THE FRESHWATER ECOLOGY COMPLIANCE STATEMENT FOR THE 3.6 MWp SOLAR PV PLANT

Boksburg, City of Ekurhuleni, Gauteng Province

October 2021

CLIENT

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1 Introduction

1.1 Background

The Biodiversity Company (TBC) was appointed to undertake a freshwater baseline and risk assessment for the establishment of a new 3.6 MWp Solar Photovoltaic (PV) plant on 3.8 ha of Unilever's property in Boksburg, City of Ekurhuleni, Gauteng Province.

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 3.6 MWp Solar PV as "Low" (Figure 1-1).

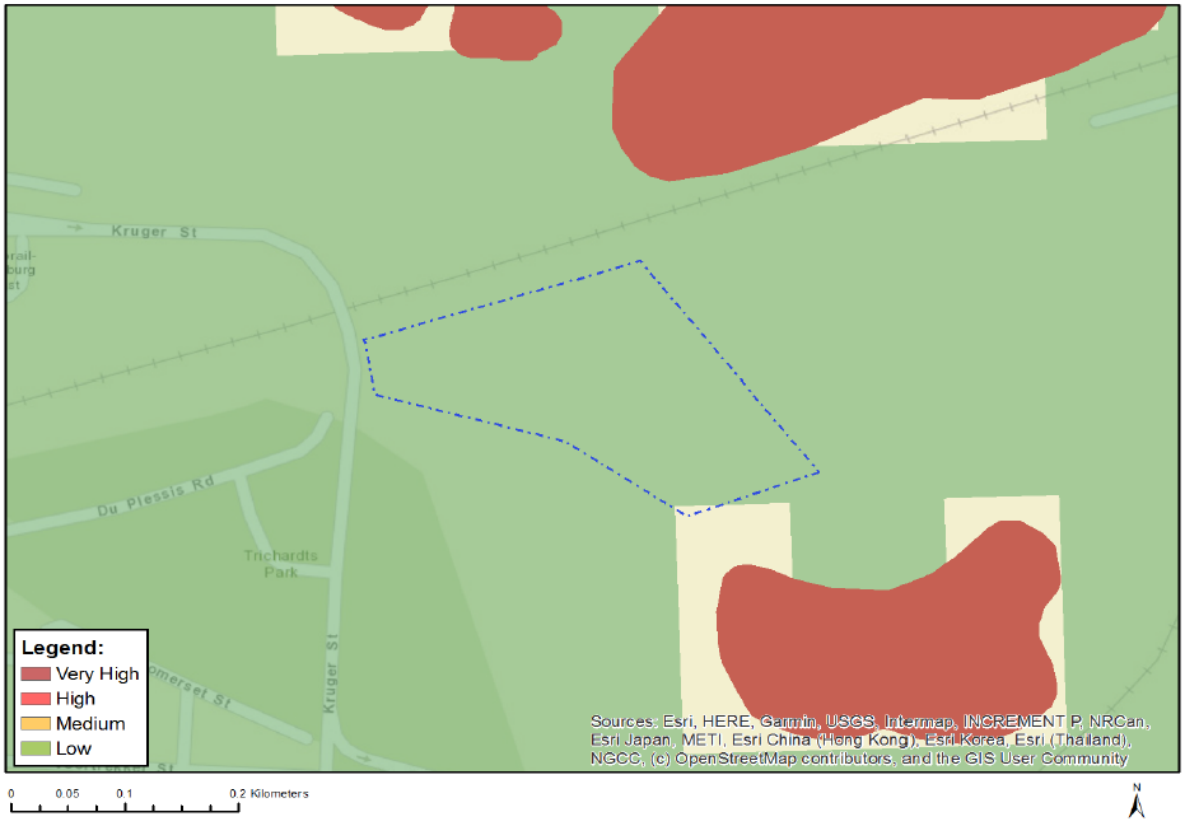


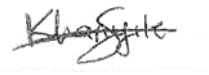
Figure 1-1 Aquatic sensitivity for the proposed 3.6MWp Solar PV plant (Ecoleges Environmental Consultants, 2021)

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.

2 Specialist Details

Report Name	**THE FRESHWATER ECOLOGY COMPLIANCE STATEMENT FOR THE 3.6 MWp SOLAR PV PLANT**
Submitted to	ecoleges Environmental Consultants
Report Writer	**Khethokuhle Hlatshwayo**  Khethokuhle Hlatshwayo is Cand. Sci. Nat. registered (124579) in the fields of Aquatic Science. Khethokuhle has obtained an Hons. degree in Zoology from the University of Johannesburg with 2.6 years' experience in aquatic ecology and has operated in various sectors, including mining, civil engineering, EIAs and research. Khethokuhle is SASS5 accredited.
Report Reviewer	**Dale Kindler**  Dale Kindler is Pr. Sci. Nat. registered (114743) in aquatic science and completed his M. Sc. in Aquatic Health at the University of Johannesburg. He has eight (8) 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 Project Area

The proposed 3.6 MWp Solar PV plant is located within Boksburg, approximately 3 km west of Actonville and 1 km north of Boksburg, City of Ekurhuleni, Gauteng Province. The surrounding land uses include residential, commercial and industrial areas. The sites considered in this assessment are located in the C22B quaternary catchment of the Vaal Water Management Area (WMA) and within the Elsburgspruit River reach. A regional map of the project area is shown in Figure 3-1.

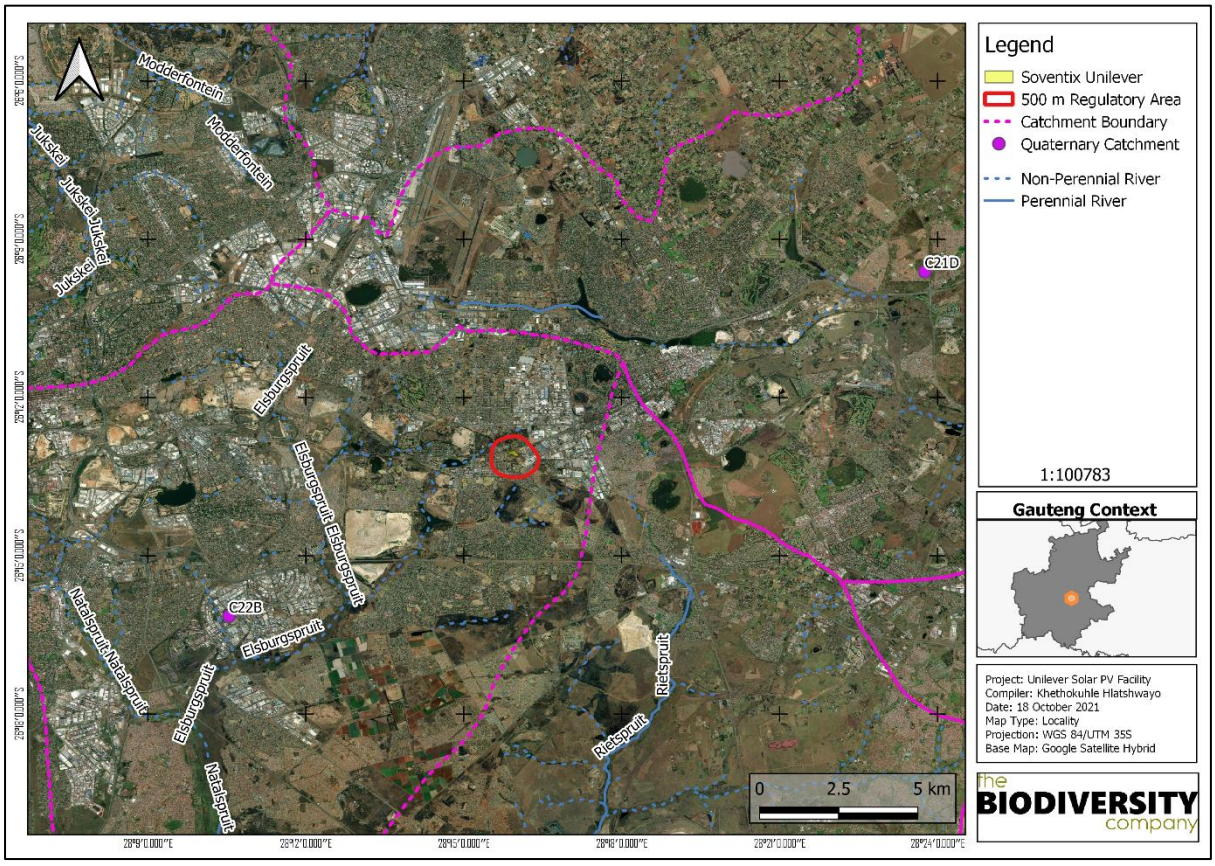


Figure 3-1 A regional map of the project area

4 Key Legislative Requirements

The legislation, policies and guidelines listed below apply to the current project in terms of biodiversity and ecological support systems. The list below, although extensive, is not exhaustive and other legislation, policies and guidelines may apply in addition to those listed below (Table 4-1).

