# WETLAND DELINEATION STUDY

## ESKOM POWERLINE FROM MASA SUB-STATION (LEPHALALE) TO NGWEDI SUB-STATION (NEAR RUSTERNBURG) – KM 43 - 81, LIMPOPO PROVINCE

**SECTION 2**


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**March 2014**

# WETLAND DELINEATION STUDY

**ESKOM POWERLINE FROM MASA SUB-STATION (LEPHALALE) TO NGWEDI SUB-STATION (NEAR RUSTERNBURG) – KILOMETER 43 – 81 (39km), LIMPOPO PROVINCE**

# FINAL

**GUDANI Project No: GC2013/013/Wetlands**
**GUDANI CONSULTING**
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## MARCH 2014

Compiled by:
Setenane Nkopane – *Pr.Sci.Nat*
Elijah Monyai – *BSc. Nat. Sci.*

**Declaration of Independence:**

I, **Setenane Nkopane**, in my capacity as a specialist consultant, hereby declare that I - Act as an independent consultant;

Do not have any financial interest in the undertaking of the activity, other than remuneration for the work performed in terms of the National Environmental Management Act, 1998 (Act

- 107 of 1998); Undertake to disclose, to the competent authority, any material information that has or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the National Environmental Management Act, 1998 (Act 107 of 1998); As a registered member of the South African Council for Natural Scientific Professions, will undertake my profession in accordance with the Code of Conduct of the Council, as well as any other societies to which I am a member; and Based on information provided to me by the project proponent, and in addition to information obtained during the course of this study, have presented the results and conclusion within the associated document to the best of my professional judgement. I will comply with the Act, regulations and all other applicable legislation; all the particulars furnished by me in this document are true and correct; and I realize that a false declaration is an offence in terms of Regulation 71 of NEMA and is punishable in terms of section 24F of the Act.

_____

**Setenane Nkopane (Pr.Sci.Nat**

SACNASP Reg. No: 400022/13

**Indemnity**
This report is based on survey and assessment techniques which are limited by time and budgetary Constraints relevant to the type and level of investigation undertaken. The findings, results, observations, conclusions and recommendations given in this report are based on the author's best scientific and professional knowledge as well as information available at the time of study. Although the author exercised due care and diligence in rendering services and preparing documents, he accepts no liability, and the client, by receiving this document, indemnifies the author against all actions, claims, demands, losses, liabilities, costs, damages and expenses arising from or in connection with services rendered, directly or indirectly by the author and by the use of this document.

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# LIST OF ABBREVIATIONS AND DEFINITIONS:

| ACRONYM | DESCRIPTION |
|---|---|
| NEMA | National Environmental Management Act |
| NWA | National Water Act |
| NEMBA | National Environmental Management Biodiversity Act |
| NEMPAA | National Environmental Management: Protect Area Act |
| NEMWA | National Environmental Management Waste Act |
| NEMAQA | National Environmental management Air Quality Act |
| ECA | Environmental Conservation Act |
| NHRA | National Heritage Resources Act |
| SAHRA | South African Heritage Resources Agency |
| LIHRA | Limpopo Heritage Resources Agency |
| DEA | Department of Environmental Affairs |
| PES | Present Ecological State |
| GIS | Geographic Information Systems |
| SANBI | South African National Biodiversity Institute |
| NEMBA | National Environmental Management Biodiversity Act |
| EMF | Environmental Management Framework |
| EIS | Ecological Importance and Sensitivity |
| VEGRAI | Riparian Vegetation Assessment Index |
| DWA | Department of Water Affairs |

In a South African legal context, the term watercourse is often used rather than the terms wetland, or river. The National Water Act (NWA) (1998) includes wetlands and rivers into the definition of the term watercourse in the following definition.
Watercourse means:

a) A river or spring;
b) A natural channel in which water flows regularly or intermittently;
c) A wetland, lake or dam into which, or from which, water flows, and
d) Any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks.

Riparian habitat is the accepted indicator used to delineate the extent of a river's footprint (DWA, 2005).

The National Water Act, 1998 (Act No. 36 of 1998), defines a riparian habitat as follows:

*"Riparian habitat includes the physical structure and associated vegetation of the areas associated with a watercourse, which are commonly characterised by alluvial soils, and which are inundated or flooded to an extent and with a frequency sufficient to support vegetation of species with a composition and physical structure distinct from those of adjacent land areas".*

The National Water Act, 1998 (Act 36 of 1998) defines a wetland as:

*"land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil."*

# FOREWORD

This document contains the report on the wetland delineation- which forms part of the specialist studies for the compilation of the environmental management programme (EMPR) for the proposed construction of 400 and 765kV power lines from Masa to Ngwedi Substations. This wetland study was undertaken by Gudani Consulting. In order to inform the EMPR in accordance with the EIA Regulations (No. R543, Department of Environmental Affairs, 18 June 2010) emanating from Part 5 of the National Environmental Management Act 1998 (Act No. 107 of 1998), as well as the Water Use Licence application Process which specifies that activities within 500m from wetlands or riparian areas are excluded from the General Application of Authorization S21 (c) and (i) water uses (government gazette No. 389), wetland and riparian delineations and functional assessments will be conducted to inform activities associated with the Limpopo section of the power line between Rhenosterpan and Vlakpoort approximately 120km.The watercourses form the basis for identifying potential wetland and riparian areas will be investigated during field surveys or walk through.

This report outlines the finding along section 2 of the Eskom powerline from km 43 to km 81 covering a distance of 39 kilometres.

# 1.0 INTRODUCTION

Gudani Consulting was appointed by Senkosi Consulting on behalf of Eskom to conduct wetland and riparian delineations and functional assessments to inform the EMPr as well as water use license application process for the 400kV and 765kV power lines from Masa (near Medupi Power-Station in Lephalale, Limpopo Province) to Ngwedi substations near Rustenburg in North West Province. Gudani Consulting conducted the wetland studies for the first 120km for the proposed project or development. Other specialist studies - Ecology, Avifauna, and Heritage were conducted some years back as part of the EIA process, but the wetland studies were not included, hence the purpose of this study.

## 1.1 Details of the Applicant

| Name of the company | Eskom Holdings SOC Limited |
|---|---|

## 1.2 Details of the Wetland Specialist

| Name of the company | Gudani Consulting |
|---|---|
| **Assessment done by** | Elijah Monyai and Albie Gotze |
| **Report Compiled by** | Elijah Monyai |
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## 1.3 Project Locality and Description of Study Area

The study area is situated in both the Limpopo Province. The two power lines of approximately 120km: 400kV and 765kV lines will run from Masa Substation in the north near Medupi power station in Lephalale, Limpopo Province to Ngwedi Substation. The study area falls to Savannah Biome and it is characterised by grass, thorn trees like Camel thorn, Acacia and shrubs, Marula, Leadwood Shepherds trees, Fig trees to mention but few. The predominant landuse is game farming where the different kinds of animals can be found including the Big Five. This report includes the findings of the wetland and riparian zone assessment along second section 43 – 81km (39 kilometres) of the powerline undertaken between the 11$^{th}$ and 15$^{th}$ November 2013 and 3$^{rd}$ and 4$^{th}$ March 2014.

