THE FRESHWATER ECOLOGY COMPLIANCE STATEMENT FOR THE SASOL PIGGING STATION PROJECT

Umbogintwini, KwaZulu-Natal

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CLIENT

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Table of Acronyms

CBA	Critical Biodiversity Area
CR	Critically Endangered
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EFZ	Estuarine Functional Zone
EN	Endangered
ESAs	Ecological Support Areas
GN	Government Notices
IHIA	Intermediate Habitat Integrity Assessment
LC	Least Concern
NEMA	National Environmental Management Act
NFEPA	National Freshwater Ecosystem Priority Areas
NT	Near Threatened
NWA	National Water Act
ONAs	Other Natural Areas
PAs	Protected Areas
SQR	Sub-quaternary catchment
VU	Vulnerable
WMA	Water Management Area

1 Introduction

1.1 Background

The Biodiversity Company was appointed to conduct a freshwater biodiversity assessment for the proposed receiving stations to be established by Sasol South Africa Limited on the existing operating pipeline network in KwaZulu-Natal (further referred to as the Sasol Pigging Station project). The project area is situated in Umbogintwini, 21 km south of Durban, KwaZulu-Natal Province (Figure 1-1 and Figure 1-3).

The Pigging operations include but are not limited to cleaning and inspecting the pipeline using a cleaning device (“pig”). This is accomplished by inserting the pig into a "pig launcher" (or "launching station") — an oversized section in the pipeline, reducing to the normal diameter. The launching station is then closed and the pressure-driven flow of the product in the pipeline is used to push the pig along the pipe until it reaches the receiving trap — the "pig catcher" (or "receiving station"). Typically, this is done without stopping the flow of the product in the pipeline. The project will entail the installation of pig traps on the existing pipeline to bypass pipelines at the existing stations and allow for inline inspection.

A single day dry season survey was conducted on the 15th of June 2022, across the whole development footprint hereafter referred to as the “project area”. The survey focused on the project footprint and the areas directly adjacent to the project area. Furthermore, identification and description of any sensitive freshwater receptors were recorded across the project area, and how these sensitive receptors may be affected by the proposed development were also investigated.

This assessment was conducted in accordance with the amendments to the Environmental Impact Assessment Regulations. 2014 (GNR 326, 7 April 2017) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). The approach has taken cognisance of the recently published Government Notices (GN) 320 (20 March 2020): “Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation” (Reporting Criteria). The National Web based Environmental Screening Tool has characterised the aquatic sensitivity of the project area as “Low” (Figure 1-2). This assessment is also completed in accordance with the requirements of the Water Use Authorisation in terms of Section 21(c) and (i) of the National Water Act (Act 36 of 1998) (NWA).

This report, after taking into consideration the findings and recommendations provided by the specialist herein, should inform and guide the Environmental Assessment Practitioner (EAP) and regulatory authorities, enabling informed decision making, as to the ecological viability of the proposed project.

