THE AQUATIC BIODIVERSITY COMPLIANCE STATEMENT FOR THE GLENCORE ENERGY CONVERSION PROJECT

Sekhukhune District, Limpopo Province

January 2022

CLIENT

Prepared by:

The Biodiversity Company

Cell: +27 81 319 1225

Fax: +27 86 527 1965

info@thebiodiversitycompany.com

www.thebiodiversitycompany.com

Executive Summary

The Biodiversity Company was appointed to conduct an aquatic biodiversity assessment for the proposed Glencore energy conversion project. The project area is situated along the provincial R555 road approximately 12 km southwest of the town Steelpoort in the Fetakgomo-Greater Tubatse Municipality (F-GTM), Sekhukhune District, Limpopo Province. The town of Burgersfort is located approximately 27 km northeast of the project area, whilst Lydenburg is approximately 47 km southwest of the project area.

A single day wet season survey was conducted in December 2021, 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 receptors were recorded across the project area, and how these sensitive receptors may be affected by the proposed development were also investigated.

The National Web based Environmental Screening Tool has characterised the aquatic sensitivity of the tributary adjacent to the project area and the downstream receiving environment (Steelpoort River) as “Low”. According to NBA (2018) the Threat status of the rivers associated with the proposed project are rated as Endangered (EN). The ecological sensitivity and importance is rated “High” with fish and invertebrates sensitivity to changes in physico-chemical properties and velocity are rated as “Very High”. A single fish species expected within the greater project area is listed as Near Threatened, *Oreochromis mossambicus.* The species is threatened due to hybridisation with *Oreochromis niloticus*, and therefore the proposed activities do not pose a threat to the species. It is highly unlikely that any of the species occurs directly within the project area. The tributary assessed as dry during the survey. However, the species are expected to occur within the downstream reaches (approximately 1 km downstream). Therefore, recommendations for best practice provided in this document must be implemented.

It is the specialists opinion and supported by survey findings which agrees with the National Web based Environmental Screening Tool to rate the aquatic sensitivity as “Low” due to the ephemeral nature of the systems, low sensitivity of the drainage line and modified habitat integrity. Provided proposed recommendations are implemented, it is the opinion of the specialist that there are no fatal flaws for the proposed activities.

Due to the nature of the aquatic systems associated with the project area and low risk to the downstream receiving environments, additional aquatic assessments are not required should adequate buffers be implemented and project footprint not change.

Document Guide

The 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 NEMA (GNR 320), as gazetted on 20 March 2020 provides guidelines on information that must be found in a compliance statement. These requirements are listed below.

Item	Pages	Comment
The assessment must be prepared by a specialist registered with the South African Council for Natural Scientific Professionals (SACNASP)	4	
Must include contact details, CV, SACNASP number and field of expertise of specialist	4	
Signed statement of independence	15	
Initial site sensitivity verification: • Desktop Analysis using satellite imagery and available information • Onsite inspection, to include a description of current land use, vegetation found on-site and status quo of screening tool confirmation/dispute • Include photographs/evidence of land and environmental sensitivity	8-11	Section 6
Methodology used to undertake the site survey and prepare compliance statement, including equipment and modelling relevant	5	Section 5
The assessment must verify the "low" sensitivity of the site, this would be in terms of aquatic biodiversity	8-11	Section 6 and Section 7
Indicate whether or not the proposed development will have any impact on the terrestrial environment, animals and/or plants	12	Section 8
Proposed impact management outcomes or monitoring requirements for inclusion in the EMPr	13	Section 9
Description of the assumptions and any uncertainties or gaps in knowledge or data	5	Section 4
Statement of timing and intensity of site inspection	1 and 5	Section 5
Any conditions to which the statement is subjected	12	Section 8

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1.1 Background

The Biodiversity Company was appointed to conduct an aquatic biodiversity assessment for the proposed Glencore energy conversion project. The project area is situated along the provincial R555 road approximately 12 km southwest of the town Steelpoort in the Fetakgomo-Greater Tubatse Municipality (F-GTM), Sekhukhune District, Limpopo Province (Figure 1-1 and Figure 1-3). The town of Burgersfort is located approximately 27 km northeast of the project area, whilst Lydenburg is approximately 47 km southwest of the project area.

A single day wet season survey was conducted in December 2021, 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 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).

The purpose of the specialist studies is to provide relevant input into the basic assessment process and provide a report for the proposed activities associated with the project. 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.

