affairs (DEA) Screening mapping, the study site is located within a wider area considered of Low Aquatic Biodiversity Sensitivity with the Groot Goerap, Klein Goeorap, and Sout River corridors indicated as Very High Aquatic Biodiversity Sensitivity (Figure 4). The very high sensitivity rating is due to the fact that these watercourses have been mapped as aquatic Critical Biodiversity Areas (CBAs) and the lower Sout River as a Freshwater Ecosystem Priority Area (FEPA) Wetland. The area is not located in a Strategic Water Source Area for groundwater or surface water. The Aquatic CBAs and FEPA mapped features are discussed further below.

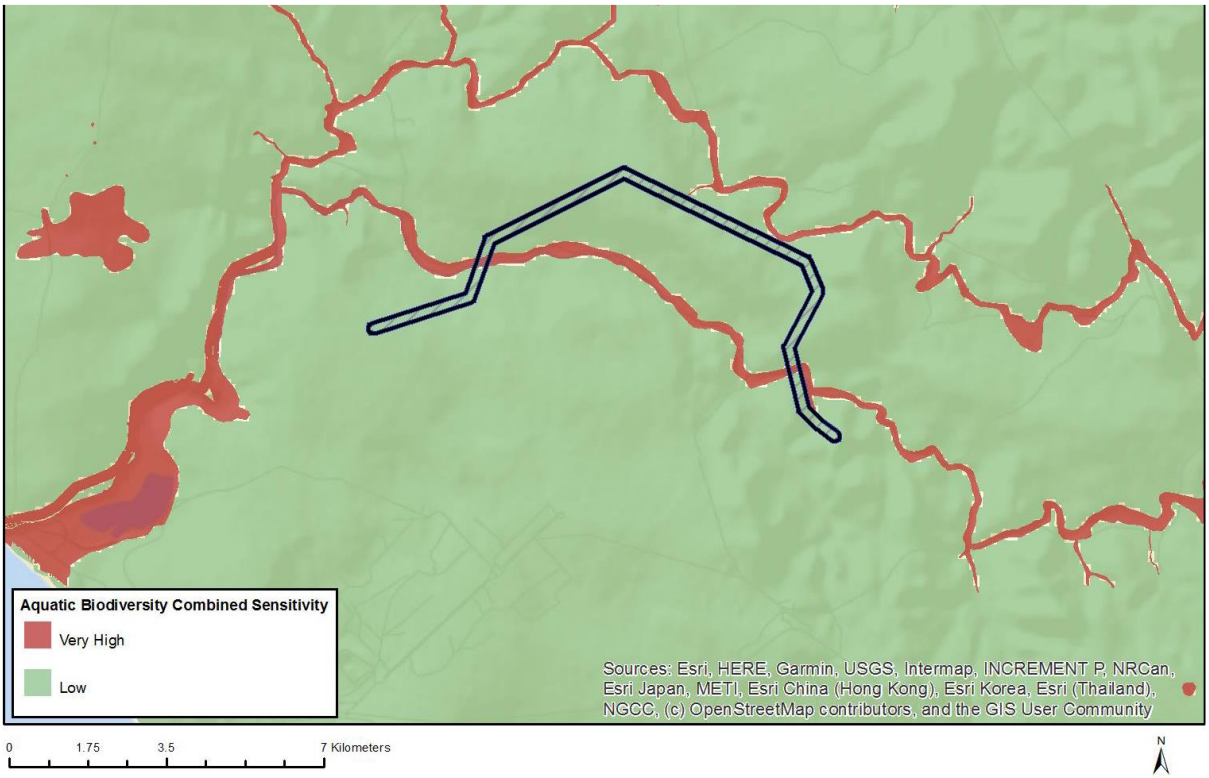

Figure 5. DEA Screening Map for the area in terms of Aquatic Biodiversity Combined Sensitivity

In South Africa two sets of mapping initiatives are available for the study area that are of relevance to the conservation and biodiversity importance of the aquatic ecosystems, that is, the 2017 Western Cape Biodiversity Spatial Plan and the National Freshwater Ecosystem Priority Areas (FEPA) map.

In terms of Freshwater Ecosystem Biodiversity Areas (Figure 6), the Sout River has not been identified as a FEPA River. The Sout River Estuary and associated wetland areas in the lower river have been mapped as a FEPA wetland/estuary area. Estuary FEPAs are the national priority estuaries identified in the National Biodiversity Assessment 2011. The estuary is considered of medium size and largely modified as a result of the salt mining currently being undertaken within the estuary. The estuary has not been ranked as being important in the rating assessment undertaken for South African estuaries compiled in 2007 in the C.A.P.E Estuary Conservation Plan.

In terms of the Critical Biodiversity Areas (CBA) mapping, the river corridors of the Groot Goerap, Klein Goeorap, and Sout Rivers have been mapped aquatic CBAs due to the fact that the river corridor has been mapped as natural valley floor wetlands in the National Wetland Map version 5 (NWM5). The adjacent riparian zones are mapped as aquatic Ecological Support Areas (ESAs) (Figure 7) as they provide important functionality in the movement of biota.

The CBA map indicates areas of land and aquatic features that must be safeguarded in their natural state if biodiversity patterns and processes are to persist and ecosystems are to continue functioning. CBAs incorporate (i) areas that need to be safeguarded to meet national biodiversity thresholds; (ii) areas required to ensure the continued existence and functioning of species and ecosystems, including the delivery of ecosystem services; and/or (iii) important locations for biodiversity features or rare species. From a management of aquatic ecosystems point of view, the objective for these areas is to maintain near-natural landscapes with no or limited loss of biodiversity pattern and limited loss of ecosystem processes.