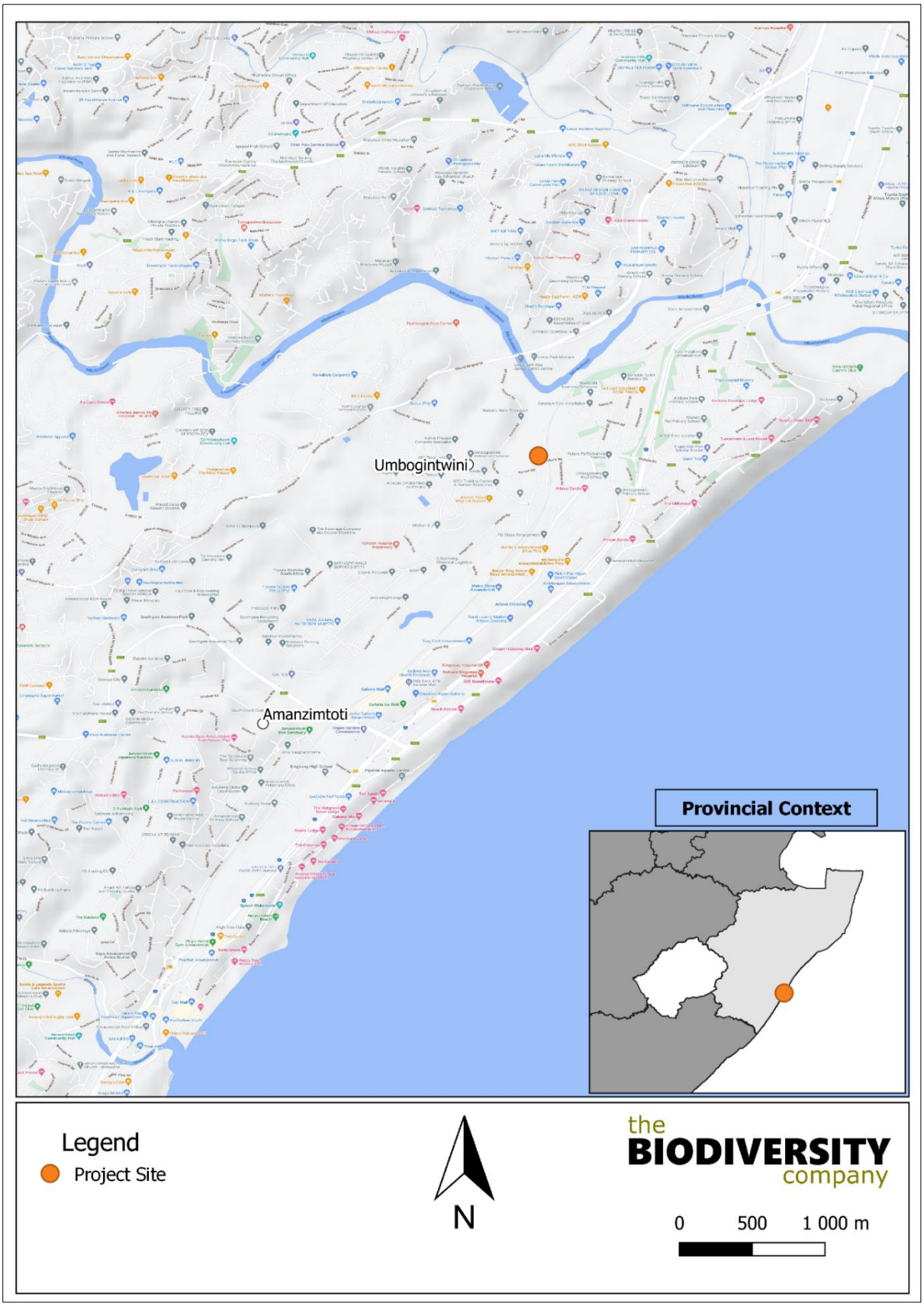

Figure 1-1 The project area in relation to nearest towns

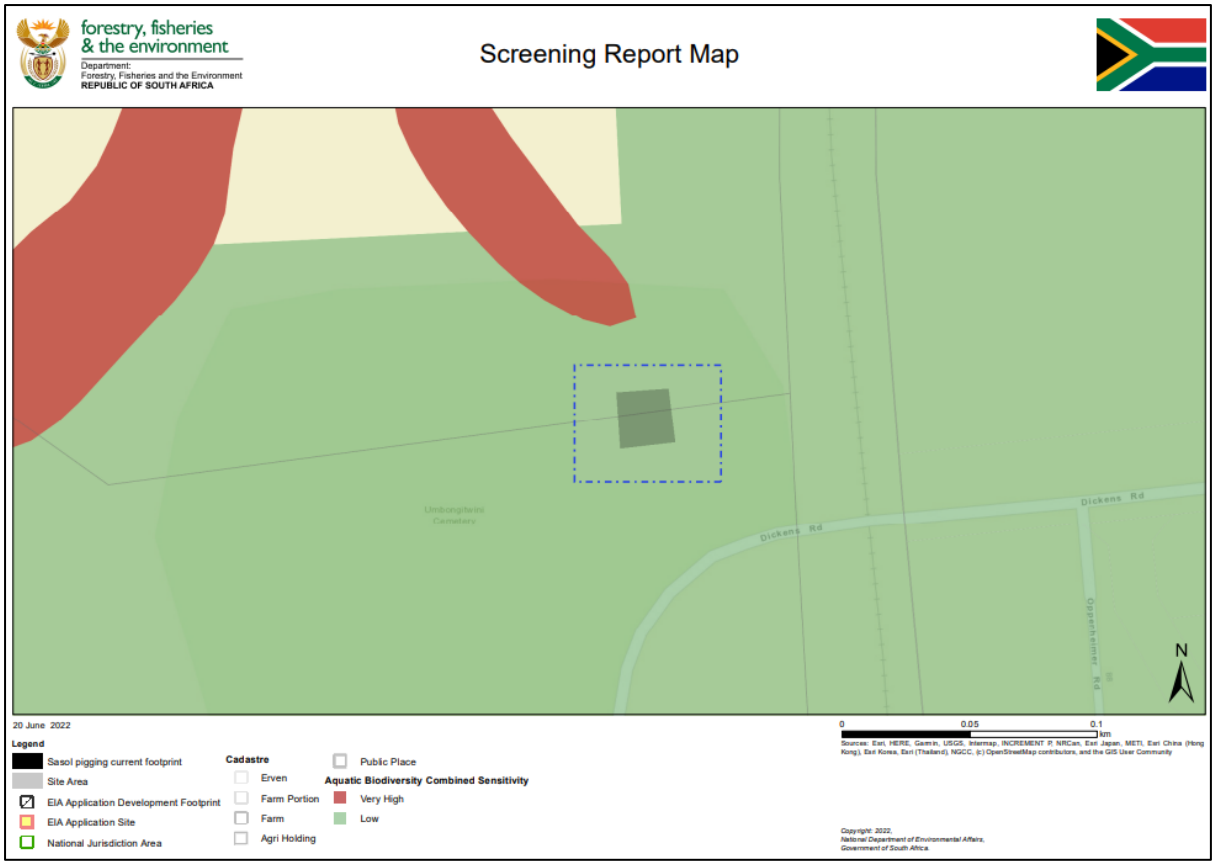

Figure 1-2 Sensitivity for the greater project area according to the Environmental Screening Tool

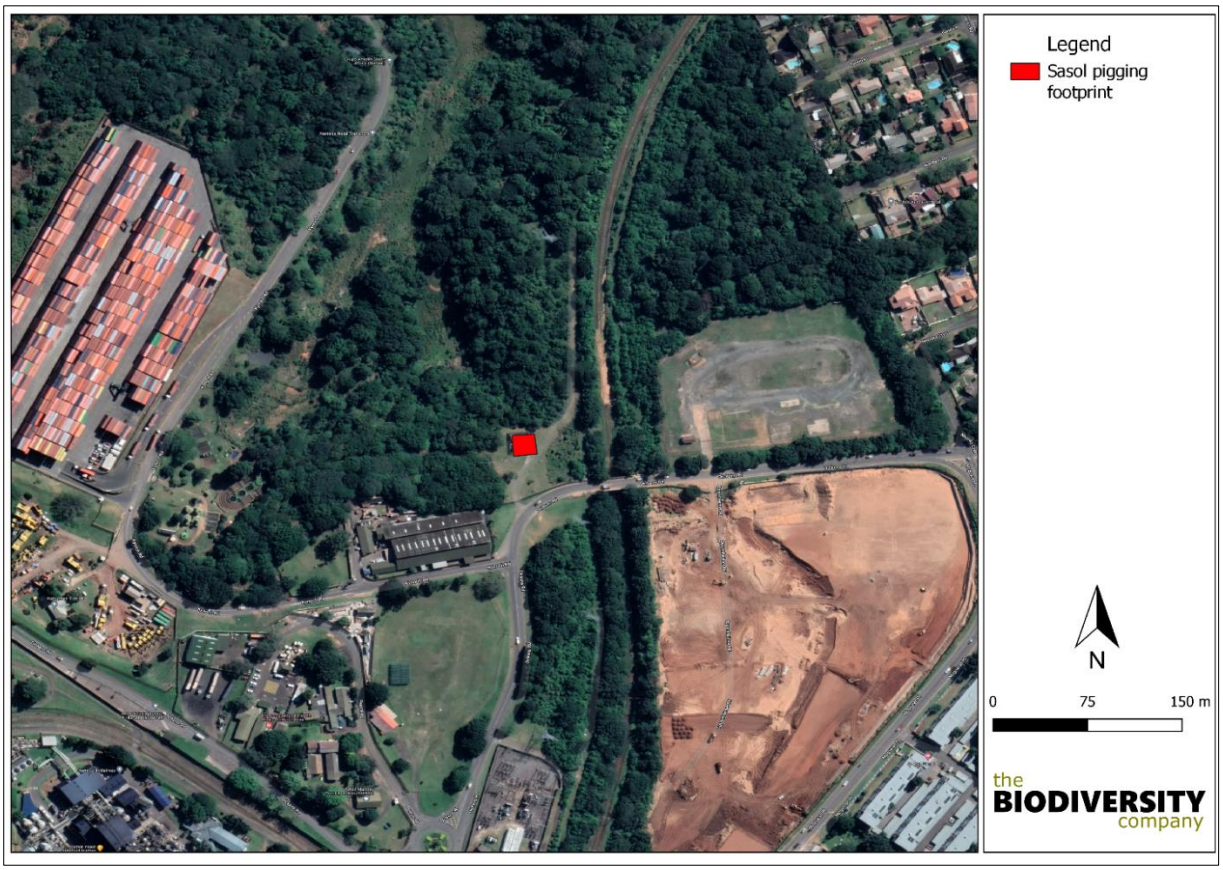

Figure 1-3 Project footprint

2 Specialist Details

Report Name	**THE FRESHWATER ECOLOGY COMPLIANCE STATEMENT FOR THE SASOL PIGGING STATION PROJECT**
Submitted to	
Report Writer (Aquatic Ecology)	**Christian Fry**  Christian Fry has obtained an MSc in Aquatic Health from the University of Johannesburg and is a registered Professional Scientist (Pr. Sci. Nat: 119082). Christian has 8 years of experience conducting basic assessments, biomonitoring and EIAs for various sectors.
Report Reviewer	**Dale Kindler**  Dale Kindler is a registered Professional Natural Scientist (Pr. Sci. Nat. 114743) in aquatic science and completed his M. Sc. in Aquatic Health at the University of Johannesburg. He has nine (9) years' experience in conducting Aquatic Specialist Assessments and is SASS 5 Accredited with the Department of Water and Sanitation (DWS). Dale has completed numerous specialist studies locally and internationally, ranging from basic assessments to Environmental Impact Assessments (EIAs) following IFC standards.
Declaration	The Biodiversity Company and its associates operate as independent consultants under the auspice of the South African Council for Natural Scientific Professions. We declare that we have no affiliation with or vested financial interests in the proponent, other than for work performed under the Environmental Impact Assessment Regulations, 2017. We have no conflicting interests in the undertaking of this activity and have no interests in secondary developments resulting from the authorisation of this project. We have no vested interest in the project, other than to provide a professional service within the constraints of the project (timing, time and budget) based on the principals of science.

3 Methodologies

3.1 Aquatic Ecology Assessment

In line with the minimum requirements for aquatic biodiversity surveys, a single survey was completed for this assessment. The survey was completed on the 15th of June 2022. The survey period therefore reflects a dry, winter survey.

Due to the absence of adequate surface water or riverine features within the local project footprint, the sampling of biotic responders, and the evaluation and interpretation of the aquatic environment was limited to a literature review at a catchment level from aerial imagery.

3.2 Desktop Assessment

The following information sources were considered for the desktop assessment;

- Aerial imagery (Google Earth Pro);
- Land Type Data (Land Type Survey Staff, 1972 - 2006);

- The National Freshwater Ecosystem Priority Areas (Nel *et al*., 2011);
- The eThekwini wetlands dataset;
- The Durban Metropolitan Open Space System; and
- Contour data (5 m).