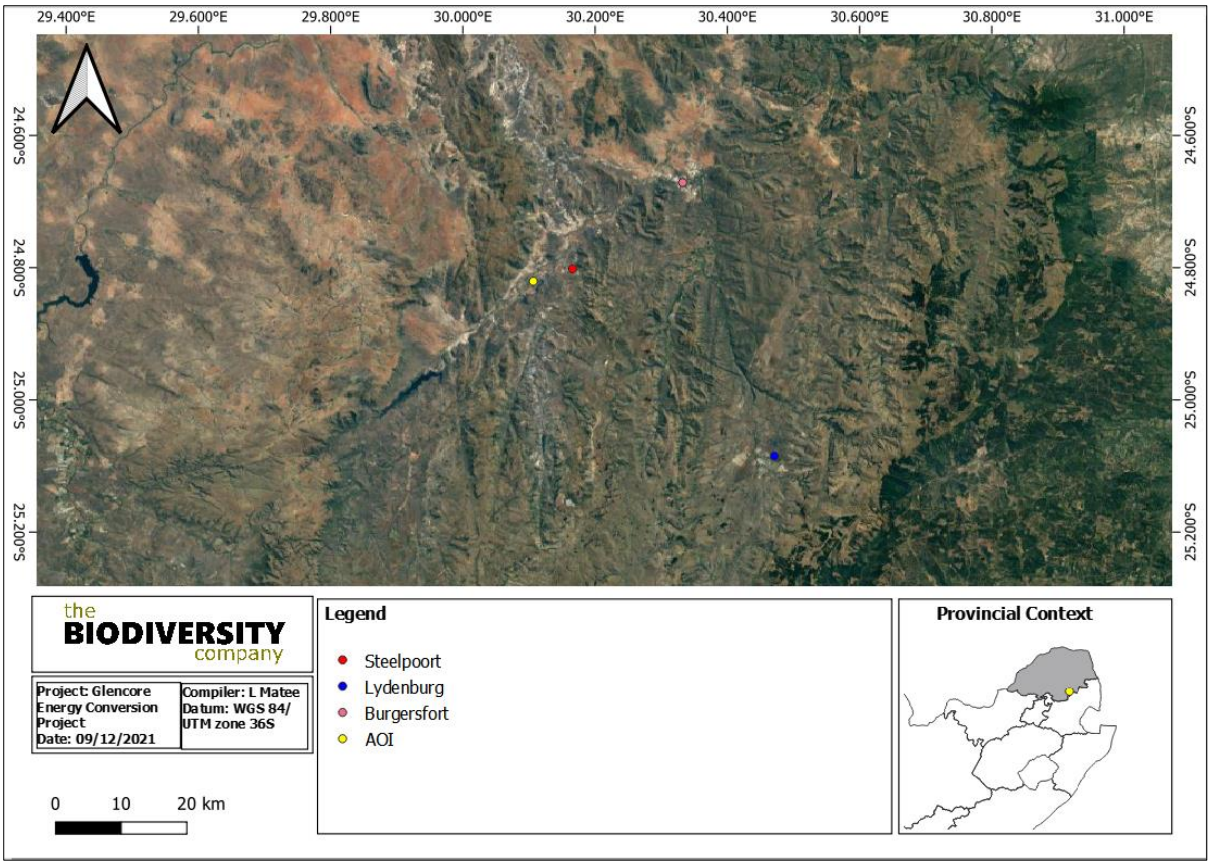

Figure 1-1 The project area in relation to nearest towns

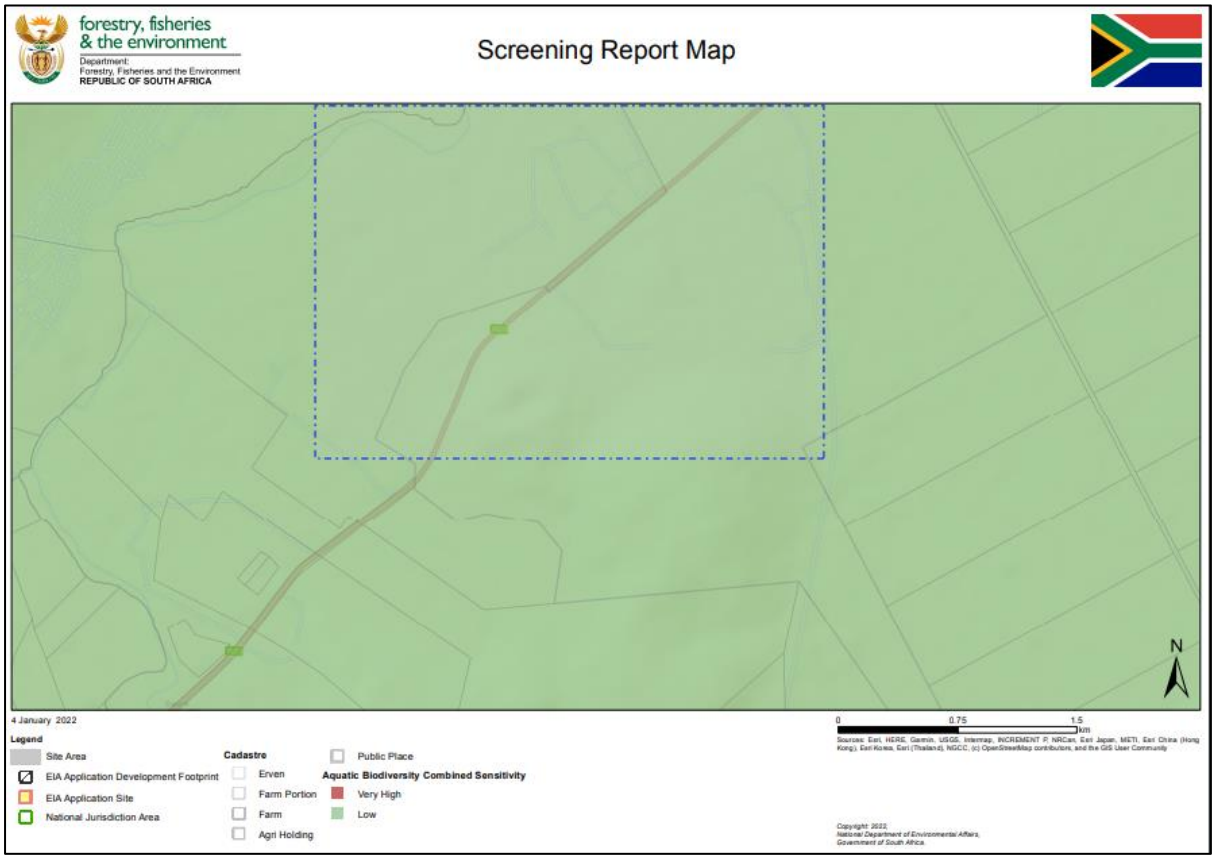

Figure 1-2 Sensitivity for the greater project area

Figure 1-3 The project area

2 Specialist Details

Report Name	**The Aquatic Biodiversity Compliance Statement for the Glencore Energy Conversion Project**
Submitted to	nettZero
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 Limitations

The following limitations should be noted for the assessment:

- A single season survey was conducted for the respective study, which would constitute a wet season survey;
- No surface water was present during the survey at the site assessed, and therefore the results of the aquatic survey are limited to desktop findings, literature review, and assessment of habitat observed on site and deductions from aerial imagery; and
- This assessment has not assessed any temporal trends for the project.

4 Methodologies

4.1 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 14th of December 2021. The survey period therefore reflects a wet, summer survey.

Due to the absence of surface water at all sites assessed during the survey, evaluation and interpretation of the state of the aquatic environment was limited to habitat observed on site, and at a catchment level from aerial imagery.

4.2 Desktop Analysis

The following databases were accessed as part of the literature and desktop analyses:

- Aerial imagery- Google Earth® (2022)
- Desktop Present Ecological Status- Department of Water and Sanitation (DWS)- Resource Quality Information Services. (2021).
- National Freshwater Priority Areas (NFEPAs) - Nel et al. (2011). Atlas of Freshwater Ecosystem Priority Areas in South Africa:
- Expected fish community and threat status- Skelton (2001), DWS (2021), and IUCN (2021)
- South African Inventory of Inland Aquatic Ecosystems (SAIIAE) - Van Deventer *et al*. (2018)
- Limpopo Biodiversity Conservation Plan- LCP (2013).