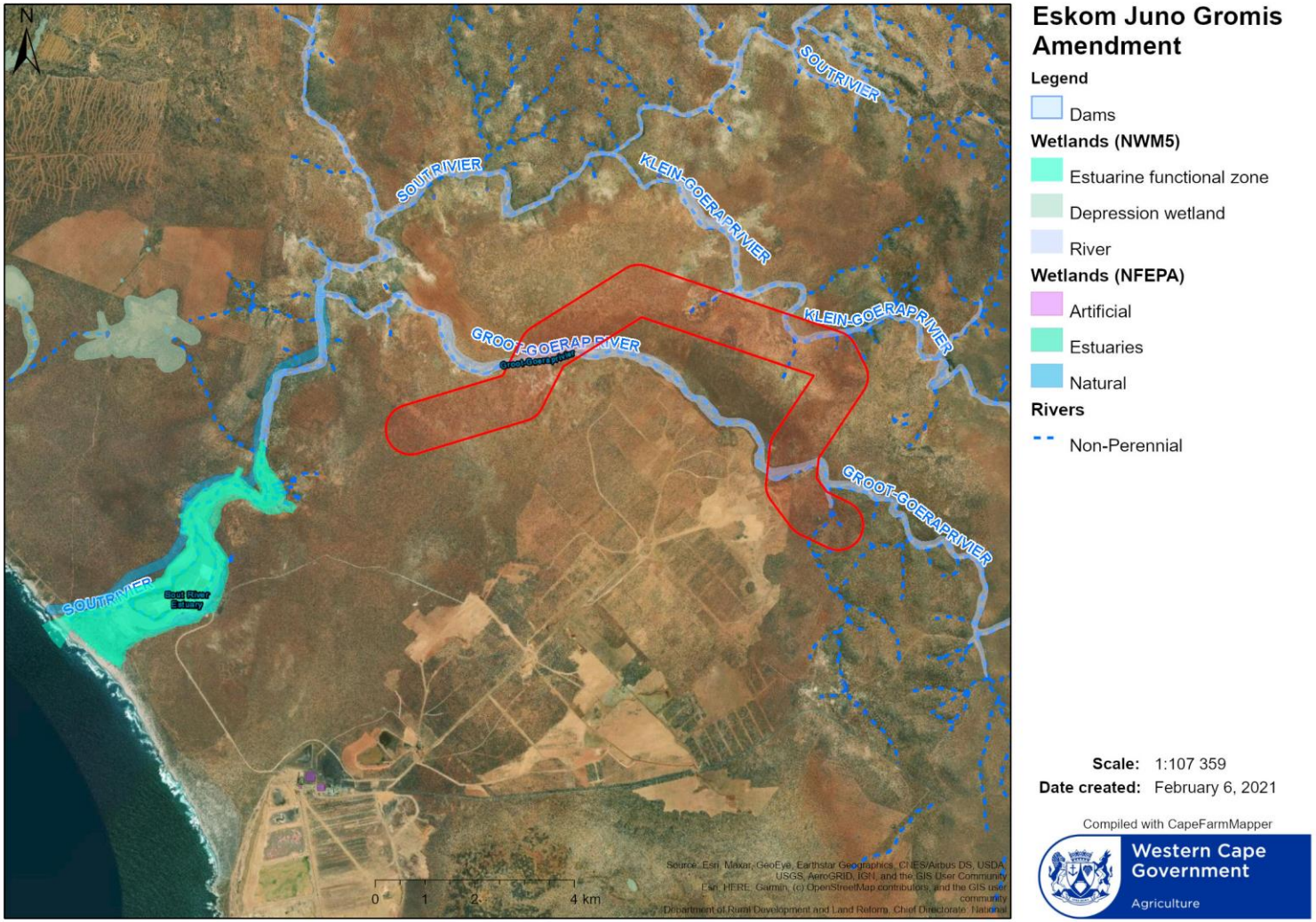

Figure 6: **Freshwater Ecosystem Priority Area Wetlands mapping for the area (valley floor wetlands), obtained from CapeFarmMapper in February 2021**

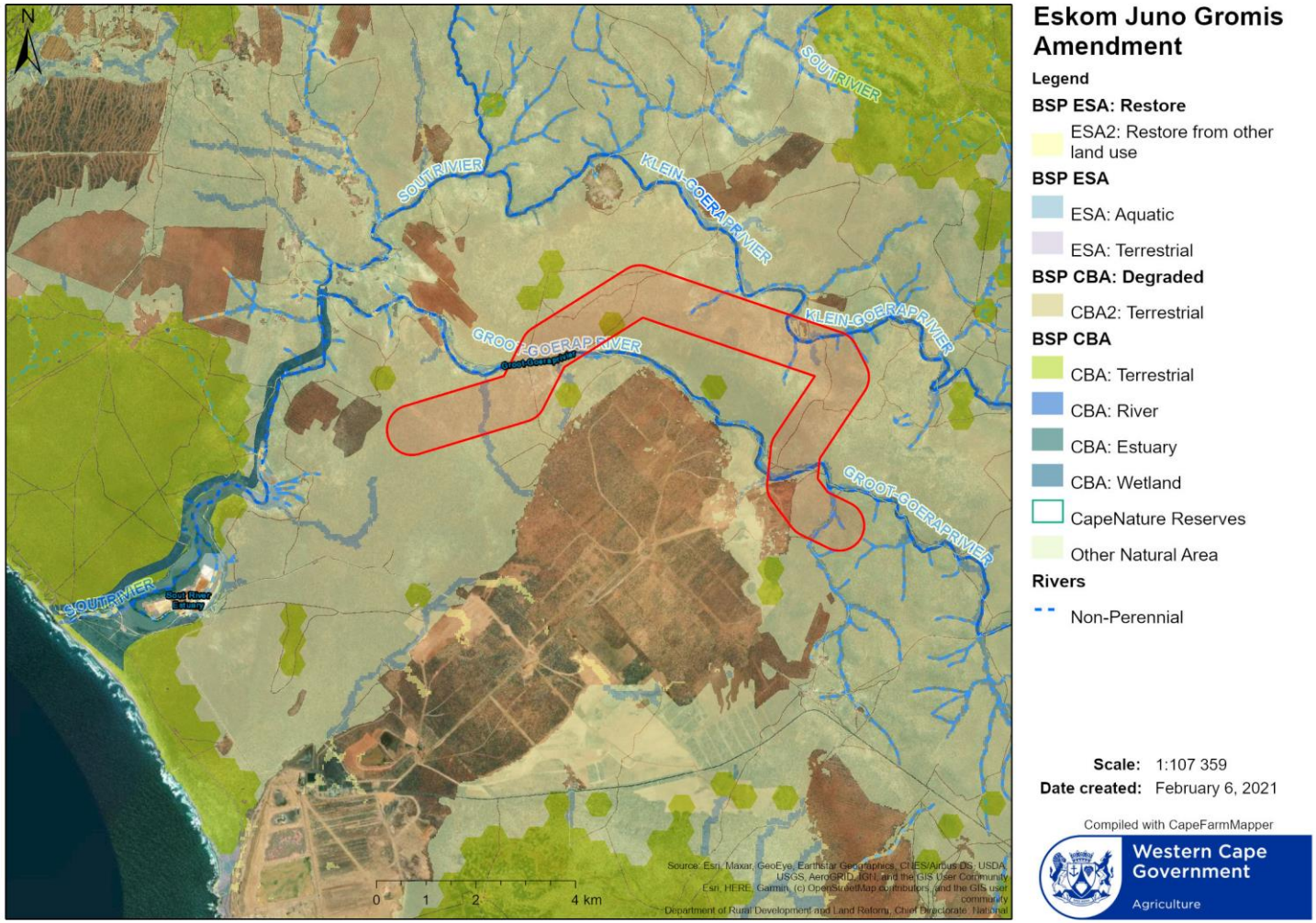

Figure 7: **Western Cape Biodiversity Spatial Plan for the area (CBA river), obtained from CapeFarmMapper in February 2021**

6. AQUATIC ECOSYSTEM ASSESSMENT

The purpose of the aquatic ecosystem assessment is to determine the relative importance, sensitivity, and current condition (ecological state) of the aquatic features concerned to assess the impact of proposed development activities on the freshwater resources. The assessment is also required to make recommendations in terms of mitigation measures that can be used to prevent or minimise the impact on freshwater resources.