3.2.1 Habitat Assessment

Habitat availability and diversity are major attributes for the biota found in a specific ecosystem, and thus knowledge of the quality of habitats is important in an overall assessment of ecosystem health. Habitat assessment can be defined as the evaluation of the structure of the surrounding physical habitat that influences the quality of the water resource and the condition of the resident aquatic community (Barbour *et al*. 1996). Both the quality and quantity of available habitat affect the structure and composition of resident biological communities (USEPA, 1998). Habitat quality and availability plays a critical role in the occurrence of aquatic biota. For this reason, habitat evaluation is conducted simultaneously with biological evaluations to facilitate the interpretation of results.

3.2.1.1 Habitat Integrity and Riparian Delineation

The Intermediate Habitat Integrity Assessment (IHIA) model was used to assess the integrity of the watercourse habitats from a riparian and instream perspective as described in Kleynhans (1996). The habitat integrity of a river refers to the maintenance of a balanced composition of physico-chemical and habitat characteristics on a temporal and spatial scale which are comparable to the characteristics of natural habitats of the region (Kleynhans, 1996).

This model compares current conditions with reference conditions that are expected to have been present. Specification of the reference condition follows an impact-based approach where the intensity and extent of anthropogenic changes within the catchment surrounding a watercourse are used to interpret the impact on the habitat integrity of the downslope freshwater ecosystem (receiving environment). To accomplish this, information on abiotic changes that can potentially influence river habitat integrity are obtained from surveys (in-field observations) in combination with available data sources such as the latest Google Earth satellite imagery. These changes are all related and interpreted in terms of modification of the drivers of the system, namely hydrology, geomorphology and physico-chemical conditions and how these changes would impact on the natural riverine habitats.

The criteria and ratings utilised in the assessment of habitat integrity are presented in Table 3-1 and Table 3-2 respectively. The spatial framework for each IHIA was 5 km up and downstream of the respective sampling points, from the highest elevation to the lowest elevation within the watercourse.

Table 3-1 Criteria used in the assessment of habitat integrity (Kleynhans, 1996)

Criterion	Relevance
Water abstraction	Direct impact on habitat type, abundance and size. Also implicated in flow, bed, channel and water quality characteristics. Riparian vegetation may be influenced by a decrease in the supply of water.
Flow modification	Consequence of abstraction or regulation by impoundments. Changes in temporal and spatial characteristics of flow can have an impact on habitat attributes such as an increase in duration of high flow season, resulting in low availability of certain habitat types or water at the start of the breeding, flowering or growing season.

Criterion	Relevance
Bed modification	Regarded as the result of increased input of sediment from the catchment or a decrease in the ability of the river to transport sediment (Gordon *et al*., 1993 in: DWS, 1999). Indirect indications of sedimentation are stream bank and catchment erosion. Purposeful alteration of the stream bed, e.g. the removal of rapids for navigation (Hilden & Rapport, 1993 in: DWS, 1999) is also included.
Channel modification	May be the result of a change in flow, which may alter channel characteristics causing a change in marginal instream and riparian habitat. Purposeful channel modification to improve drainage is also included.
Water quality modification	Originates from point and diffuse point sources. Measured directly or agricultural activities, human settlements and industrial activities may indicate the likelihood of modification. Aggravated by a decrease in the volume of water during low or no flow conditions.
Inundation	Destruction of riffle, rapid and riparian zone habitat. Obstruction to the movement of aquatic fauna and influences water quality and the movement of sediments (Gordon *et al*., 1992 in DWS, 1999)).
Exotic macrophytes	Alteration of habitat by obstruction of flow and may influence water quality. Dependent upon the species involved and scale of infestation.
Exotic aquatic fauna	The disturbance of the stream bottom during feeding may influence the water quality and increase turbidity. Dependent upon the species involved and their abundance.
Solid waste disposal	A direct anthropogenic impact which may alter habitat structurally. Also, a general indication of the misuse and mismanagement of the river.
Indigenous vegetation removal	Impairment of the buffer the vegetation forms to the movement of sediment and other catchment runoff products into the river (Gordon *et al*., 1992). Refers to physical removal for farming, firewood and overgrazing.
Exotic vegetation encroachment	Excludes natural vegetation due to vigorous growth, causing bank instability and decreasing the buffering function of the riparian zone. Allochtonous organic matter input will also be changed. Riparian zone habitat diversity is also reduced.
Bank erosion	Decrease in bank stability will cause sedimentation and possible collapse of the river bank resulting in a loss or modification of both instream and riparian habitats. Increased erosion can be the result of natural vegetation removal, overgrazing or exotic vegetation encroachment.

Table 3-2 Descriptions used for the ratings of the various habitat criteria (Kleynhans, 1996)

Impact Category	Description	Score
None	No discernible impact, or the modification is located in such a way that it has no impact on habitat quality, diversity, size and variability.	0
Small	The modification is limited to very few localities and the impact on habitat quality, diversity, size and variability are also very small.	1 - 5
Moderate	The modifications are present at a small number of localities and the impact on habitat quality, diversity, size and variability are also limited.	6 - 10
Large	The modification is generally present with a clearly detrimental impact on habitat quality, diversity, size and variability. Large areas are, however, not influenced.	11 - 15
Serious	The modification is frequently present and the habitat quality, diversity, size and variability in almost the whole of the defined area are affected. Only small areas are not influenced.	16 - 20
Critical	The modification is present overall with a high intensity. The habitat quality, diversity, size and variability in almost the whole of the defined section are influenced detrimentally.	21 - 25

The habitat integrity assessment considers the riparian zone and the instream channel of the river. Assessments are made separately for both aspects, but data for the riparian zone are primarily interpreted in terms of the potential impact on the instream component (Table 3-3). The relative weighting (importance value) of criteria remains the same as for the assessment of habitat integrity (DWS, 1999).

Table 3-3 Criteria and weights used for the assessment of instream habitat integrity and riparian habitat integrity (from Kleynhans, 1996)

Instream Criteria	Weight	Riparian Zone Criteria	Weight
Water abstraction	14	Indigenous vegetation removal	13
Flow modification	13	Exotic vegetation encroachment	12
Bed modification	13	Bank erosion	14
Channel modification	13	Channel modification	12
Water quality	14	Water abstraction	13
Inundation	10	Inundation	11
Exotic macrophytes	9	Flow modification	12
Exotic fauna	8	Water quality	13
Solid waste disposal	6		
Total	**100**	**Total**	**100**

The negative weights are added for the instream and riparian facets respectively and the total additional negative weight subtracted from the provisionally determined intermediate integrity to arrive at a final intermediate habitat integrity estimate. The eventual total scores for the instream and riparian zone components are then used to place the habitat integrity in a specific intermediate habitat integrity category (DWS, 1999). These categories are indicated in Table 3-4.

Table 3-4 Intermediate habitat integrity categories (From Kleynhans, 1996)

Category	Description	Score (% of Total)
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. A large loss of natural habitat, biota and basic ecosystem functions 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 the basic ecosystem functions have been destroyed and the changes are irreversible.	0

The riparian delineation was completed according to DWAF (2005). Typical riparian cross sections and structures are provided in Figure 3-1. Indicators such as topography and vegetation were the primary indicators used to define the riparian zone. Elevation data was obtained from topography spatial data was also utilised to support the infield assessment.