4.3 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.

4.3.1.1 Habitat Integrity and Riparian Delineation

The Intermediate Habitat Integrity Assessment (IHIA) model was used to assess the integrity of the 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 are used to interpret the impact on the habitat integrity of the system. To accomplish this, information on abiotic changes that can potentially influence river habitat integrity are obtained from surveys or available data sources. 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 4-1 and Table 4-2 respectively. The spatial framework for each IHIA was 5km up and downstream of the respective sampling points, from the highest elevation to the lowest elevation within the watercourse.

Table 4-1 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.
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.

Criterion	Relevance
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 4-2 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 4-3). The relative weighting (importance value) of criteria remains the same as for the assessment of habitat integrity (DWS, 1999).

Table 4-3 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 4-4.

Table 4-4 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 4-1. 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.

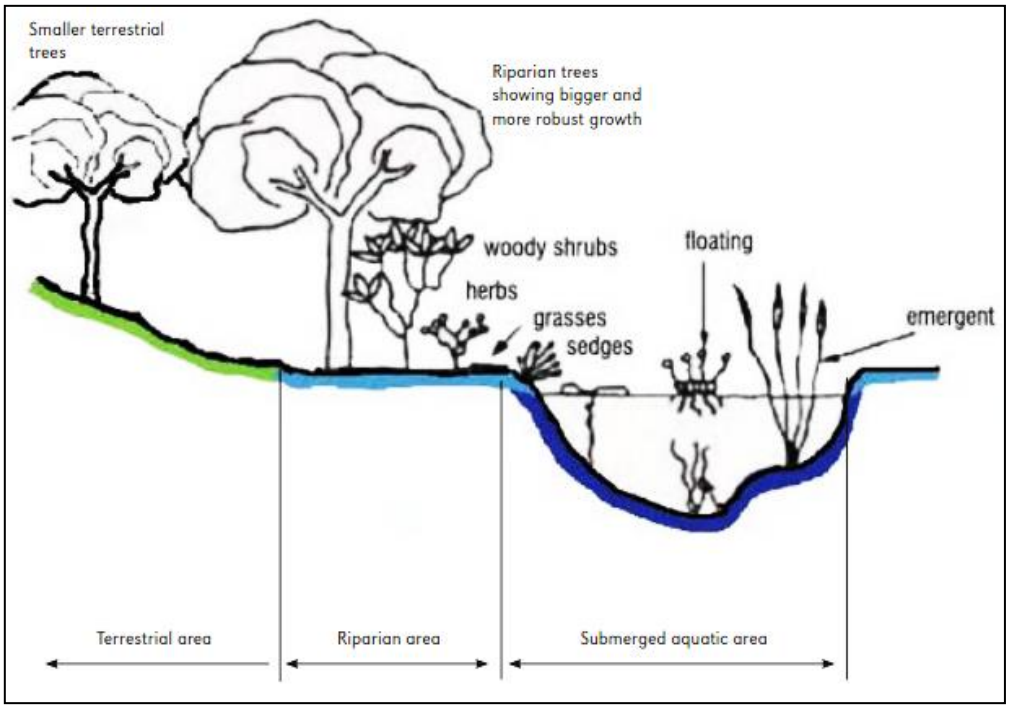

Figure 4-1 Riparian Habitat Delineations (DWAF, 2005)

5 Receiving Environment

5.1 Desktop Spatial Assessment

The following features describes the general area and habitat, this assessment is based on spatial data that are provided by various sources such as the provincial environmental authority and SANBI.

5.1.1 Limpopo Conservation Plan

Limpopo Biodiversity Conservation Plan (LCP, 2013) 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. The LCP 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 (LCP, 2013). The LCP uses the following terms to 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 5-1 illustrates the project area overlaps with areas designated as CBA2, ESA, 1 and ESA2 which align with the terrestrial conservations plans. No aquatic features fall within the project area, however, a drainage lines falls within 300 m south west of the proposed activities. The drainage line east of the project area no longer exists due to the construction of the smelter and associated infrastructure.