The study area is located within the lower Sout River System, crossing the Groot Goerap River and following an alignment south of the Klein Goeorap River. The upper limit of the estuary is located approximately 8.5 km downstream of the downstream crossing for the proposed powerlines under consideration. As such a detailed assessment of the estuary has not been undertaken. A more detailed assessment of the lower Groot Goerap and Klein Goerap at the corridor was however undertaken. The condition and character of these rivers are such that they could be assessed together.

The Index for Habitat Integrity (IHI) and Site Characterisation Assessments were utilised to provide information on the ecological condition of the rivers in the study area. No detailed assessments were undertaken in terms of stream geomorphology and aquatic biota. The nature of the proposed activities is also such that if the proposed mitigation measures and buffer zones are adhered to it should not have an impact on aquatic organisms *per se*.

6.1 RIVER CLASSIFICATION

To assess the condition and ecological importance and sensitivity of the river, it is necessary to understand how the river might have appeared under un-impacted conditions. This is achieved through classifying rivers according to their ecological characteristics so that they 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 conditions 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: groups of rivers within South Africa, which share similar physiography, climate, geology, soils, and potential natural vegetation. For this study, the ecoregional classification presented in DWAF (1999), which divides the country's rivers into ecoregions was used.

Sub-regions: 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: Characteristics of the Western Coastal Belt Ecoregion (dominant types in bold)

Main Attributes	Characteristics
Terrain Morphology	**Plains; Low Relief**; Plains Moderate Relief; Closed Hills; Mountains; Moderate and High Relief
Vegetation types	**Lowland Succulent Karoo**; Upland Succulent Karoo (limited); Strandveld Succulent Karoo
Altitude	0-700m a.m.s.l
MAP	0 to 300mm
Coefficient of Variation	35 to >40 % of annual precipitation
Rainfall concentration index	45 to 64
Rainfall seasonality	Winter
Mean annual temp.	16 to 22°C
Median annual simulated runoff	<5 mm for quaternary catchment

6.2 SITE CHARACTERISATION

From the Site Characterisation assessment, the geomorphological and physical characteristics of the Groot and Klein Goerap Rivers can be classified together as follows:

Table 3: Geomorphological and Physical features

River	Lower Groot and Klein Goerap Rivers
Geomorphological Zone	Foothill rivers
Lateral mobility	Unconfined to confined within river valleys
Channel form	Simple
Channel pattern	Single thread: low sinuosity
Channel type	Mixed (alluvium with bedrock)
Channel modification	Moderate modification (farming into the riparian zone and some alien vegetation encroachment)
Hydrological type	Seasonal to ephemeral
Ecoregion	Western Coastal Belt
DWA catchment	F60B and F60D
Vegetation type	Namaqualand Riviere vegetation
Rainfall region	Winter

The surrounding land-use impacts upstream of the site consist largely of low-level agriculturally related and mining disturbance activities with loss of indigenous riparian vegetation.

6.3. INDEX OF HABITAT INTEGRITY

The evaluation of the 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 Groot and Klein Goerap Rivers at the corridor for the proposed powerline diversion.

The methodology (DWAF, 1996, and updated in 2013) 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 from 0 (no impact) to 25 (critical impact). The IHI assessment is based on an evaluation of the impacts of two components of the river, the riparian zone, and the instream habitat. The total scores for the instream and riparian zone components are used to place the habitat integrity of both in a specific habitat category (Table 4).

Table 4: Habitat Integrity categories (From DWAF, 1996 and updated in 2013)

Category	Description	Score
A	Unmodified, **natural**.	90-100
B	**Largely natural** with few modifications. A small change in natural habitats and biota may have taken place but the ecosystem functions are essentially unchanged.	80-90
C	**Moderately modified**. A loss and change of natural habitat and biota have occurred but the basic ecosystem functions are still predominantly unchanged.	60-79
D	**Largely modified**. Large loss of natural habitat, biota & basic ecosystem function has occurred.	40-59
E	The loss of natural habitat, biota, and basic ecosystem functions is extensive.	20-39
F	Modifications have reached a critical level and the lotic system has been modified completely with an almost complete loss of natural habitat and biota. In the worst instances, basic ecosystem functions have been destroyed and changes are irreversible.	0

The results of the habitat integrity assessment are summarised in Table 5. Both the riparian and instream habitat integrity of the Orange River can be described as moderately modified. This is the result of flow modification, water quality changes, and vegetation removal that have taken place in the entire catchment.

Table 5: Index of Habitat Integrity Assessment results and criteria assessed for the lower Groot and Klein Goerap Rivers at the corridor for the proposed powerline diversion

INSTREAM HABITAT INTEGRITY	Score	RIPARIAN ZONE HABITAT INTEGRITY	Score
Water Abstraction	**5**	Vegetation Removal	**5**
Flow Modification	**7**	Exotic Vegetation	**2**
Bed Modification	**7**	Bank Erosion	**7**
Channel Modification	**5**	Channel Modification	**4**
Water Quality	**4**	Water Abstraction	**8**
Inundation	**2**	Inundation	**9**
Exotic Macrophytes	**0**	Flow Modification	**6**
Exotic Fauna	**0**	Water Quality	**5**
Rubbish Dumping	**2**		
INTEGRITY CLASS	B	INTEGRITY CLASS	**B/C**

The instream as well as the riparian vegetation of the rivers at the proposed powerline corridor is in a largely natural to moderately modified condition, largely as a result of some flow and water quality modification in the upstream catchment. There are also limited direct habitat impacts that have resulted in some loss of indigenous riparian vegetation and the subsequent low-density invasion of alien plants.

6.4 ECOLOGICAL IMPORTANCE AND SENSITIVITY (EIS)

The Ecological Importance and Sensitivity (EIS) assessment considers several biotic and habitat determinants surmised to indicate either importance or sensitivity. The determinants are rated

according to a four-point scale (Table 6). The median of the resultant score is calculated to derive the EIS category (EISC).