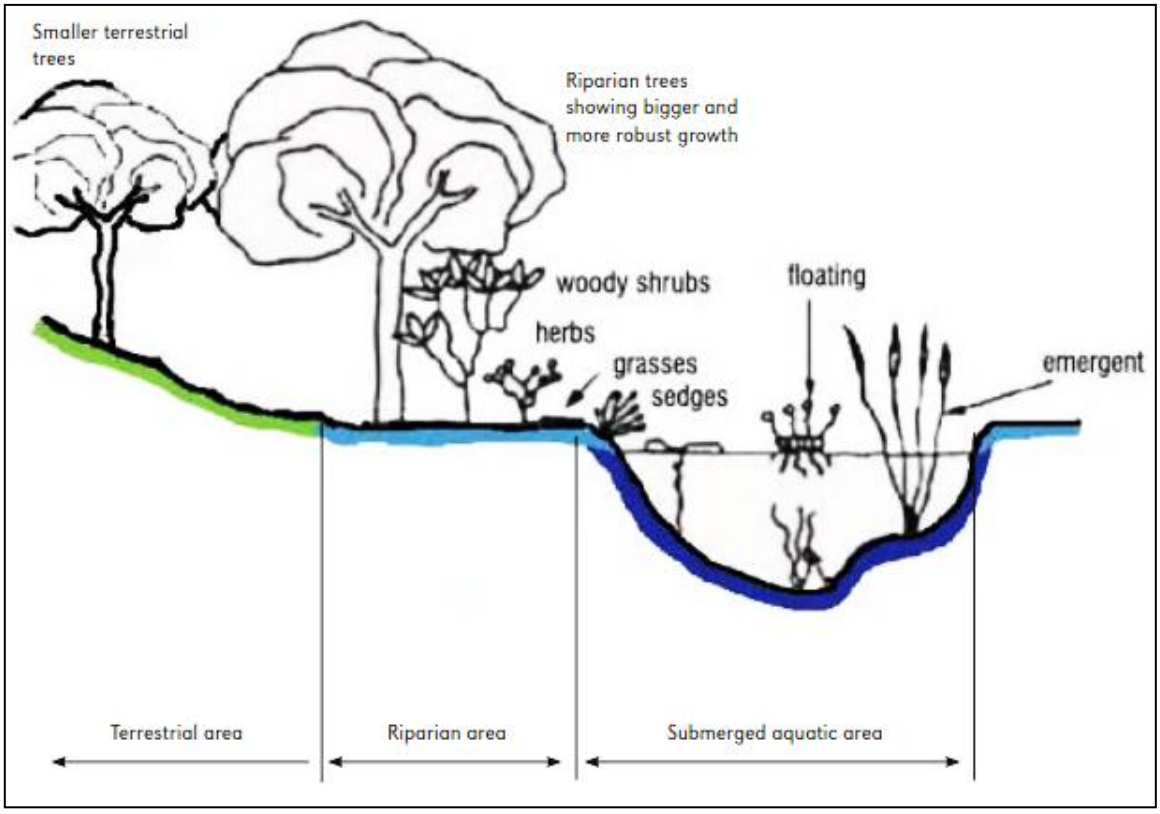

Figure 3-1 Riparian Habitat Delineations (DWAF, 2005)

3.3 Limitations

The following limitations should be noted for the assessment:

- A single season site visit was conducted for the respective study, which would constitute a dry season survey. As a result no spatial or temporal trends were assessed for the associated watercourses.

4 Receiving Environment

4.1 Climate

This region is characterised by summer rainfall, even though rainfall in the winter months are not uncommon. This region is frost-free and has high humidity. The mean maximum temperature for this region is 32.6°C whereas the mean minimum temperature for this region is 5.7 °C in January and July respectively, (Figure 4-1) (Mucina & Rutherford, 2006).

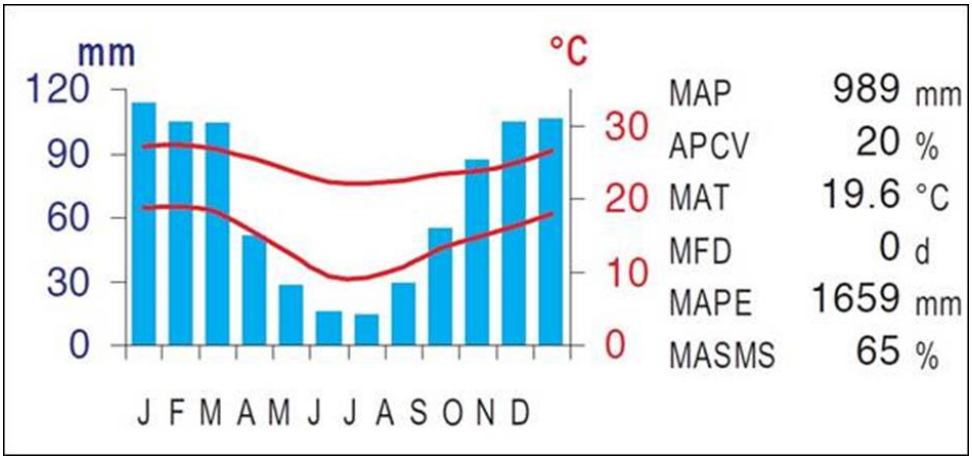

Figure 4-1 The climate summary for local area

4.2 Desktop Spatial Assessment

The following section describes the general area and associated freshwater features and habitat at a National and local scale. This assessment is based on spatial data that are provided by various sources such as the provincial environmental authority and SANBI.

4.2.1 Hydrological Setting

The project area is located within the U60E quaternary catchment in the Pongola to Mtamvuna Water Management Area (WMA) (NWA, 2016), and the North Eastern Coastal Belt Ecoregion. The project footprint is located 40 m south of a small drainage line that flows north into the Mbokodweni River and the freshwater features associated with the project area are presented in Figure 4-2. Based on the topography of the local area, this drainage line drains the proposed working area, with activities within the active working area having the potential to negatively influence the downslope drainage lines and watercourses further downstream in the catchment. The watercourse draining the project footprint is characterised as an ephemeral drainage line and wetland system according to National Freshwater Ecosystem Priority Areas (NFEPA) datasets presented later in this report (Section 4.2.5).

The downstream Mbokodweni River reach (the receiving environment) is represented by the U60E-4792 Sub-quaternary catchment (SQR). The U60E-4792 SQR reach spans approximately 10 km of the Mbokodweni River. The ecological status and composition of the classified SQR is shown in Table 4-1, whilst the ecological status of the unclassified drainage line is unknown. Desktop information of the catchment and watercourse condition was obtained from DWS (2014). The catchment surrounding the project area falls under the Mbokodweni SQR and therefore the ecological status of the Mbokodweni SQR was substituted for the unclassified drainage. The Present Ecological Status (PES) category of the

reach is classed as moderately modified (class C). The Ecological Importance (EI) of the reach is classified as high. The Ecological Sensitivity (ES) is categorised as very high due to the presence of macroinvertebrate taxa that are sensitive to flow and physico-chemical water modifications. Anthropogenic impacts identified within the sub-quaternary catchment included rural communities, cultivated lands, alien invasive plants, roads, and instream dams within the reach. Further, the Mbokodweni reach associated with the project falls within the ecologically important and sensitive estuarine functional zone as presented in Figure 4-3. The proposed activities do not pose risks to the estuarine functional zone.

Table 4-1 Summary of the status of sub-quaternary reach U60E- 4792

Present Ecological Status	**Moderately modified (class C)**
Ecological Importance	High
Ecological Sensitivity	Very High