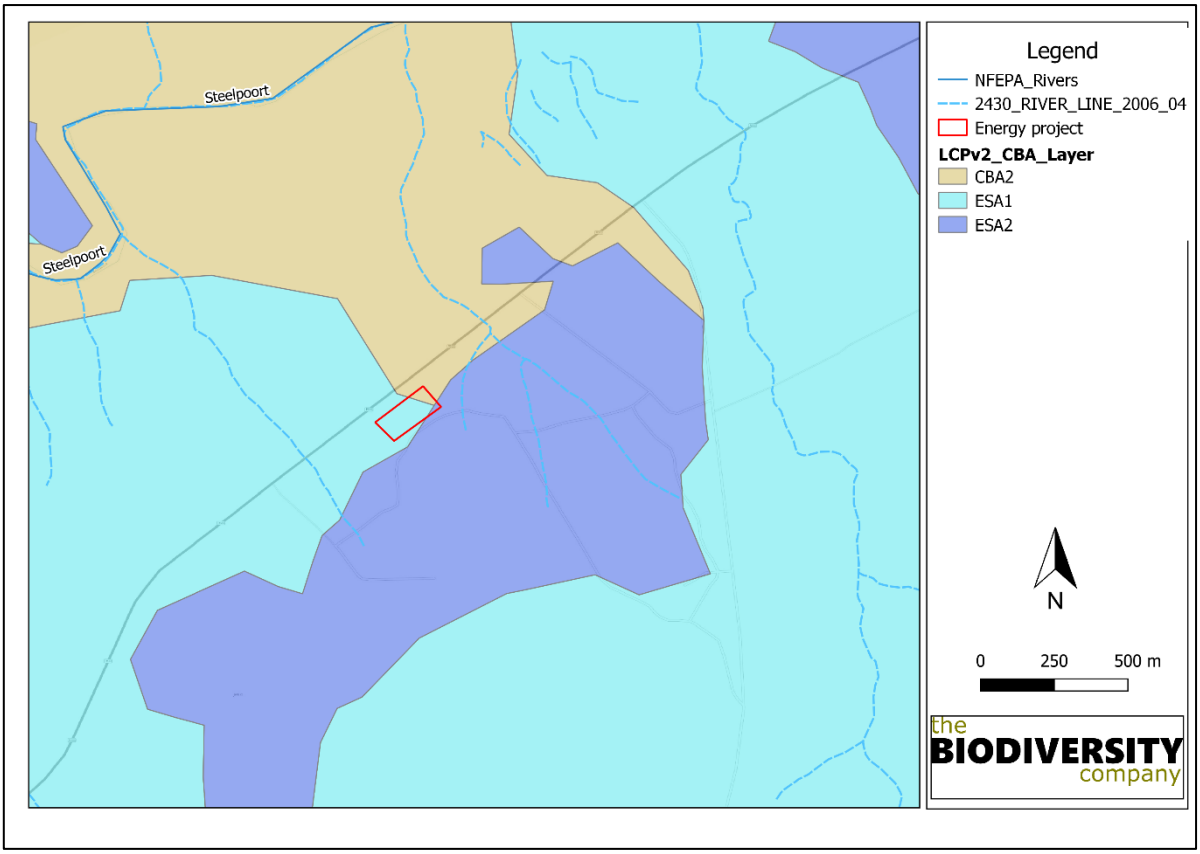

Figure 5-1 The project area superimposed on the Limpopo Biodiversity Conservation Plans (LCP, 2013)

5.1.1.1 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 aquatic ecosystems. The project area does not directly intersect with an NFEPA River, however, the downstream Steelpoort River would potentially be a receiving environment from the nearby by drainage line associated with the project area. Therefore, the protection status and threat status for the Steelpoort River are presented below.

Based on Figure 5-2 and Figure 5-3 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).

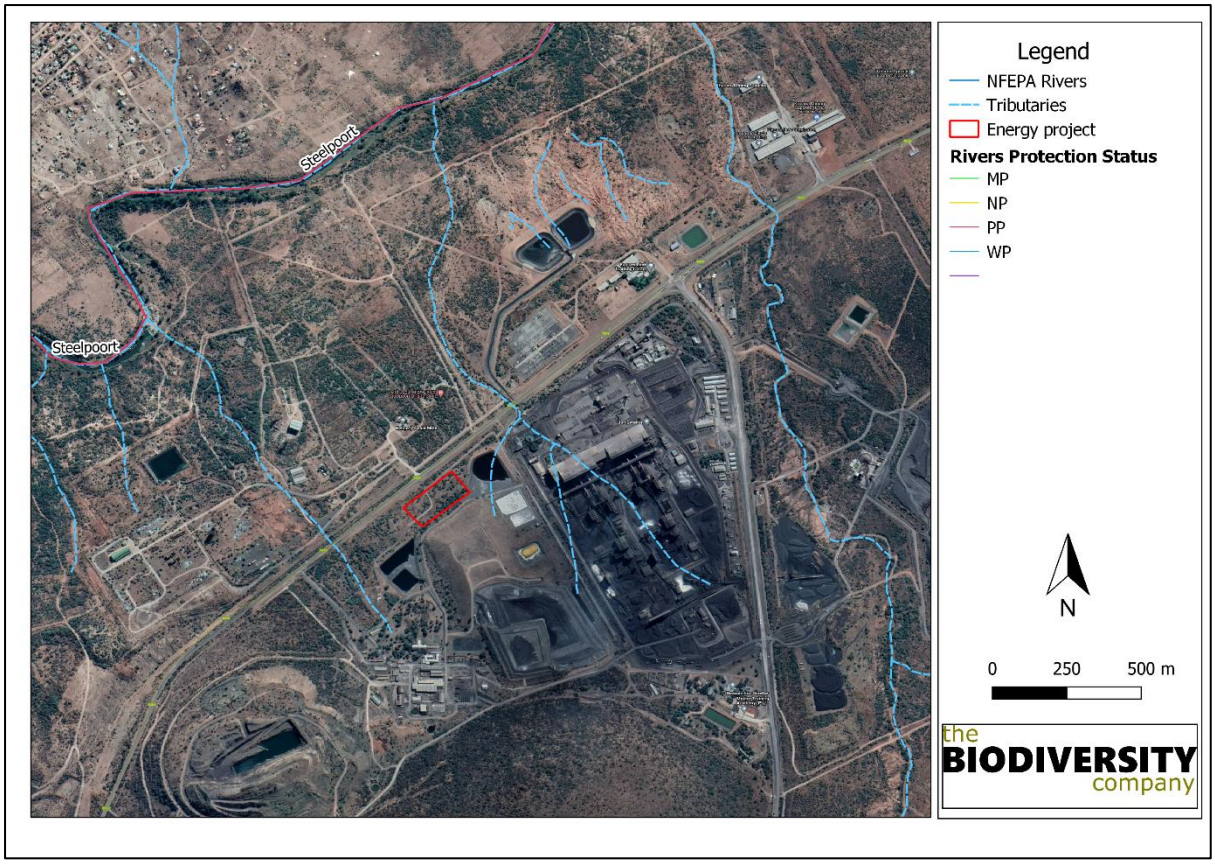

Figure 5-2 The map highlighting the protection status of aquatic ecosystems within the proposed project area (NBA, 2018)

