H 2 - Detailed Freshwater Ecological Assessment

Detailed Freshwater Ecological Assessment:

Single Residential Development of Farm 1620 Stellenbosch, Western Cape

Prepared for:

Virdus Works

Prepared by:

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SACNASP Reg. no. 400029/02

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Executive Summary

Background

Part of the residential dwelling developed by the owner on Farm 1620 Stellenbosch in the Jonkershoek Valley encroached on the 32m NEMA regulatory line for watercourses. Accordingly, the development should have received prior environmental authorisation but this was not obtained. The owner is therefore applying for retrospective authorisation and a NEMA Section 24G (S24G) Rectification Application is being submitted. In order to fulfil the reporting requirements of the S24G Rectification Application a detailed level of freshwater ecological assessment is required.

Desktop Assessment

The site is situated within the Southwestern Coastal Belt ecoregion (Kleynhans *et al*, 2005) and within the Breede Olifants Water Management Area (WMA), the Greater Cape Town Sub-WMA and the G22F quaternary catchment.

The applicable terrestrial ecosystem type is Boland Granite Fynbos (Endangered) and the applicable wetland vegetation type is Southwest Granite Fynbos (Critically Endangered).

The soils in the area can be described as comprising mostly rock with limited Glenrosa and/or Mispah soil forms with a moderate erodibility, limited depth (<450 mm) and clay content (< 15%).

Available databases indicating the presence of watercourses (NGI Rivers and NWM5) are aligned insofar as these indicate the lack of any wetlands within the NWA Regulated Area (i.e. 500m). The NGI Rivers database indicates that the Eerste River forms the south western boundary of the site and is indicated as a perennial river. In addition, a non-perennial drainage line is mapped to runs along the north western boundary and discharges into the Eerste River at the extreme western end of the property.

A review of the WCBSP (2023) indicates that narrow bands of terrestrial CBAs occur along the north western and south eastern property boundaries and that the entire portion of the Eerste River and its associated riparian zone comprises an Aquatic CBA.

Watercourse Description & Delineation

The reach of the Eerste River adjacent to the site comprises an upper foothills river with an alluvial channel characterised by an undulating bed that defines a sequence of coarse bars (cobbles or gravel) (riffles) and scour pools. Immediately adjacent to the site the scour pools are flanked by isolated stands of *Prionium serratum* (palmiet). The riparian zone adjacent to the site comprises a moderate to low density indigenous and alien macrophytes such as *Olea capensis* (wild olive) *Salix mucronata* (willow), *Virgilia* sp. (keurboom) *Quercus* sp. (oak), *Acacia mearnsii* (black wattle) with the latter being a Category 1 listed alien invasive species.

The right-hand bank of the river[1] adjacent to the location of the residential dwelling has been impacted both as a result of historical anthropogenic influences (mostly associated with the agricultural use of the property over many decades) and the development of the residential dwelling.

At the properties extreme western boundary, a non-perennial drainage line meets the river just within the property boundary. At this point a stand of mature *Phragmites australis* (common reed) were evident suggesting the presence of a wetland. Other plant species encountered in this area included *Carpha glomerata* (vlei sedge), *Juncus* sp., *Zantedeschia aethiopica* (arum lily) and *Tropaeolum* sp. (nasturtium), all associated with above-normal levels of soil saturation indicating the likely presence of a wetland.

Soil augering in the area confirmed the presence of a wetland in this area but the development of the residential dwelling is considered not to have impacted on this wetland. The assessment was therefore

[1] This refers to when one faces downstream.

limited to the impacts of the residential development on the aquatic biodiversity associated with the Eerste River.

Detailed Freshwater Assessment Results

Table presenting the results of the freshwater ecological assessments.

Indice	Overall Result	Key reasons:
Eerste River		
PES (IHIA)	Category "C"	• The most noticeable instream modifications are bed and channel modification caused by historic floods and invasion by exotic fauna (alien trout have caused the elimination of the Berg River Redfin from the upper reaches of the river). • Water quality impairment as a result of construction of bridges and other cementitious structures was considered to be a minor impact on the instream component. • Indigenous vegetation removal, streambank erosion, channel modification and exotic vegetation encroachment have also had a clearly detrimental impact on riparian habitat quality, diversity, size and variability. • Historical construction within the riparian zone of concrete structures would have also led to minor water quality impacts. Overall, the riparian component has been modified to a greater extent that the instream component.
EIS	Moderate	• The river may support endangered or rare biota or populations of unique species and is likely to be an important site for species migration, breeding and/or feeding given it falling within historical distribution of Boland Granite Fynbos (EN) and being identified as an Aquatic CBA. • At the landscape scale the river has zero protection status, has a PES of C (Moderately modified) but is considered to be a river of notable size and moderate rarity. • In terms of sensitivity, the river is regarded as being moderately sensitive to changes in floods and changes in low-flow, owing primarily to its classification as a upper foothills river, and is also sensitive to changes in water quality due to the low nutrient levels in the general area's freshwater systems (in their unimpacted, reference condition).
REC	Category "C"	• Given that the EIS category was determined to be Moderate, which means that the site's river is ecologically important and sensitive on a provincial or local scale, and the PES is a "C" means it is not considered necessary to increase the PES. The REC for the river is therefore a Category "C".

Impact Assessment

The construction of the residential dwelling is likely to have caused the following significant impacts on freshwater ecosystems (the impacts are highlighted in bold and the activity causing the impact is also described):

- The operation of construction vehicles and machinery, stockpiling of construction materials and also the presence of construction workers within or in close proximity to aquatic habitat would have caused **disturbance to riparian habitat** associated with the river.
- The use of cementitious materials when constructing the fire pit on the riverbank would have resulted in **water quality impairment** of the river.
- When clearing the site of vegetation and preparing the levelled building platform soil would have been exposed. During periods of rainfall the exposed areas would have been prone to **erosion** and where this occurred would have contributed to **sediment loading** of the river.

Potential impacts associated with the ongoing residential land use of the site would be as follows:

- **Alteration of flow regime** affecting the river as a result of increased run-off from hard surfaces (primarily roofs and paved areas) which in turn increases peak flow in the river.
- Riparian habitat would endure ongoing, long term **habitat disturbance and edge effects** due to

the fact that part of the residential dwelling is not sufficiently setback from the edge of the riparian area.

The table below presents a summary of the impact assessment for the identified impacts associated with the construction and operational phases of the residential development.

Table presenting a Summary of Impact Significance Ratings for identified Direct Impacts.