Figure 4-2 Freshwater features associated with the project area

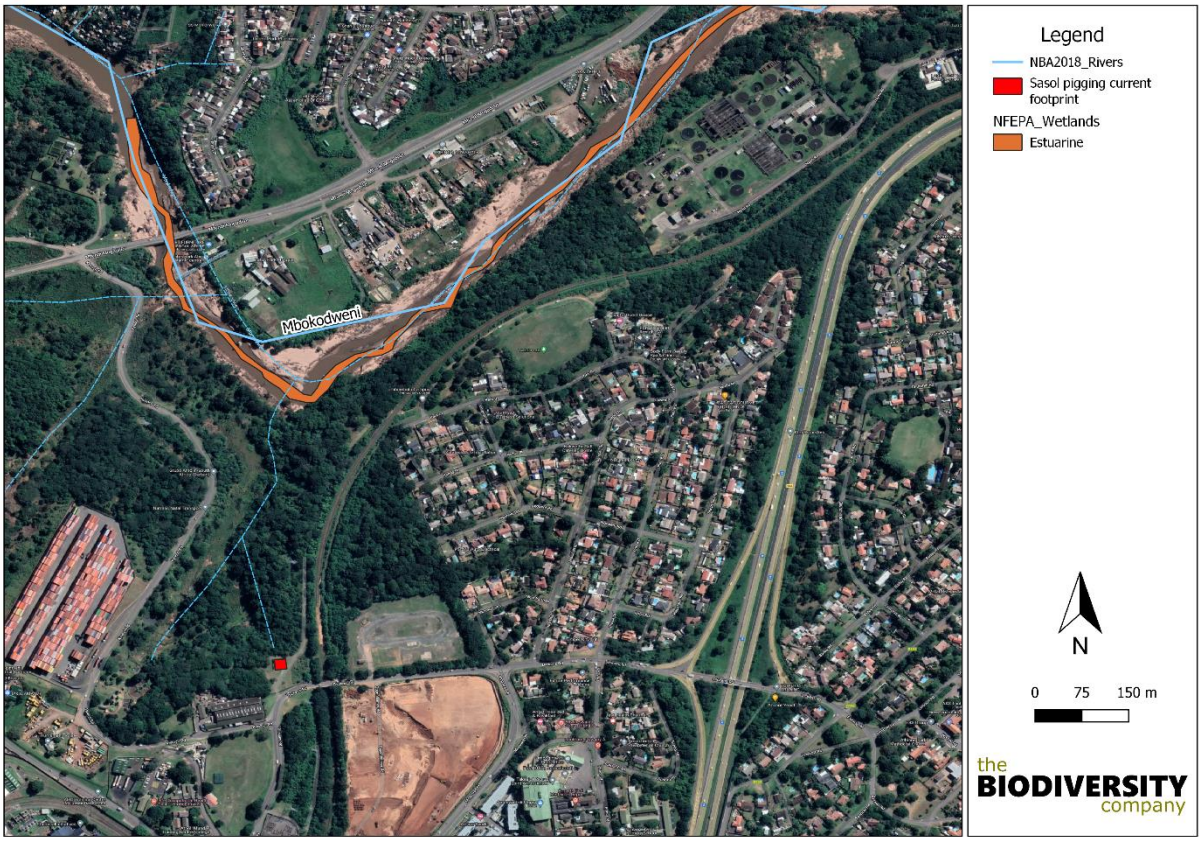

Figure 4-3 Illustration of the functional estuarine zone according to NFEPA delineation

4.2.2 KwaZulu-Natal Conservation Plan

KwaZulu-Natal Biodiversity Spatial Planning (KZN, 2014) addresses the urgent need to identify and map critical biodiversity areas and priorities for conservation in the province. It also provides land use planning guidelines, recommending biodiversity-friendly activities in priority areas. This is intended for use by technical users and decision-makers in the spheres of planning, development and environment. Spatial mapping information can be used both reactively and strategically to guide future development away from sensitive and priority biodiversity areas.

The key output of a systematic biodiversity plan is a map of biodiversity priority areas. The CBA map delineates Critical Biodiversity Areas (CBAs), Ecological Support Areas (ESAs), Other Natural Areas (ONAs), Protected Areas (PAs), and areas that have been irreversibly modified from their natural state. The following terms categorise the various land used types according to their biodiversity and environmental importance:

- CBA – 1;
- CBA –2;
- CBA –3;
- ONA; and
- PA.

CBAs are terrestrial and aquatic areas of the landscape that need to be maintained in a natural or near-natural state to ensure the continued existence and functioning of species and ecosystems and the delivery of ecosystem services. CBAs are areas of high biodiversity value and need to be kept in a natural state, with no further loss of habitat or species. Thus, if these areas are not maintained in a natural or near natural state then biodiversity targets cannot be met. Maintaining an area in a natural state can include a variety of biodiversity compatible land uses and resource uses (SANBI-BGIS, 2007).

ONAs consist of all those areas in good or fair ecological condition that fall outside the protected area network and have not been identified as CBAs or ESAs. A biodiversity sector plan or bioregional plan must not specify the desired state/management objectives for ONAs or provide land-use guidelines for ONAs (SANBI-BGIS, 2017).

Figure 4-4 illustrates the project area overlaps with areas designated as an irreplaceable CBA.

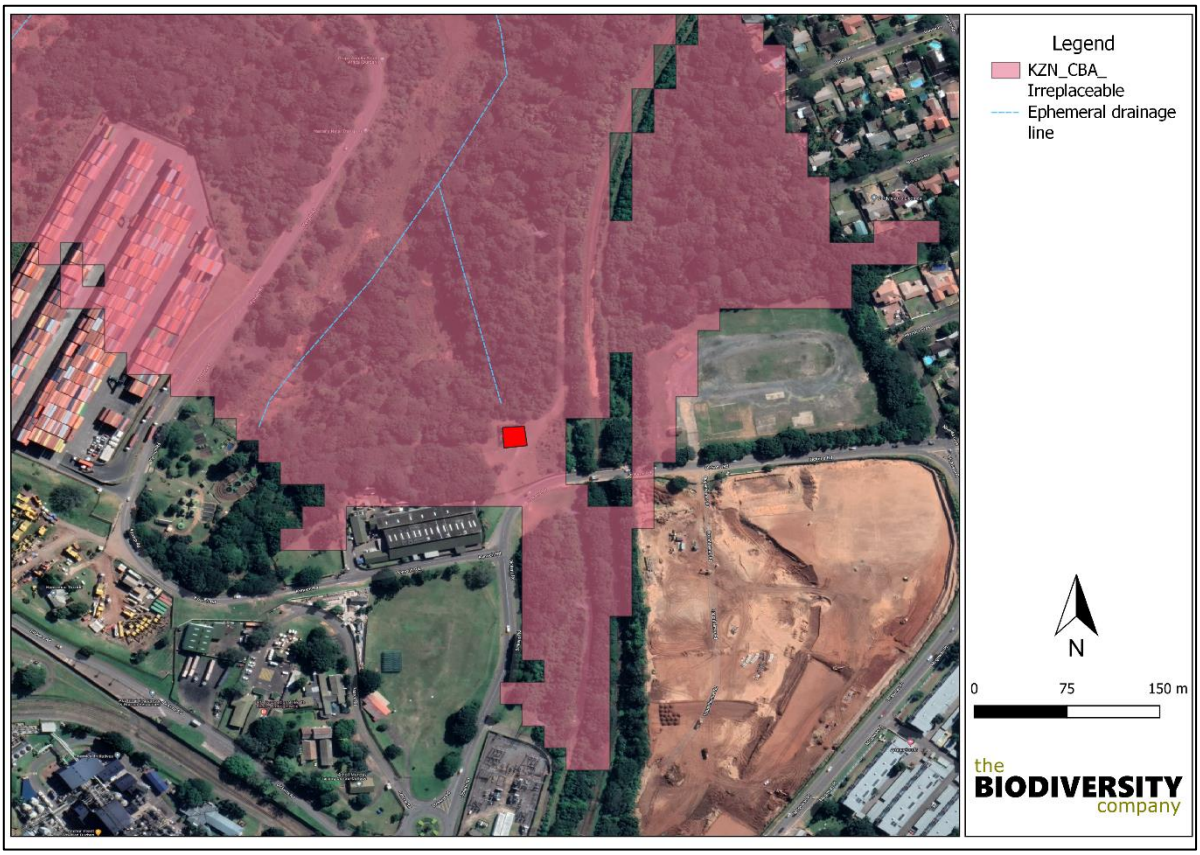

Figure 4-4 The project area superimposed on the KwaZulu-Natal Biodiversity Conservation Plans (KZN, 2014)

4.2.3 Ecosystem Protection Level and Threat Status

The Ecosystem Threat Status is an indicator of an ecosystem's wellbeing, based on the level of change in structure, function or composition. Ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT) or Least Concern (LC), based on the proportion of the original extent of each ecosystem type that remains in good ecological condition. Ecosystem protection level tells us whether ecosystems are adequately protected or under-protected. Ecosystem types are categorised as not protected, poorly protected, moderately protected or well protected, based on the proportion

of each ecosystem type that occurs within a protected area recognised in the Protected Areas Act (Skowno *et al*., 2019).

