PROPOSED DEVELOPMENT OF THE RICHARDS BAY COMBINED CYCLE POWER PLANT (CCPP) AND ASSOCIATED INFRASTRUCTURE ON A SITE NEAR RICHARDS BAY, KWAZULU-NATAL PROVINCE - WATER RESOURCE SCOPING STUDY

WETLANDS & AQUATIC ECOLOGY

CLIENT

AFZELIA

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REFERENCE

RICHARDS BAY

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Report name	**PROPOSED DEVELOPMENT OF THE RICHARDS BAY COMBINED CYCLE POWER PLANT (CCPP) AND ASSOCIATED INFRASTRUCTURE ON A SITE NEAR RICHARDS BAY, KWAZULU-NATAL PROVINCE - WATER RESOURCE SCOPING STUDY** **WETLANDS & AQUATIC ECOLOGY**	
Reference code	**RICHARDS BAY**	
Submitted to	**AFZELIA**	
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1 INTRODUCTION

The Biodiversity Company (TBC) was appointed to undertake a Scoping Study for a proposed development site associated with the Richards Bay Combined Cycle Power Plant (CCPP) project and associated infrastructure. The proposed project will be developed on Erf 2/11376 (65ha) and Erf 4/11376 (6ha). Eskom proposes to construct and operate a CCPP, with an installed capacity of 3000 MW, and an inclusive footprint of 40-60ha, at a site located within the Industrial Development Zone (IDZ) of Richards Bay. The specialist fields that have been assessed for the scoping study include:

- Wetlands; and
- Aquatic ecology.

2 PROJECT AREA

The project site is located in the greater Richards Bay area on the KwaZulu-Natal north coast, within the Natal Coastal Plain Eco Region and within the Usuthu to Mhlatuze Water Management Area (WMA or primary catchment W). Additionally, the project site is located within the quaternary catchment of W12F (Figure 1).

For increased data resolution quaternary catchments are sub divided into Sub-Quaternary Reaches or SQRs. This allows for data to be collected and displayed per a given unit of river length and position. The table below (Table 1) combines data from quaternary catchments as well as the DWS Resource Quality Information Services (RQIS) to present the Ecological Importance (EI), Ecological Sensitivity as well as the Present Ecological Status (PES) and the default ecological status of the SQR in closest proximity to the project area. The SQR rivers are not representative of all aquatic ecosystems and more may be present on the ground, hence ground-truthing of this information is essential. Some data from the SQR desktop tool may be out of date and no longer applicable. The PES of the site was found to be largely modified (Class D).

Table 1: Summarised desktop information (Department of Water and Sanitation 2014)

Quaternary Catchment	SQR	River	EI	ES	PES
W12F	W12H-03459	Nseleni	High	Very High	Largely modified (class D)