Table 4-1 A list of key legislative requirements relevant to these studies in Gauteng

Region	Legislation
International	Convention on Biological Diversity (CBD, 1993)
	The Convention on Wetlands (RAMSAR Convention, 1971)
	The United Nations Framework Convention on Climate Change (UNFCC,1994)
	The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES 1973)
	The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention, 1979)
National	Constitution of the Republic of South Africa (Act No. 108 of 2006)
	The National Environmental Management Act (NEMA) (Act No. 107 of 1998)
	The National Environmental Management Act (NEMA) (Act No. 107 of 1998) Section 24, No 42946 (January 2020)
	The National Environmental Management Act (NEMA) (Act No. 107 of 1998) Section 24, No 43110 (March 2020)
	The National Environmental Management Protected Areas Act (Act No. 57 of 2003)
	The National Environmental Management Biodiversity Act (Act No. 10 of 2004)
	The National Environmental Management: Waste Act, 2008 (Act 59 of 2008);
	The Environment Conservation Act (Act No. 73 of 1989) and associated EIA Regulations
	National Environmental Management Air Quality Act (No. 39 of 2004)
	National Protected Areas Expansion Strategy (NPAES)
	Environmental Conservation Act (Act No. 73 of 1983)
	Natural Scientific Professions Act (Act No. 27 of 2003)
	National Biodiversity Framework (NBF, 2009)
	National Forest Act (Act No. 84 of 1998)
	National Veld and Forest Fire Act (101 of 1998)
	National Spatial Biodiversity Assessment (NSBA)
	World Heritage Convention Act (Act No. 49 of 1999)
	National Heritage Resources Act, 1999 (Act 25 of 1999)
	Municipal Systems Act (Act No. 32 of 2000)
	Alien and Invasive Species Regulations, 2014
	South Africa's National Biodiversity Strategy and Action Plan (NBSAP)
	Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983)
	Sustainable Utilisation of Agricultural Resources (Draft Legislation).
	White Paper on Biodiversity
	National Water Act (NWA, 1998)
Provincial	GDARD Requirements for Biodiversity Assessments (Version 3, 2014a)
	Gauteng Department of Agriculture and Rural Development (GDARD): Checklist for Biodiversity Assessments
	GDARD Mining and Environmental Impact Guide
	Transvaal Nature Conservation Ordinance (Nature Conservation Ordinance, No 12 of 1983)

5 Methodologies

5.1 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 October 2021. The survey period therefore reflects a wet season, summer survey.

The water channels observed on site were manmade drainage systems. In a total of seven (7) selected sites, only three (3) had limited surface water with no connectivity between the sites, resulting in no habitat to support aquatic life (macroinvertebrates and fish) (Figure 5-1). Therefore, macroinvertebrate and fish assessments and the habitat integrity assessment were not feasible on the artificial drainage systems. Evaluation and interpretation of the state of the aquatic environment was limited to *in situ* water quality observed on sites.

Figure 5-1 Site N 1, paved drainage system

5.1.1 Water Quality

Water quality was measured in situ using a calibrated multi-parameter water quality meter. The following constituents were measured: pH, conductivity (µS/cm), temperature (°C) and dissolved oxygen (DO) in mg/l.

5.2 Wetland Assessment

The wetland assessment fieldwork was undertaken on the 15th of October 2021, which constitutes an early wet season survey.

5.2.1 Identification and Mapping

The wetland areas were delineated in accordance with the DWAF (2005) guidelines, a cross section is presented in Figure 5-2. The outer edges of the wetland areas were identified by considering the following four specific indicators:

- The Terrain Unit Indicator helps to identify those parts of the landscape where wetlands are more likely to occur;

- The Soil Form Indicator identifies the soil forms, as defined by the Soil Classification Working Group (1991), which are associated with prolonged and frequent saturation.
    - The soil forms (types of soil) found in the landscape were identified using the South African soil classification system namely; Soil Classification: A Taxonomic System for South Africa (Soil Classification Working Group, 1991);
- The Soil Wetness Indicator identifies the morphological "signatures" developed in the soil profile as a result of prolonged and frequent saturation; and
- The Vegetation Indicator identifies hydrophilic vegetation associated with frequently saturated soils.

Vegetation is used as the primary wetland indicator. However, in practise the soil wetness indicator tends to be the most important, and the other three indicators are used in a confirmatory role.

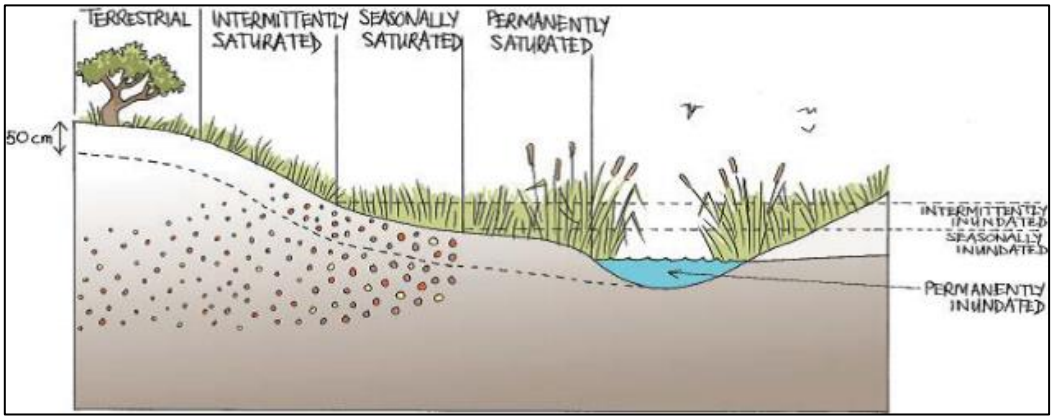


Figure 5-2 Cross section through a wetland, indicating how the soil wetness and vegetation indicators change (Ollis et al. 2013)

5.2.2 Delineation

The wetland indicators described above are used to determine the boundaries of the wetlands within the project area. These delineations are then illustrated by means of maps accompanied by descriptions.

5.3 Limitations and Assumptions

The following limitations should be noted for the assessment:

- A single season survey was conducted for the respective study, which would constitute a summer wet season survey;
- This assessment has not assessed any temporal trends for the project;
- The Impacts and Risks of the operational phase were not assessed in this report; and
- The project area was located within the artificial drainage systems with no habitat to support aquatic macroinvertebrates and fish, the focus was therefore afforded on water quality within the sites where sufficient water was present to conduct *in situ* water quality.

6 Receiving Environment

6.1 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 South African National Biodiversity Institute (SANBI).

6.1.1 Gauteng Biodiversity Conservation Plan

The Critical Biodiversity Areas (**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).

Other Natural Areas (**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 Ecological Support Areas (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 6-1 illustrates the project area with the Gauteng Biodiversity Conservation Plan CBA, ESA, Threatened Ecosystem and National Freshwater Protection Areas (NFEPA) wetlands.