The project area was superimposed on the ecosystem protection level map and threat level map to assess the protection and threat status of the associated and potentially influenced aquatic ecosystems. The project area does not directly intersect with an NFEPA River, however, the downstream Mbokodweni River would potentially be a receiving environment from the nearby drainage line associated with the project footprint. Therefore, the protection status and threat status for the Mbokodweni River are presented below.

Based on Figure 4-5 and Figure 4-6 the aquatic ecosystems associated with the development are rated as *Poorly Protected*. The Threat status of the rivers associated with the proposed project is rated as *Endangered* (EN).

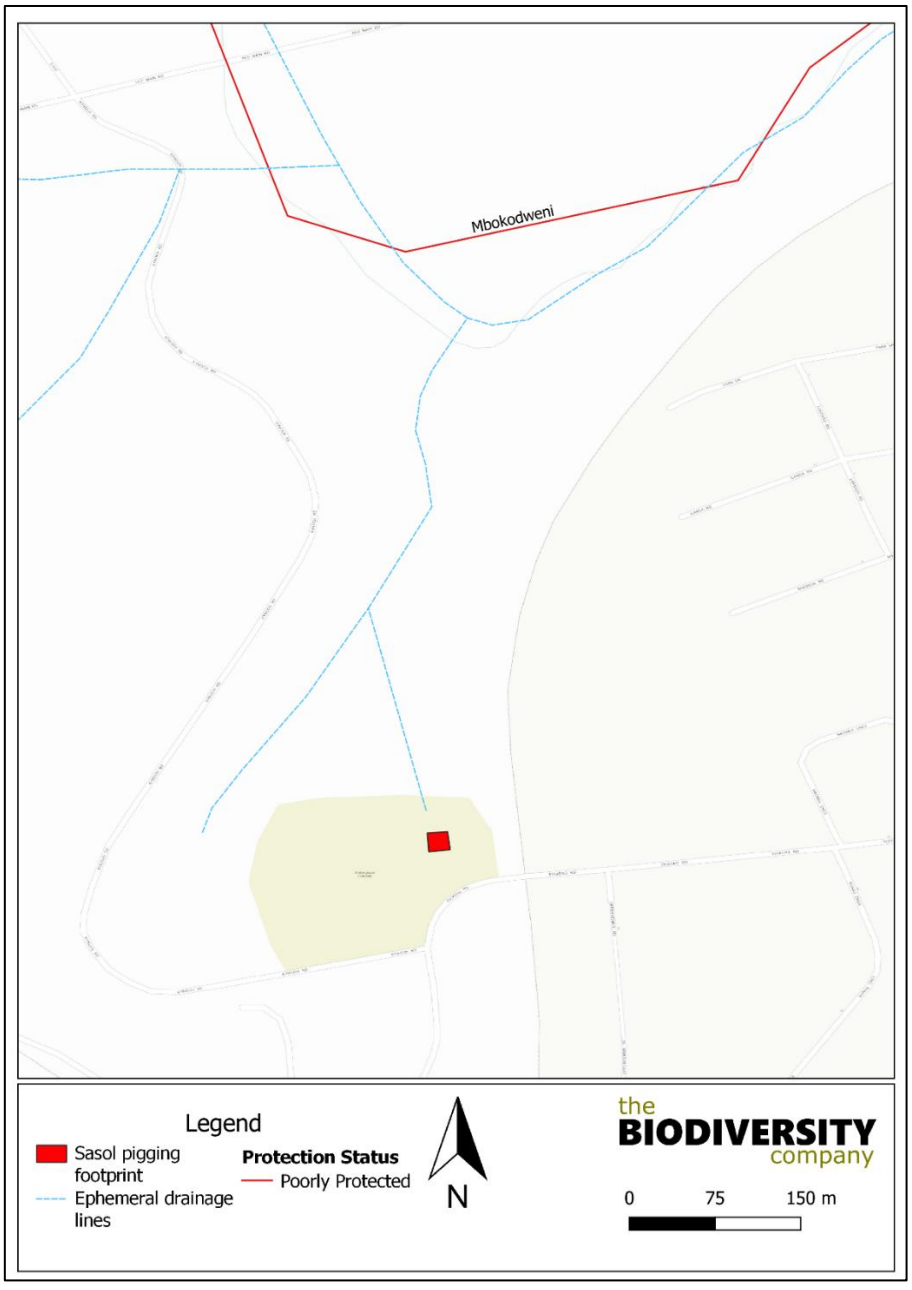

Figure 4-5 *The map highlighting the protection status of aquatic ecosystems within the proposed project area (NBA, 2018)*

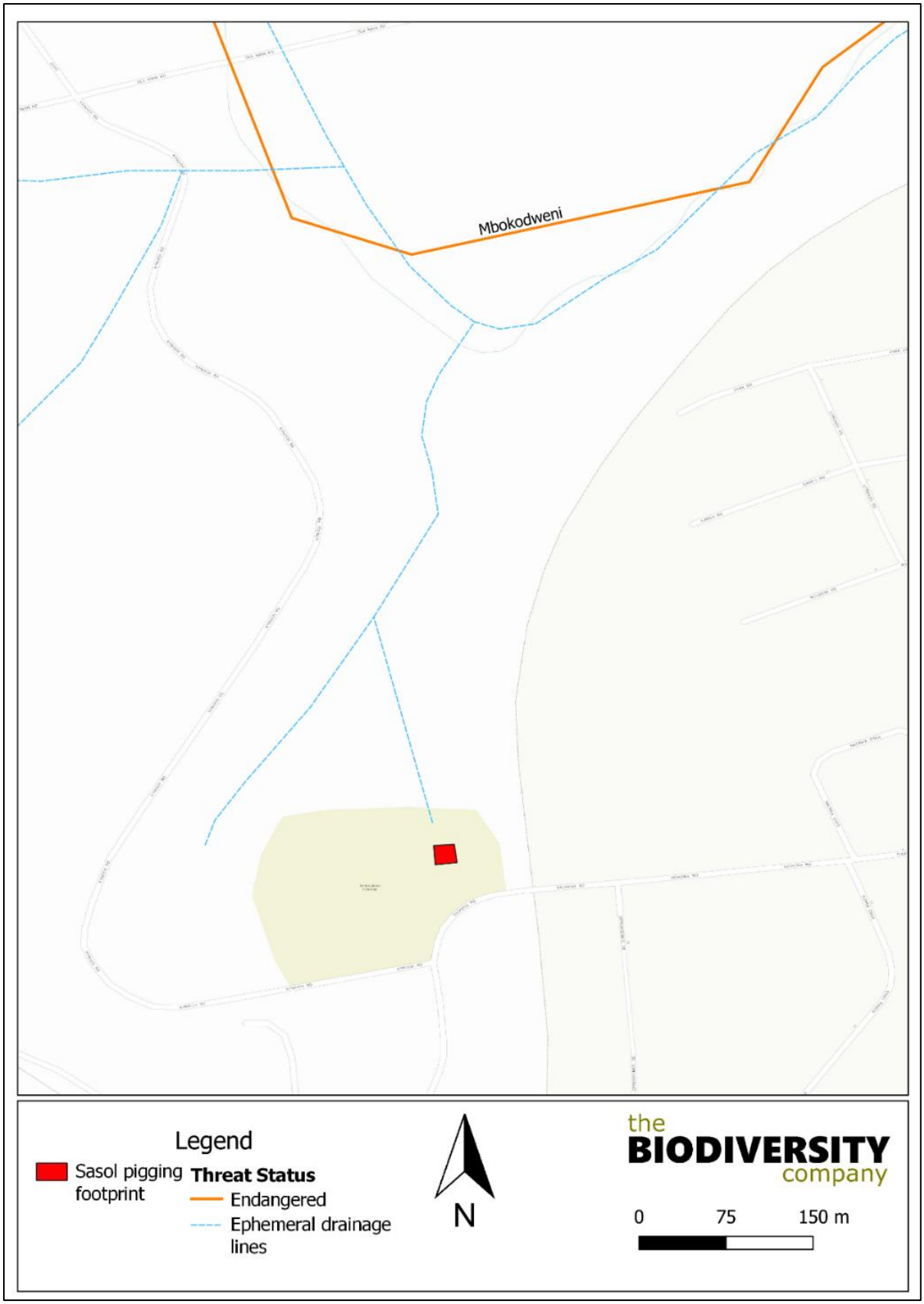

Figure 4-6 The map highlighting the threat status of aquatic ecosystems within the proposed project area (NBA, 2018)

4.2.4 Estuary Functional Zone (EFZ)

The proposed activity is located within the Mbokodweni Estuarine Functional Zone (EFZ) (Figure 4-7). This zone comprises the adjacent areas of the floodplain associated with the water body, which support the physical and biological processes and habitats necessary for estuarine function and health. It includes all dynamic areas influenced by long-term estuarine sedimentary processes, i.e. sediment stored or eroded during floods, changes in channel configuration, aeolian transport processes, and/or changes due to coastal storms. It also encompasses the multiple ecotones of floodplain and estuarine vegetation that contribute detritus (food source) to the estuary and/or provide refuge during high flow events.