# 2.0 STUDY METHODOLOGY AND APPROACH

## 2.1 Study Methodology

The wetland studies was conducted to ensure that no wetland or riparian zone will be disturbed or damaged during the proposed construction and operational phases of the power lines. The 120km distance of the wetland studies was divided into three sections of approximately 40 km and subsequently three reports: The first section starts at Rhenosterpan to Klippan farms and is approximately 42km. Secondly, Turfpan to Paarl farms which is approximately 39km and the last section or report was from Mecklenburg to Vlakpoort which is approximately 35km. This first report will address the wetland/ riparian areas for the second 39km of the powerline route - i.e. from Turfpan to Paarl from km 43 to 81.

The protocol/methodology that Gudani Consulting followed in conducting the Riparian/Wetland Delineation was in line with the delineation method documented by the Department of Water Affairs:

"An updated manual for identification and delineation of wetlands and riparian areas" (DWA, 2008), was followed throughout the field survey. This guideline describes the use of indicators to determine the outer edge of the wetland and riparian areas such as soil and vegetation forms as well as the terrain unit indicator. A hand held GPS was used to capture GPS co-ordinates in the field. 1:50 000 cadastral maps and available GIS data will be used as reference material for the mapping of the preliminary wetland boundaries. These will be converted to digital image backdrops and delineation lines and boundaries will be imposed accordingly after the field survey.

## 2.2 Study Approach and Objectives

The objectives of this study were as follows:

- Identify and evaluate the existing wetland aspects along the powerlines routes;
- Give specialist input to the environmental management programme;
- Identify management options that can be implemented in order to reduce or minimise the predicted environmental impacts,
- Assess the significance of the predicted impacts in terms of nature, probability of occurrence, extent, and duration before and after implementation of mitigation measures;
- Document the findings;
- To inform and provide the information and an understanding of the project, issues and solutions;
- Identify key issues and concerns;
- identify shortcomings and gaps in existing information;
- Highlight the potential for environmental impacts, whether positive or negative.

## 2.3 Study Assumptions

The following assumptions are made in this document:

- Although the proposed power lines will occur within an approximate 135m corridor, wetlands within 500m of construction activities should be identified as per the DWA

Water Use Licence application regulations. In order to meet the timeframes and budget constraints for the project, wetlands within the proposed corridor will be delineated on a fine scale based on detailed soil and vegetation sampling. Wetlands that fall outside of this 120m corridor, but that fall within 500m of the proposed activities will be delineated based on desktop analysis of vegetation gradients visible from aerial imagery.

- Flood line calculation, groundwater and hydrological processes fall outside the scope of wetland and riparian delineation and functional assessments discussed in this report.

- The effect of the power lines on aquatic ecosystems, for example, the migration routes of fish, is not included in the wetland and riparian delineation.

## 2.4 Study Limitations and Challenges

- The accuracy of the handheld GPS unit used in the field, the delineated wetland/ riparian boundaries cannot be guaranteed beyond an accuracy of about 5m on the ground. Should greater mapping accuracy be required, the wetlands would need to be pegged in the field and surveyed using conventional survey techniques.

- This company, the consultants and/or specialist investigators do not accept any responsibility for conclusions, suggestions, limitations and recommendations made in good faith, based on the information presented to them, obtained from these strategic assessments or requests made to them for the purpose of this report.

- This report is based on survey and assessment techniques which are limited by time and budgetary Constraints relevant to the type and level of investigation undertaken.

## 2.5 Wetland and Riparian Delineation

According to the Department Water Affairs and Forestry – DWAF (2005), the four main indicators of the presence of a wetland are:

- The presence of water (hydrology)
- The presence of wetland (hydromorphic) soils
- The presence of water loving plants (hydrophytes)
- The terrain unit, which indicates the position in the landscape where wetlands are most likely to occur.

Although all four indicators are important in the identification and delineation of a wetland the soil form indicator is the most important and the most accurate due to the fact that the morphological indicators in the soil are far more permanent and will hold signs of frequent saturation long after a wetland has been drained or otherwise transformed. The other three indicators are used more in a confirmatory role (DWAF, 2005). Because of this and because it is difficult to define the minimum frequency and duration of saturation that creates a wetland, the finding of the outer edge of the wetland is dependent on four, more specific indicators:

- The Terrain Unit Indicator (as mentioned above).
- The Soil Form Indicator, which identifies soil forms, as defined by the Soil Classification Working Group (1991), which are associated with prolonged and frequent saturation.

- The Soil Wetness Indicator, which identifies the morphological signatures that develop in the soil profile as a result of prolonged and frequent saturation.
- The Vegetation Indicator, which identifies hydrophilic vegetation that is associated with permanent or frequently saturated soils.

Three zones are distinguished within a wetland i.e. the permanent zone (all year round wetness), the seasonal zone (wet for at least three months of a year), and the temporary zone (wet for less than three months of a year). The object of a wetland delineation procedure is to identify the outer edge of the temporary zone. This outer edge marks the boundary between the wetland and the adjacent terrestrial areas (DWAF, 2005).

The method described by (DWAF, 2005) and followed in the delineation of the wetlands in the study area is as follows:

- First the position of the wetland is visually determined (Terrain Unit Indicator).
- Starting at the wettest parts, a transect is then followed width ways across the wetland and using a soil auger the soil profile is examined up to a depth of 50cm for the presence of soil form indicators and / or soil wetness indicators. Vegetation indicators are also recorded.
- Proceeding outwards towards the estimated edge of the wetland, sampling continues at regular intervals to check for wetness and vegetation indicators.
- The outer edge of the wetland is subsequently defined as the point where soil wetness indicators are no longer visible within the top 50cm of the soil profile.
- The outer edge is recorded with a handheld GPS and eventually the GPS waypoints are plotted and joined on a map to visually indicate the extent of the outer edge (temporary zone) of the wetland.
- Several further transects are then also followed at regular intervals and at other strategic points in the wetland paying particular attention to features that may disrupt the wetland boundary, such as seeps entering the wetland, large floodplains, etc.