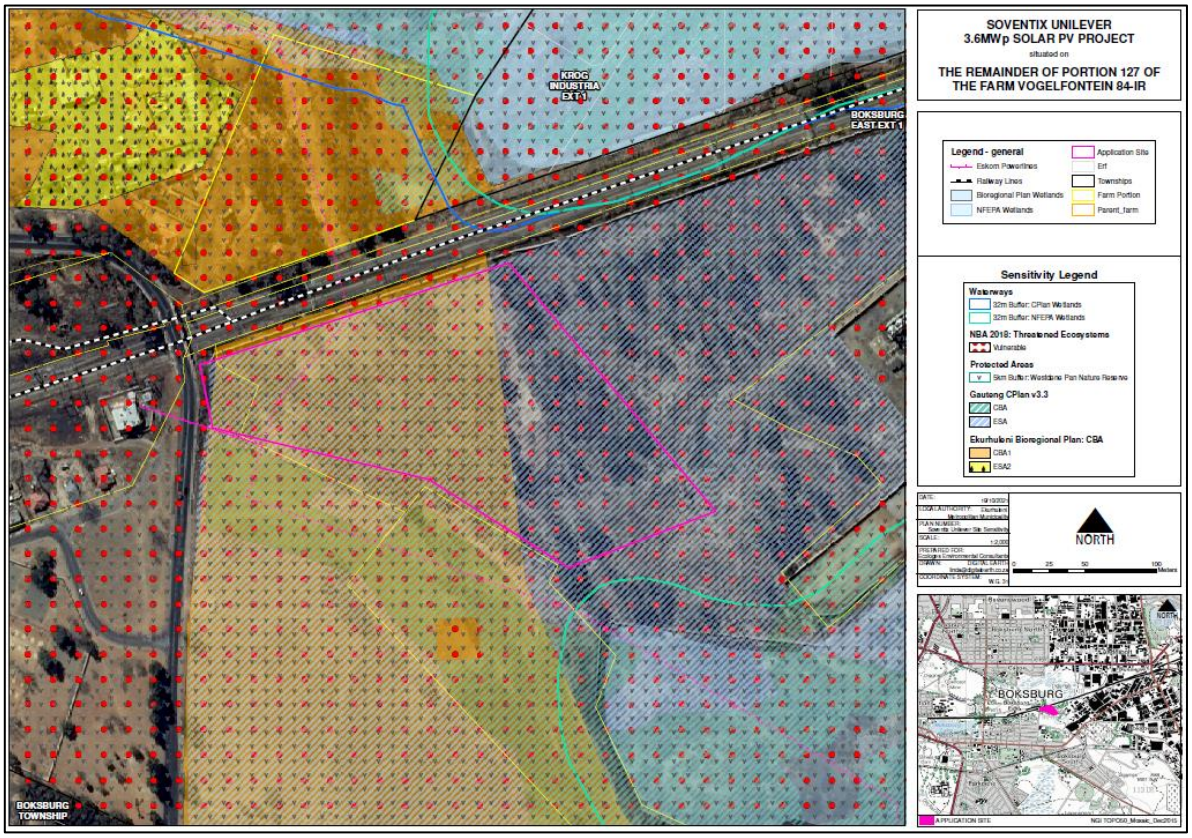


Figure 6-1 The project area superimposed on the Gauteng Biodiversity Conservation Plan CBA, ESA, Threatened Ecosystem and NFEPA wetlands (Ecoleges Environmental Consultants, 2021)

6.1.2 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. Based on Figure 6-2 the aquatic ecosystems associated with the development are rated as *Poorly Protected*. The Threat status of the rivers associated with the proposed project are largely rated as Critically Endangered (CR).

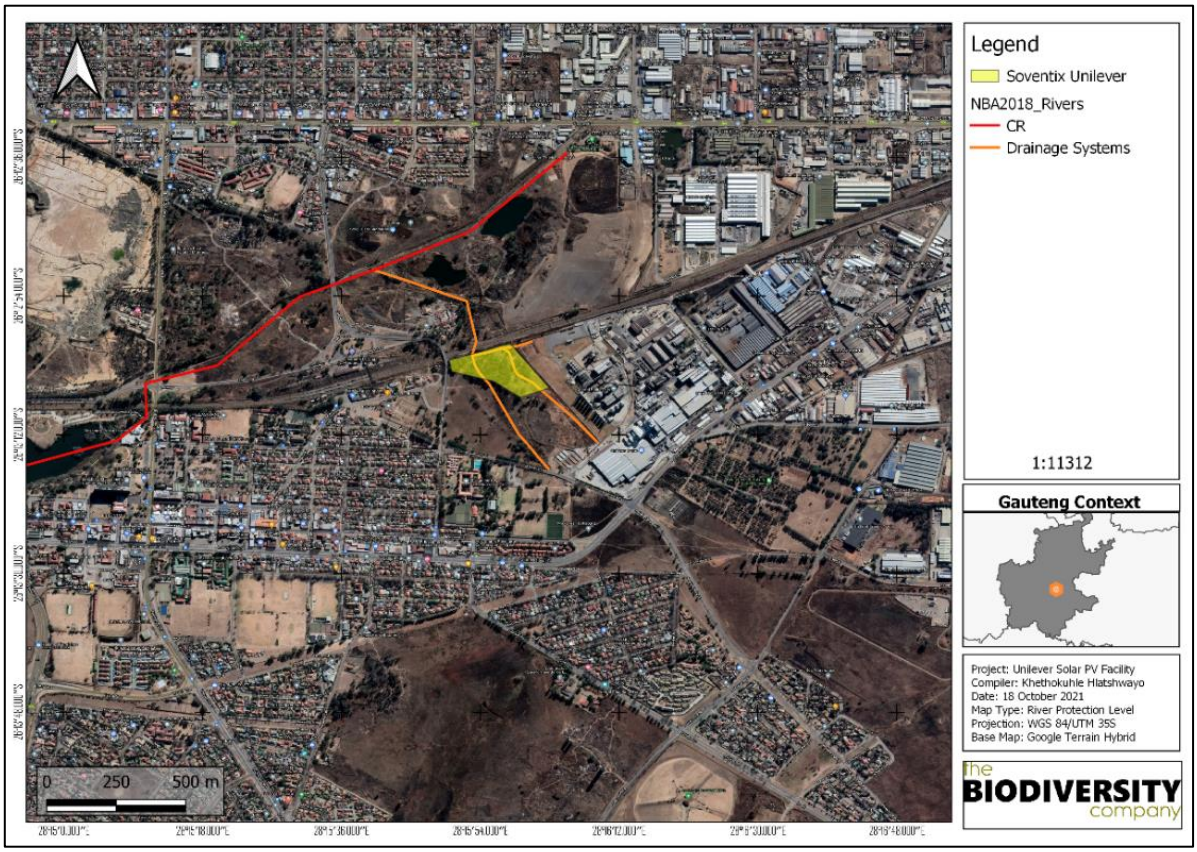


Figure 6-2 The map highlighting the threat status of aquatic ecosystems within the proposed project area (NBA, 2018)