Impact	Without mitigation	With mitigation
Construction phase:		
Disturbance of riparian habitat	**Low**	*N/A*
Alteration of Flow Regime	**Low**	*N/A*
Increased erosion & sedimentation	**Low**	*N/A*
Water quality impairment	**Low**	*N/A*
Operational phase:		
Alteration of flow regime	**Medium**	**Very low**
Disturbance of riparian habitat	**Medium**	**Very low**

The impacts associated with the construction phase have already occurred and therefore cannot be mitigated. The operational phase impacts can be mitigated by:

- Alteration of flow regime:
  - Install rainwater harvesting tanks with sufficient capacity to contain roof run-off for a significant proportion of the winter rainy season.
  - Utilise the stored water in the dry summer season for garden / landscaping irrigation or alternatively use the water for domestic consumption (e.g. as grey water for ablutions etc).
- Riparian habitat disturbance (edge effects):
  - Ensure that the dumping of any form of waste into the river does not take place;
  - Decommission the landscaped flower bed and replant the area with a suitable groundcover that results in no areas of exposed soil;
  - Inspect the riparian zone for the presence of invasive alien plants and remove with immediate effect. For effective best practise methods for invasive alien vegetation removal consult Martens *et al*. (2021).

Decommissioning Scenario

The only alternative to allowing the continued construction and operation of the residential development is to decommission the dwelling and associated infrastructure. Decommissioning as an activity in itself, due to the residential dwelling's location adjacent to a river, would potentially cause significant aquatic ecological impacts to the river. These impacts could be partially mitigated through formulating and implementing a Remediation Plan which would presumably include specifications to ensure that decommissioning activities have minimal impact on the site's environmentally sensitive features and also to ensure that any disturbed habitat is suitably rehabilitated. In assessing the aquatic ecological impact of the decommissioning scenario, this assessment has found that the overall impact of decommissioning would be of a **Medium (-ve)** significance and with mitigation could be reduced to a **Low (-ve)** significance.

Conclusion & Recommendations

In terms of the assessment of freshwater ecological impacts associated with the residential development of Farm 1620 Stellenbosch, the continued operation of the residential development with implementation of the recommended mitigation measures outlined in this report would be similar to the decommissioning scenario (assuming the effective implementation of a Remediation Plan, should decommissioning take place). In comparing the feasibility of allowing the continued operation of the residential development with the option of decommissioning, a key consideration in support of the continued operation of the residential development is the added significant cost to the owner of decommissioning and lost opportunity cost of not realising the development aspirations for the site. These added costs constrain the likelihood of effective remediation associated with decommissioning thereby rendering decommissioning even less favourable from a freshwater ecological perspective. In summary, decommissioning with effective remediation is considered unfeasible compared to the

implementation of the recommended mitigation measures and allowing the residential dwelling to remain.

It is therefore the specialist's reasoned opinion that, provided the recommended mitigation measures are implemented, the continued operation of the residential development should be supported from a freshwater ecological perspective.

Risk Assessment

Given that all of the activities have been determined to be associated with a LOW risk rating, the proposed development qualifies for a General Authorisation (GA) as far as the Section 21 (c) and (i) water uses are concerned.

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Glossary[2]

Alluvial soil: A deposit of sand, mud, etc. formed by flowing water, or the sedimentary matter deposited thus within recent times, especially in the valleys of large rivers.

Biodiversity: The number and variety of living organisms on earth, the millions of plants, animals and micro-organisms, the genes they contain, the evolutionary history and potential they encompass and the ecosystems, ecological processes and landscape of which they are integral parts.

Buffer: A strip of land surrounding a wetland or riparian area in which activities are controlled or restricted, in order to reduce the impact of adjacent land uses on the wetland or riparian area.

Catchment: The area contributing to runoff at a particular point in a river system.

Chroma: The relative purity of the spectral colour which decreases with increasing greyness.

Critical Biodiversity Areas: Areas of the landscape that need to be maintained in a natural or near-natural state in order to ensure the continued existence and functioning of species and ecosystems and the delivery of ecosystem services.

Delineation (of a wetland): To determine the boundary of a wetland based on soil, vegetation and/or hydrological indicators.

Ecoregion: A recurring pattern of ecosystems associated with characteristic combinations of soil and landform that characterise that region.

Non-perennial stream: A stream that has transitory or short-lived flow.

Groundwater: Subsurface water in the saturated zone below the water table.

Habitat: The natural home of species of plants or animals.

Hue (of colour): The dominant spectral colour.

Hydromorphic soil: A soil that, in its undrained condition, is saturated or flooded long enough to develop anaerobic conditions favouring the growth and regeneration

[2] As provided by DWA (2005) and WRC Report No. TT 434/09.

	of hydrophytic vegetation (vegetation adapted to living in anaerobic soils).
Hydrology:	The study of the occurrence, distribution and movement of water over, on and under the land surface.
Hydrophytes:	Also called obligate wetland plants - plants that are physiologically bound to water where at least part of the generative cycle takes place in the water or on the surface.
Halophytes:	Salt tolerant plants.
Helophytes:	Also called facultative wetland plants - essentially terrestrial plants of which the photosynthetically active parts tolerate long periods of submergence or floating on water.
Indicator species:	A species whose presence in an ecosystem is indicative of particular conditions (such as saline soils or acidic waters).
Intermittent flow:	Flows only for short periods.
Macrophyte:	A large plant - in wetland studies usually a large plant growing in shallow water or waterlogged soils.
Perennial:	Permanent - persisting from year to year.
Riparian area delineation:	The determination and marking of the boundary of the riparian area.
Riparian habitat:	Includes the physical structure and associated vegetation of the areas associated with a watercourse which are commonly characterized by alluvial soils (deposited by the current river system) and which are inundated or flooded to an extent and with a frequency sufficient to support vegetation of species with a composition and physical structure distinct from those of adjacent areas.
Shrub:	A shrub is a small to medium-sized woody plant.
Temporary zone:	The zone that is alternately inundated and exposed.
Terrain unit morphological classes:	Areas of the land surface with homogenous form and slope.
Watercourse (NWA):	(a) A river or spring; (b) A natural channel in which water flows regularly or intermediately; (c) A wetland, lake or dam into which or from which water flows; and (d) Any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse.
Water table:	The upper surface of groundwater or that level below which the soil is saturated with water. The water table feeds base flow to the river channel network when the river channel is in contact with the water table.
Wetland:	An area of marsh, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed ten metres.