Table 6: Scale used to assess biotic and habitat determinants indicating 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)

Table 7: 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 diversity, 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 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 8: Results of the EIS assessment for the Lower Groot and Klein Goerap Rivers at the corridor for the proposed powerline diversion

Biotic Determinants	Lower Groot and Klein Goerap Rivers
Rare and endangered biota	3
Unique biota	2
Intolerant biota	2
Species/taxon richness	2
Aquatic Habitat Determinants	
Diversity of aquatic habitat types or features	3
Refuge value of habitat type	2
Sensitivity of habitat to flow changes	1
Sensitivity of flow-related water quality changes	1
Migration route/corridor for instream and riparian biota	2
National parks, wilderness areas, Nature Reserves, Natural Heritage sites, Natural areas, PNEs	2
RATINGS	**2.0**
EIS CATEGORY	**Moderate/high**

The lower Lower Groot and Klein Goerap Rivers are considered to be of a moderate to high ecological importance and sensitivity. This is due to the fact that it is directly upstream of the Sout River Estuary and the aquatic habitat associated with the river is particularly important in providing refugia in an arid area.

6.5. RECOMMENDED ECOLOGICAL CATEGORY

According to the gazetted Water Resource Classification of the Olifants Doring Water Management Area (Government Gazette Co 843 of 3 October 2014), the recommended ecological category for Groot Goerap and Klein Goerap Rivers in Quaternary Catchments F60B and F60D as well as the downstream Sout river is a B Category (largely natural). The FEPA mapped wetlands along the watercourses should also be maintained in a largely natural condition.

7. AQUATIC ECOSYSTEM CONSTRAINTS

Within the corridor for the construction of the proposed powerline diversion, the aquatic ecosystem constraints consist of the lower Groot Goerap and Klein Goerap Rivers and their associated aquatic habitats. Small drainage features also drain the hillsides to the south of both rivers. These features do not provide any aquatic habitat of significance but simply provide a conduit for water draining the steeper banks south of the rivers. The aquatic features are mapped in Figure 8.

A recommended buffer in which any construction activities should be set back from the mapped aquatic features is also shown in Figure 8. The buffer varies between 15m and 200m depending on the bank slope and sensitivity of the aquatic habitats. The drainage lines should also be avoided to prevent erosion of these areas from occurring and as such have also been included in the recommended buffers.

The proposed powerline towers are all placed outside of the recommended buffers. The new road proposed for the construction and maintenance of the powerline should avoid being placed within the recommended buffer. Where possible existing farm roads should be utilised. The route that would avoid most of the recommended buffers and make use of existing roads would need to be placed in the southern extent of the indicated corridor (See Section 8.1). Mitigation measures such as the shaping of the roads to prevent a concentration of runoff along roads on slopes should be put in place to prevent erosion of the watercourses occurring as a result of concentrated runoff from the roads.

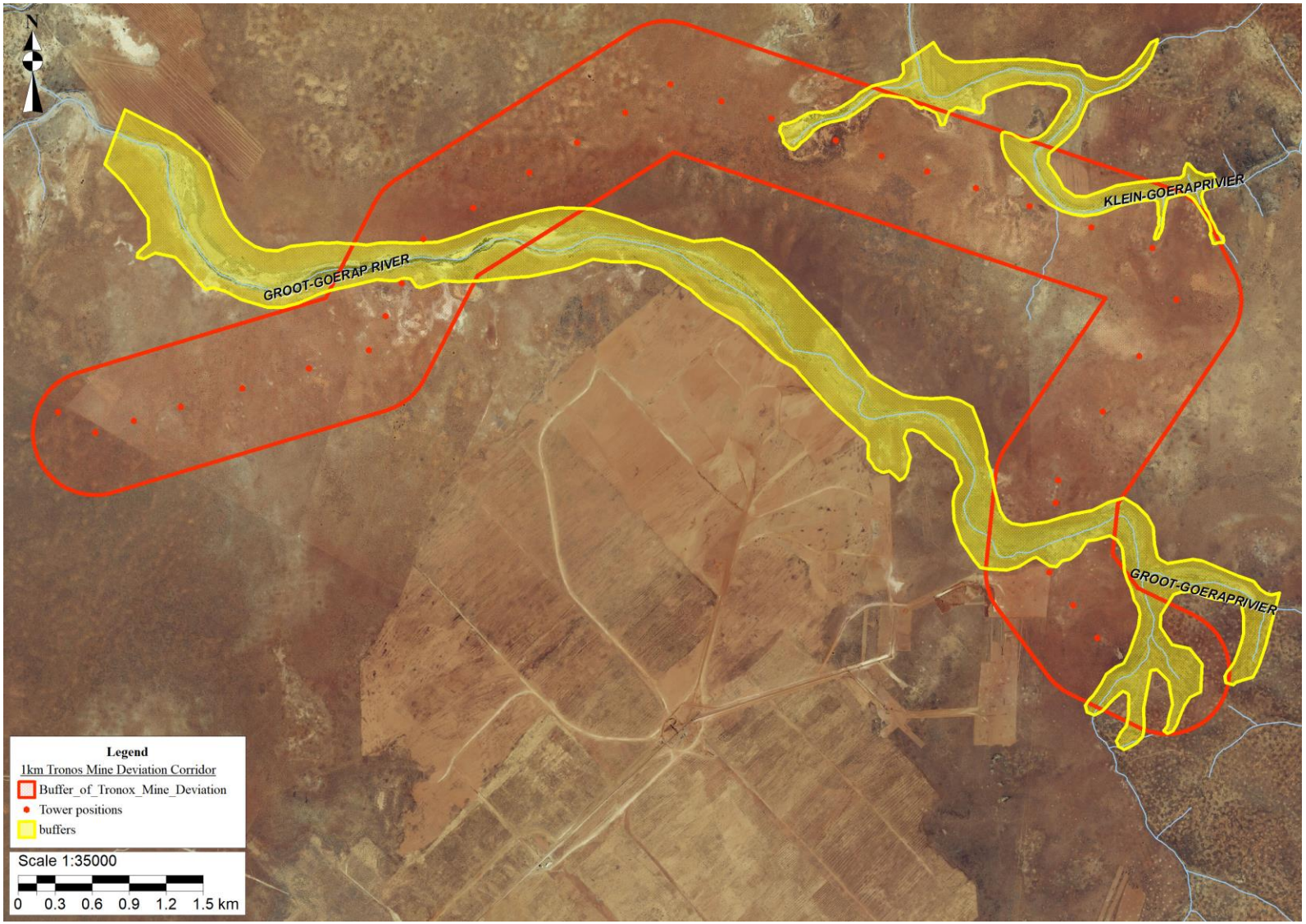

Figure 8: Mapped aquatic constraints associated with the proposed project activities

8. POTENTIAL AQUATIC IMPACT OF PROPOSED OVERHEAD POWERLINE

8.1 DESCRIPTION AND ASSESSMENT OF IMPACTS OF PROPOSED ACTIVITIES

This section provides an assessment of the potential impact of the proposed powerline on the aquatic ecosystems in the area. Potential impact consists largely of the direct modification or loss of aquatic habitat and the associated impacts on aquatic biota and to a lesser degree potential flow and water quality impacts that would mostly take place in the construction phase of the project. The potential impacts on the aquatic ecosystems are associated with:

- Construction of the powerline;
- Establishment of a new access road for the new powerline; and
- Longer-term maintenance activities.