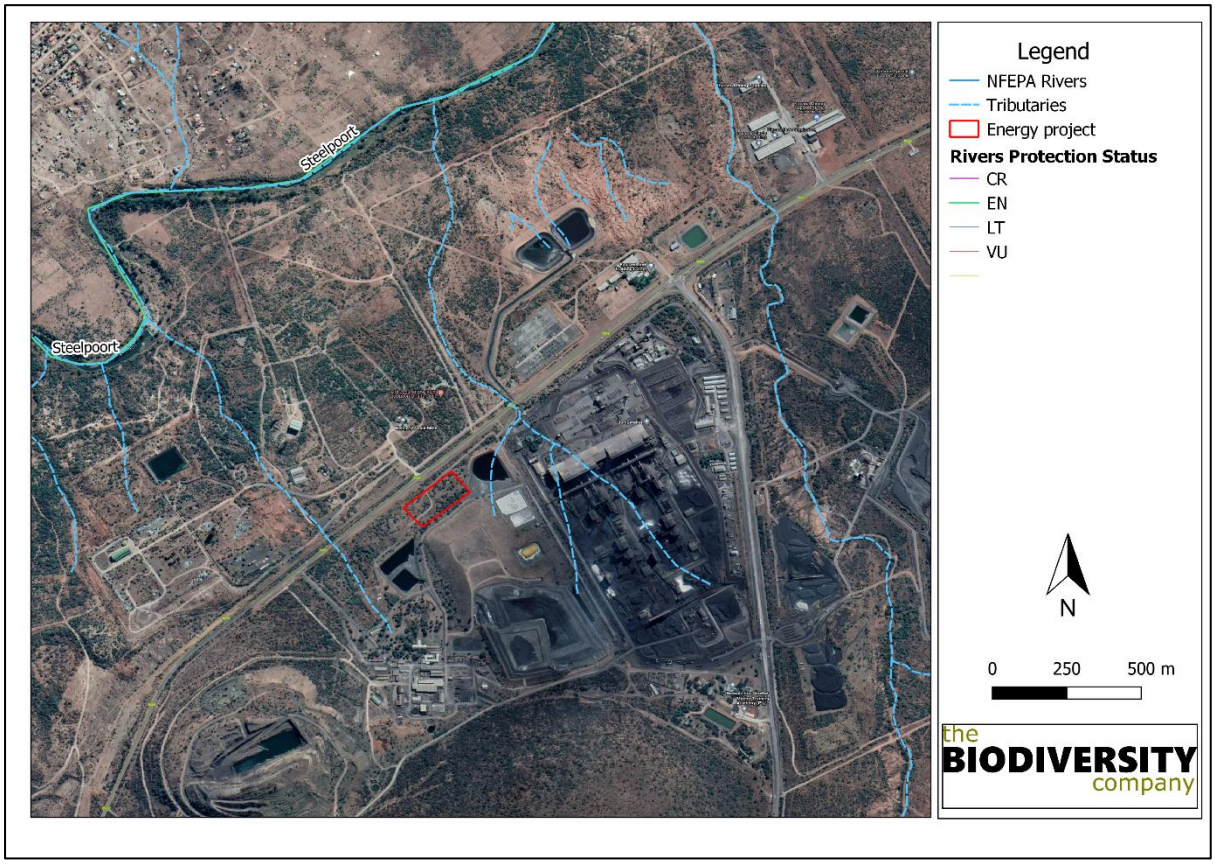

Figure 5-3 The map highlighting the threat status of aquatic ecosystems within the proposed project area (NBA, 2018)

5.1.2 Hydrological Setting

The project area is located in the Olifants Water Management Area (WMA2) (NWA, 2016), and the Eastern Bankenveld ecoregion. The project area is located within the quaternary catchments, B41J which drains north into the Steelpoort River (Figure 5-3). The proposed activities addressed in the study fall adjacent to a tributary off the Steelpoort River. The watercourse associated with the project area is characterised as ephemeral drainage line.

The Steelpoort River reach which is the downstream receiving environment is represented by the B41J-576 Sub-quaternary catchment (SQR). The ecological status and composition of the classified SQR is shown in Table 5-1, whilst the ecological status of the unclassified drainage line is unknown. The B41J-576 SQR was classified as class D or largely modified ecological classification. Factors contributing to the modified nature of the watercourse includes largely modified instream habitat continuity, moderate flow modifications, and impacts to water quality. The ecological importance and sensitivity of the SQR was found to be high.

Table 5-1 Desktop data pertaining to the ecological condition of the SQR assessed (DWS, 2018)

	Present Ecological State		Ecological Importance		Ecological Sensitivity	
	D (largely Modified)		High		High	
	Variable	**Status**	**Variable**	**Status**	**Variable**	**Status**
B41J-576	Modifications to Instream Habitat Continuity	Small	Fish species per sub quaternary catchment	17	Fish Physico-Chemical sensitivity description	Very high
	Modifications to Riparian/ Wetland Zone Continuity	Moderate	Invertebrate taxa per sub quaternary catchment	47	Fish No-flow sensitivity description	Very high
	Potential Instream Habitat Modifications	Large	Habitat Diversity Class	Very Low	Invertebrate Physico-Chemical sensitivity	Very high
	Modifications to Riparian/ Wetland Zones	Large	Instream Migration Link Class	Very High	Invertebrate velocity sensitivity	Very high
	Potential Flow Modifications	Moderate	Riparian-Wetland Zone Migration Link	High	Stream size sensitivity to modified flow/water level changes description	Low
	Potential Physico-Chemical Modifications	Large	Instream Habitat Integrity Class	Moderate	Riparian-Wetland Vegetation intolerance to water level changes description	Low
	Anthropogenic Impacts					
	The following impacts/activities were identified: SMALL: Abstraction (run-of river)/increased flows, Irrigation, Runoff/effluent: Irrigation, MODERATE: Exotic vegetation, Roads, Runoff/effluent: Urban areas, LARGE: Agricultural lands, Erosion, Mining, Runoff/effluent: Mining, Sedimentation, Grazing / trampling, Urbanization, Vegetation removal, SERIOUS: Algal growth,					

5.1.3 National Freshwater Protection Areas

The layout of project area and NFEPAs are provided in Figure 5-4. The National Freshwater Ecosystem Priority Areas (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 fall within a single river FEPA, including a Fish Support Area and fish sanctuary in the B41J-576 SQR. The watercourses therefore need to be managed in a manner that enables the systems to remain in a good condition to contribute to national biodiversity goals and support sustainable use of water resources. The B41J-576 SQR is labelled as a fish support area for the fish species *Opsaridium peringueyi* (Southern barred minnow). According to the IUCN, the species is listed as Least Concern (LC) due to its large distribution range across Southern Africa, however population reductions are associated with habitat loss (IUCN, 2021).