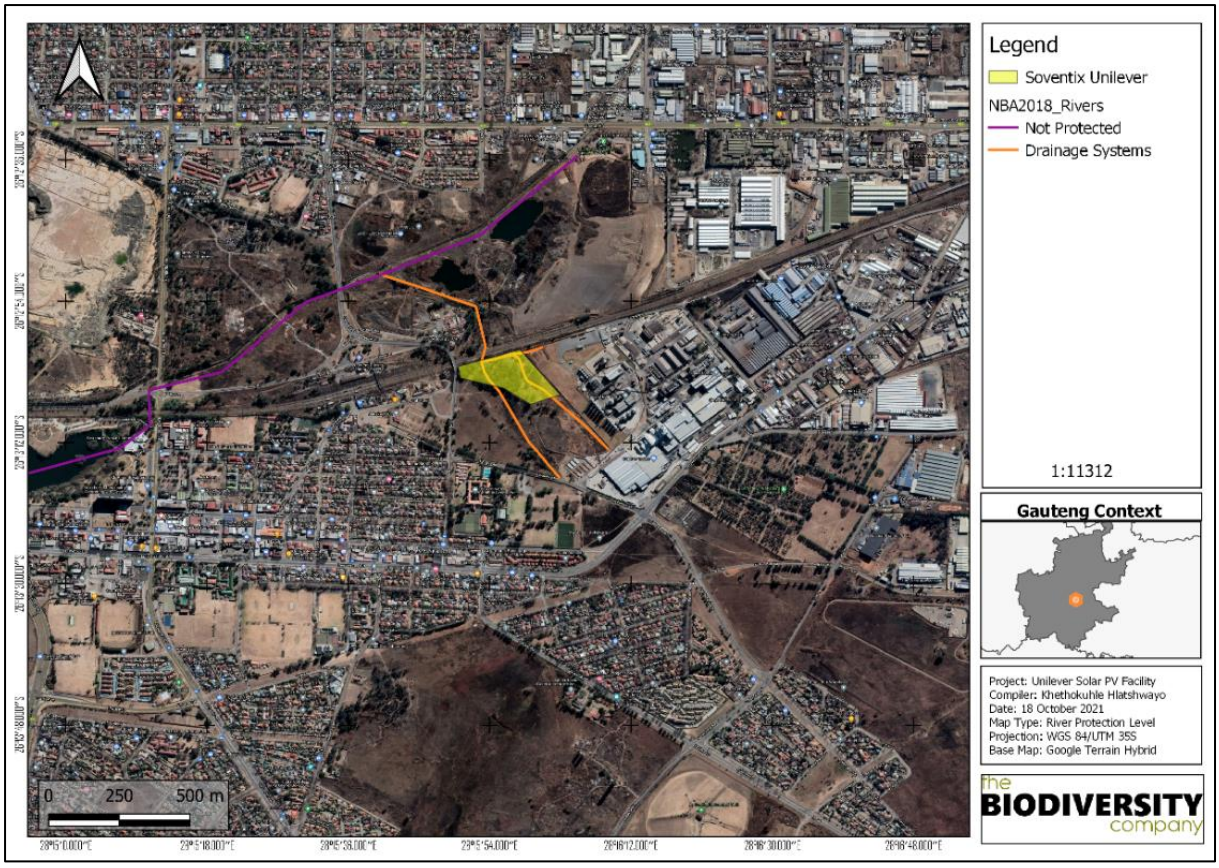


Figure 6-3 The map highlighting the protection status of aquatic ecosystems within the proposed project area (NBA, 2018)

6.1.3 Hydrological Setting

The project area is located in the Vaal Water Management Area (WMA) (NWA, 2016), and the Highveld ecoregion. The project area is located in proximity to two drainage lines which are unnamed tributaries draining into the Elsburgspruit. The proposed activities addressed in the aquatics study fall within the headwaters of the latter, C22B Elsburgspruit catchment, and therefore only this catchment was addressed. The watercourses in the immediate project area are characterised as artificial ephemeral drainage lines, which flow in a north-easterly direction into the headwaters of the Elsburgspruit reach (Figure 6-4).

The ecological status and composition of the classified Sub-quaternary Reach (SQR) is shown in Table 6-1, whilst the ecological status of the unclassified tributary network is unknown. The C22B-1350 SQR (unnamed tributary) is considered critically modified with a low Ecological Importance and a moderate Ecological Sensitivity at a desktop level (DWS, 2021). The modified state of the reach was due to critical impacts to instream habitat, wetland and riparian zone continuity, large flow modifications and serious potential impacts on physico-chemical conditions (water quality). This results from the surrounding industrial, and urban influence within the SQR.

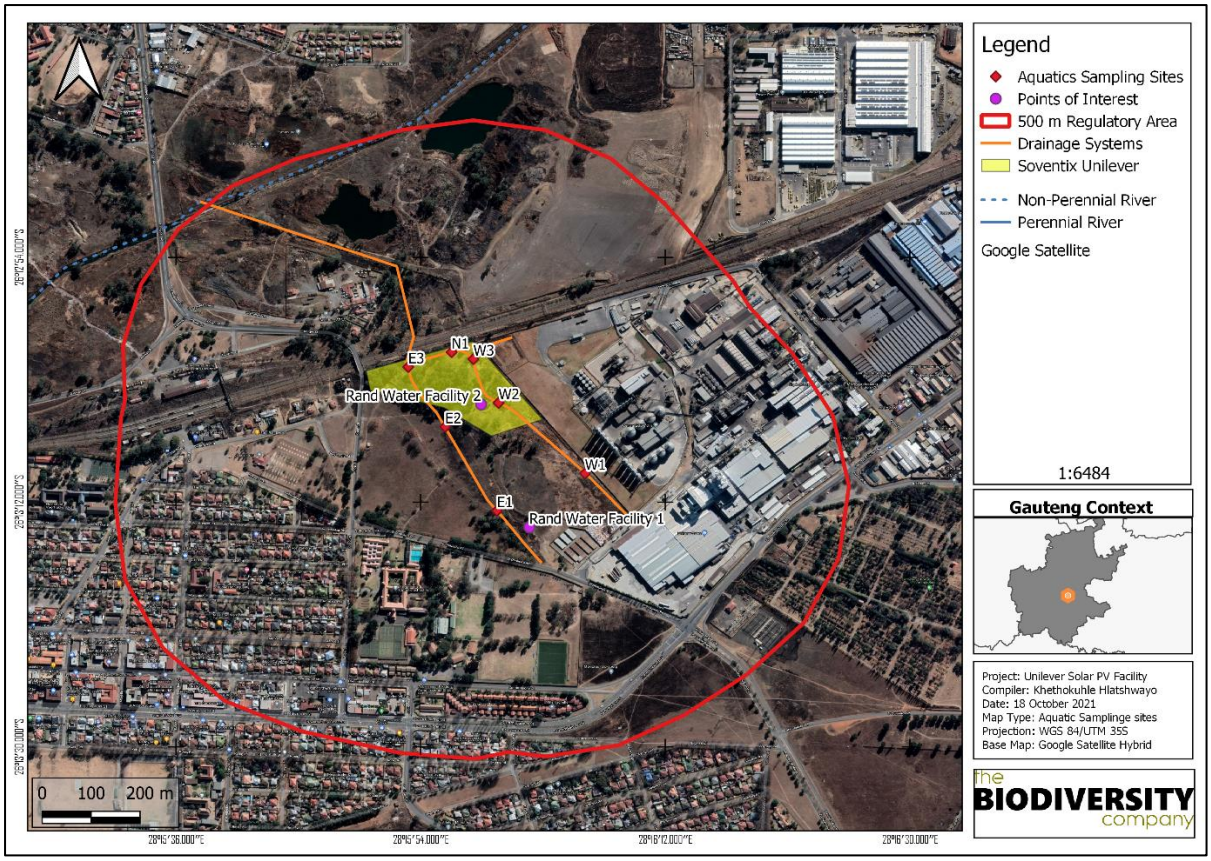


Figure 6-4 The rivers and artificial drainage systems in the project area

Table 6-1 Desktop data pertaining to the ecological condition of the SQRs assessed (DWS, 2021)

	Present Ecological State		Ecological Importance		Ecological Sensitivity	
	F (Critically Modified)		Low		Moderate	
	Variable	**Status**	**Variable**	**Status**	**Variable**	**Status**
C22B-1350	Modifications to Instream Habitat Continuity	Critical	Fish species per sub quaternary catchment	5	Fish Physico-Chemical sensitivity description	Moderate
	Modifications to Riparian/ Wetland Zone Continuity	Critical	Invertebrate taxa per sub quaternary catchment	15	Fish No-flow sensitivity description	Moderate
	Potential Instream Habitat Modifications	Critical	Habitat Diversity Class	Low	Invertebrate Physico-Chemical sensitivity	Moderate
	Modifications to Riparian/ Wetland Zones	Critical	Instream Migration Link Class	Very Low	Invertebrate velocity sensitivity	High
	Potential Flow Modifications	Large	Riparian-Wetland Zone Migration Link	Very Low	Stream size sensitivity to modified flow/water level changes description	Low
	Potential Physico-Chemical Modifications	Serious	Instream Habitat Integrity Class	Very Low	Riparian-Wetland Vegetation intolerance to water level changes description	High
	Anthropogenic Impacts					
	Industrial, mining, urban					