Acronyms

CBA	Critical Biodiversity Area
DWA	Department of Water Affairs
DWAF	Department of Water Affairs and Forestry
DWS	Department of Water and Sanitation
EIS	Ecological Importance and Sensitivity
ESA	Ecological Support Area
FEPA	Freshwater Ecological Priority Area
GA	General Authorisation
GPS	Global Positioning System
HGM	Hydrogeomorphic

IHI Index of Habitat Integrity
IHIA Intermediate Habitat Integrity Assessment
MAP Mean Annual Precipitation
NEMA National Environmental Management Act
NFEPA National Freshwater Ecosystem Priority Areas
NWA National Water Act
PES Present Ecological State
REC Recommended Ecological Category
SANBI South African National Biodiversity Institute
Sub-WMA Sub - Water Management Area
WCBSP Western Cape Biodiversity Spatial Plan
WMA Water Management Area
WUL Water Use Licence

Disclaimer

EnviroSwift Western Cape has exercised all due care in the reviewing of all available information and the delineation of the watercourse boundaries. The accuracy of the results and conclusions from the assessment are entirely reliant on the accuracy and completeness of available desktop information, site conditions at the time of the assessment and professional judgment. EnviroSwift Western Cape does not accept responsibility for any errors or omissions in the assessment and therefore does not accept any consequential liability arising from commercial decisions made, which are based on the information contained in this report. Opinions presented in this report apply to conditions/site conditions applicable at time of review and those conditions which are reasonably foreseeable.

Specialist Details and Experience

Nick Steytler (Pr.Sci.Nat. 400029)

Nick Steytler is an environmental scientist (Pr Sci Nat) with over 25 years' experience as a professional in the field of environmental management and in the last 6 years has expanded on his range of professional expertise to include freshwater ecology. Nick's professional career began in 1996 when he was employed in KwaZulu-Natal as part of the Institute of Natural Resources' (INR) Natural Resource Management Programme. He then moved to the Western Cape in 2000 where he was employed by SRK Consulting as an environmental consultant. In 2007 Nick established his own company, KHULA Environmental Consultants, which developed a notable reputation in the Western Cape in the field of Integrated Environmental Management (e.g. EIAs, EMPs, environmental audits and ECO services). At the beginning of 2019 Nick began working as an associate to EnviroSwift Western Cape (WC) where he was mentored by Josh Gericke in undertaking freshwater ecological specialist studies. Following Josh's immigration to New Zealand Nick took over the company and now undertakes all wetland specialist work in the Western, Southern, Eastern and Northern Cape. EnviroSwift Western Cape is partnered by EnviroSwift KZN which is owned/directed by Louise Santana. Nick Steytler's CV is attached as Appendix 3.

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1 Introduction

1.1 Project Background

Dupré Lombard of Virdus Works ("Virdus Works"), on behalf of the owner of Farm 1620 Stellenbosch, requested that EnviroSwift Western Cape (EnviroSwift) provide the required freshwater specialist input and guidance for the recent development of Farm 1620 Stellenbosch (see Figure 1 for Site Location Plan). Given that part of the residential dwelling developed by the owner encroached on the 32m NEMA regulatory line for watercourses, the development should have received prior environmental authorisation but this was not obtained. The owner is therefore applying for retrospective authorisation and a NEMA Section 24G (S24G) Rectification Application is being submitted. In order to fulfil the reporting requirements of the S24G Rectification Application a detailed level of freshwater ecological assessment is required.

Also, due to the requirement for a Water Use Authorisation in terms of the National Water Act (NWA, Act 36 of 1998), a detailed freshwater ecological assessment would be required to inform the Water Use Authorisation. The detailed assessment must include a risk assessment in order to determine whether the project qualifies for a General Authorisation (GA) or a Water Use Licence Application (WULA). Accordingly, EnviroSwift has been appointed by Virdus Works to conduct a detailed Freshwater Ecological Assessment (inclusive of a Risk Assessment) to inform the Section 24G Rectification Application and likely Water Use Application.

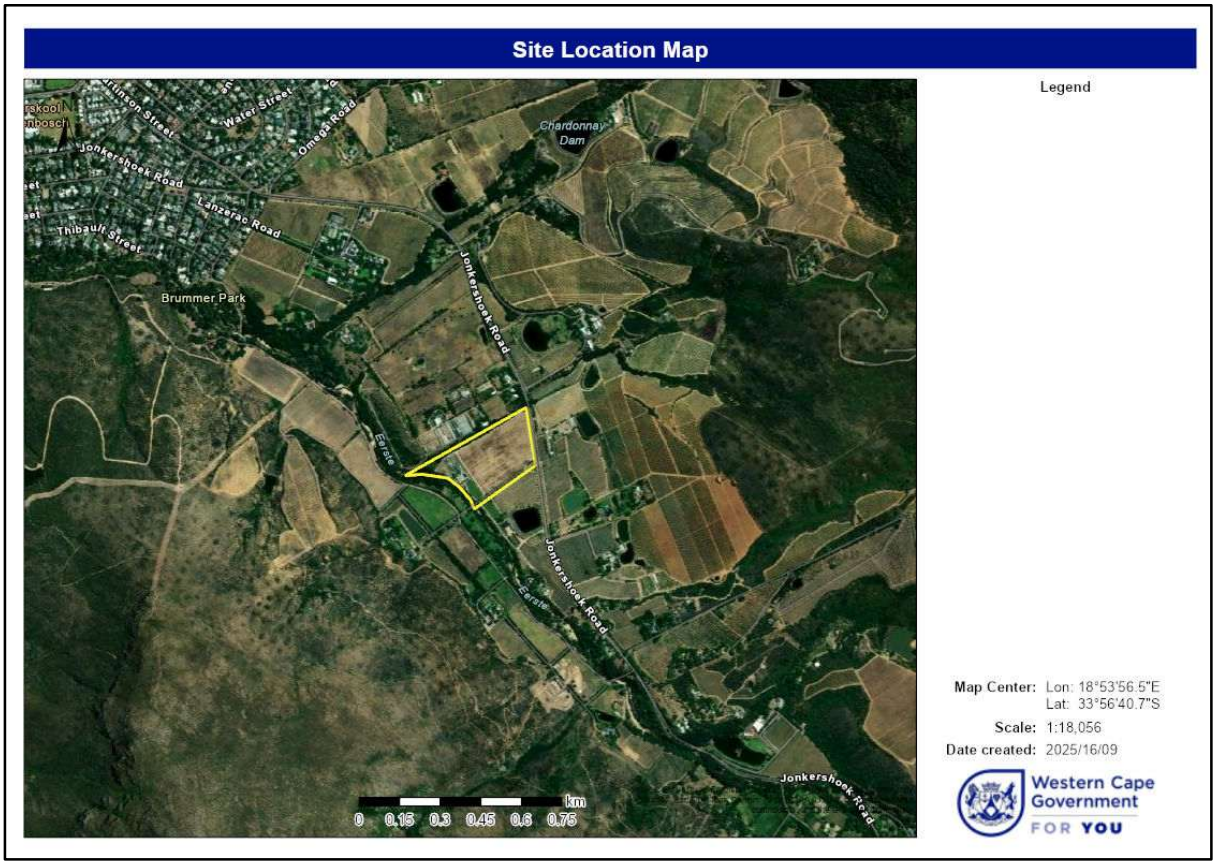

Figure 1: Location of Farm 1620 Stellenbosch. The yellow polygon indicates the extent of the property.