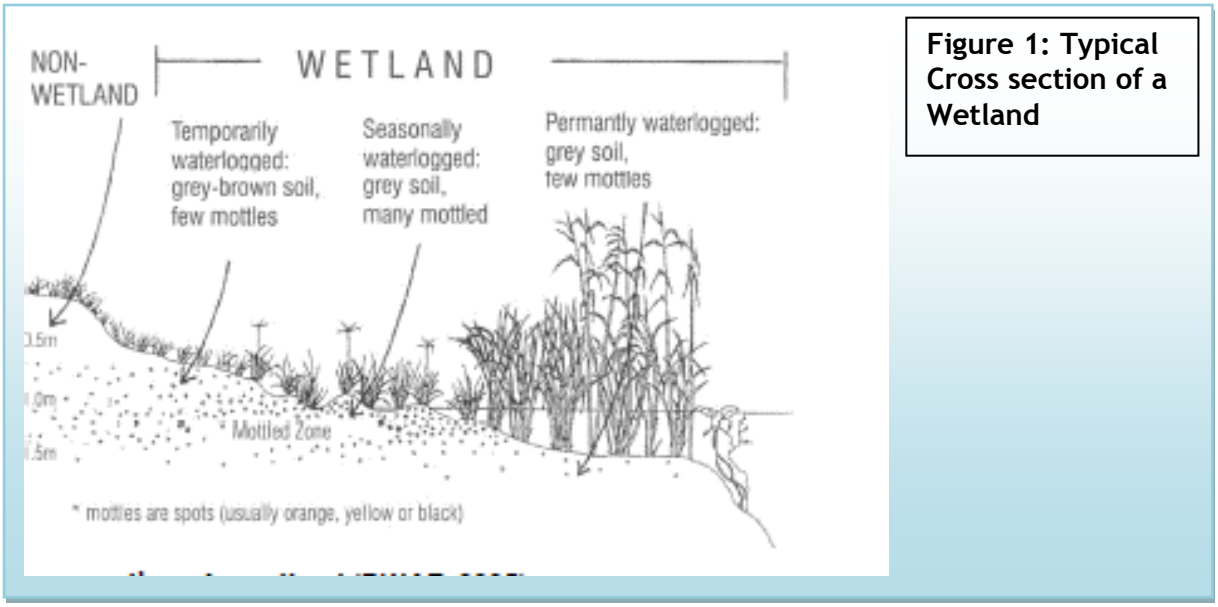


**Figure 1: Typical Cross section of a Wetland**

According to DWAF (2005) the National Water Act defines a riparian habitat as follows: "Riparian habitat includes the physical structure and associated vegetation of the areas associated with a watercourse which are commonly characterized by alluvial soils, and which are inundated or flooded to an extent and with a frequency sufficient to support vegetation of species with a composition and physical structure distinct from those of adjacent land areas."

Riparian habitats, also known as riparian areas, include plant communities adjacent to and affected by surface and subsurface hydrologic features, such as rivers, streams, lakes, or drainage ways. These areas may be a few meters wide near streams or more than a kilometer in floodplains. Both perennial and non-perennial streams support riparian vegetation. Because riparian areas represent the interface between aquatic and upland ecosystems, the vegetation in the riparian area may have characteristics of both aquatic and upland habitats. Many of the plants in the riparian area require plenty of water and are adapted to shallow water table conditions. Due to water availability and rich alluvial soils, riparian areas are usually very productive. Tree growth rate is high and the vegetation under the trees is usually lush and includes a wide variety of shrubs, grasses, and wildflowers.

Riparian habitat is classified primarily by identifying riparian vegetation along the edge of the macro stream channel. The macro stream channel is defined as the outer bank of a compound channel and should not be confused with the active river bank. The macro channel bank often represents a dramatic change in the energy with which water passes through the system. Rich alluvial soils deposit nutrients making the riparian area a highly productive zone. This causes a very distinct change in vegetation structure and composition along the edges of the riparian area (DWAF, 2005). The marginal zone has also been referred to as active features or wet bank (Van Niekerk and Heritage, 1993 cited in DWAF, 2008). It includes the area from the water level at low flow, if present (the greenline concept may be used in the absence of base flow, to those features that are hydrologically activated for the greater part of the year (WRC Report No TT 333/08 April, 2008 cited in DWAF, 2008). The non-marginal zone is the combination of the upper and lower zones.

Riparian areas perform a variety of functions that are of value to society, especially the protection and enhancement of water resources, and provision of habitat for plant and animal species.
Functions of riparian areas according to DWAF (2005) include:

- stores water and helps reduce floods
- stabilizes stream banks;
- improves water quality by trapping sediment and nutrients;
- maintains natural water temperature for aquatic species;
- provides shelter and food for birds and other animals;
- provides corridors for movement and migration of different species;
- acts as a buffer between aquatic ecosystems and adjacent land uses;
- can be used as recreational sites; and
- provides material for building, muti, crafts and curios.

Not all riparian areas develop the same way and may not perform these functions to the same extent. It is important that a riparian area's capacity to provide the benefits listed is not reduced. Many of these areas are best managed as natural areas, rather than being converted to other uses (DWAF 2005).

Like wetlands, riparian areas have their own unique set of indicators. It is possible to delineate riparian areas by checking for the presence of these indicators. Some areas may display both wetland and riparian indicators, and can accordingly be classified as both. If you are adjacent to a watercourse, it is important to check for the presence of the riparian indicators described below, in addition to checking for wetland indicators, to detect riparian areas that do not qualify as wetlands (DWAF 2005).

The delineation process requires that the following be taken into account:
- topography associated with the watercourse;
- vegetation; and
- alluvial soils and deposited material.

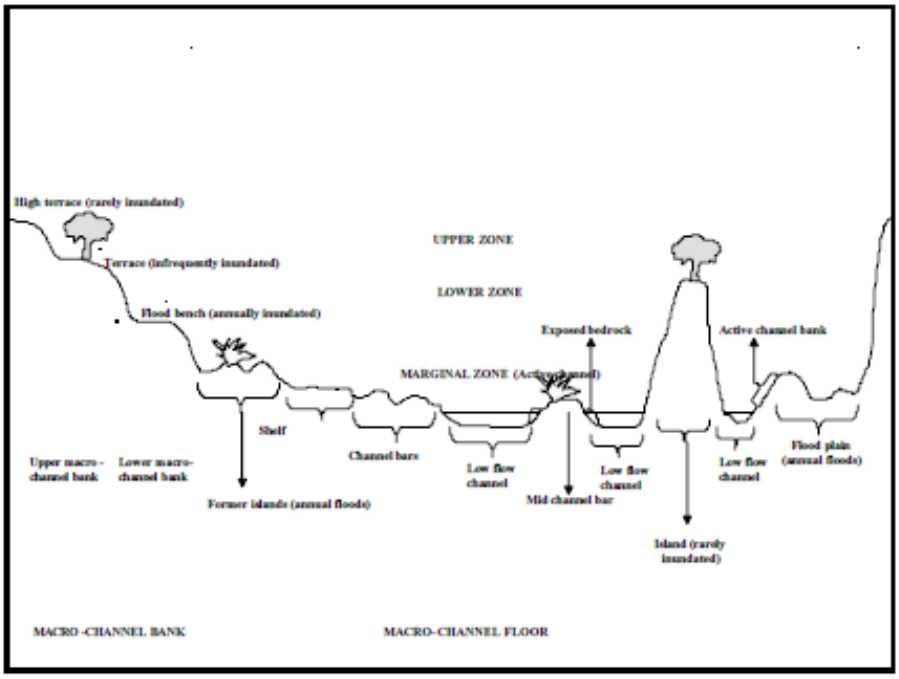


**Figure 2: Schematic diagram illustrating an example of where the 3 zones would be placed relative to geomorphic diversity (Kleynhans *et al.2007*)**

## 2.6 Wetland and Riparian Functionality and Integrity Assessments

For the purpose of activities within the 1:100 year floodline or the wetland/riparian area (whichever is the greatest), an application for a Water Use License must be made. In addition, activities close to wetlands are excluded from the General Authorization for S21 (c) and (i) water uses (government gazette No. 389) due to the complexity and potentially cumulative impact on a wetlands and rivers and the resources as a whole (DWA, 2010). Therefore all activities within 500m of wetlands or rivers should be subject to an application for authorization.