6.1.4 National Freshwater Protection Areas

The layout of project area and NFEPAs are provided in Figure 6-5. 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 watercourse considered in this assessment has two (2) wetland ecosystem types designated to it, namely the Mesic Highveld Grassland Group 3_Depression and Mesic Highveld Grassland Group 3_Flat. The watercourse therefore needs 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 C22B-1350 SQR is labelled as an upstream management area and is therefore considered sensitive to further modification and needs to be maintained and protected in order to sustain the River FEPA's and associated aquatic and terrestrial biota located downstream of the project area. This further ensure downstream water users have water security for food production and recreational activities.

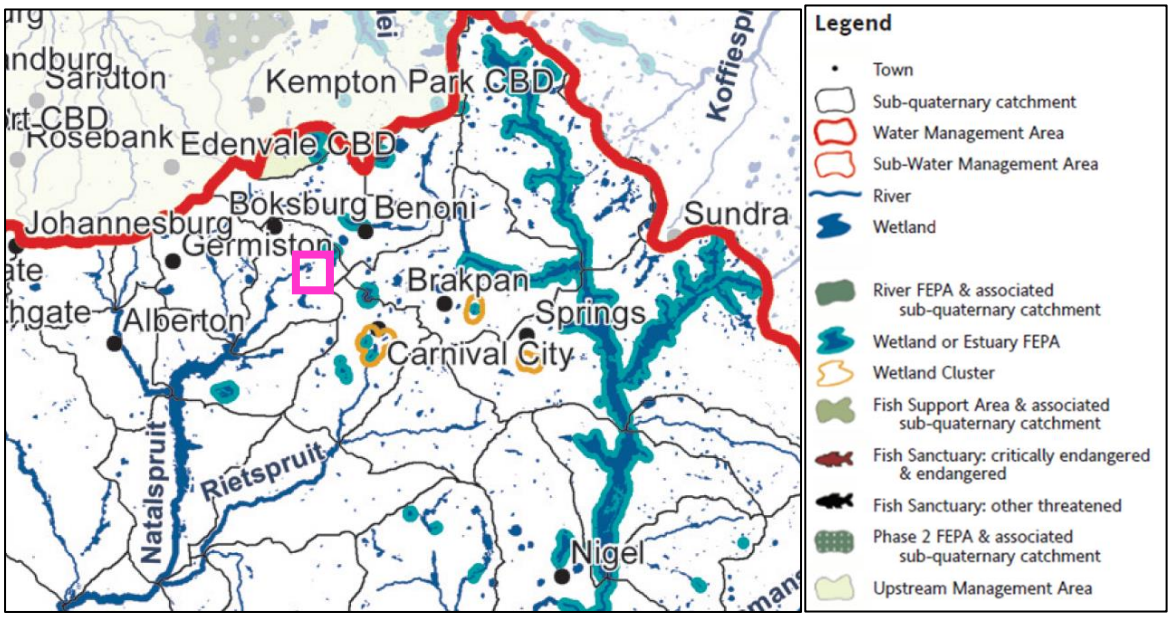


Figure 6-5 Illustration of NFEPAs associated with the project area (indicated in pink square)

6.2 Survey Results

6.2.1 Aquatic Assessment

A single high flow survey was conducted on the 15th of October 2021. This survey was completed in order to support the compliance statement. The project area was located within the artificial drainage systems with insufficient habitat to support aquatic macroinvertebrates and fish communities, the focus therefore afforded to water quality at sites where sufficient water was present to conduct *in situ* water quality analysis and reached based assessments were conducted. Photographs and Global Positioning System (GPS) co-ordinates pertaining to the aquatic ecology assessment are presented in Table 6-2 and the sampling sites are illustrated in Figure 6-6.

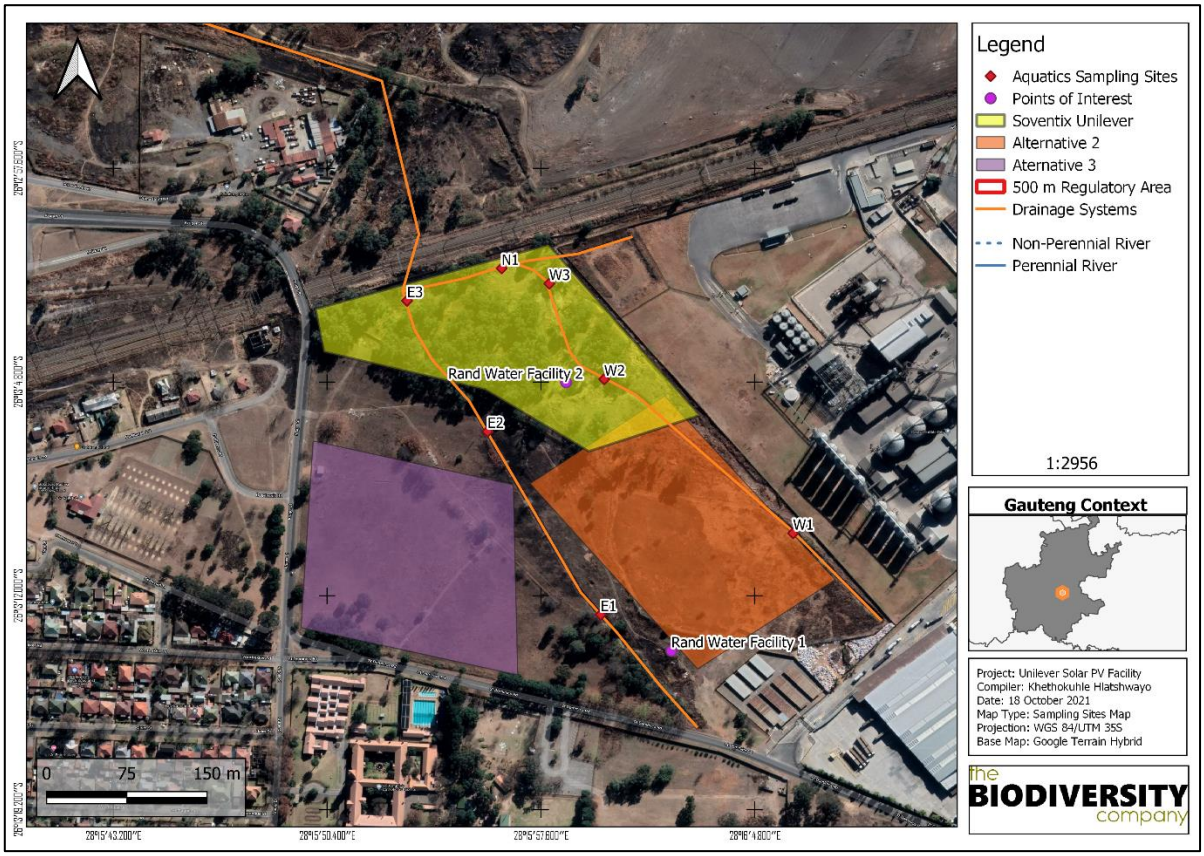


Figure 6-6 Aquatic sampling sites within the project area

Table 6-2 Photographs and GPS co-ordinates pertaining to the aquatic ecology assessment

	Downstream	
Site	**E 1**	**E 2**
		
GPS	26°13'12.64"S 28°15'59.61"E	26°13'6.46"S 28°15'55.81"E
Site	**E 3**	**W 1**
		
GPS	26°13'2.06"S 28°15'53.09"E	26°13'9.89"S 28°16'6.09"E
Site	**W 2**	**W 3**
		
GPS	26°13'4.70"S 28°15'59.73"E	26°13'1.48"S 28°15'57.88"E
Site	**N 1**	
		
GPS	26°13'0.97"S 28°15'56.28"E	

6.2.1.1 *In situ* Water Quality

In situ water quality results have been compared to limits stipulated in the Target Water Quality Range (TWQR) as well as Recourse Quality Objectives (RQOs) for catchments of the Upper Vaal for aquatic ecosystems (DWAF, 1996; RSA, 2016).