1.2 Scope of Work

The Terms of Reference provided by Virdus Works were as follows:

- Undertake a detailed freshwater ecological assessment which assesses the impacts caused by the

development of the single residential dwelling and associated infrastructure on watercourses as defined in terms of the relevant environmental legislation;
- Recommend feasible and practicable mitigation measures which can be implemented by the landowner to mitigate any on-going or future impacts;
- Include a Risk Assessment utilising the revised Risk Assessment Matrix (RAM) prescribed by the Department of Water & Sanitation (DWS) and accordingly determine whether the project qualifies for a GA or a WULA in terms of the NWA.

Based on the above ToR, the following scope of works was undertaken:

- Assessment of relevant background information including the National Wetland Map Version 5 (NWM5, 2018), the Western Cape Biodiversity Spatial Plan (WCBSP, 2023), the National Geospatial Information (NGI) Service topographical maps and vector data, and pertinent academic resources;
- A site assessment including delineation of any rivers and any wetland temporary boundaries at risk of being impacted by the development in accordance with best practice methods (refer to methods section);
- Assessment of the Present Ecological State (PES), Ecological Importance and Sensitivity (EIS) of the directly affected watercourses according to best practice methods (refer to methods section);
- Identification of the freshwater impacts associated with the construction and operation of the residential dwelling and associated infrastructure; and
- Assessment of the identified freshwater impacts and recommendation of practicable mitigation measures; and
- Completion of the Revised RAM and determination of the relevant level of Water Use Authorisation in terms of the NWA.

1.3 Limitations and Assumptions

The following limitations apply to this study:

- The scope of the assessment has been prescribed by VIRDUS WORKS and includes the assessment of impacts associated with the construction and operation of the existing residential dwelling and associated infrastructure due to the fact that the dwelling has encroached the 32m NEMA Regulatory area from a watercourse and therefore should have obtained prior environmental authorisations in terms of the NEMA EIA Regulations (2014, as amended) and the National Water Act, Act 36 of 1998.
- Given that the dwelling and associated infrastructure has already been built, determination of the predevelopment state of the site has only been possible from historical aerial imagery. As a result some freshwater habitat that existed on or near the site may not have been detected.
- The site's watercourses were delineated using a Garmin Etrex 20 with an expected accuracy of 3 to 5 metres. Aerial imagery (Google Earth Pro) was also used to assist with the delineations. This was considered acceptable for this study because the primary aim of the study was to determine the impacts that have already taken place and/or are currently occurring as a result of the ongoing use of the site for residential purposes.
- One site assessment was conducted on 22 August 2025 in the middle of the wet season. Hydrology could therefore be directly observed and therefore there is no reason to re-visit the site to determine hydrology and seasonality.
- In order to assess the Present Ecological State (PES) of the river reach abutting the site only the Intermediate (IHIA) indice was used. In addition to the IHIA is the South African Scoring System version 5 (SASS5) and Riparian Vegetation Index (RVI) which also provide information on the ecological condition of rivers and their associated riparian zones. SASS5 and RVI assessments were undertaken by Ekologik (2024) for a portion for the river which included the portion that flows adjacent to the site. The assessments were undertaken to inform the compilation of a Maintenance Management Plan (MMP) for a portion of the Eerste River that includes Farm 1620 Stellenbosch that was adopted by DEA&DP in June 2025. No SASS5 or RVI assessment was deemed necessary as the aim of the present study is to inform a retrospective application for environmental authorisations for the development of a residential dwelling due to its proximity to the river. Given that the MMP is adopted for the river reach that abuts the site, it is also not considered necessary to repeat the SASS5 and RVI assessments.

- The River Health Programme has also undertaken a number of assessments of the river in the past and provided additional data for the river assessment undertaken by Ekologik. The Ekologik report and River Health Programme (2005) assessment therefore provided additional useful information in assessing the ecological condition of the river.
- The river has been subjected to significant floods in recent years which would have affected the PES of the river (both instream and riparian habitat were significantly impacted). As such the PES is on a trend of improvement until a future flood causes the PES to decline.
- The application of the Buffer Zone Guidelines (Macfarlane and Bredin, 2017) was not considered applicable in this instance given that the residential building has already been constructed and the opportunity to establish a suitable buffer has been lost.

1.4 Legislation

1.4.1 National Water Act (Act 36 of 1998)

The purpose of the NWA is to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled in ways which take into account amongst other factors -
(g) protecting aquatic and associated ecosystems and their biological diversity; and
(h) reducing and preventing pollution and degradation of water resources.

In order to understand and interpret the Act correctly, the following definitions are applicable to this project:
``**pollution"** means the direct or indirect alteration of the physical, chemical or biological properties of a water resource;
``**protection",** in relation to a water resource, means -
(a) maintenance of the quality of the water resource to the extent that the water resource may be used in an ecologically sustainable way;
(b) prevention of the degradation of the water resource; and
(c) the rehabilitation of the water resource;
``**resource quality"** means the quality of all the aspects of a water resource including -
(a) the quantity, pattern, timing, water level and assurance of instream flow;
(b) the water quality, including the physical, chemical and biological characteristics of the water;
(c) the character and condition of the instream and riparian habitat; and
(d) the characteristics, condition and distribution of the aquatic biota;
“watercourse" means -
(a) a river or spring;
(b) a natural channel in which water flows regularly or intermittently;
(c) a wetland, lake or dam into which, or from which, water flows; and
(d) any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks; and
``**water resource"** includes a watercourse, surface water, estuary, or aquifer.

The NWA deals with pollution prevention, and in particular the situation where pollution of a water resource occurs or might occur as a result of activities on land. The person who owns, controls, occupies or uses the land in question is responsible for taking measures to prevent pollution of water resources. The measures may include measures to -
(a) cease, modify or control any act or process causing the pollution;
(b) comply with any prescribed waste standard or management practice;
(c) contain or prevent the movement of pollutants;
(d) eliminate any source of the pollution;
(e) remedy the effects of the pollution; and
(f) remedy the effects of any disturbance to the bed and banks of a watercourse.