In order to inform the water use licence application process, an analysis of wetland and riparian functionality or integrity must be undertaken. Wetland functionality is defined as a measure of the deviation of wetland structure and function from its natural reference condition. In this study the hydrological, geomorphological and vegetation integrity will be assessed for the wetland units that are recorded at the time of the site visit to provide a Present Ecological Status (PES) score (Macfarlane *et al,* 2007), and an Environmental Importance and Sensitivity category (EIS) (DWAF, 1999) and in the case of riparian areas VEGRAI (Kleyhans *et al*, 2006).

Furthermore the ecosystem services provided by the wetland will be explored using Wet-Eco Services (Kotze *et al*, 2005). The functional assessment methodologies presented below take into consideration these recorded impacts in various ways to determine the scores attributed to each functional Hydrogeomorphic (HGM) wetland unit. It is important to note that, for the purposes of this wetland assessment, functional wetland units are approached as larger units which may combine smaller parts that could be considered as separate functional units in a more detailed study. The aspect of wetland functionality and integrity that is predominantly addressed includes hydrological and geomorphological function and the integrity of the biodiversity component (mainly based on the intactness of natural vegetation).

## 2.7 Ecological Importance and Sensitivity (EIS)

Ecological importance is an expression of a wetland's importance to the maintenance of ecological diversity and functioning on local and wider spatial scales. Ecological sensitivity refers to the system's ability to tolerate disturbance and its capacity to recover from disturbance once it has occurred (DWAF, 1999). This classification of water resources allows for an appropriate management class to be allocated to the water resource and includes the following:

- Ecological Importance in terms of ecosystems and biodiversity;
- Ecological functions; and
- Basic human needs.

| Ecological Importance and Sensitivity Categories | Rating | Summary |
|---|---|---|
| Wetlands that are considered ecologically important and sensitive on a national or even international level. The biodiversity of these wetlands is usually very sensitive to flow and habitat modifications. They play a major role in moderating the quantity and quality of water in major rivers | >3 and <=4 | **Very High** |
| Wetlands that are considered to be ecologically important and sensitive. The biodiversity of these wetlands may be sensitive to flow and habitat modifications. They play a role in moderating the quantity and quality of water of major rivers | >2 and <=3 | **High** |
| Wetlands that are considered to be ecologically important and sensitive on a provincial or local scale. The biodiversity of these wetlands is not usually sensitive to flow and habitat modifications. They play a small role in moderating the quantity and quality of water in major rivers | >1 and <=2 | **Moderate** |
| Wetlands that is not ecologically important and sensitive at any scale. The biodiversity of these wetlands is ubiquitous and not sensitive to flow and habitat modifications. They play an insignificant role in moderating the quantity and quality of water in major rivers | >0 and <=1 | **Low** |

## 2.8 Wet-EcoServices Tool

Wet-EcoServices Kotze *et al*, (2005) was adapted and used to assess the different benefit values of a wetland. A Level 1 desktop assessment will be performed to determine the wetland's functional benefits.

Several characteristics will be verified during the field survey to produce a comprehensive initial functional analysis. This technique is not ideally suited to determine the specific level of impact of a current or proposed development and is based more on qualitative data as opposed to quantitative data, which opens it up to subjective misuse (Kotze *et al*, 2005). Figure 3 provides an example of the results for a Wet-EcoServices analysis.

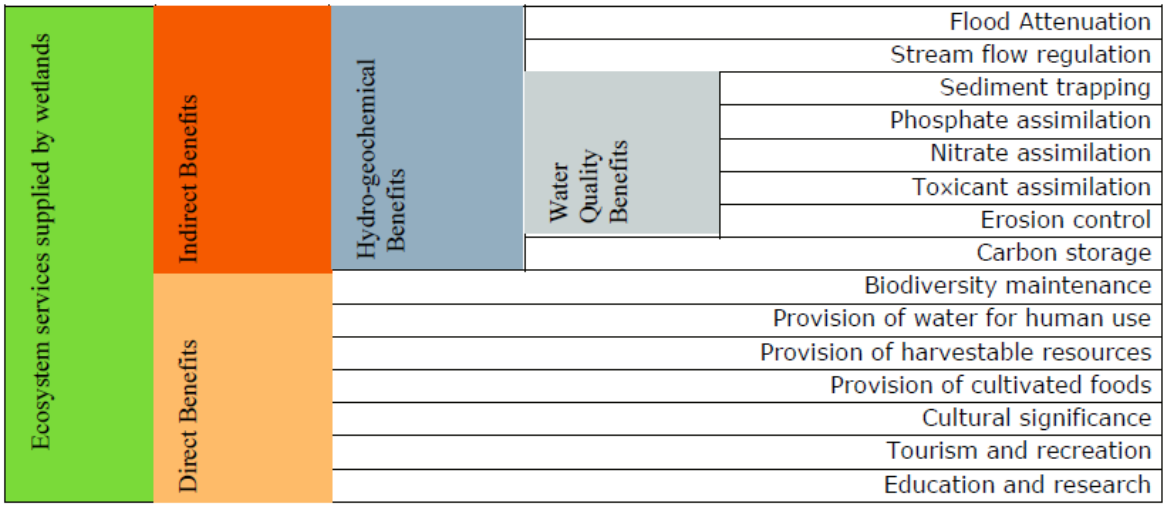


**Figure 3: Wet-EcoServices Tool**

## 2.9 Wet-Health

WET-Health is a tool designed to assess the health or integrity of a wetland. Wetland health is defined as a measure of the deviation of wetland structure and function from its natural reference condition. This technique attempts to assess hydrological, geomorphological and vegetation health and is suitable for the functional assessment of floodplain, channelled and un-channelled valley bottom, seepage wetlands and pans. It is a modular approach that uses:

- An impact-based approach for those activities that do not produce clearly visible responses in wetland structure and function. The impact of irrigation or afforestation in the catchment, for example, produces invisible impacts on water inputs. This is the main approach used in the hydrological assessment.
- An indicator-based approach for activities that produce clearly visible responses in wetland structure and function such as the presence of gullies or alien species. This approach is mainly used in the assessment of geomorphological and vegetation health.
- Each of these modules follows a broadly similar approach that examines extent, intensity and magnitude of impact. This is translated into a health score. The approach is as follows:
- The extent of impact is measured as the proportion of a wetland and/or its catchment that is affected by an activity. Extent is expressed as a percentage.
- The intensity of impact is estimated by evaluating the degree of alteration that results from a given activity.
- The magnitude of impact for individual activities is the area-weighted product of extent and intensity.
- The magnitude of individual activities is combined in a structured and transparent way to calculate the overall impact of all activities that affect hydrology, geomorphology or vegetation.

- The overall magnitude of impact is then translated into an estimate of wetland health for hydrology, geomorphology or vegetation.