CONSTRUCTION PHASE ACTIVITIES

Nature of Impact: Construction activities would include the construction of foundations for each pylon or tower as well as the establishment of access roads alongside the powerline. The powerline comprises a 400kV line traversing the lower Groot Goerap River twice. The new access road for the powerline would also need to cross the river twice. Activities during the construction phase of the project could result in ***some disturbance of vegetation cover*** and ***disturbance to the bed and banks*** should activities need to take place within or adjacent to the delineated aquatic features. The proposed activities may also impact waterbirds and other biota associated with the habitat in the lower river. This impact is assessed in the Avifauna and Biodiversity Specialist Assessments for the project.

Significance of impacts without mitigation: A localized shorter-term impact of medium to low intensity (depending on the distance between the construction activities and the aquatic features) that is expected to have a low overall significance in terms of its impact on the identified aquatic ecosystems in the area. This is due to the fact that the proposed powerline towers will be located outside of any aquatic features and the recommended buffers and the associated roads and infrastructure can also most likely be placed outside of the aquatic features. Long-term impacts associated with the new access road would be of a low significance and largely be limited to the crossings of the road at the watercourses.

Proposed mitigation: Construction activities must as far as possible occur outside of the delineated aquatic features and the proposed buffer zones. The recommended buffers for the Groot Goerap River at the proposed crossing vary depending on the slope and sensitivity of the banks within the study area.

Placement of the powerline towers and the new access road to the towers within the river channel, riparian zone, or the recommended buffer zones must be avoided as far as possible. The overhead powerlines may however cross over the buffer zones and the river. As far as possible existing access roads must be utilised to minimise the extent of disturbance in the area. The new access road proposed to be established should follow the shortest route through the aquatic constraints areas

that would create the least disturbance. Figure 9 shows the proposed access road route and a suggested route alternative that would make use of existing tracks that would have the least impact on the aquatic features and would make use of existing tracks through these areas. The proposed alternative shows the existing tracks that may not be feasible along the entire length of road and slight realignments to this route may be required. It is assumed that the proposed powerline route could be relocated to largely follow the proposed alternative access route. The road crossing structures within the watercourses should preferably comprise a simple low water crossing / concrete slab type structure that would not impede the low flow in the watercourses or become blocked with sediment and debris.

Due to the fact that the vegetation in the study area is still largely natural with minimal invasive alien plant growth, any of the cleared areas that are not hardened surfaces must be rehabilitated after construction is completed by re-vegetating the areas disturbed by the construction activities with suitable local indigenous plants. Any invasive alien plant growth occurring within the immediate area of the construction activities must be removed and any regrowth prevented.

To reduce the risk of erosion, all service/ access roads should be contoured along any steep slope. Run-off over the exposed areas and within the drainage lines must be mitigated to reduce the rate and volume of run-off and prevent erosion.

Contaminated runoff from construction must be prevented from entering the river. All materials on the construction site must be properly stored and contained. Disposal of waste from the site must also be properly managed. Construction workers must be given ablution facilities at the construction site that are located outside of the recommended buffer for the river and regularly serviced. These measures must 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 **very low**.

OPERATION PHASE ACTIVITIES

Nature of Impact: An impact of very limited significance is expected on any of the aquatic features that are associated with the longer-term maintenance activities during the operation phase. Potential impacts relate to disturbance of aquatic habitat and the provision of an ongoing opportunity for invasive alien plant growth.

Significance of impacts without mitigation: A localized longer-term impact of low intensity that is expected to have a 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 must only take place via the designated access routes. Disturbed areas along the access routes must 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, long-term impact of a very low overall significance could be expected to occur.