In terms Section 21 of the NWA “water use” is defined broadly and includes taking and storing water, activities which reduce stream flow, waste discharges and disposals, controlled activities (activities which impact detrimentally on a water resource), altering a watercourse, removing water found underground for certain purposes, and recreation. In general, a water use must be licensed unless it is listed in Schedule I, is an existing lawful use, is permissible under a general authorisation, or if a responsible authority waives the need for a licence. Of particular relevance to this study are the following

Section 21 water uses:

- Section 21 (c): Impeding or diverting the flow in a watercourse; and
- Section 21 (i): Altering the bed, banks, course or characteristics of a watercourse.

Notice Number 4167 of the Government Gazette 49833 dated 8 December 2023 promulgated in terms of the NWA makes allowance for a regulated area around all watercourses within which the risk of Section 21 (c) and (i) activities must be assessed. The stipulated regulated areas include everything within 500m of the boundary of wetland, and everything within 100m or the 1:100 year flood-line (whichever is the greater distance) of a river, stream or river.

The following is applicable for any development within the regulated zone:

- Should a freshwater ecologist consider the proposed development to be of zero to negligible risk to freshwater resources then a letter may be provided to this effect and the requirement for a WUA would be waivered (W. Roets, pers. comm.).
- In all other cases, a risk assessment in terms of the revised General Authorisation (GA) for 21(c) and (i) water uses must be undertaken to determine the quantum of risk posed to the watercourse by the proposed development.
- Should the development pose a LOW risk, registration of the water use under the General Authorisation (GA) would be required.
- Should the development pose a MEDIUM risk, application for a Water Use License (WUL) would be required.
- HIGH risk developments also require a WUL but are not readily approved.

DWS holds competency in terms of the NWA and as such either authorises or rejects Water Use Applications.

1.4.2 National Environmental Management Act (107 of 1998)

The NEMA states the following:

“Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment.”

The Act also makes special mention of the importance of the protection of wetlands:
“Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure.”

Environmental Impact Assessment (EIA) Regulations have been promulgated under NEMA since 2006[3] which list activities that may be detrimental to the environment and that require prior Environmental Authorisation. The Regulations specify the level of EIA (either a Basic Assessment or a full Scoping and EIA process) that needs to be undertaken in order to obtain the required Environmental Authorisation.

Section 24 of NEMA makes provision for the retrospective issuing of an environmental authorisation (termed “rectification”) where developments have commenced without the required prior Environmental Authorisation. If an activity is deemed to have proceeded without the requisite Environmental Authorisation then the competent authority may issue a Directive to the responsible party(s) to cease continuing with the activity and either rehabilitate the site or submit an application for rectification. The rectification application entails the identification and assessment of impacts that have actually been caused by the development and the recommendation of mitigation measures, where practicable and reasonable, to reverse historical impacts and minimise the ongoing impacts. If successful, the

[3] Regulations were promulgated in 2006, 2010 and 2014.

rectification process will result in the activities being authorised in terms of the NEMA EIA Regulations and may stipulate conditions of authorisation that need to be complied with.

2 Method of Assessment

2.1 Overview

The methods used in this freshwater specialist study entailed the following:

- A desktop assessment to determine the ecological context of the affected watercourse;
- Site assessment to describe the site's watercourse(s) and delineate their extent;
- An assessment of the Present Ecological Status (PES) and Ecological Importance and Sensitivity (EIS) of the directly affected watercourses using recognised classification systems and indices based on the information collected during the desktop assessment and site assessment;
- An impact assessment where the impacts caused by the future construction and operation of the residential development are identified (based on historical aerial imagery and the site assessment) assessed and mitigation and/or management measures are recommended to minimise the potentially significant negative impacts and enhance potential benefits; and
- A Risk Assessment as prescribed in terms of Notice Number 4167 of the Government Gazette 49833 to determine whether the residential development qualifies for a GA or a WULA (see Section 1.4.1).

These methods are discussed in more detail in the following sections.

2.2 Desktop Assessment

The scope of work includes a desktop assessment using available national and provincial databases including the WCBSP (2023), the NWM5 (CSIR, 2018), the NFEPA database (2011) and maps and vector data form the National Geospatial Information (NGI) directorate as available on Cape Farm Mapper (2025). The WCBSP categorises natural features into Protected Areas (PAs), Critical Biodiversity Areas (CBAs), Ecological Support Areas (ESAs), and Other Natural Areas (ONAs), which are defined in the plan as follows:

Table 1: Systematic Conservation Planning category definitions and management objectives.

MAP CATEGORY	DEFINITION	DESIRED MANAGEMENT OBJECTIVE	SUB-CATEGORY
Protected Area	Areas that are proclaimed as protected areas under national or provincial legislation.	Must be kept in a natural state, with a management plan focused on maintaining or improving the state of biodiversity. A benchmark for biodiversity.	n/a
Critical Biodiversity Area 1	Areas in a natural condition that are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure.	Maintain in a natural or near-natural state, with no further loss of habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land uses are appropriate.	CBA: River CBA: Estuary CBA: Wetland CBA: Forest CBA: Terrestrial
Critical Biodiversity Area 2	Areas in a degraded or secondary condition that are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure.	Maintain in a functional, natural or near-natural state, with no further loss of natural habitat. These areas should be rehabilitated.	CBA: Degraded
Ecological Support Area 1	Areas that are not essential for meeting biodiversity targets, but that play an important role in supporting the functioning of PAs or CBAs, and are often vital for delivering ecosystem services.	Maintain in a functional, near-natural state. Some habitat loss is acceptable, provided the underlying biodiversity objectives and ecological functioning are not compromised.	ESA: Foredune ESA: Forest ESA: Climate Adaptation Corridor ESA: Coastal Resource Protection ESA: Endangered Ecosystem ESA: River ESA: Estuary ESA: Wetland ESA: Watercourse Protection ESA: Water Source Protection ESA: Water Recharge Protection
Ecological Support Area 2	Areas that are not essential for meeting biodiversity targets, but that play an important role in supporting the functioning of PAs or CBAs, and are often vital for delivering ecosystem services.	Restore and/or manage to minimise impact on ecological infrastructure functioning; especially soil and water-related services.	ESA: Restore from NN
ONA: Natural to Near-Natural	Areas that have not been identified as a priority in the current systematic biodiversity plan, but retain most of their natural character and perform a range of biodiversity and ecological infrastructure functions. Although they have not been prioritised for biodiversity, they are still an important part of the natural ecosystem.	Minimise habitat and species loss and ensure ecosystem functionality through strategic landscape planning. Offers flexibility in permissible land uses, but some authorisation may still be required for high-impact land uses.	ONA: Natural to Near-Natural ONA: Degraded
No Natural Remaining	Areas that have been modified by human activity to the extent that they are no longer natural, and do not contribute to biodiversity targets. These areas may still provide limited biodiversity and ecological infrastructure functions, even if they are never prioritised for conservation action.	Manage in a biodiversity-sensitive manner, aiming to maximise ecological functionality. Offers the most flexibility regarding potential land uses, but some authorisation may still be required for high-impact land uses.	No Natural Remaining

2.3 Watercourse Identification and Delineation

For the purpose of the identification of water resources, the definition as provided by the NWA (Act no. 36 of 1998) was used to guide the site assessment. The NWA defines a water resource as a watercourse, surface water, estuary or aquifer, of which the latter two are not applicable to this assessment due to an estuary being associated with the sea and, in line with best practice guidelines, wetland and riparian assessments only include the assessment of the first 50 cm from the soil surface, therefore aquifers are excluded. In addition, reference to a watercourse as provided above includes, where relevant, its bed and banks.