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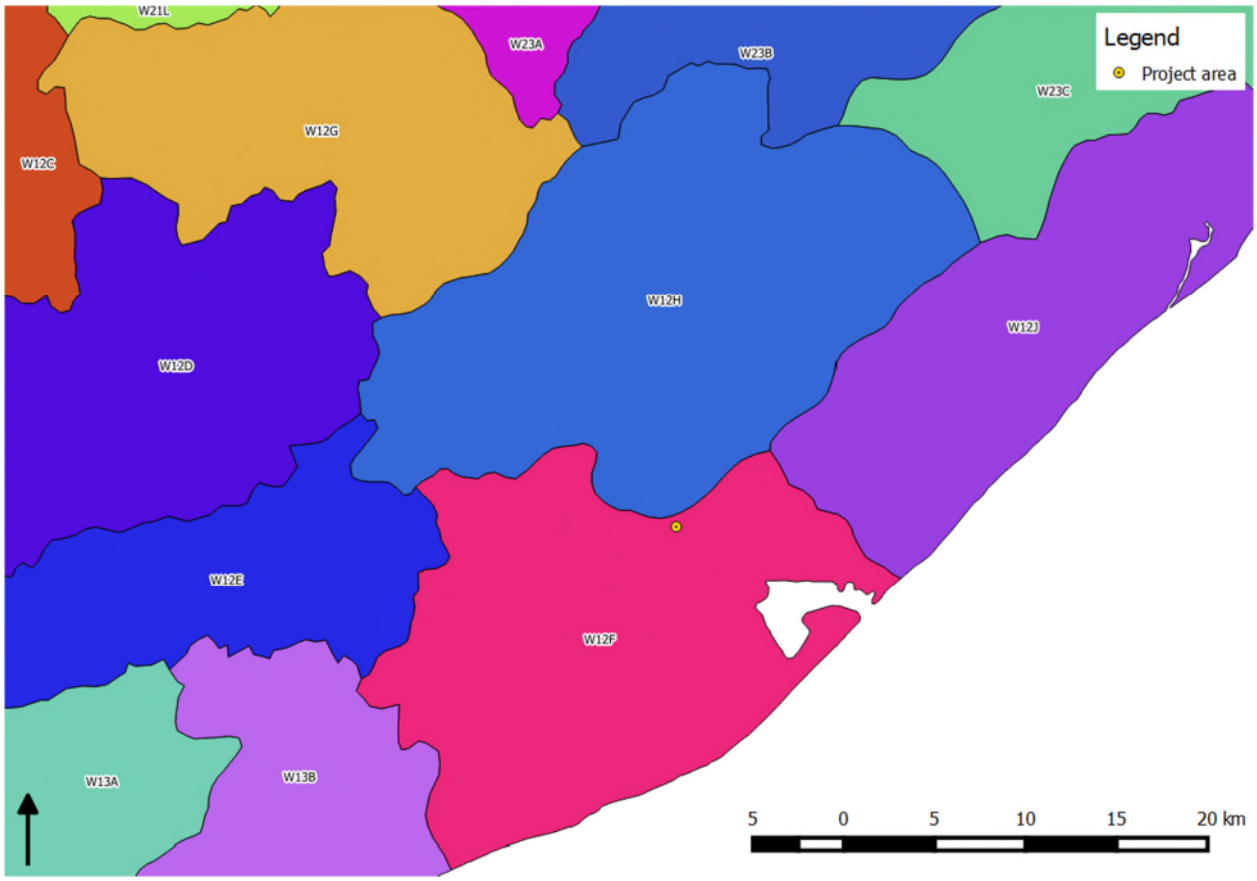

Figure 1: The location of the project area within quaternary catchment W12J

3 LIMITATIONS

This scoping level assessment was conducted as a desktop study exercise only, no site inspections have been completed. The scoping study has therefore assumed that all information provided for the study is correct.

4 METHODOLOGY

In order to conduct the scoping study, a variety of representative datasets were utilised. As a result of this, the latest national datasets available for wetlands and rivers were used for the environmental scoping process. These datasets include:

- The South African National Land Cover dataset (2013 – 2014).
- The National Freshwater Ecological Priority Area programme (2011).
- KwaZulu-Natal Wetlands Map (2009).

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- Watercourse delineations for South Africa.

5 RESULTS

The outcomes from the scoping assessment are discussed in more detail in the subsequent sections.

5.1 National Land Cover

In terms of Land Cover, the following is summarised from a wetland and aquatic resources perspective (Figure 2):

- The dataset suggests the presence of water within the project area, and the associated 500m buffer area. It is likely that this feature is associated with wetlands.
- There is no indication that a river system is located within the project area, nor within the buffer area.