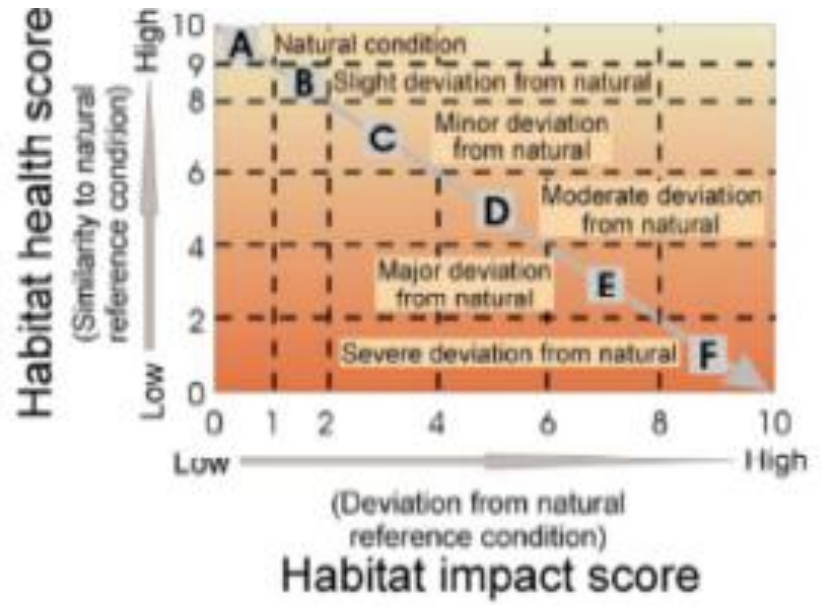


**Figure 4: Wet-Health Tool**

## 2.10 Riparian Vegetation Response Assessment (VEGRAI):

The Riparian Vegetation Response Assessment Index (VEGRAI) (Kleynhans *et al*, 2007) was used to determine the functionality of the riparian zone on the study site in terms of its Eco-Classification. Eco-Classification is the term used for the Ecological Classification process. This refers to the determination and categorization of the Present Ecological State (PES) of various biophysical attributes of rivers relative to the natural or close to the natural reference condition (Kleynhans & Louw 2007). VEGRAI has a spreadsheet model component that is composed of a series of metrics and metric groups, each of which is rated by populating spreadsheets with field data. The metrics in VEGRAI first describe the status of riparian vegetation in both its current and reference states and second, compare differences between the two states as a measure of vegetation response to an impact regime (Kleynhans *etal*, 2007).

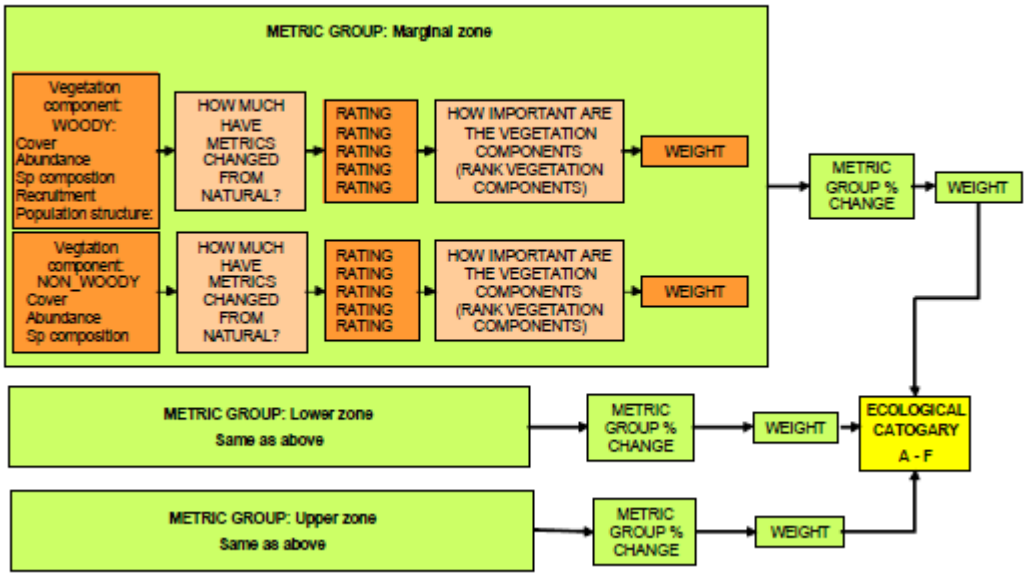


**Figure 5: Generic ecological categories for Eco-Status components used in the VEGRAI index** (modified from Kleynhans, 1996 and Kleynhans 1999 cited in Kleynhans & Louw 2007b)

# 3. WETLAND AND RIPARIAN DELINEATION FINDINGS

## 3.1 Wetland and Riparian Findings

**Wetland Findings:**
No wetlands were encountered at any of the tower positions of either the 765KV or the 400KV powerlines for the whole of Section 2

**Riparian Zones Findings:**
No riparian zones were encountered at any of the tower positions of either the 765KV or the 400KV powerlines for the whole of Section 2

# 4.0 LEGISLATIVE FRAMEWORK

## 4.1 National Environmental Management Act, 1998

The National Environmental Management Act (NEMA), 1998 can be regarded as the most important piece of general environmental legislation. It provides a framework for environmental law reform and covers three areas, namely:

- Land, planning and development.
- Natural and cultural resources, use and conservation.
- Pollution control and waste management.

The law is based on the concept of sustainable development. The object of NEMA is to provide for co-operative environmental governance through a series of principles relating to:

- the procedures for state decision-making on the environment; and
- the institutions of state which make those decisions.

The NEMA principles serve as:

- a general framework for environmental planning;
- guidelines according to which the state must exercise its environmental functions; and
- a guide to the interpretation of NEMA itself and of any other law relating to the environment.

***What are the NEMA principles?***

Some of the most important principles contained in NEMA are that:

- environmental management must put people and their needs first;
- development must be socially, environmentally and economically sustainable;
- there should be equal access to environmental resources, benefits and services to meet basic human needs;
- government should promote public participation when making decisions about the environment;
- communities must be given environmental education;
- decisions must be taken in an open and transparent manner and there must be access to information;
- the role of youth and women in environmental management must be recognised;
- the person or company who pollutes the environment must pay to clean it up;
- the environment is held in trust by the state for the benefit of all South Africans; and
- the utmost caution should be used when permission for new developments is granted.

The NEMA is enforced by the Department of Environment Affairs. In the Limpopo Province this delegated role is fulfilled by the Limpopo Department of Economic Development, Environment and Tourism. Regulations 544 and 545, 2010 promulgated under NEMA the following activities require an Environmental Impact Assessment or Basic Environmental Assessment:

## 4.2 National Water Act, 1998

In terms of the NWA, 1998 the national government, acting through the Minister of Water Affairs ("the Minister"), is the public trustee of South Africa's water resources, and must ensure that water is protected, used, development, conserved, managed and controlled in a sustainable and equitable manner for the benefit of all persons. The Minister is responsible to ensure that water is allocated equitably and used beneficially in the public interest, while promoting environmental values. The national government, acting through the Minister, has the power to regulate the use, flow and control of all water in South Africa.