In order to establish if the watercourses in question can be classified as 'wetland habitat' or 'river habitat', the definitions as drafted by the NWA (Act no. 36, 1998)[4] were taken into consideration:

- A 'wetland' is land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil; and
- 'Riparian' habitat includes the physical structure and associated vegetation of the areas associated with a watercourse which are commonly characterized by alluvial soils, and which are inundated or flooded to an extent and with a frequency sufficient to support vegetation of species with a composition and physical structure distinct from those of adjacent areas'.

Freshwater habitat was identified with the use of the definitions provided above and the delineation took place according to the method supplied by DWAF (2005, updated 2008). Several indicators are prescribed in the watercourse delineation guideline to facilitate the delineation of either the temporary wetland zone or the rivers riparian zone.

Indicators used to determine the boundary of the wetland temporary zone include:

1) The position in the landscape;
2) The type of soil form;
3) The presence of wetland vegetation species; and
4) The presence of redoximorphic soil features, which are morphological signatures that appear in soils with prolonged periods of saturation.

Indicators used to determine the boundary of the riparian zone include:

1) Landscape position;
2) Alluvial soils and recently deposited material;
3) Topography associated with riparian areas; and
4) Vegetation associated with riparian areas.

[4] The definitions as provided by the NWA (Act No. 36 of 1998) are the only legislated definitions of wetlands in South Africa.

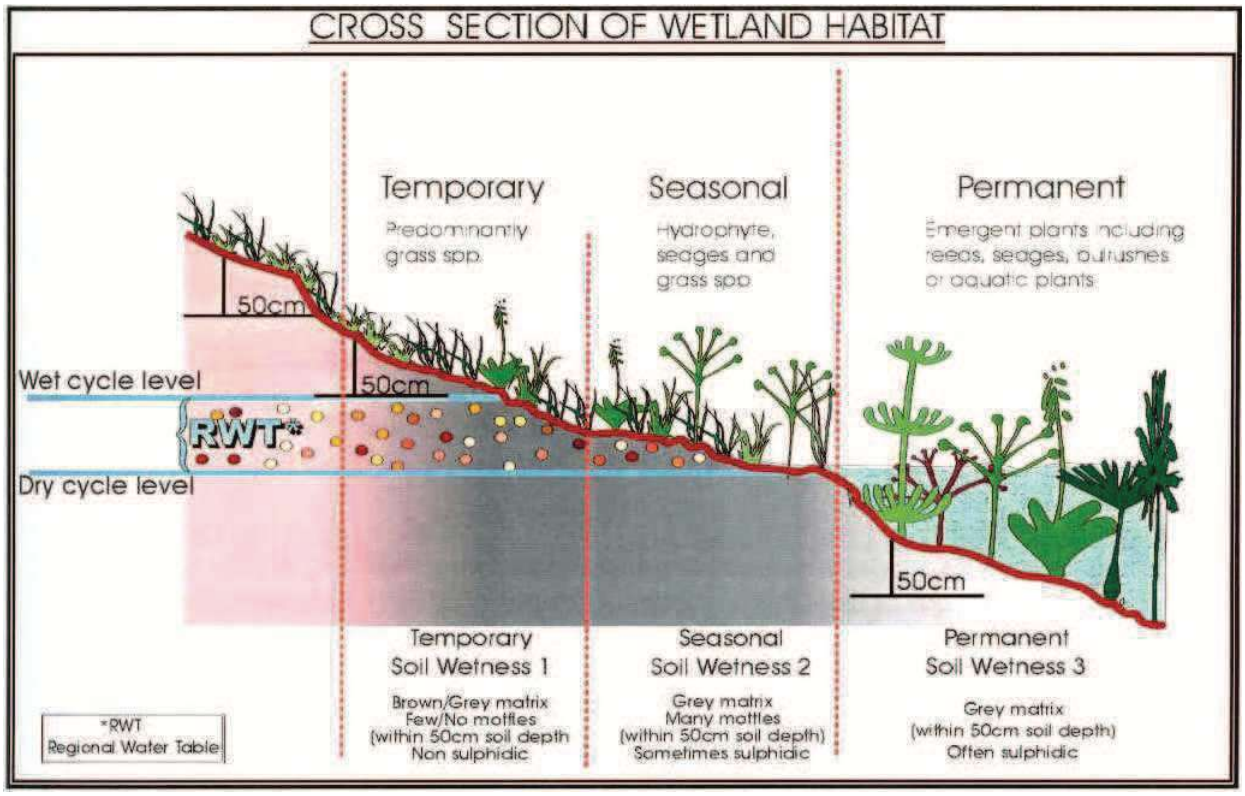

Figure 2: Cross section through a wetland (after DWAF, 2005).

Table 2: Vegetation characteristics used in the delineation of wetlands (after DWAF, 2005).

Terrestrial / Non wetland	Temporary	Seasonal	Permanent / Semi-permanent
Dominated by plant species which occur extensively in non-wetland areas; hydrophytic[5] species may be present in very low abundance	Predominantly grass species; mixture of species which occur extensively in non-wetland areas and hydrophytic plant species which are restricted largely to wetland areas	Hydrophytic sedge and grass species which are restricted to wetland areas	Dominated by emergent plants, including reeds, sedges and bulrushes or floating or submerged aquatic plants

[5] Plants that are physiologically bound to water where at least part of the generative cycle takes place in the water or on the surface.