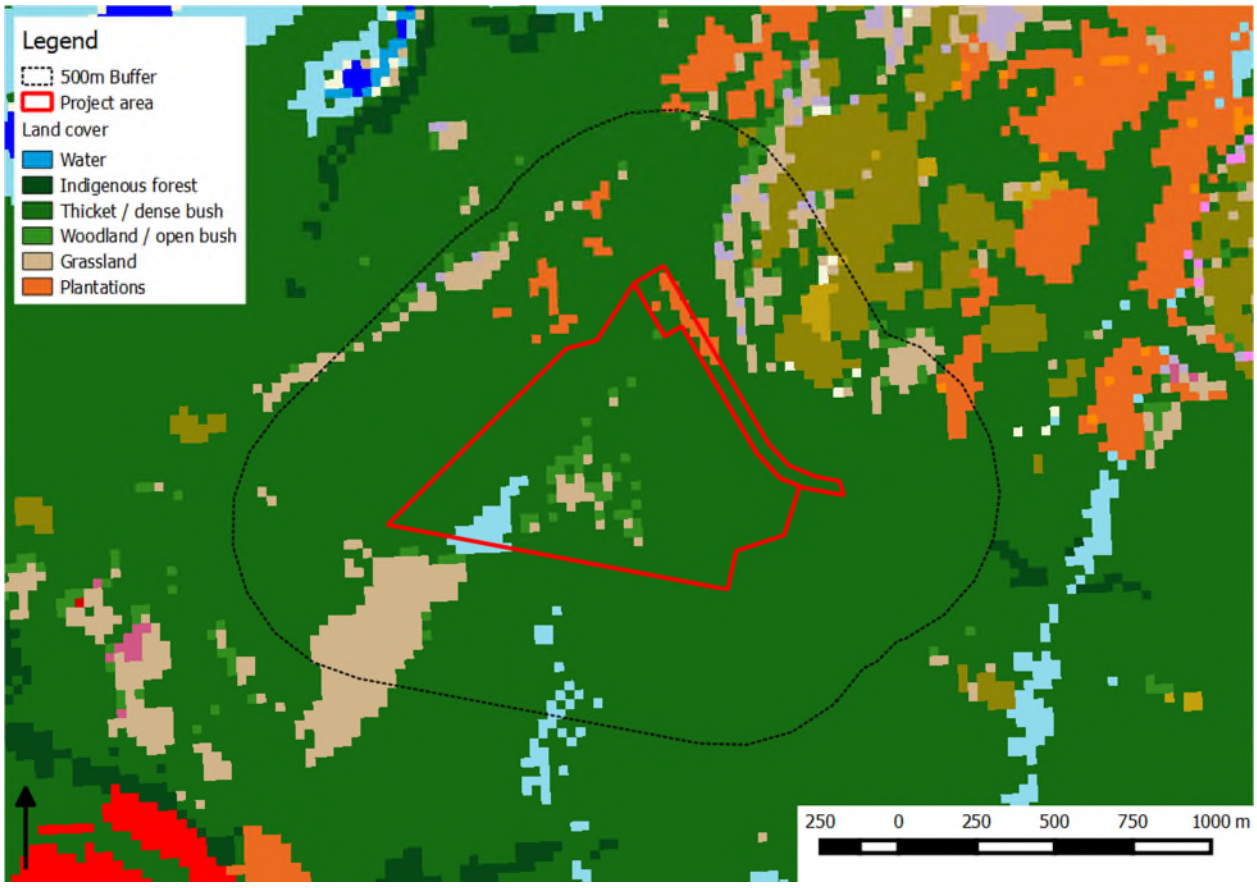

Figure 2: The location of the project area in relation to the land cover

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5.2 National Freshwater Ecosystem Priority Area (NFEPA) Programme

In terms of the NFEPA programme (Figure 3), the following is summarised:

- The NFEPA flat wetlands located within the project area are not classified as ecological priority areas.
- The flat, floodplain and seep wetlands located within the project area, and the 500m buffer area are classified as natural systems. These systems are considered to be “natural or good” with a percentage land cover of more than 75% (Class AB).
- The abovementioned wetlands are all a Rank 2, suggesting the possibility for the presence of a listed threatened species, or in the very least, these systems are considered for exception biodiversity importance.