The Estuary is classified as a type E subtropical estuary, and is a normally open, barred Estuary. According to Harrison, Cooper, & Ramm (2000), the species richness of fish is considered moderate to high. Average water quality within the estuary is considered very poor for sustaining aquatic health and suitability for human contact.

Based on information extracted from the South African Estuary Information System (https://saeis.saeon.ac.za/Info/25), the Mbokodweni Estuary is in a 'Poor' condition with high anthropogenic impact and major ecological degradation. The degradation of the system is linked to intensive land use activities resulting in sand accumulation, pollution and mouth manipulation. An illustration of land use activities in presented in Figure 4-7.

Figure 4-7 Map illustrating an overview of the land-use within the local catchment of the Mbokodweni Estuary

4.2.5 National Freshwater Protection Areas

The layout of project area in relation to NFEPAs are provided in Figure 4-8. The NFEPA database forms part of a comprehensive approach of the sustainable and equitable development of South Africa's scarce water resources. The NFEPAs are intended to be conservation support tools and envisioned to guide the effective implementation of measures to achieve the National Environment Management Biodiversity Act's biodiversity goals (NEM:BA) (Act 10 of 2004), informing both the listing of threatened freshwater ecosystems and the process of bioregional planning provided for by this Act (Nel *et al.,* 2011).

The watercourses considered in this assessment does not fall within a designated river NFEPA (Figure 4-8). Further, the project area has two Wetland NFEPAs within the SQR (Table 4-2).

Table 4-2 NFEPAs listed for the U60E- 4792 SQR

FEPA Type	Biodiversity Feature
Wetland ecosystem type	Indian Ocean Coastal Belt Group 2_Flat
Wetland ecosystem type	Indian Ocean Coastal Belt Group 2_Seep

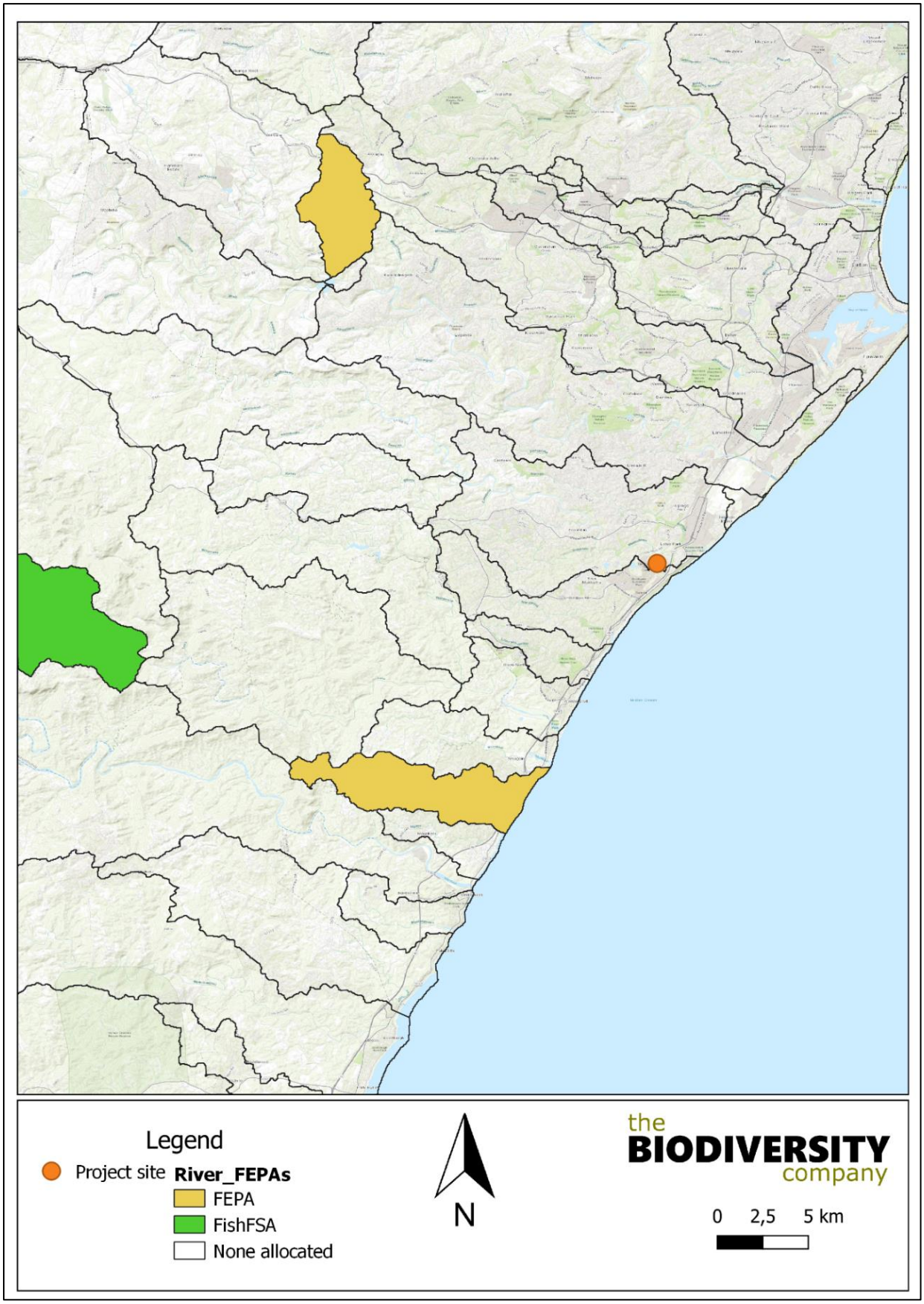

Figure 4-8 Illustration of absence of river FEPAs associated with the project area

4.2.6 Desktop Fish Community Assessment

A list of expected fish species for the watercourses associated with the catchment of influence is presented in Table 4-3 (IUCN, 2022; Skelton, 2001; DWS, 2014). Based on this, a total of eleven (11) fish species were expected to occur in the watercourses surrounding the project area. It should be noted that these expected species lists are compiled on an SQR basis and not on a site-specific basis. It is therefore unlikely that all of the expected species will be present at every site in the SQR with habitat type and availability being the main driver of species present. Therefore Table 4-3 should be viewed as a list of potential species rather than an expected species list. The conservation status of the expected species was assessed according to the International Union for Conservation of Nature and Natural Resources (IUCN) red list of threatened species (IUCN, 2022). According to the IUCN data base, a single threatened species occurs within the SQR, namely *Oreochromis mossambicus* (Mozambique Tilapia), which is listed as Vulnerable (VU). The species is threatened by hybridisation with the exotic *Oreochromis niloticus* (Nile Tilapia), and therefore the proposed activities do not threaten the species.

Due to the absence of a flowing watercourse within the immediate project area, no fish are expected. However, it is stressed that land use activities within the catchment, such as the those associated with the project, do potential pose a risk to water quality and fish populations within the downslope receiving watercourses (Mbokodweni River).