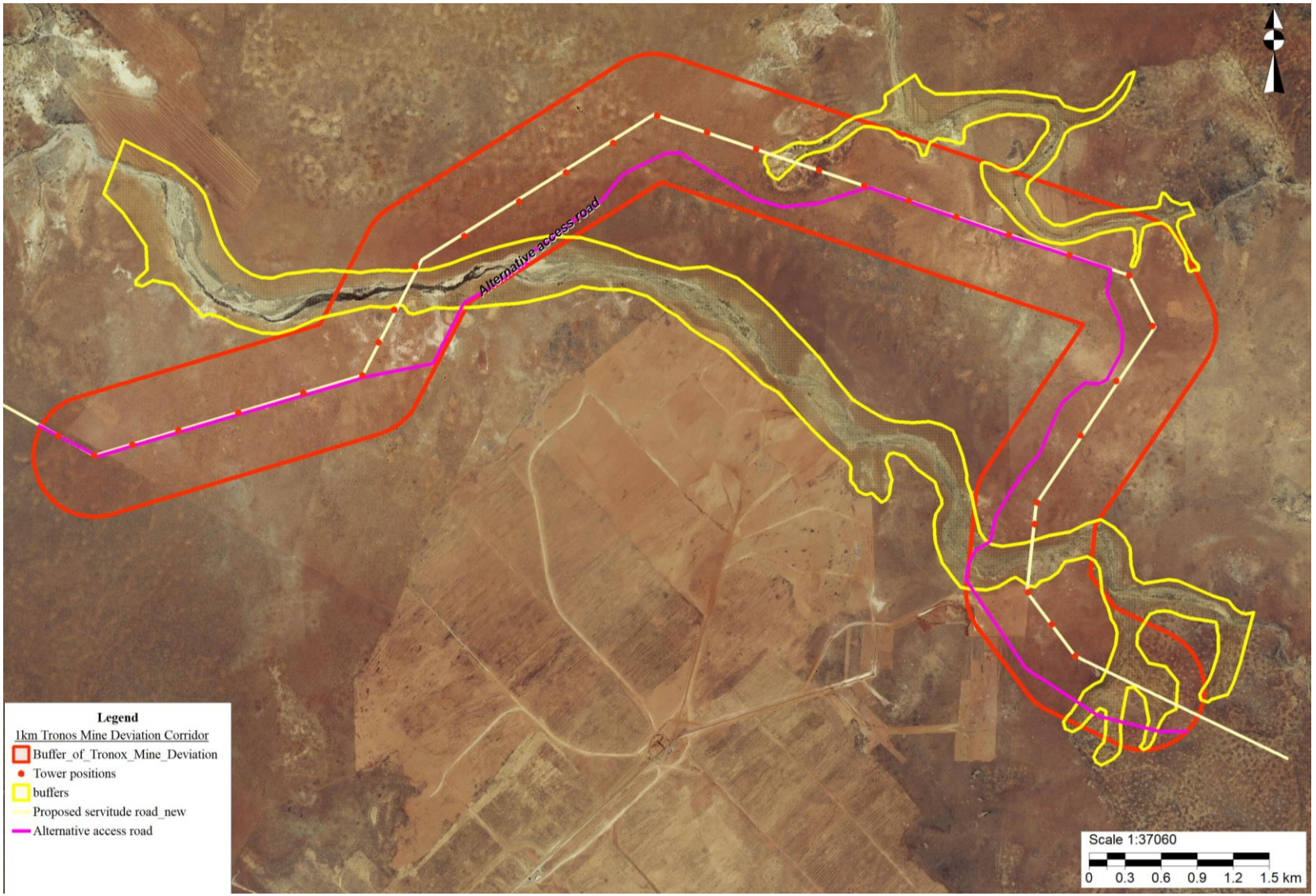

Figure 9. Orthophotograph with the mapped aquatic ecosystem constraints, the proposed new servitude route and a proposed alternative that follows existing tracks

CUMULATIVE IMPACT OF THE ACTIVITIES ON FRESHWATER ECOSYSTEMS:

The lower Groot Goerap and Klein Goerap Rivers are in a largely natural to moderately modified ecological condition mostly as a result of flow and water quality impacts in its upstream catchment. Land use activities upstream and downstream of the corridor of the proposed powerlines have resulted in a direct modification to the aquatic habitat and more specifically to the riparian and estuarine habitats associated with the river. These aquatic habitats are considered to be of a moderate to high ecological importance and sensitivity and thus further degradation of this aquatic habitat should not be allowed to occur. It can be expected that the proposed powerline would however not result in any impacts to the aquatic habitats if they are adequately mitigated and most importantly remain outside of the recommended buffer areas.

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

A summary of the potential impacts on the aquatic ecosystems associated with the lower Groot Goerap and Klein Goerap Rivers at the location of the proposed project activities is provided in Table 9 in terms of the construction phase activities and Table 10 in terms of the operation phase activities.

CONSTRUCTION PHASE ACTIVITIES:

Table 9: Construction phase impact summary

Potential impact on freshwater features	Construction of the proposed powerline diversion
Nature of impact:	Disturbance of habitat and possibly very limited runoff and water quality impacts
Extent and duration of impact:	Localised short term impacts
Intensity of Impact	Medium to low intensity (depending on the distance between the construction activities and the freshwater features)
Probability of occurrence:	Possible depending on the extent of construction activities within aquatic features
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:	Construction activities must as far as possible occur outside of the delineated aquatic features and the proposed buffer zones. The recommended buffers for the Groot Goerap River at the proposed crossing vary depending on the slope and sensitivity of the banks within the study area. Placement of the powerline towers and the access roads to the pylons must, as far as possible, be placed within the river channel, riparian zone, or the recommended buffer zones. The overhead powerlines may however cross over the buffer zones and the river. As far as possible existing access roads must be utilised to minimise the extent of disturbance in the area. If new roads do need to be established the shortest route that would create the least disturbance within this area must be selected. An alternative access road route is proposed that largely makes use of existing tracks and crossings through the watercourses. The road crossing structures within the watercourses should preferably comprise a simple low water crossing / concrete slab type structure that would not impede the

	low flow in the watercourses or become blocked with sediment and debris. Due to the fact that the vegetation in the study area is still largely natural with minimal invasive alien plant growth, any of the cleared areas that are not hardened surfaces must be rehabilitated after construction is completed by re-vegetating the areas disturbed by the construction activities with suitable indigenous plants. Any invasive alien plant growth occurring within the immediate area of the construction activities must be removed and any regrowth prevented. To reduce the risk of erosion, all service/ access roads must be contoured along any steep slope. Run-off over the exposed areas and within the drainage lines must be mitigated to reduce the rate and volume of run-off and prevent erosion. Contaminated runoff from construction must be prevented from entering the river. All materials on the construction site must be properly stored and contained. Disposal of waste from the site must also be properly managed. Construction workers must be given ablution facilities at the construction site that are located outside of the recommended buffer for the river and regularly serviced. These measures must be addressed, implemented, and monitored in terms of the Environmental Management Plan for the construction phase.
Significance after mitigation	Very Low
Cumulative impact post mitigation:	Very Low impact

OPERATION PHASE ACTIVITIES:

Table 10: Operational phase impact summary

Potential impact on freshwater features	Maintenance activities associated with the proposed powerline
Nature of impact:	Disturbance of habitat
Extent and duration of impact:	Localised longer-term impacts
Intensity of Impact	Low
Probability of occurrence:	Possible 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 impact

9. RISK ASSESSMENT

The DWS is in the process of finalising a “Risk Assessment Matrix” to determine the risks associated with each respective water use. The Risk Assessment Matrix has been developed with identified State-Owned Companies to assist with the determination of risks associated with various proposed water use activities. Based on the outcome of the Risk Assessment Matrix, Low risk activities will be generally authorised with conditions, while moderate to high risk activities will be required to go through a Water Use Licence Application Process. Water use activities that are authorised in terms of the General authorisations will still need to be registered with the DWS.

The Risk Assessment Matrix as distributed in December 2014 by the DWS has been used in the assessment of the risk posed to the aquatic ecosystems for the proposed road upgrade. The proposed activities pose the following risks to the aquatic ecosystems for each of the activities:

Phases	Activity	Impact	Significance	Risk Rating	Risk Rating
Construction	Construction of the proposed powerline	Disturbance of habitat and possibly some very limited surface water runoff and water quality impacts	**48**	**L**	**L**
	Construction of proposed access road	Disturbance of aquatic habitat at road crossings with some modification to water quality and possibly flow during construction	**68**	**M/L**	**L**
Operation	Maintenance activities associated with the proposed powerline	Loss of biodiversity & habitat - Facilitation of erosion and potential for invasion by alien plants	**66**	**LM/L**	**LL**

*Low risk rating = Significance score of ≤55;

The risk associated with the shorter-term construction and longer-term maintenance-related activities is thus deemed to be moderate to low that can be reduced to low provided that the mitigation measures as recommended in the aquatic ecosystem report and included in the attached risk assessment matrices (Appendix B) are implemented.