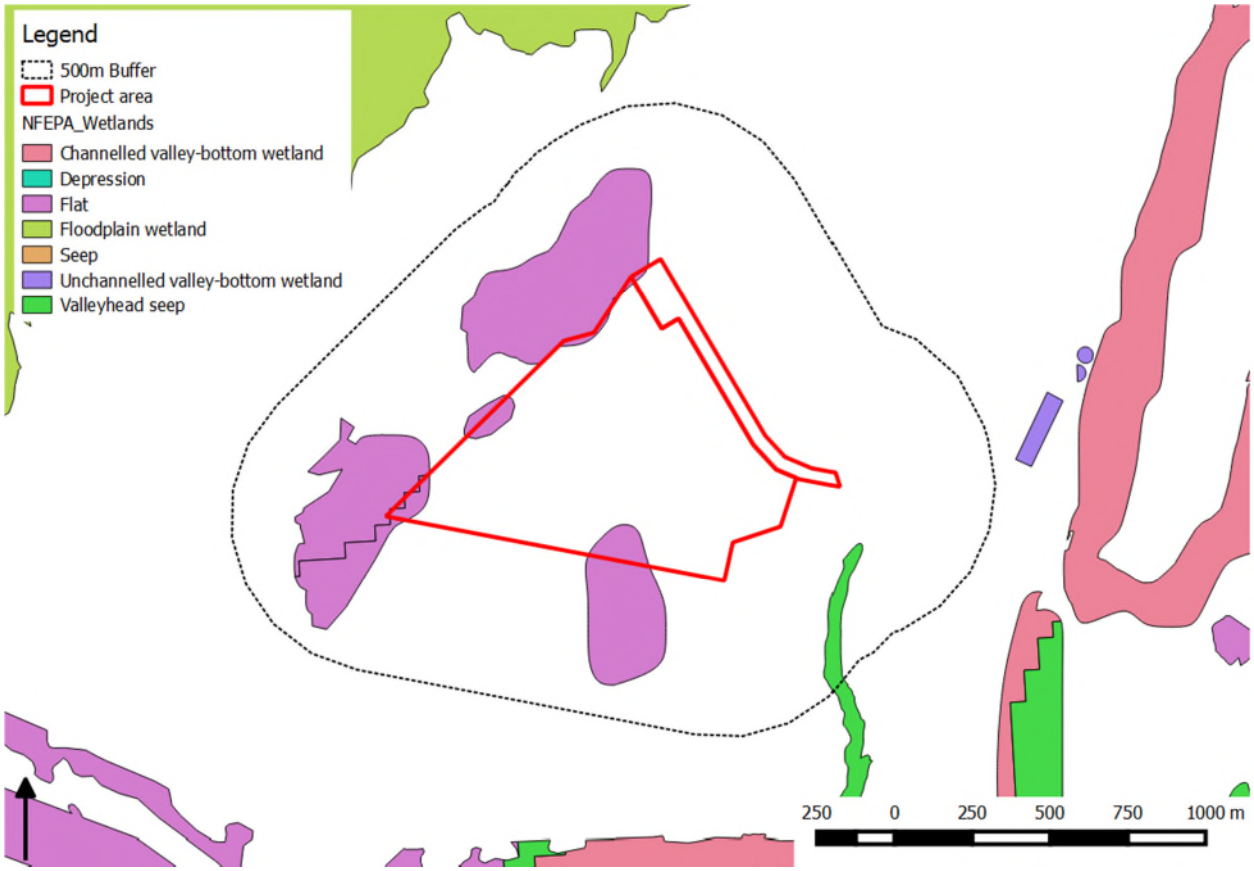

Figure 3: The location of the project area in relation to the NFEPA wetlands

5.3 Wetlands of KwaZulu-Natal

In terms of the KwaZulu-Natal wetland delineations (Figure 4), the following is summarised:

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- Freshwater wetlands and systems classified as pans or open lakes are located within the project area.
- In addition to the abovementioned systems, alluvial wetlands are also located within the 500m buffer of the project area.