The majority of the provisions of the National Water Act came into effect as of 1 October 1998 and at the same time various provisions of the 1956 Water Act were repealed. The remaining provisions of the National Water Act commenced on 1 January 1999 and 1 October 1999 (and the remaining provisions of the 1956 Water Act repealed).

The most fundamental departure from the old legislation is the removal of the concept of water as private property. Instead, water will be made available through user licences, which may be issued for a maximum period of 40 years, subject to renewal. A priority of users has been established for the allocation of licences, with the environment near the top of the list of priorities.

Section 21 of the National Water Act indicates that "water use includes":

- taking water from a water resource;
- storing water;
- impeding or diverting the flow of water in a water course;
- engaging in a stream flow reduction activity contemplated in section 36;
- engaging in a controlled activity which has either been declared as
- such or is identified in section 37(1);
- discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit;
- disposing of waste in a manner which may detrimentally impact on a water resource;
- disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process;
- altering the bed, banks, course or characteristics of a water course;
- removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; and
- using water for recreational purposes.

A person may only use water:

- without a licence:
  - if that water use is permissible under Schedule I;
  - if that water use is permissible as a continuation of an existing lawful water use; or
  - if that water use is permissible in terms of a general authorisation issued under section 39;
- if the water use is authorised by a licence under the National Water Act; or
- if the responsible authority has dispensed with a licence requirement (which may be done if the responsible authority is satisfied that the purpose of the National Water Act will be met by the grant of a licence, permit or other authorisation under any other law).

A person who uses water:

- must use the water subject to any condition of the relevant authorisation;
- is subject to any limitation, restriction or prohibition in terms of the National Water Act or any other law;
- in the case of the discharge or disposal of waste or water containing waste, must comply with any applicable waste standards or management practices prescribed by regulations, unless the conditions of the relevant authorisation provide otherwise;
- may not waste that water; and
- must return any seepage, run-off or water containing waste which emanates from that use to the water resource from which the water was taken, unless the responsible authority directs otherwise or the relevant authorisation provides otherwise.
-

### 4.3 National Environmental Management: Biodiversity Act

National Environmental Management: Biodiversity Act (Act 10 of 2004) identifies that all people and organizations should act with due care to conserve and avoid negative impacts on biodiversity, and to use biological resources sustainably, equitably and efficiently.

Biodiversity is defined to include "the number and variety of living organisms on earth, the millions of plants, animals, and micro organisms, the genes they contain, the evolutionary history and potential they encompass, and the ecosystems, ecological processes and landscapes of which they are integral parts. Biodiversity thus refers to the life-support systems and natural resources upon which we depend".

The National Environmental Management: Biodiversity Act provides for:

- The management and conservation of the biological diversity of South Africa;
- The sustainable use of our biological resources; and
- The fair and equitable sharing of benefits arising from the use and application of genetic resources and material.

### 4.4 National Environment Management: Protected Areas Act

The National Environmental Management: Protected Areas Act (Act 57 of 2003) forms part of a suite of legislation established to manage the environment. The Protected Areas Act provides for the continued existence of the South African National Parks, the declaration and management of protected areas in South Africa and cooperative governance in such declaration and management of protected areas.

Four types of protected area can be declared in terms of the Act:

- Special nature reserve
- National Park
- Nature Reserve
- Protected Environment

# 5 ENVIRONMENTAL IMPACT ASSESSMENT

### 5.1 Introduction

This section therefore provides:

- Details of the potential **environmental impacts** that were identified;

- An assessment of all the potential impacts in terms of their significance;

The assessment of impacts must also adhere to the minimum requirements in the EIA Regulations, 2010, and should take applicable official guidelines into account.

The environmental impact assessment on the wetland aspects along the entire 120km (including section 1) powerline route from Masa (Lephalale) to Ngwedi (near Rustenburg) sub-stations was conducted taking cognizance of the provisions of section 2 and Chapter 5 of the NEMA, 1998, and the relevant EIA Regulations. The criteria followed to measure each impact is outlined below:

| **NATURE:** The character of the impact | | | |
|---|---|---|---|
| **EXTENT** | **DURATION** | **PROBABILITY** | **MAGNITUDE** |
| Area | Time Frame | Likelihood | Intensity of impact to destroy or alter the environment. |
| **SIGNIFICANCE:** Implication of the impact both with or without mitigation | | | |
| **TYPE:** Description as to whether the impact is negative or positive or neutral. | | | |
| **MITIGATION:** Possible impact management, minimization and mitigation of the identified impacts. | | | |
| **NO GO OPTION:** Evaluation of the no-go-option | | | |

## 5.2 Impact Measuring Criteria and Rating

### 5.2.1 Nature

Nature of impact describes the character of the impact in terms of the effect on the relevant environmental aspect.

### 5.2.2 Spatial Extent

Measures the area extent, physical and spatial scale over which the impact will occur. This implies the scale limited to the Specific power-line route (footprint), entire power-line development sites (Sites) or over the entire power-line project area, including adjacent residential/game farm areas (localized), or the Municipality area (regional) or the entire Province (Provincial), or the entire country (National) or beyond the borders of South Africa.

| **Criteria** | **Footprint (F)** | **Site/Local (S-L)** | **Regional (R)** | **National (N)** | **International (I)** |
|---|---|---|---|---|---|
| **Rating** | **1** | **2** | **3** | **4** | **5** |

### 5.2.3 Duration

Duration measures the timeframe of the impact in relation to the lifetime of the power-line activities under application. It gives an assessment of whether the impact will disappear with mitigation immediately (0-1) after a short time (1-5 years), medium term (5-10 years), long term (11- 30 years of the power-line construction activities), or permanent (persists beyond life) due to the power-line activities.

| **Criteria** | **Immediately (I)** | **Short Term (ST)** | **Medium Term (MT)** | **Long Term (LT)** | **Permanent (P)** |
|---|---|---|---|---|---|
| **Rating** | **1** | **2** | **3** | **4** | **5** |

### 5.2.4 Probability

Probability measures the probability or likelihood of the impact actually occurring, as either probable, possible, likely, highly likely or definite (impact will occur regardless of preventative measures).

| Criteria | Probable (PR) (0-10%) | Possible (PO) (10-25%) | Likely (L) (25-50%) | Highly Likely (HL) (50-75%) | Definite (D) (100%) |
|---|---|---|---|---|---|
| **Rating** | **1** | **2** | **3** | **4** | **5** |

### 5.2.5 Magnitude/Intensity

Magnitude or intensity of the impact measures whether the impact is destructive or benign, whether it destroys, alters the functioning of the impacted environment, or alters the environment itself. It is rated as insignificant, low, medium, high or very high.

| Criteria | Insignificant (I) | Low (L) | Medium (M) | High (H) | Very High (VH) |
|---|---|---|---|---|---|
| **Rating** | **1** | **2** | **3** | **4** | **5** |

### 5.2.6 Significance

Significance measures the foreseeable significance of the impacts of the Eskom power-line project both with and without mitigation measures. The significance on the aspects of the environment is classified as:

- Insignificance: where the impact would not have any influence on the decision to proceed with the power-line project – with or without mitigation;
- Low significance: where the impact would minimal influence on the decision to proceed with the power-line project – with or without mitigation;
- Moderate significance: where the impact should influence the decision to proceed with the power-line project – with mitigation;
- High significance: where the impact should influence the decision to proceed with the power-line project unless it is effectively managed and mitigated. This may require modification of the power-line project design or determination of strict mitigation measures;
- Very High significance: where the impact would influence the decision to proceed with the power-line project regardless of any mitigation measures. Significance rating is determined as follows:

| **Significance Rating (SR) =** | (Extent + Intensity + Duration) x Probability |
|---|---|

| Criteria | Insignificant (I) | Low (L) | Medium (M) | Highly (H) | Very High (VH) |
|---|---|---|---|---|---|
| **SR Without Mitigation** | **0-5** | **6-30** | **31-60** | **61-90** | **90 <** |
| **SR With Mitigation** | **0-5** | **6-30** | **31-60** | **61-90** | **90 <** |

### 5.2.7 Status of impact

Status of impact describes whether the impact is positive (beneficial) on the affected environment or negative (detrimental) or neutral.

### 5.3. Environmental Impacts Assessment

No wetlands or riparian habitats we identified for section 2 of the proposed Ngwedi – Masa powerline along km 43 – 81. No environmental or wetland/riparian habitat impacts were identified.

## 6 CONCLUSION AND RECOMMENDATIONS

Based on the data and information presented in this report as well as observations made during the survey and the comments above there are no major limitations or objections towards the proposed development as in this section 2 no wetlands or riparian zones were identified.

# 7 LIST OF APPENDICES

## Appendix 1: List of Towers, Findings and Comments with Regards to Wetlands and Riparian Zones for the 400kV power line - Section 2

| 400KV Tower Number | X Easting (m) | Y Northing (m) | Comment regarding wetlands & Riparian zones |
|---|---|---|---|
| 97 | 37531.74 | -2675194.4 | No comment |
| 98 | 37451.25 | -2675659.7 | No comment |
| 99 | 37365.87 | -2676153.3 | No comment |
| 100 | 37277.37 | -2676664.9 | No comment |
| 101 | 37184.37 | -2677202.5 | No comment |
| 102 | 37099.01 | -2677695.9 | No comment |
| 103 | 37015.26 | -2678180.1 | No comment |
| 104 | 36924.1 | -2678707.1 | No comment |
| 105 | 36833.25 | -2679232.3 | No comment |
| 106 | 36739.04 | -2679776.9 | No comment |
| 107 | 36646.33 | -2680312.8 | No comment |
| 108 | 36555.65 | -2680837 | No comment |
| 109 | 36464.37 | -2681364.7 | No comment |
| 110 | 36372.07 | -2681898.2 | No comment |
| 111 | 36291.74 | -2682362.6 | No comment |
| 112 | 36220.51 | -2682774.4 | No comment |
| 113 | 36144.28 | -2683215.1 | No comment |
| 114 | 36072.31 | -2683631.1 | No comment |
| 115 | 35961.9 | -2684043.3 | No comment |
| 116 | 35832.01 | -2684528.1 | No comment |
| 117 | 35692.42 | -2685049.2 | No comment |
| 118 | 35568.49 | -2685511.9 | No comment |
| 119 | 35477.02 | -2685853.3 | No comment |
| 120 | 35361.79 | -2686283.4 | No comment |

| 400KV Tower Number | X Easting (m) | Y Northing (m) | Comment regarding wetlands & Riparian zones |
|---|---|---|---|
| 121 | 35237.81 | -2686746.3 | No comment |
| 122 | 35102.37 | -2687251.8 | No comment |
| 123 | 34968.32 | -2687752.3 | No comment |
| 124 | 34842.42 | -2688222.3 | No comment |
| 125 | 34719.23 | -2688682.1 | No comment |
| 126 | 34588.74 | -2689169.2 | No comment |
| 127 | 34465.83 | -2689628 | No comment |
| 128 | 34341.64 | -2690091.6 | No comment |
| 129 | 34202.43 | -2690611.3 | No comment |
| 130 | 34062.71 | -2691132.9 | No comment |
| 131 | 33923.76 | -2691651.6 | No comment |
| 132 | 33791.18 | -2692146.5 | No comment |
| 133 | 33666.32 | -2692612.6 | No comment |
| 134 | 33545.77 | -2693062.6 | No comment |
| 135 | 33415.77 | -2693547.9 | No comment |
| 136 | 33277.57 | -2694063.8 | No comment |
| 137 | 33134.95 | -2694596.2 | No comment |
| 138 | 32993.36 | -2695124.7 | No comment |
| 139 | 32871.84 | -2695578.3 | No comment |
| 140 | 32748.67 | -2696038.1 | No comment |
| 141 | 32609.61 | -2696557.2 | No comment |
| 142 | 32467.23 | -2697088.8 | No comment |
| 143 | 32327.56 | -2697610.1 | No comment |
| 144 | 32232.65 | -2697964.4 | No comment |
| 145 | 32105.91 | -2698437.5 | No comment |
| 146 | 31970.5 | -2698943 | No comment |
| 147 | 31830.78 | -2699464.6 | No comment |

| 400KV Tower Number | X Easting (m) | Y Northing (m) | Comment regarding wetlands & Riparian zones |
|---|---|---|---|
| 148 | 31690.66 | -2699987.7 | No comment |
| 149 | 31549.9 | -2700513.1 | No comment |
| 150 | 31409.94 | -2701035.6 | No comment |
| 151 | 31270.11 | -2701557.5 | No comment |
| 152 | 31128.99 | -2702084.4 | No comment |
| 153 | 30992.01 | -2702595.7 | No comment |
| 154 | 30855.33 | -2703105.9 | No comment |
| 155 | 30718.85 | -2703615.4 | No comment |
| 156 | 30583.58 | -2704120.4 | No comment |
| 157 | 30447.84 | -2704627.1 | No comment |
| 158 | 30309.1 | -2705145 | No comment |
| 159 | 30180.81 | -2705623.9 | No comment |
| 160 | 30052.93 | -2706101.3 | No comment |
| 161 | 29918.4 | -2706603.5 | No comment |
| 162 | 29782.81 | -2707109.6 | No comment |
| 163 | 29640.5 | -2707640.8 | No comment |
| 164 | 29511.39 | -2708122.8 | No comment |
| 165 | 29385.76 | -2708591.8 | No comment |
| 166 | 29246.91 | -2709110.1 | No comment |
| 167 | 29110.54 | -2709619.2 | No comment |
| 168 | 28997.29 | -2710041.9 | No comment |
| 169 | 28864.21 | -2710538.7 | No comment |
| 170 | 28747.7 | -2710973.6 | No comment |
| 171 | 28576.65 | -2711341.9 | No comment |
| 172 | 28484.08 | -2711687.5 | No comment |
| 173 | 28378.65 | -2712081.1 | No comment |
| 174 | 28285.33 | -2712429.4 | No comment |

| 400KV Tower Number | X Easting (m) | Y Northing (m) | Comment regarding wetlands & Riparian zones |
|---|---|---|---|
| 175 | 28271.94 | -2712749.7 | No comment |