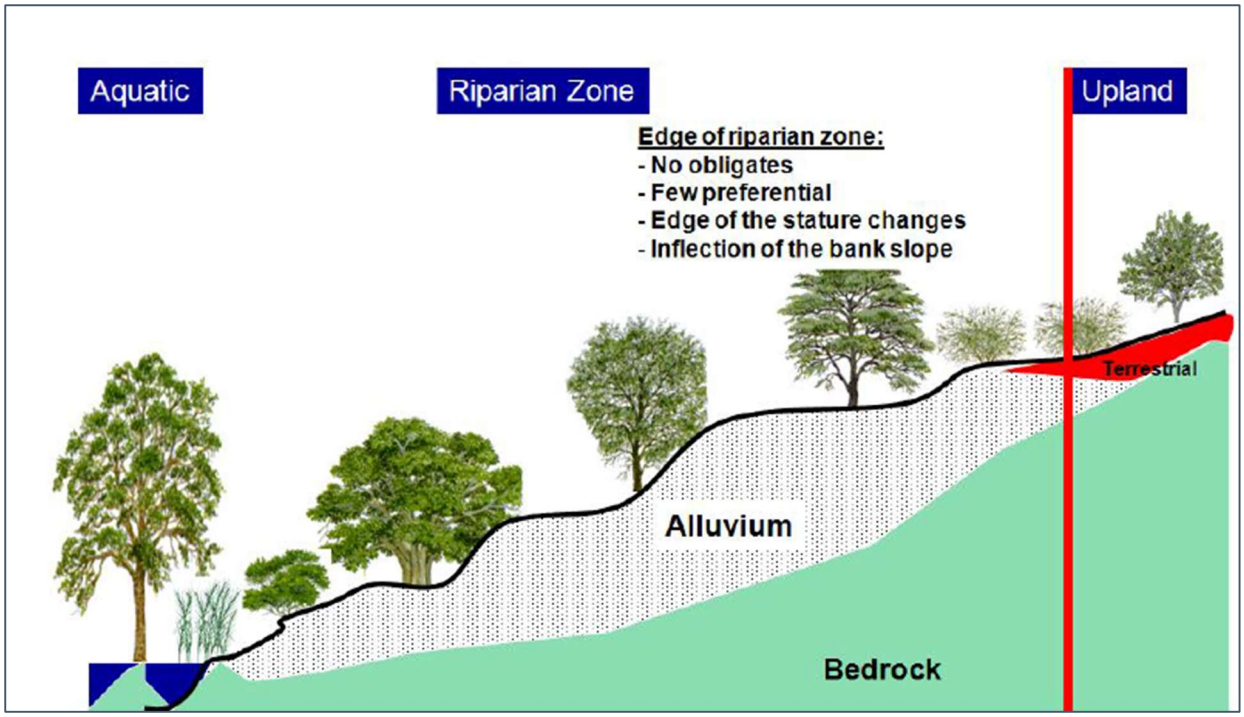

Figure 3: A schematic diagram illustrating the edge of the riparian zone on one bank of a large river (DWA, 2008).

2.4 Freshwater Feature Classification

Ecosystems included within the 'Classification System for Wetlands and other Aquatic Ecosystems in South Africa' (hereafter referred to as 'the Classification System') developed by Ollis *et. al*., (2013) encompass those that the Ramsar Convention defines, rather broadly, as 'wetlands', namely areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres (cited by Ramsar Convention Secretariat, 2011). The inland component of the Classification System has a six-tiered structure presented in the figure overpage.

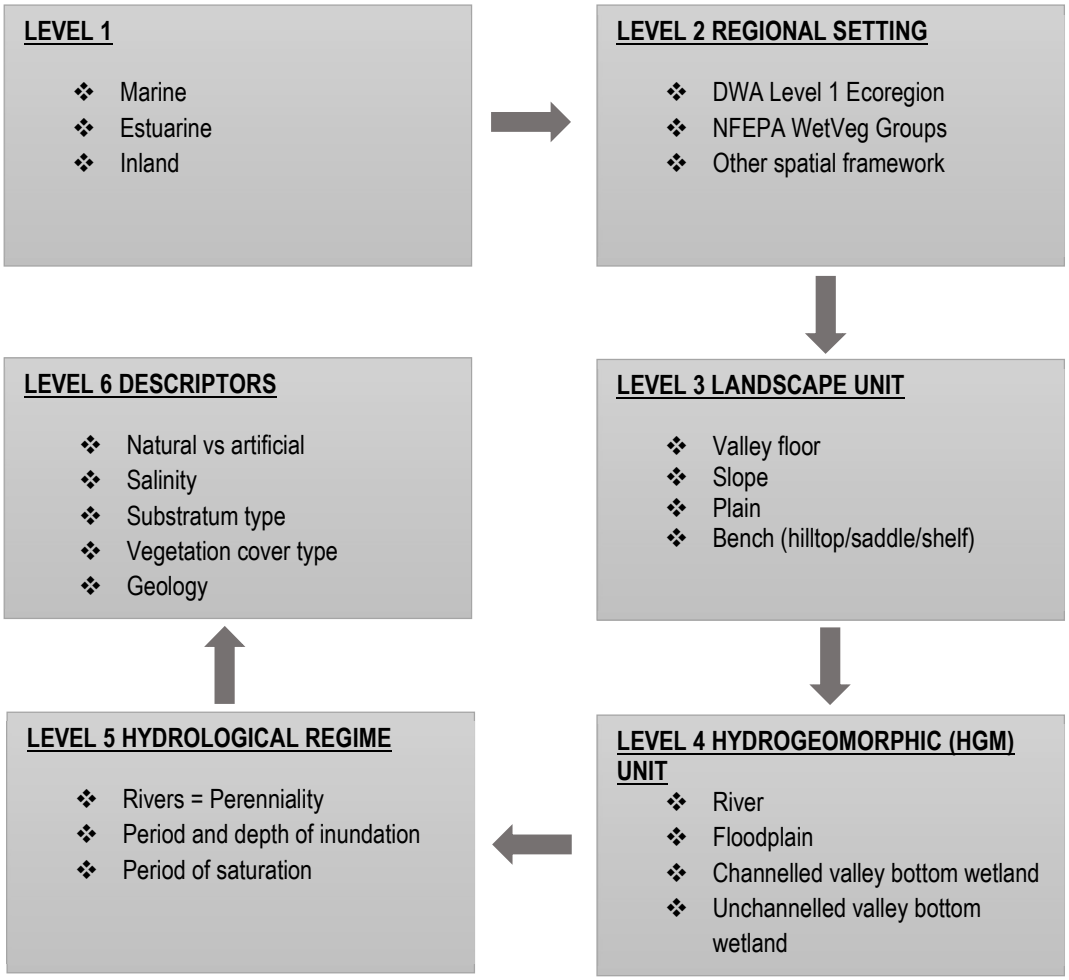

Figure 4: Classification System for wetlands and other aquatic ecosystems in South Africa.

2.5 Ecological Assessment Methodology for Wetlands

No wetlands were identified on or near the site that were at risk therefore it was not necessary to undertake any ecological assessment of wetlands.