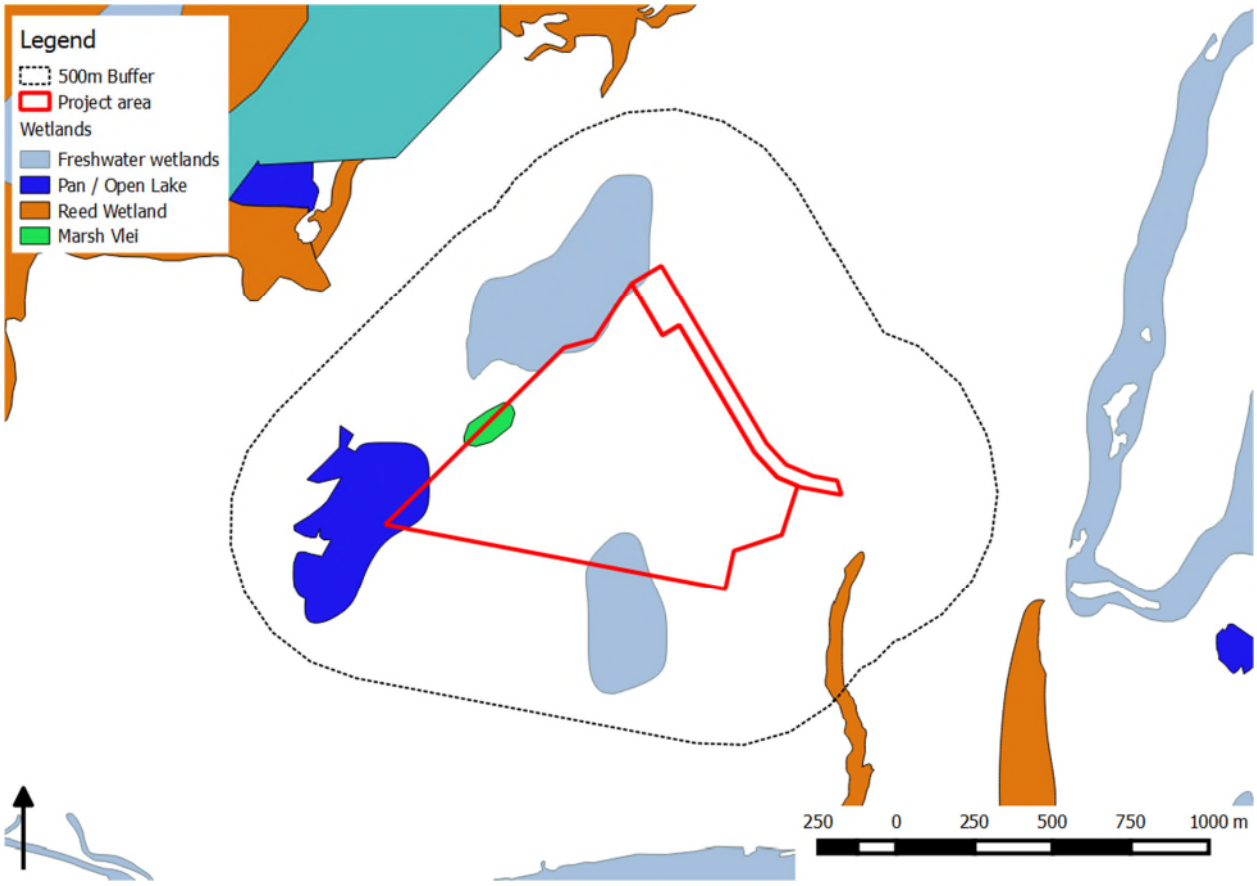

Figure 4: The location of the project area in relation to the provincial wetland dataset

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5.4 Watercourses

In terms of watercourses, the following is summarised:

- No watercourses (rivers or streams) are located within the project area, or within the 500m buffer area.

6 DISCUSSION

It appears that no rivers are at risk due to the development of the proposed project, and the findings from the scoping study will only focus on the wetland study component. Owing to the fact that the wetlands within the project area are considered to be in a largely natural state and ecologically important, the loss of these systems is considered to be significant. If the loss of these systems is avoidable, any changes to the status and functioning of these systems resulting from indirect impacts are considered to be major negatives for the project.