Table 6-3 In situ surface water quality results

Site	pH	Conductivity (µS/cm)	DO (mg/l)	Temperature (°C)
TWQR*/ RQO**	6.5-9.0*	1110**	>5.00*	5-30*
Western Drainage System				
W 1	8.23	2450	4.62	20.6
W 3	8.51	2780	2.21	18.2
Northern Drainage System				
N 1	7.19	1059	3.10	18.7

***TWQR – Target Water Quality Range; **RQO - Recourse Quality Objectives; Levels exceeding guideline levels are indicated in red**

The *in situ* water quality indicated modified water quality conditions within the drainage systems when compared to the TWQR and RQO limits for aquatic life. Water temperature and pH levels were within the TWQR. Sampled sites indicated depressed levels of dissolved oxygen (DO) and elevated dissolved solids [measured by Conductivity (µS/cm)]. Water quality within the sites would limits abundance and diversity of aquatic biota.

6.2.1.2 Fish Community Assessment

The list of expected fish species is presented in Table 6-4 (IUCN, 2021; Skelton, 2001; DWS, 2014). Based on this, a total of five (5) 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 6-4 should be viewed as a list of potential species rather than an expected species list.

Table 6-4 Desktop Fish Community Assessment

Species/Site	Common Names	IUCN Status	Sensitivity	
			No-flow	Phys-chem
Clarias gariepinus	Sharptooth Catfish	LC	**1.7**	**1.0**
Enteromius anoplus	Chubbyhead Barb	LC	**2.3**	**2.6**
Enteromius paludinosus	Straightfin Barb	LC	**2.3**	**1.8**
Pseudocrenilabrus philander	Southern Mouthbrooder	LC	**1.0**	**1.4**
Tilapia sparrmanii	Banded Tilapia	LC	**0.9**	**1.4**
Total Sampled Native Species			**0**	
Total Expected Native Species			**5**	

LC: Least Concern

Fish have different sensitivities or levels of tolerance to various aspects that they are subjected to within the aquatic environment. These tolerance levels are rated with a sensitivity score as

presented in Table 6-5. These tolerance levels are scored to show each fish species sensitivity to flow and physico-chemical modifications.

Table 6-5 Intolerance rating and sensitivity of fish species

Sensitivity Score	Tolerance/Sensitivity Level
0-1	Highly tolerant = Very low sensitivity
1-2	Tolerant = Low sensitivity
2-3	Moderately tolerant = Moderate sensitivity
3-4	Moderately intolerant = High sensitivity
4-5	Intolerant = Very high sensitivity

6.2.2 Wetland Delineation

During the wetland survey, one HGM type, comprising of a single HGM unit was identified within the 500 m regulated area, namely the Seep (HGM 1), and two artificial wetlands (Figure 6-7). The HGM unit is located in the northern part of the project area on the opposite side of the train tracks from the proposed activities. The rail route will thus prevent any impacts associated with overland flow from the proposed development reaching the HGM unit. Further to this, the artificial drains will also contain and divert flows bypassing the wetland to the non-perennial river. The rail route will also prevent interflow from the project area to the wetland due to the compaction of the vadose zone, creating a subsurface barrier. The wetland is more than 45 m from the closest project alternative, and not considered to be at risk. A 32 m Zone of Regulation (ZoR) in accordance with the National Environmental Management Act, 1998 (Act No. 107 of 1998) is applicable for the project.

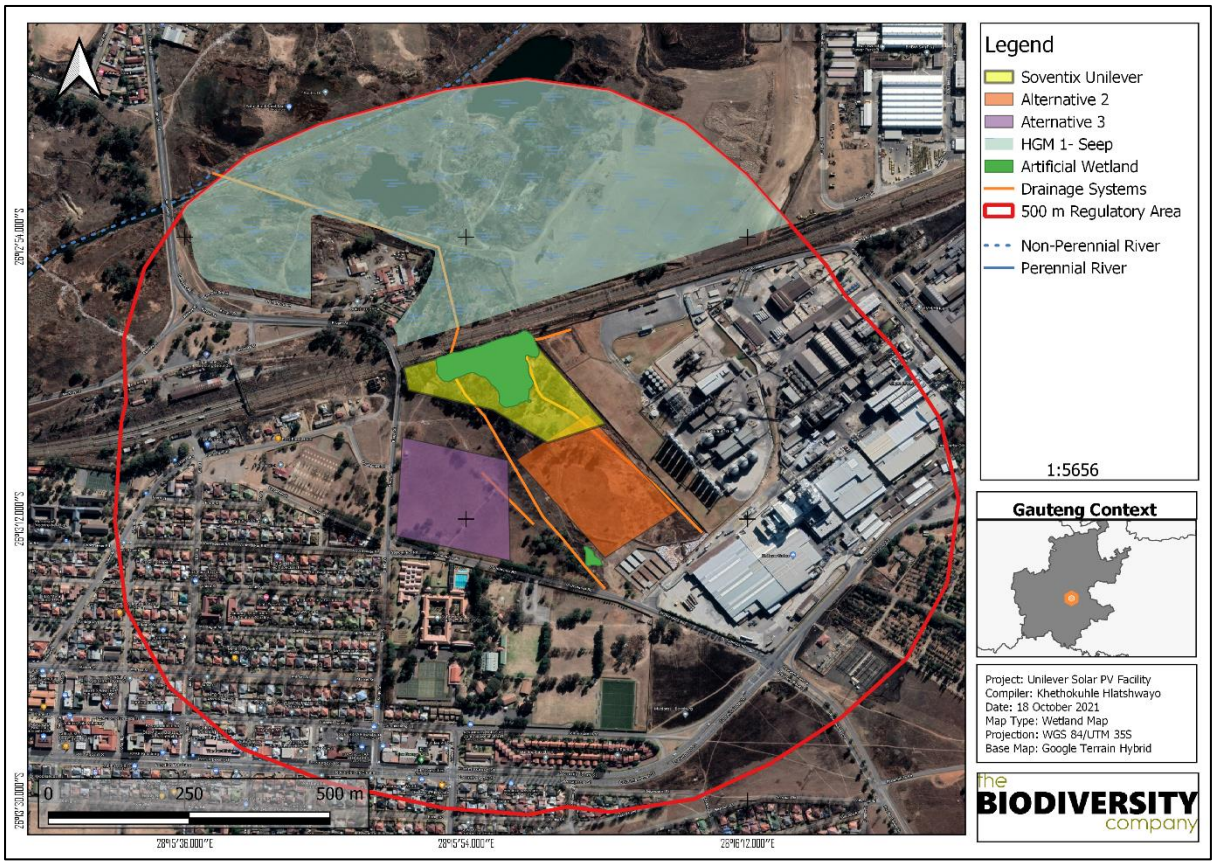


Figure 6-7 Delineated wetlands within project area

7 Impact Assessment

Potential impacts were evaluated against the data captured and site observations during the fieldwork assessment to identify relevance to the project area, specifically the proposed development footprint areas.

7.1 Alternatives Considered

Three alternatives for the solar PV area were considered and assessed. All three alternatives were within the 500 m regulatory area. The proposed project area (indicated in yellow), alternative 2 (in orange) and alternative 3 (in purple) were all located with portions located within the manmade drainage system (Figure 7-1).