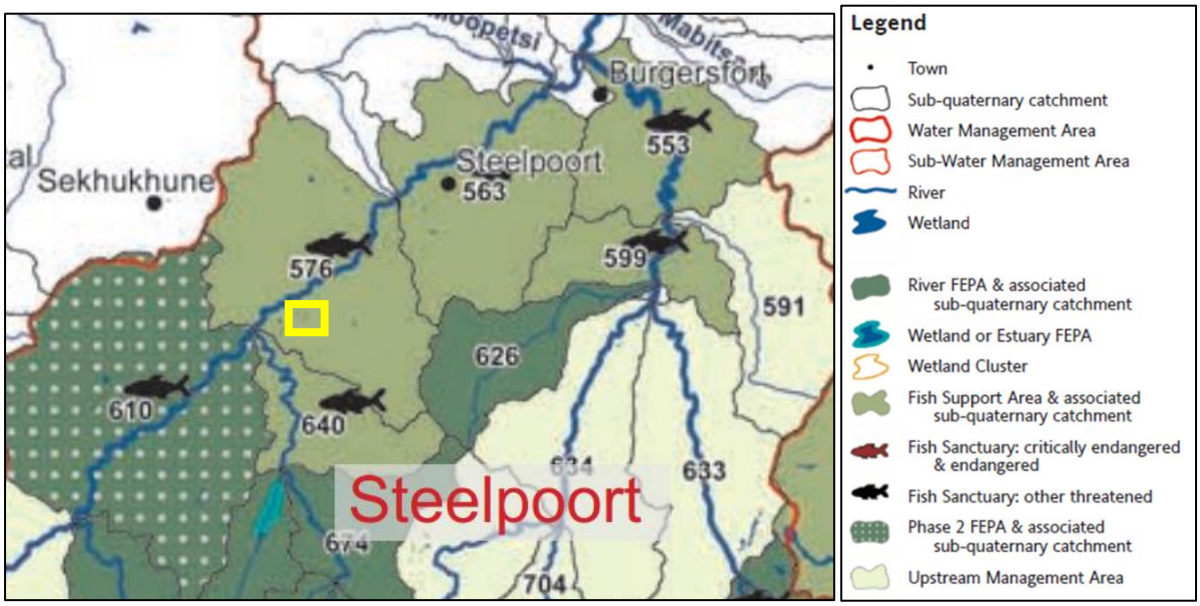

Figure 5-4 Illustration of NFEPAs associated with the project area (indicated in yellow square)

5.1.4 Desktop Fish Community Assessment

The list of expected fish species is presented in Table 5-2 (IUCN, 2021; Skelton, 2001; DWS, 2018). Based on this, a total of seventeen (17) fish species were expected to occur in 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 5-2 should be viewed as a list of potential species rather than an expected species list. A single threatened species occurs within the SQR, *Oreochromis mossambicus*, which is listed as Vulnerable (VU). The species is threatened by hybridisation with the exotic *Oreochromis niloticus*, and therefore the proposed activities do not threaten the species.

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

Table 5-2 Desktop Fish Community Assessment

Species/Site	IUCN Status
Amphilius uranoscopus	LC
Enteromius anoplus	LC
Labeobarbus marequensis	LC
Enteromius neefi	LC
Enteromius paludinosus	LC
Enteromius trimaculatus	LC
Enteromius unitaeniatus	LC
Clarias gariepinus	LC
Chiloglanis paratus	LC
Chiloglanis pretoriae	LC
Chiloglanis swierstrai	LC
Labeo cylindricus	LC
Labeo molybdinus	LC
Oreochromis mossambicus	VU
Opsaridium peringueyi	LC
Pseudocrenilabrus philander	LC
Tilapia sparrmanii	LC
LC: Least Concern VU: Vulnerable	**Total: 17**

5.2 Survey Results

5.2.1 Aquatic Sampling Points

A single high flow survey was conducted on the 14th of December 2021. This survey was completed in order to support the compliance statement. As the site was dry during the survey, a focus on habitat of the site and reached based assessments were conducted.