It is apparent from the scoping datasets that the development of the project area is likely to result in the loss of wetland areas. If it is required that the entire extent of the project area is to be developed, the loss of wetland areas are unavoidable. These systems will be lost during the construction phase of the project, with the loss considered to be permanent throughout the operation phase of the project. The loss of wetlands cannot be mitigated, and as a result a form of wetland offset would need to be implemented. Any local or regional offset programmes will be considered in support of the project, should the need for a wetland offset strategy arise.

In the event that the proposed development can be amended in order to avoid the wetlands, secondary impacts to these systems are anticipated. The clearing of the area, stripping of topsoil, the storage of materials and structures and the use of machinery, vehicles and equipment all pose a risk to the wetland systems. The most significant risks are expected to be sedimentation and the input of contaminants into the wetland areas during the construction phase of the project. The development (operation phase) of the project will reduce the extent of the catchment area, increase the extent of hardened surfaces and provide storm water measures which will have an impact on the adjacent wetland systems. These impacts will alter the geomorphology and hydrology of the receiving systems, resulting in the likely erosion and scouring of the wetland areas. The wetlands within the project area are at the most risk, with the wetlands within the 500m buffer also at risk, but considerably less. A project risk assessment will be conducted for all wetland areas within 500m of the project area in order to determine the level of risk posed by the project.

The most significant impact resulting from the project is the potential loss of wetland areas due to the development of the power plant on these systems. The baseline study will be required to identify, delineate and assess the ecological characteristics of the wetland areas. Based on the baseline findings, it is recommended that layout alternatives attempt to avoid the wetland areas and accompany a buffer zone. Potential direct and indirect impacts resulting from the proposed

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project, and the likely cumulative and residual impacts are presented in Table 2. A summary of the major issues, impacts and potential No-Go area is presented in Table 3.

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Table 2: Potential impacts expected for the proposed development project

Nature of Impact	Impact type	Rating	Mitigation	Interpretation
Direct Impact:	Existing	High	No mitigation possible for the loss of wetlands.	Wetlands are under threat due to development and change in land uses.
Development of the facility will result in the loss of wetlands	Cumulative	High	Demarcate wetland areas to prevent unnecessary loss of other wetland areas. Include the importance of wetlands in the site induction.	The cumulative loss of wetlands is considered to be high, due to the development of the area and local land uses.
	Residual	High		The loss of wetlands is permanent and does not include rehab or offset programmes
Indirect Impact:	Existing	High	A stormwater management plan must be prepared and implemented. Phased clearing of vegetation is recommended. Prioritise the clearing of already disturbed areas. No pumping or discharge of waste or dirty water into the systems. No unnecessary construction within the watercourses. Reduce the development footprint as much as possible. Incorporate green engineering measures in the design.	Development and land uses have contributed to altered hydrology regimes
Altered hydrology of the catchment area and receiving watercourses	Cumulative	Medium		The increase in hardened surfaces and loss of surface roughness could contribute to altered flows
	Residual	Low		No formal discharge required. Stormwater measures will be implemented. Green engineering measures to be included.
Indirect Impact:	Existing	Medium	Formal onsite waste management. A stormwater management plan must be prepared and implemented. Phased clearing of vegetation. Prioritise the clearing of already disturbed areas. Separation of clean and dirty water. No unnecessary construction within the watercourses.	The quality of water resources is expected to be impaired
Impaired water quality of the water resources	Cumulative	Medium		Leaks, spills, waste and erosion all impact on water quality
	Residual	Low		No formal discharge of dirty or treated water