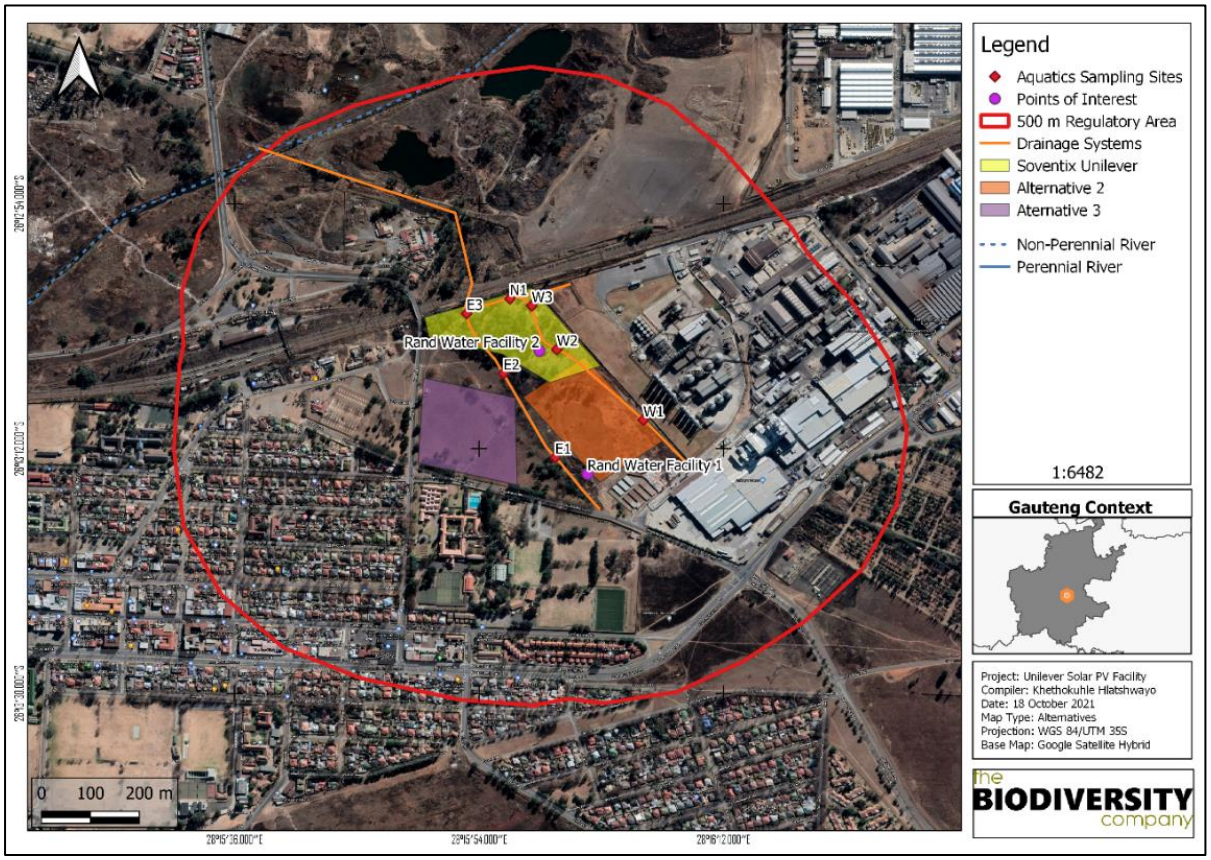


Figure 7-1 Alternatives considered for the solar PV area

7.2 Aquatic Impact Assessment

7.2.1 Current impacts, Need and Desirability

Existing impacts within the PV Area included alien invasive species, low water crossings, riparian vegetation clearing for firewood, and two manmade drainage systems with patches of pavements. The CBAs, ESAs, Wetlands, Threatened Ecosystems, Spatial Development Framework, and Global and international responsibilities relating to the environment within the project area were taken into consideration for the **Need** and **Desirability** of the proposed project. In terms of **Need** and **Desirability**, the freshwater component has low sensitivity within the project area, therefore the project can proceed (for all three proposed alternatives). However, the need to ensure minimal disturbance and impact to drainage lines is imperative

to ensure water quality preservation downstream of the area is considered, especially following rainfall events.

7.2.2 Anticipated Construction Impacts

The proposed PV areas are situated along the manmade drainage systems. Proposed activities will disturb these artificial areas through direct impacts during construction activities associated with the installation of the panels and access road(s), operation of heavy machinery, and the clearing of indigenous vegetation and additional infrastructure. These activities will result in impacts associated with stormwater runoff from hard surfaces that may lead to erosion of these drainage systems, and sedimentation of downstream systems. A vegetated buffer of 30 m should be imposed to the drainage lines to minimize direct impacts to the water resources. However, during the rainy season, a risk of erosion is probable due to the land disturbances and bare/exposed areas, resulting in downstream sedimentation and potential contamination of petrochemicals should leaks and spills occur. Construction should be prioritised / scheduled for the dry season period.

7.2.3 Risk Assessment

The project area was classified as low sensitivity and due to the unnatural drainage systems observed during the assessment, there are low risks to the water resources associated with the proposed solar PV alternatives considered. Therefore, no Risk Assessment for S21(c) and (i) water uses [for purposes of General Authorisation Registration (GN 509 of 2016)] was completed for this assessment. However, impacts and risks were assessed according to The Impact and Risks Matrix and Criteria provided by Ecoleges Environmental Consultants (can be provided on request).

The extent of the project during the construction phase is Localised with a Very Low magnitude with a Short Term duration, therefore resulting in a Very Low overall risk rating and the significance rating of Very Low (Low magnitude with a site-specific extent and construction period duration). However, these unnatural drainage systems still serve as water (stormwater) routes to the downstream watercourse and therefore need to be managed in a manner that enables the downstream systems to contribute to national biodiversity goals and support sustainable use of water resources. Mitigation measures and recommendations are provided below.

7.2.4 Mitigation Measures and Recommendations

Despite the PV project area being classed as low sensitivity, the area is likely prone to erosion should poor stormwater management be implemented. Therefore, a comprehensive stormwater management plan is required for the project. Increased runoff during high rainfall periods remains a high concern for the project area. The following is prescribed in support of the aquatic ecology assessment:

- A vegetation alien invasive management plan should be implemented. This plan must be implemented during the construction phase of the project and continue for the life of the project. This plan must be adapted based on changing site conditions;
- An adaptive rehabilitation plan needs to be implemented from the onset of the project. This must be compiled with input from independent ecological specialists;

- A competent Environmental Control Officer (ECO) must oversee the construction and rehabilitation phase of the project, with adjacent watercourse areas as a priority; and
- 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.

7.2.4.1 General Mitigation Measures

The following general mitigation measures are provided:

- 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;
- Mixing of concrete must under no circumstances take place within the drainage systems. Scrape the area where mixing and storage of sand and concrete occurred to clean once finished;
- The water resources outside of the specific project site area must be avoided;
- Laydown yards, camps and storage areas must be beyond the watercourse and associated buffer areas. Where possible, the construction of any watercourse crossings must take place from the existing areas of disturbance and not from within the drainage lines;
- The contractors used for the project should have spill kits available to ensure that any fuel or oil spills are clean-up and discarded correctly;
- 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;
- All chemicals and toxicants to be used for the construction must be stored outside the watercourses and in a bunded area;
- All machinery and equipment should be inspected regularly for faults and possible leaks, these should be serviced off-site;
- All contractors and employees should undergo induction which is to include a component of environmental awareness. The induction is to include aspects such as the need to avoid littering, the reporting and cleaning of spills and leaks and general good “housekeeping”;
- Adequate sanitary facilities and ablutions on the servitude must be provided for all personnel throughout the project area. These should not be placed near any water course or in buffer zones. Use of these facilities must be enforced (these facilities must be kept clean so that they are a desired alternative to the surrounding vegetation);
- Have action plans on site, and training for contactors and employees in the event of spills, leaks and other impacts to the drainage systems;
- All removed soil and material must not be stockpiled within the watercourses. Stockpiling should take place outside of drainage systems. All stockpiles must be

protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds;

- Erosion and sedimentation into the drainage lines must be minimised through the effective stabilisation (gabions and Reno mattresses) and the re-vegetation of any disturbed areas;
- Any exposed earth should be rehabilitated promptly by planting suitable vegetation (vigorous indigenous grasses that are drought tolerant) to protect the exposed soil;
- No dumping of construction material on-site may take place;
- All waste generated on-site during construction must be adequately managed. Separation and recycling of different waste materials should be supported;
- 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 associated with steep slopes and bare/exposed soils.