**Appendix 2: List of Towers, Findings and Comments with Regards to Wetlands and Riparian Zones for the 765kV power line - Section 2**

| 765KV Tower Number | X Easting (m) | Y Northing (m) | Comment regarding wetlands & Riparian zones |
|---|---|---|---|
| MASNGW 95 | 37485.56 | -2675065 | No comment |
| MASNGW 96 | 37400.15 | -2675558.7 | No comment |
| MASNGW 97 | 37318.13 | -2676032.9 | No comment |
| MASNGW 98 | 37238.18 | -2676495.1 | No comment |
| MASNGW 99 | 37152.96 | -2676987.7 | No comment |
| MASNGW 100 | 37067.77 | -2677480.2 | No comment |
| MASNGW 101 | 36983.06 | -2677969.9 | No comment |
| MASNGW 102 | 36899.36 | -2678453.7 | No comment |
| MASNGW 103 | 36814.12 | -2678946.5 | No comment |
| MASNGW 104 | 36730.61 | -2679429.2 | No comment |
| MASNGW 105 | 36646.08 | -2679917.9 | No comment |
| MASNGW 106 | 36564.08 | -2680391.9 | No comment |
| MASNGW 107 | 36484.42 | -2680852.4 | No comment |
| MASNGW 108 | 36408.15 | -2681293.3 | No comment |
| MASNGW 109 | 36327.13 | -2681761.7 | No comment |
| MASNGW 110 | 36242.77 | -2682249.4 | No comment |
| MASNGW 111 | 36162.25 | -2682714.8 | No comment |
| MASNGW 112 | 36085.3 | -2683159.7 | No comment |
| MASNGW 113 | 36006.28 | -2683616.5 | No comment |

| 765KV Tower Number | X Easting (m) | Y Northing (m) | Comment regarding wetlands & Riparian zones |
|---|---|---|---|
| MASNGW 114 | 35881.59 | -2684081.9 | No comment |
| MASNGW 115 | 35756.31 | -2684549.6 | No comment |
| MASNGW 116 | 35634.57 | -2685004.1 | No comment |
| MASNGW 117 | 35512.91 | -2685458.2 | No comment |
| MASNGW 118 | 35427.72 | -2685776.2 | No comment |
| MASNGW 119 | 35303.5 | -2686239.9 | No comment |
| MASNGW 120 | 35170.36 | -2686737 | No comment |
| MASNGW 121 | 35045.88 | -2687201.6 | No comment |
| MASNGW 122 | 34921.6 | -2687665.6 | No comment |
| MASNGW 123 | 34792.21 | -2688148.6 | No comment |
| MASNGW 124 | 34675.04 | -2688586 | No comment |
| MASNGW 125 | 34570.69 | -2688975.5 | No comment |
| MASNGW 126 | 34445.72 | -2689442.1 | No comment |
| MASNGW 127 | 34317.19 | -2689921.9 | No comment |
| MASNGW 128 | 34194.91 | -2690378.3 | No comment |
| MASNGW 129 | 34089.79 | -2690770.7 | No comment |
| MASNGW 130 | 33980.06 | -2691180.4 | No comment |
| MASNGW 131 | 33862.15 | -2691620.5 | No comment |
| MASNGW 132 | 33736.57 | -2692089.3 | No comment |
| MASNGW 133 | 33611.33 | -2692556.8 | No comment |
| MASNGW 134 | 33484.13 | -2693031.7 | No comment |
| MASNGW 135 | 33357.03 | -2693506.1 | No comment |
| MASNGW 136 | 33247.87 | -2693913.6 | No comment |
| MASNGW 137 | 33138.46 | -2694322.1 | No comment |
| MASNGW 138 | 33026.4 | -2694740.4 | No comment |
| MASNGW 139 | 32899.39 | -2695214.5 | No comment |
| MASNGW 140 | 32780.43 | -2695658.6 | No comment |

| 765KV Tower Number | X Easting (m) | Y Northing (m) | Comment regarding wetlands & Riparian zones |
|---|---|---|---|
| MASNGW 141 | 32656.77 | -2696120.2 | No comment |
| MASNGW 142 | 32536.97 | -2696567.4 | No comment |
| MASNGW 143 | 32411.73 | -2697034.9 | No comment |
| MASNGW 144 | 32283.37 | -2697514.1 | No comment |
| MASNGW 145 | 32173.43 | -2697924.5 | No comment |
| MASNGW 146 | 32050.16 | -2698384.7 | No comment |
| MASNGW 147 | 31926.18 | -2698847.5 | No comment |
| MASNGW 148 | 31801.64 | -2699312.4 | No comment |
| MASNGW 149 | 31675.89 | -2699781.8 | No comment |
| MASNGW 150 | 31554.68 | -2700234.3 | No comment |
| MASNGW 151 | 31418.5 | -2700742.7 | No comment |
| MASNGW 152 | 31299.27 | -2701187.7 | No comment |
| MASNGW 153 | 31188.78 | -2701600.2 | No comment |
| MASNGW 154 | 31069.81 | -2702044.3 | No comment |
| MASNGW 155 | 30945.47 | -2702508.5 | No comment |
| MASNGW 156 | 30817.87 | -2702984.8 | No comment |
| MASNGW 157 | 30694.87 | -2703444 | No comment |
| MASNGW 158 | 30564.73 | -2703929.8 | No comment |
| MASNGW 159 | 30439.28 | -2704398.1 | No comment |
| MASNGW 160 | 30320.74 | -2704840.6 | No comment |
| MASNGW 161 | 30202.5 | -2705282 | No comment |
| MASNGW 162 | 30086.98 | -2705713.3 | No comment |
| MASNGW 163 | 29966.7 | -2706162.3 | No comment |
| MASNGW 164 | 29839.19 | -2706638.2 | No comment |
| MASNGW 165 | 29725.8 | -2707061.5 | No comment |
| MASNGW 166 | 29612.14 | -2707485.8 | No comment |
| MASNGW 167 | 29483.09 | -2707967.6 | No comment |

| 765KV Tower Number | X Easting (m) | Y Northing (m) | Comment regarding wetlands & Riparian zones |
|---|---|---|---|
| MASNGW 168 | 29355.77 | -2708442.8 | No comment |
| MASNGW 169 | 29277.4 | -2708735.4 | No comment |
| MASNGW 170 | 29156.05 | -2709188.4 | No comment |
| MASNGW 171 | 29033.65 | -2709645.3 | No comment |
| MASNGW 172 | 28914.34 | -2710090.7 | No comment |
| MASNGW 173 | 28794.82 | -2710536.9 | No comment |
| MASNGW 174 | 28682.22 | -2710957.2 | No comment |
| MASNGW 175 | 28549.81 | -2711335.8 | No comment |
| MASNGW 176 | 28438.84 | -2711750.1 | No comment |
| MASNGW 177 | 28326.09 | -2712171 | No comment |
| MASNGW 178 | 28259.13 | -2712421 | No comment |
| MASNGW 179 | 28207.09 | -2712730.9 | No comment |

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