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Indirect Impact:	Existing	High	Avoid wetlands as much as possible. Identify lost services and implement measures to rehabilitate the system to gain these services back. Rehabilitate adjacent wetland areas to compensate for lost services. Incorporate green engineering to offer key services such as water polishing and energy dissipation.	The development of the area, local land uses and poor local protection of wetlands has resulted in the systems being impacted on.
Loss of ecological services	Cumulative	Medium		
	Residual	Low		In addition to avoiding wetlands, adjacent areas must be rehabilitated to compensate for any form of loss.
Indirect Impact:	Existing	High	Use of gabions and reno mattresses to secure systems and trap sediment. Re-vegetation disturbed areas as soon as possible. Phased clearing of vegetation. Prioritise the clearing of already disturbed areas. Use of silt traps. Dust suppression. Energy dissipaters for discharge areas.	Sedimentation of the local systems is likely, primarily due to agricultural practices and clearing for development
Sediment and erosion of the watercourses	Cumulative	Medium		The clearing of areas and soil stockpiles may contribute to sedimentation
	Residual	Low		Proven methods to prevent erosion of areas and stockpiles

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Table 3: A summary of potential issues, impacts and likely No-Go areas identified for the study

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Development of the facility will result in the loss of wetlands	Loss of wetland and the accompanying ecological and social services	Local	All wetland areas to be treated as No-Go areas. A buffer zone should be determined for the project. The buffer area should also be regarded as a No-Go zone.
Altered hydrology of the catchment area and receiving watercourses	Altered attenuation properties resulting in likely scouring and erosion due to increased flows	Local	
Impaired water quality of the water resources	Impact on the functioning of the wetlands, and the associated biota dependent on the system	Local	
Loss of ecological services	Loss of ecological services, notably the maintenance of biodiversity and water quality enhancement services	Local	
Sediment and erosion of the watercourses	Impact on the potential of the system to provide services, and loss of habitat quality and quantity.	Local	
Gaps: No layout alternatives or project descriptions were made available for the scoping study, therefore the likely extent and significance of impacts is based on expected impacts only, and is not an accurate indication for this stage of the project.			

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6.1 Methodology

Delineation

The wetland areas are to be delineated in accordance with the DWAF (2005) guidelines.

Wetland Classification System

The wetland areas are to be classified in accordance with Ollis et al., 2013.

Present Ecological Status (PES)

Conduct Level 2 on-site evaluation to determine the integrity of the systems. This involves structured sampling and data collection in a single wetland and its surrounding catchment.

Wetland Ecosystem Services

The assessment of the ecosystem services supplied by the identified wetlands must be conducted per the guidelines as described in WET-EcoServices (Kotze et al., 2009).

Ecological Importance and Sensitivity (EIS)

The method takes into consideration PES scores as well as function and service provision to enable the assessor to determine the most representative EIS category for the wetland feature or group being assessed.

Buffer Determination

The “Preliminary Guideline for the Determination of Buffer Zones for Rivers, Wetlands and Estuaries” (Macfarlane, *et al.,* 2015) must be used to determine the appropriate buffer zone for the proposed activity.

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7 REFERENCES

Department of Water Affairs and Forestry (DWS). (2005). A practical field procedure for identification and delineation of wetlands and riparian areas. Pretoria: Department of Water Affairs and Forestry.

Kotze, D.C., Marneweck, G.C., Batchelor, A.L., Lindley, D.C., and Collins, N.B. 2009. A Technique for rapidly assessing ecosystem services supplied by wetlands. Mondi Wetland Project.

Macfarlane, D.M., Kotze, D.C., Ellery, W.N., Walters, D., Koopman, V., Goodman, P. and Goge, C. 2007. A technique for rapidly assessing wetland health: WET-Health. WRC Report TT 340/08.

Nel JL, Murray KM, Maherry AM, Petersen CP, Roux DJ, Driver A, Hill L, Van Deventer H, Funke N, Swartz ER, Smith-Adao LB, Mbona N, Downsborough L and Nienaber S. 2011. Technical Report for the National Freshwater Ecosystem Priority Areas project. WRC Report No. K5/1801.

Ollis DJ, Snaddon CD, Job NM, and Mbona N. 2013. Classification System for Wetlands and other Aquatic Ecosystems in South Africa. User Manual: Inland Systems. SANBI Biodiversity Series 22. South African Biodiversity Institute, Pretoria.

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