8 Conclusions

The National Web based Environmental Screening Tool has characterised the aquatic sensitivity of the solar PV project area as “Low” (Figure 1-1). According to the NBA (2018) the threat status of the rivers associated with the proposed project are largely rated as Critically Endangered (CR) and not protected. The *in situ* water quality assessment indicated modification in terms elevated dissolved solids and depressed dissolved oxygen levels within the artificial drainage systems. At the desktop level the Present Ecological Status (PES) of the larger catchment area watercourses were rated at critically modified with ecological sensitivity rated as moderate with low ecological importance. Based on the site assessment, the project area was considered to have a low sensitivity due to the drainage systems being unnatural. Based on this, the risks to the water resources associated with the proposed solar PV plant for all three alternatives were considered to be low. However, these unnatural drainage systems still serve as water (stormwater) routes to the downstream watercourse and therefore need to be preserved to contribute to national biodiversity goals and support sustainable use of water resources.

8.1 Impact Statement

An impact statement is required as per the NEMA regulations with regards to the proposed development.

Proposed activities will disturb the artificial watercourse areas through direct impacts during construction activities during the installation of the panels and access road(s) and additional infrastructure. However, the impacts are rated as low and considered localised. Based on survey findings the specialist agrees with the “Low” aquatic sensitivity as per the National Web based Environmental Screening Tool due to the unnatural drainage systems, and low and localised impacts associated with the project. Provided prescribed mitigation measures and recommendations are implemented, it is the opinion of the specialist that there are no fatal flaws for the proposed activities.

9 References

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10 Appendices

Appendix A Specialist declaration

DECLARATION

I, Khethokuhle Hlatshwayo, 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.

Khethokuhle Hlatshwayo

Aquatic Ecologist

The Biodiversity Company

October 2021

Appendix B Specialist Curriculum Vitae

Khethokuhle Good-Gift Hlatshwayo

Hons. Zoology

Cell: +27 719999644
Email: khetho@thebiodiversitycompany.com
Identity Number: 9401146093084
Date of birth: 14 January 1994

Profile Summary

I have experience in aquatic ecology, providing expertise for the assessment and management of freshwater systems and specialist input into EIAs.

I have worked in multiple projects including Mining projects, infrastructure developments such as housing, roads and bridges.

The implementation of aquatic biomonitoring programmes in accordance with licensing.

Areas of Interest

Aquatic Ecology and Water Resource Management.

Mining, Infrastructure Development Projects, Sustainability and High Conservation Value Assessments.

Publication of scientific articles.

Key Experience

- Water resource baseline, monitoring and impact assessments
- The use of macroinvertebrates to determine water quality
- Aquatic Ecological Assessments
- Monitoring Programmes

Countries worked in

South Africa

Lesotho

Swaziland

Nationality

South African

Languages

English – Proficient

IsiZulu – Proficient

Qualifications

- BSc Honours (University of Johannesburg) – Zoology
- BSc Zoology & Human Physiology
- SASS5 Accreditation - Department of Water and Sanitation for the River Health Programme
- SACNASP (124579) as candidate natural scientist

SELECTED PROJECT EXPERIENCE

Project Name: The Aquatic Ecology Baseline & Impact Assessment for the 132KV Msenge Emoyeni Powerline

Client: Nala Environmental

Personal position / role on project: Aquatic Ecologist/ Project leader

Location: Bedford, Eastern Cape Province - 2021

Main project features: To assess the aquatic impacts and risk assessment of new 132kV powerline and ESKOM main transmission substation for the authorised Msenge Emoyeni Wind Energy Facility (WEF).

Project Name: Aquatic and Risk Assessment: Installation of Groynes in the Mkhomazana River along the Sani Pass Road 2020

Client: Hanslab

Personal position / role on project: Aquatic Ecologist/ Project leader

Location: KwaZulu-Natal (Sani Pass) - 2020

Main project features: To assess the aquatic impacts and risk assessment of groynes to be installed within the Mkhomazana River.

Project Name: Johannesburg State of the Rivers 2020

Client: TheoServ

Personal position / role on project: Aquatic Ecologist.

Location: South Africa (City of Johannesburg (CoJ)) - 2020

Main project features: The 2020 current ecological status and riparian status of all CoJ rivers

Project Name: The Environmental and Social Impact Assessment (ESIA) the proposed Nondvo Dam

Client: WSP

Personal position / role on project: Aquatic Ecology Intern.

Location: Swaziland - 2019

Main project features: The baseline and impact assessment for a proposed impoundment

Project Name: Aquatic biomonitoring of the aquatic systems for the Ilima Coal Mine, in Mpumalanga Province.

Client: GSW.

Personal position / role on project: Aquatic Ecology Intern.

Location: South Africa (Carolina) – 2019

Main project features: To conduct annual aquatic biomonitoring of the aquatic systems to assess the impacts of the mine on the river systems and aquatic biota.

Project Name: Watercourse Baseline & Impact Assessment for The Proposed Upgrading of The Balfour WWTW, Balfour, Mpumalanga

Client: SLR

Personal position / role on project: Aquatic Ecology Intern.

Location: South Africa (Mpumalanga, Balfour) - 2019

Main project features: The baseline and impact assessment for a proposed upgrade of wastewater treatment works

Please take note that this represents only a selection of project background and expertise.

OVERVIEW

An overview of the specialist technical expertise include the following:

- Monitoring plans for rivers.
- Aquatic ecological state and functional assessments of rivers and dams.
- Toxicity and metal analysis of water, sediment and biota.
- Implementation of recognised biotic indices: Fish, Macroinvertebrates, and Vegetation studies.
- Implementation of recognised abiotic indices: Intermediate Habitat Integrity Assessment (IHIA). Interpretation of Chemical Analyses and Toxicity Tests.
- Assistance with faunal surveys which includes mammals.

TRAINING

Some of the more pertinent training undergone include the following:

- SASS 5 training (SASS accredited) – Groundtruth with Department of Water and Sanitation.
- Advanced 4 x 4 driving course – Through the University of Johannesburg (2018)
- First Aid Level 1 – SDC Consult (2021)

EMPLOYMENT EXPERIENCE

CURRENT EMPLOYMENT: The Biodiversity Company (March 2019 – Present)

I am a SACNASP registered candidate natural scientist in aquatic ecologist field (124579). I am currently employed by The Biodiversity Company as an Intern in an Aquatic unit within the company. I have been exposed to numerous projects within these unit. Establishment and identification of baseline ecological and physical structures (surveys). We manage risks to the environment to reduce impacts with practical, relevant and measurable methods. These services are offered to numerous sectors, such as mining, agriculture, construction and natural resources.

Demonstrator and tutor: 2018 -University of Johannesburg, Gauteng

ACADEMIC QUALIFICATIONS

University of Johannesburg, Johannesburg, South Africa (2018): BACCALAUREUS SCIENTIAE CUM HONORIBUS (Hons) – Zoology

Title: Effect of two anaesthetics on selected nerve functions of the sciatic nerve of *Xenopus laevis, South Africa*

University of Johannesburg, Johannesburg, South Africa (2013 - 2017): BACCALAUREUS SCIENTIAE IN LIFE AND ENVIRONMENTAL SCIENCES. Majors: Zoology and Human Physiology

ONLINE PLATFORMS

https://www.linkedin.com/in/khethokuhle-hlatshwayo-625364172/