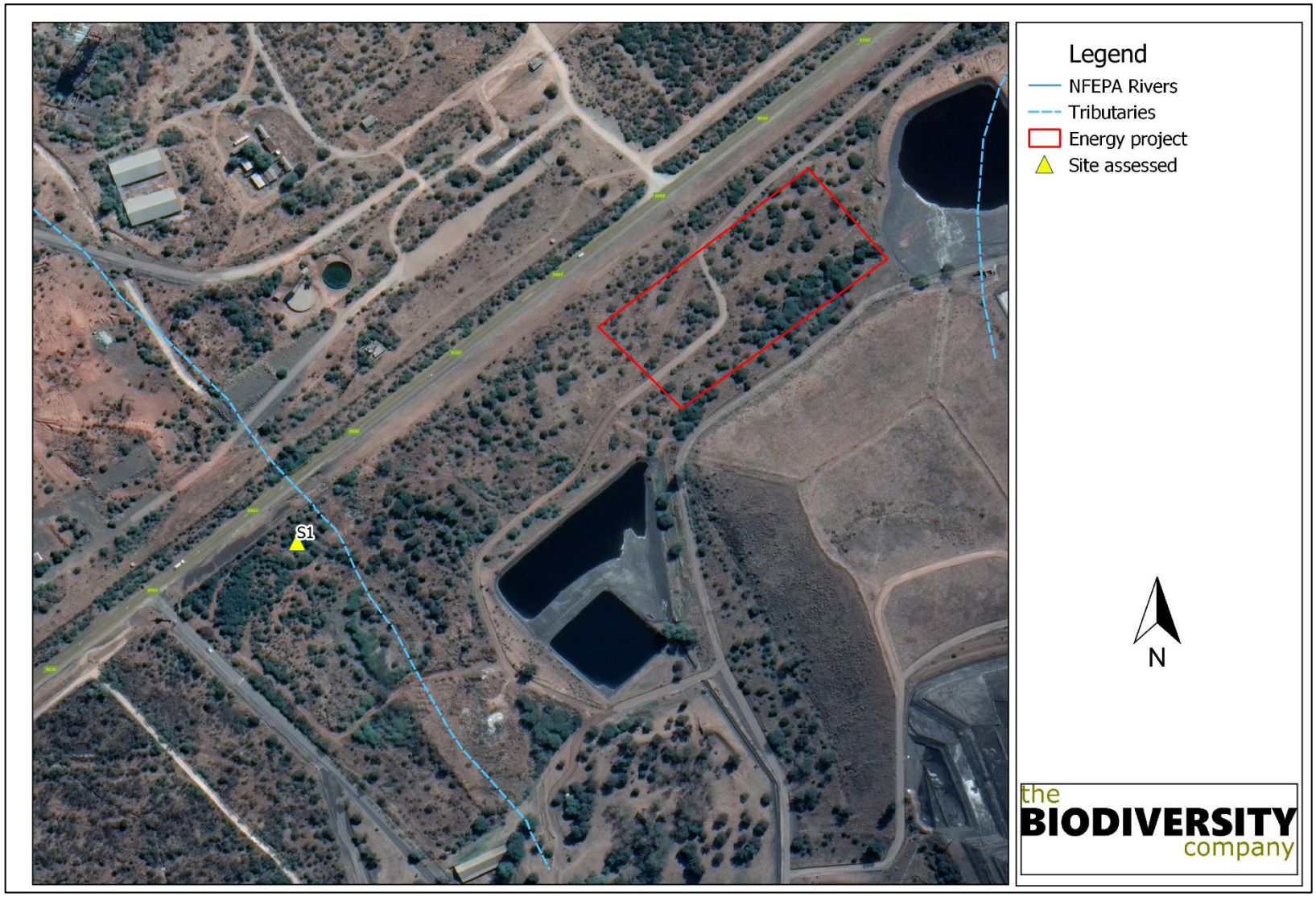

Figure 5-5 Location of the sampling point

Table 5-3 Photographs and GPS co-ordinates pertaining to the site visit

Site	Upslope view	Downslope view
S1		
GPS	24°49'14.26"S 30° 6'35.05"E	

5.2.2 Habitat Integrity

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

The results of the IHIA for the tributary indicated largely modified instream conditions. Instream modifications were largely attributed to channel modification with the construction of a channel below the R555 (Figure 5-7). Additionally, extensive bed modification occurred within the upper reaches of the tributary, with concrete slabbing observed throughout the upper reaches (Figure 5-6), and the use of rubber tyres for erosion control, which have been burnt during veld fires resulting in solid waste within the tributary (Figure 5-8). The riparian zone has been moderately modified from reference conditions (unmodified watercourse), with channel and bed modification and indigenous vegetation removal contributing to the loss of habitat integrity.

Table 5-4 Results for the habitat assessment in the Steelpoort tributary

Instream	Steelpoort tributary	
	Impact Score	Weighted Score
Water abstraction	7	3,92
Flow modification	10	5,2
Bed modification	20	10,4
Channel modification	25	13
Water quality	8	4,48
Inundation	5	2
Exotic macrophytes	0	0
Exotic fauna	5	1,6
Solid waste disposal	5	1,2
Total Instream		58.2
Category		**D**
Riparian	**Steelpoort tributary**	
	Impact Score	**Weighted Score**
Indigenous vegetation removal	15	7,8

Instream	Steelpoort tributary	
	Impact Score	Weighted Score
Exotic vegetation encroachment	12	5,76
Bank erosion	17	9,52
Channel modification	20	9,6
Water abstraction	2	1,04
Inundation	0	0
Flow modification	5	2,4
Water quality	0	0
Total Riparian		64
Category		**C**

Figure 5-6 Channel modification within the tributary (Google Earth imagery, 2021)

Figure 5-7 Illustration of concrete within the bed of the tributary

Figure 5-8 Illustration of tyres used for erosion control

6 Riparian Delineation and Buffer

A riparian delineation was conducted using vegetation features along the visible drainage lines observed onsite with results presented in Figure 6-1. Despite the low sensitivity of the drainage lines, it is recommended that a 32 m buffer be applied to the riparian zone, and that any construction activities or stockpiling occur outside of the applied buffer to limit habitat and water quality impacts within this system and the downstream Steelpoort River NFEPA.

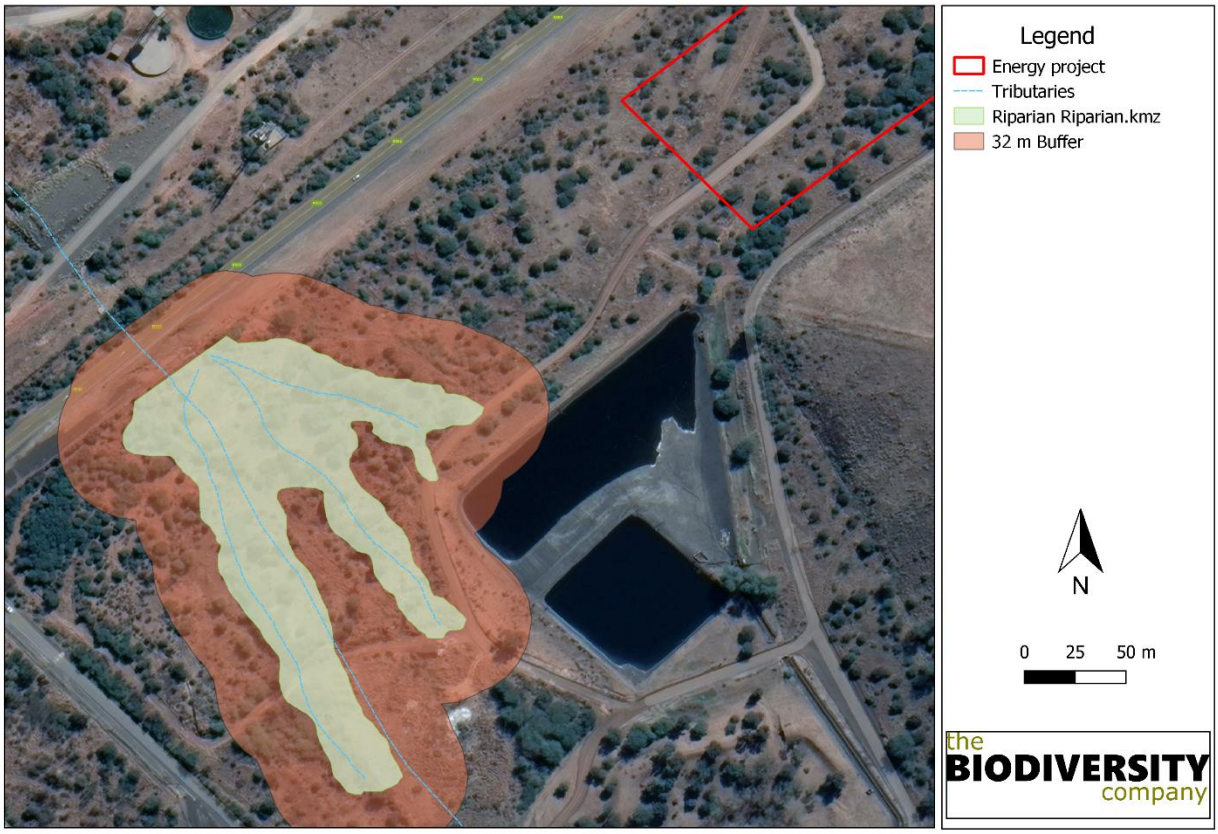

Figure 6-1 Illustration of the riparian zone and applied 32 m buffer

7 Site Verification Outcome

The National Web based Environmental Screening Tool has characterised the aquatic sensitivity of the tributary adjacent to the project area and the downstream receiving environment (Steelpoort River) as “Low” (Figure 7-1). According to NBA (2018) the Threat status of the rivers associated with the proposed project are rated as Endangered (EN). The ecological sensitivity and importance is rated “High” with fish and invertebrates sensitivity to changes in physico-chemical properties and velocity are rated as “Very High”. A single fish species expected within the greater project area is listed as Near Threatened, *Oreochromis mossambicus.* The species is threatened due to hybridisation with *Oreochromis niloticus*, and therefore the proposed activities do not pose a threat to the species. It is highly unlikely that any of the species occurs directly within the project area. The tributary assessed as dry during the survey. However, the species are expected to occur within the downstream reaches (approximately 1 km downstream). Therefore, recommendations for best practice provided in this document must be implemented.