10. CONCLUSIONS AND RECOMMENDATIONS

The proposed powerline diversion will potentially impact the lower Groot Goerap and Klein Goerap Rivers and their associated aquatic habitats. The rivers are in a largely lateral to moderately modified ecological state with a moderate to high ecological importance and sensitivity.

It is expected that the proposed powerline diversion would also not result in any impacts to the aquatic habitats if adequately mitigated and most importantly the associated structures remain outside of the recommended buffer areas. Thus, provided the following recommended mitigation measures are implemented the significance of the impact is expected very low:

- Construction activities should as far as possible occur outside of the delineated aquatic features and the proposed buffer zones. The recommended buffers for the Groot Georap River at the proposed crossing vary depending on the slope and sensitivity of the banks within the study area.

- Neither the powerline towers nor the access roads to the pylons should be placed within the river channel, riparian zone, or the recommended buffer zones. The overhead powerlines may however cross over the buffer zones and the river. As far as possible existing access roads should be utilised to minimise the extent of disturbance in the area. An alternative access road route is proposed that largely makes use of existing tracks and crossings through the watercourses.

- The road crossing structures within the watercourses should preferably comprise a simple low water crossing / concrete slab type structure that would not impede the low flow in the watercourses or become blocked with sediment and debris.

- Due to the fact that the vegetation in the study area is still largely natural with minimal invasive alien plant growth, any of the cleared areas that are not hardened surfaces should be rehabilitated after construction is completed by re-vegetating the areas disturbed by the construction activities with suitable indigenous plants. Any invasive alien plant growth occurring within the immediate area of the construction activities should be removed and any regrowth prevented.

- To reduce the risk of erosion, all service/ access roads should be contoured along any steep slope. Run-off over the exposed areas and within the drainage lines should be mitigated to reduce the rate and volume of run-off and prevent erosion.

- Contaminated runoff from construction should be prevented from entering the river. All materials on the construction site should be properly stored and contained. Disposal of waste from the site should also be properly managed. Construction workers should be given ablution facilities at the construction site that are located outside of the recommended buffer for the river and regularly serviced. These measures should be addressed, implemented, and monitored in terms of the Environmental Management Plan for the construction phase.

- 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 may need to be obtained from the Department of Water and Sanitation Western Cape Regional Office for approval of the water use aspects of the proposed activities. Due to the low risk that the proposed activities place on the aquatic features in the area, the associated water use activities could likely be authorised using the General Authorisations.

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APPENDIX A: PRESENT ECOLOGICAL STATUS, ECOLOGICAL IMPORTANCE AND ECOLOGICAL SENSITIVITY ASSESSMENTS FOR THE SOUT AND GROOT GOERAP RIVERS (DWS, 2012)

SELECT SQ REACH	SQR NAME	LENGTH km	STREAM ORDER	PES ASSESSED BY XPERTS? (IF TRUE="Y")	REASONS NOT ASSESSED	PES CATEGORY DESCRIPTION	PES CATEGORY BASED ON MEDIAN
F60C-06201	Sout	3.93	2	Y		LARGELY NATURAL	B
MEAN EI CLASS	MEAN ES CLASS	DEFAULT ECOLOGICAL CATEGORY (DEC)	RECOMMENDED ECOLOGICAL CATEGORY (REC)				
HIGH	HIGH	B	0.00				

PRESENT ECOLOGICAL STATE		ECOLOGICAL IMPORTANCE				ECOLOGICAL SENSITIVITY	
INSTREAM HABITAT CONTINUITY MOD	NONE	FISH SPP/SQ		INVERT TAXA/SQ	10.00	FISH PHYS-CHEM SENS DESCRIPTION	
RIP/WETLAND ZONE CONTINUITY MOD	SMALL	FISH: AVERAGE CONFIDENCE		INVERT AVERAGE CONFIDENCE	2.40	FISH NO-FLOW SENSITIVITY DESCRIPTION	
POTENTIAL INSTREAM HABITAT MOD ACT.	SMALL	FISH REPRESENTIVITY PER SECONDARY: CLASS		INVERT REPRESENTIVITY PER SECONDARY, CLASS	VERY HIGH	INVERT PHYS-CHEM SENS DESCRIPTION	MODERATE
RIPARIAN-WETLAND ZONE MOD	SMALL	FISH REPRESENTIVITY PER SECONDARY: CLASS		INVERT RARITY PER SECONDARY: CLASS	VERY LOW	INVERTS VELOCITY SENSITIVITY	HIGH
POTENTIAL FLOW MOD ACT.	SMALL	FISH RARITY PER SECONDARY: CLASS		ECOLOGICAL IMPORTANCE: RIPARIAN-WETLAND-INSTREAM VERTEBRATES (EX FISH) RATING	VERY LOW	RIPARIAN-WETLAND-INSTREAM VERTEBRATES (EX FISH) INTOLERANCE WATER LEVEL/FLOW CHANGES DESCRIPTION	HIGH
POTENTIAL PHYSICO-CHEMICAL MOD ACTIVITIES	SMALL	ECOLOGICAL IMPORTANCE: RIPARIAN-WETLAND-INSTREAM VERTEBRATES (EX FISH) RATING	VERY LOW	HABITAT DIVERSITY CLASS	LOW	STREAM SIZE SENSITIVITY TO MODIFIED FLOW/WATER LEVEL CHANGES DESCRIPTION	HIGH
		RIPARIAN-WETLAND NATURAL VEG RATING BASED ON % NATURAL VEG IN 500m (100%=5)	VERY HIGH	HABITAT SIZE (LENGTH) CLASS	VERY LOW	RIPARIAN-WETLAND VEG INTOLERANCE TO WATER LEVEL CHANGES DESCRIPTION	VERY HIGH
		RIPARIAN-WETLAND NATURAL VEG IMPORTANCE BASED ON EXPERT RATING	VERY HIGH	INSTREAM MIGRATION LINK CLASS	VERY HIGH		
				RIPARIAN-WETLAND ZONE MIGRATION LINK	VERY HIGH		
				RIPARIAN-WETLAND ZONE HABITAT INTEGRITY CLASS	VERY HIGH		
				INSTREAM HABITAT INTEGRITY CLASS	VERY HIGH		