Table 4-3 Fish species expected within the Mbokodweni River reach

Scientific name	Common name	IUCN status
Anguilla marmorata	Giant mottled eel	LC
Anguilla mossambica	Longfin eel	LC
Clarias gariepinus	Sharptooth catfish	LC
Eleotris fusca	Dusky sleeper	LC
Eleotris melanosoma	Broadhead sleeper	LC
Enteromius paludinosus	Straightfin barb	LC
Enteromius viviparus	Bowstripe barb	LC
Gambusia affinis	Mosquito fish	EX
Glossogobius callidus	River goby	LC
Labeobarbus natalensis	Scaly	LC
Oreochromis mossambicus	Mozambique tilapia	VU
Total Indigenous Species Expected		**11**

IUCN Conservation status: LC - Least Concern; VU - Vulnerable; OBS – Observed; Red – Exotic

4.3 Survey Results

4.3.1 Aquatic Sampling Points

A single dry season survey was conducted on the 15th of June 2022. This survey was completed in order to support the compliance statement. As the site presented limited surface water and was characteristic of wetland features, a focus on habitat of the site and reached based assessments were conducted. Table 4-4 presents freshwater features and well developed riparian areas downstream of the project area.

Table 4-4 Photographs and GPS illustrating freshwater features within the downstream reaches

		
GPS	30° 0'56.07"S 30°54'28.68"E	

4.3.2 Habitat Integrity

The results of the Intermediate Habitat Integrity Assessment (IHIA) for the Mbokodweni river are provided in Table 4-5.

Table 4-5 Intermediate Habitat Integrity Assessment for the Mbokodweni River reach

Criterion	Average Impact Score	Weighted Impact Score
Instream		
Water abstraction	17	9,52
Flow modification	6,75	3,51
Bed modification	5	2,6
Channel modification	5	2,6
Water quality	10,5	5,88
Inundation	2	0,8
Exotic macrophytes	5,5	1,98
Exotic fauna	3	0,96
Solid waste disposal	6,25	1,5
Total Instream Score		**70,65**

Instream Category		class C
Riparian		
Indigenous vegetation removal	10,75	5,59
Exotic vegetation encroachment	11,25	5,4
Bank erosion	4,75	2,66
Channel modification	6	2,88
Water abstraction	12,25	6,37
Inundation	6,25	2,75
Flow modification	6,75	3,24
Water quality	13,25	6,89
Total Riparian Score		64,22
Riparian Category		class C

The results of the instream and riparian habitat assessment in the Mbokodweni River indicates a moderately modified state (class C). The modified state of the watercourse and associated catchment can be attributed to the modification of riparian habitat due to exotic vegetation encroachment, and indigenous vegetation clearing. Impacts to instream habitat included extensive solid waste, flow and channel modifications through instream impoundments (Figure 4-9), and extensive instream sedimentation. Impacts to the river banks are evident from aerial imagery and comprise the habitat integrity of the reach (Figure 4-10 and Figure 4-11). The aforementioned impacts together with the additional impacts listed in Table 4-5 are cumulatively resulting in deterioration of the riparian and instream habitat condition. The level of impacts to the riparian and instream habitat condition determines the level of ecosystem functioning and capacity of a watercourse to provide ecosystem services. Therefore the moderately modified status of the watercourse indicates that a loss and change of natural habitat and biota have occurred but the basic ecosystem functions are still predominantly unchanged. The proposed project must prevent impacts to water quality and habitat condition in the vicinity of the project footprint to avoid indirect impacts to the local drainage system which is ecologically interconnected with the downstream Mbokodweni River.

Figure 4-9 Illustration of instream migration barrier within the Mbokodweni

Figure 4-10 Modifications to river banks (Google Earth)

Figure 4-11 Modifications and activities adjacent to the river banks (Google Earth)

5 Conclusions

The National Web based Environmental Screening Tool has characterised the aquatic biodiversity theme within the project footprint as “Low”. However, the downstream receiving environment is rated as “Very High” (Figure 5-1). According to the NBA (2018) dataset the Threat status of the rivers associated with the proposed project are rated as Endangered (EN). The ecological sensitivity and importance is rated High and Very High respectively, with fish and invertebrates sensitivity to changes in physico-chemical properties and velocity rated as “Very High”.

It is the specialist’s opinion and supported by survey findings (Section 4.3) which agrees with the National Web based Environmental Screening Tool to rate the aquatic sensitivity of the project footprint as “Low”. Should all projected prospected aspects be restricted to the demarcated area, it is the opinion of the specialist that there are no fatal flaws for the proposed activities.

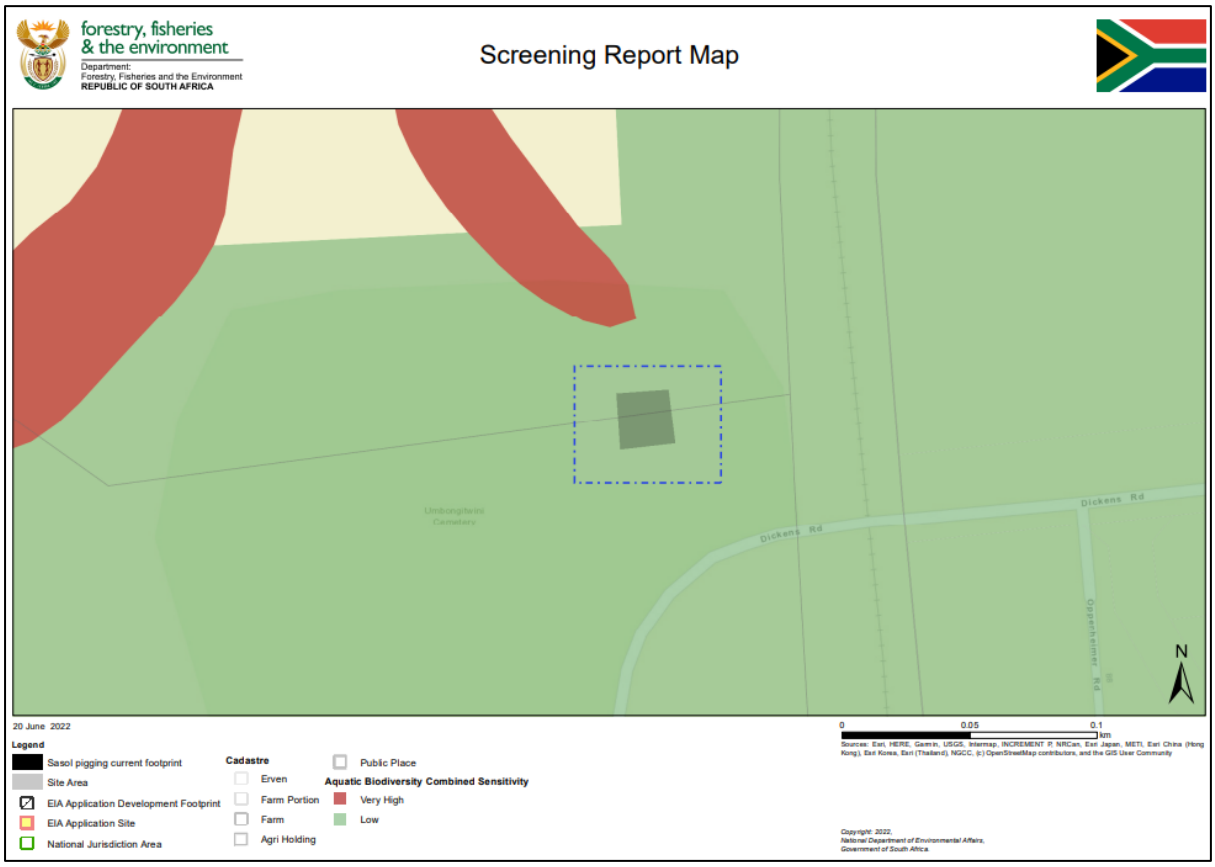

Figure 5-1 Sensitivity for the greater project area

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7 Appendix A Specialist declarations

DECLARATION

I, Christian Fry, declare that:

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

Christian Fry

Aquatic Ecologist

The Biodiversity Company

June 2022