It is the specialists opinion and supported by survey findings (Section 5.2) which agrees with the National Web based Environmental Screening Tool to rate the aquatic sensitivity as “Low” due to the ephemeral nature of the systems, low sensitivity of the drainage line and modified habitat integrity. Provided proposed recommendations are implemented, it is the opinion of the specialist that there are no fatal flaws for the proposed activities.

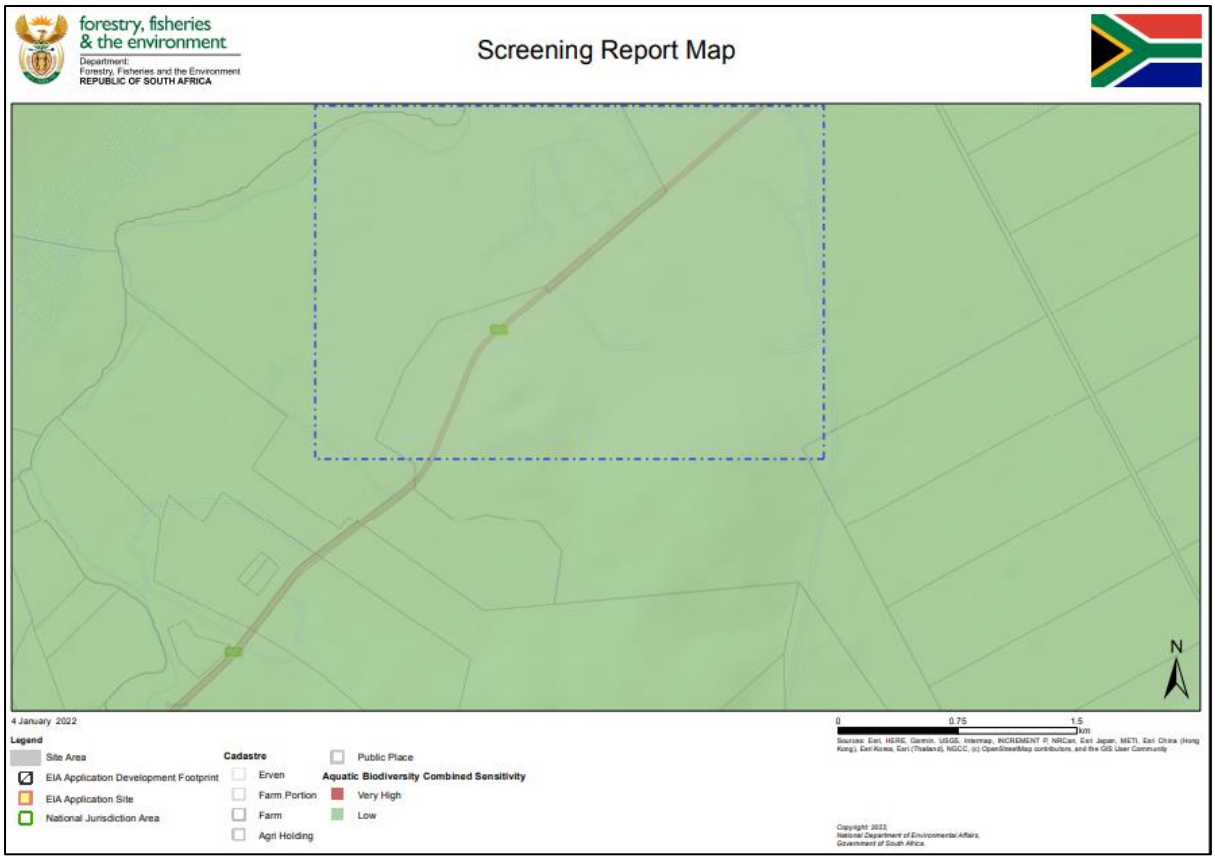

Figure 7-1 Sensitivity for the greater project area

8 Plan of study for Basic Assessment

The following are recommendations made in support of the aquatic ecology assessment. It is possible that some of these recommendations are already being achieved for the existing authorisations and may only need to be expanded on to accommodate this project. These recommendations include:

- Due to the nature of the aquatic systems associated with the project area and low risk to the downstream receiving environments, additional aquatic assessments are not required should adequate buffers be implemented and project footprint not change;
- A vegetation alien invasive management plan should be implemented. This plan must be implemented during the construction phase of the project. Refer to terrestrial report for species list (TBC, 2022);
- An adaptive rehabilitation plan needs to be implemented from the onset of the project. This must be compiled with input from independent ecological specialists. Additionally, a rehabilitation plan is recommended for existing modifications within the drainage line, including implementing adequate erosion control, removal of tyres and the removal of concrete from the instream zone. These should be replaced by drought tolerant indigenous vegetation suited for erosion control;
- A competent Environmental Control Officer (ECO) must oversee the construction and rehabilitation phase of the project, with watercourse areas as a priority;
- An infrastructure monitoring and service plan must be compiled and implemented during the operational phase. This will include the monitoring of all stormwater discharge points, energy dissipation structures, and stability of watercourses in the project footprint;
- Mixing of concrete must under no circumstances take place within the drainage lines. Scrape the area where mixing and storage of sand and concrete occurred to clean once finished;
- All waste generated on-site during construction must be adequately managed. Separation and recycling of different waste materials should be supported;
- Prevent uncontrolled access of vehicles through the watercourse that can cause a significant adverse impact on the hydrology and alluvial soil structure of these areas;
- Appropriately contain any generator diesel storage tanks, machinery spills (e.g. accidental spills of hydrocarbons oils, diesel etc.) or construction materials on site (e.g. concrete) in such a way as to prevent them leaking and entering the environment;
- Make sure all excess consumables and building materials / rubble are removed from site and deposited at an appropriate waste facility; and
- Landscape and re-vegetate all cleared areas as soon as possible to limit erosion potential.

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10 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

January 2022