SELECT SQ REACH	SQR NAME	LENGTH km	STREAM ORDER	PES ASSESSED BY XPERTS? (IF TRUE="Y")	REASONS NOT ASSESSED	PES CATEGORY DESCRIPTION	PES CATEGORY BASED ON MEDIAN
F60D-06236	Groot-Goerap	36.31	2	Y		LARGELY NATURAL	B
MEAN EI CLASS	MEAN ES CLASS	DEFAULT ECOLOGICAL CATEGORY (DEC)	RECOMMENDED ECOLOGICAL CATEGORY (REC)				
HIGH	HIGH	B	0.00				

PRESENT ECOLOGICAL STATE		ECOLOGICAL IMPORTANCE				ECOLOGICAL SENSITIVITY	
INSTREAM HABITAT CONTINUITY MOD	NONE	FISH SPP/SQ		INVERT TAXA/SQ	10.00	FISH PHYS-CHEM SENS DESCRIPTION	
RIP/WETLAND ZONE CONTINUITY MOD	SMALL	FISH: AVERAGE CONFIDENCE		INVERT AVERAGE CONFIDENCE	2.40	FISH NO-FLOW SENSITIVITY DESCRIPTION	
POTENTIAL INSTREAM HABITAT MOD ACT.	SMALL	FISH REPRESENTIVITY PER SECONDARY: CLASS		INVERT REPRESENTIVITY PER SECONDARY, CLASS	VERY HIGH	INVERT PHYS-CHEM SENS DESCRIPTION	MODERATE
RIPARIAN-WETLAND ZONE MOD	SMALL	FISH REPRESENTIVITY PER SECONDARY: CLASS		INVERT RARITY PER SECONDARY: CLASS	VERY LOW	INVERTS VELOCITY SENSITIVITY	HIGH
POTENTIAL FLOW MOD ACT.	SMALL	FISH RARITY PER SECONDARY: CLASS		ECOLOGICAL IMPORTANCE: RIPARIAN-WETLAND-INSTREAM VERTEBRATES (EX FISH) RATING	VERY LOW	RIPARIAN-WETLAND-INSTREAM VERTEBRATES (EX FISH) INTOLERANCE WATER LEVEL/FLOW CHANGES DESCRIPTION	VERY LOW
POTENTIAL PHYSICO-CHEMICAL MOD ACTIVITIES	SMALL	ECOLOGICAL IMPORTANCE: RIPARIAN-WETLAND-INSTREAM VERTEBRATES (EX FISH) RATING	VERY LOW	HABITAT DIVERSITY CLASS	MODERATE	STREAM SIZE SENSITIVITY TO MODIFIED FLOW/WATER LEVEL CHANGES DESCRIPTION	VERY HIGH
		RIPARIAN-WETLAND NATURAL VEG RATING BASED ON % NATURAL VEG IN 500m (100%=5)	HIGH	HABITAT SIZE (LENGTH) CLASS	HIGH	RIPARIAN-WETLAND VEG INTOLERANCE TO WATER LEVEL CHANGES DESCRIPTION	VERY HIGH
		RIPARIAN-WETLAND NATURAL VEG IMPORTANCE BASED ON EXPERT RATING	VERY HIGH	INSTREAM MIGRATION LINK CLASS	VERY HIGH		
				RIPARIAN-WETLAND ZONE MIGRATION LINK	VERY HIGH		
				RIPARIAN-WETLAND ZONE HABITAT INTEGRITY CLASS	VERY HIGH		
				INSTREAM HABITAT INTEGRITY CLASS	VERY HIGH		

APPENDIX B: RISK ASSESSMENT

ASPECTS AND IMPACT REGISTER/RISK ASSSESSMENT FOR WATERCOURSES INCLUDING RIVERS, PANS, WETLANDS, SPRINGS, DRAINAGE LINES
Eskom Juno Gromis Powerline Project - Route diversion EA Amendment

COMPILED BY: Toni Belcher, BlueScience
Date: March 2021

Nr.	Phases	Activity	Impact	Severity: Flow Regime	Severity: Physico & Chemical (Water Quality)	Severity: Habitat (Geomorph +Vegetation)	Severity: Biota	Severity	Spatial scale	Duration	Consequence	Frequency of activity	Frequency of impact	Legal Issues	Detection	Likelihood	Significance	Risk Rating	Adj. Risk Rating	Control Measures	Borderline LOW MODERATE Rating Classes	Type Watercourse
1	Construction	Construction of the proposed powerline	Disturbance of habitat and possibly some very limited surface water	1	1	1	1	1	1	2	**4**	1	2	5	4	**12**	**48**	L	L	Construction activities must as far as possible occur outside of the delineated aquatic features and the proposed buffer zones. The recommended buffers for the Groot Goerap River at the proposed crossing vary depending on the slope and sensitivity of the banks within the study area. Placement of the powerline towers and the access roads to the pylons must, as far as possible, be placed within the river channel, riparian zone, or the recommended buffer zones. The overhead powerlines may however cross over the buffer zones and the river. As far as possible existing access roads must be utilised to minimise the extent of disturbance in the area. If new roads do need to be established the shortest route that would create the least disturbance within this area must be selected. An alternative access road route is proposed that largely makes use of existing tracks and crossings through the watercourses. The road crossing structures within the watercourses should preferably comprise of a simple low water crossing / concrete slab type structure that would not impede the low flow in the watercourses of become blocked with sediment and debris. Due to the fact that the vegetation in the study area is still largely natural with minimal invasive alien plant growth, any of the cleared areas that are not hardened surfaces must be rehabilitated after construction is completed by re-vegetating the areas disturbed by the construction activities with suitable indigenous plants. Any invasive alien plant growth occurring within the immediate area of the construction activities must be removed and any regrowth prevented. To reduce the risk of erosion, all service/ access roads must be contoured along any steep slope. Run-off over the exposed areas and within the drainage lines must be mitigated to reduce the rate and volume of run-off and prevent erosion. Contaminated runoff from construction must be prevented from entering the river. All materials on the construction site must be properly stored and contained. Disposal of waste from the site must also be properly managed. Construction workers must be given ablution facilities at the construction site that are located outside of the recommended buffer for the river and regularly serviced. These measures must be addressed, implemented, and monitored in terms of the Environmental Management Plan for the construction phase. 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.	High	Lower Groot and Klein Goerap Rivers and associated aquatic habitat; PES=B/C: EIS= Moderate to High
		Construction of proposed access road	Disturbance of aquatic habitat at road crossings with some modification to water quality and possibly flow during construction	1.5	2	2	2	1.875	1	2	**4.875**	1	4	5	4	**14**	**68.25**	M/L	L			
	Operation	Maintenance activities associated with the proposed powerline	Loss of biodiversity & habitat - Facilitation of erosion and potential for invasion by alien plants	1	1	1	1	1	1	4	**6**	1	1	5	4	**11**	**66**	M/L	L			