2.6 Ecological Assessment Methodology for Rivers

2.6.1 Present Ecological State (PES)

The river Intermediate Habitat Integrity Assessment (IHIA) method (Kemper, 1999) is used to determine the PES of rivers. The river IHIA is based on two components of the watercourse, the riparian zone and the instream channel. Assessments are made separately for both aspects, but data for the riparian zone is primarily interpreted in terms of the potential impact on the instream component. The method involves the rating of the perceived modification of nine instream criteria and eight riparian criteria against a set scoring guideline. The final score is derived by calculating the average scores, which places the final score in one of the categories listed in Table 3 below.

Table 3: IHIA categories (From Kemper, 1999).

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

2.6.2 Ecological Importance and Sensitivity

The EIS method applied to rivers is based on the approach adopted by the DWA as detailed in the document "Resource Directed Measures for Protection of Water Resources" (1999). In the method a series of biota and habitat determinants are assessed on a scale of 0 to 4, where "0" indicates no importance and "4" indicates very high importance. The median score for the biota and habitat determinants is then derived and then is assigned to a category as indicated in Table 4. The EIS score also provides guidance on the recommended ecological category of the watercourse assessed (see Section 2.6.3).

Table 4: Ecological Importance and Sensitivity (EIS) categories and the interpretation of median scores for biota and habitat determinants (adapted from Kleynhans, 1999).

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

2.6.3 Recommended Ecological Category (REC)

The Recommended Ecological Category (REC) is determined by the PES score as well as importance and/or sensitivity. Rivers which have a PES falling within an E or F ecological category are deemed unsustainable. In such cases the REC must automatically be increased to a D. Where the PES is determined to be within an A, B, C or D ecological category, the EIS components must be evaluated to determine if any of the aspects of importance and sensitivity are high or very high. If this is the case, the feasibility of increasing the PES (particularly if the PES is in a low C or D category) should be evaluated and either set at the same ecological category or higher depending on feasibility. This is

recommended to enable important and/or sensitive rivers to maintain their functionality and continue to provide the goods and services for the environment and society.

2.6.4 Buffer Determination

No buffer determination was undertaken as the opportunity to establish a sufficiently wide buffer has been lost as the building has already been constructed.

2.7 Impact Assessment

A summary of the method of assessment is provided below; the detailed method is provided in Appendix 1. The following criteria were taken into consideration when determining the impact of the unlawful activities:

- The nature of the impact i.e. positive, negative, direct, indirect;
- The extent and location of the impact;
- The duration of the impact i.e. short term, long term, intermittent or continuous;
- The magnitude/intensity of the impact i.e. high, medium, low; and
- The likelihood or probability of the impact having occurred.

Given that the impacts generated during the construction phase have already occurred they cannot be mitigated. Only the ongoing activities associated with the residential development that are causing environmental impacts (i.e. the impacts identified as being associated with the operational phase) can, in most instances, be mitigated. Mitigation measures were subsequently identified and recommended only for the operational phase impacts to reduce the overall impact significance to an acceptable level, where and if possible.

Mitigation measures were aimed to ensure that:

- Alternative and more environmentally sound designs / layouts / technologies, etc., are implemented, if feasible;
- Environmental benefits of the unlawful activity are enhanced;
- Negative impacts are avoided, minimised or remedied; and
- Residual negative impacts are kept within acceptable levels.

Some of the impacts that have occurred in the construction phase can be reversed by removing the structures/infrastructure that caused the impacts and restoring the freshwater systems to their pre-development condition. Instead of assessing a No-Go and or no development alternative as is the standard for EIAs for proposed developments, this study considers the option of decommissioning the residential development (or significant parts thereof) from a freshwater ecological perspective only. It must be noted that this option potentially has significant socio-economic implications which it is assumed will be addressed by the EAP in the Basic Assessment process.

2.8 Risk Assessment

The risk assessment utilised the methodology stipulated by Government Notice No. 4167 (dated 8 December 2023) promulgated in terms of the NWA (Act 36 of 1998). In undertaking the risk assessment, the NWA Section 21 c and i activities are identified and their risk rated by assessing a number of criteria. The activities are assessed with the assumption that the recommended impact/risk mitigation measures are implemented (i.e. they reflect the “with mitigation” scenario).

3 Results

3.1 Desktop Assessment

3.1.1 Regional Setting

The site is situated within the Southwestern Coastal Belt ecoregion (Kleynhans *et al*, 2005), the main features of which are summarised in Table 5 which is adapted from Cape Farm Mapper website (https://gis.elsenburg.com/apps/cfm/). Local climatic, topographic and soil conditions for the study area are shown in Table 5, which is also sourced from the Cape Farm Mapper website. The study area is furthermore within the Breede Olifants Water Management Area (WMA), the Greater Cape Town Sub-WMA and the G22F quaternary catchment.

Table 5: Main attributes of the Southwestern Coastal Belt Ecoregion (Kleynhans *et. al.*, 2005).

Main Attributes	South Western Coastal Belt Ecoregion
Geology	Granite, quartzitic sandstone, quartzite, conglomerate, slate
Vegetation	Sand Plain Fynbos; Mountain Fynbos; West Coast Renosterveld; Dune Thicket; Strandveld Succulent Karoo
Landscape	Closed hills; mountains; moderate and high relief
Mean altitude	300-900m AMSL

3.1.2 Local Setting

Farm 1620 Stellenbosch is situated 9n the Jonkershoek Valley approximately 4 km east of the Stellenbosch CBD. The farm is approximately 7,6 ha in extent and lies on the northern side of the Eerste River which forms the southern boundary of the site. Most of the site comprises vineyards with the residential dwelling located in the southern portion of the site adjacent to the Eerste River.

The farm is moderately sloping (3 – 10%) with the exception of the portion of the site where the residential dwelling is located being slightly sloping to flat (<3% - see Figure 5) and at elevations of between 160 and 185 m a.s.l. It exhibits cool to warm temperatures and relatively high rainfall conditions that are typical of the Southwestern Coastal Belt. The main attributes of the site are presented in Table 6 below and in the figures that follow.

Table 6: Main attributes applicable to the site according to Cape Farm Mapper (2025).

Main Attributes	Farm 1620 Stellenbosch
Terrain:	0 – 10% slopes (see Figure 5)
Geology:	Granite of the Stellenbosch Pluton, Cape Granite Suite, as well as greywacke, phyllite and quartzitic sandstone of the Tygerberg Formation, Malmesbury Group, largely covered by gritty sand and scree; also alluvium.
Soils:	Rock with limited soils. Glenrosa and/or Mispah forms (other soils may occur), lime rare or absent in the entire landscape with the following characteristics: • Moderate Erodibility (0,34) • Soil Depth: <450 mm • Clay content: < 15%
Vegetation type:	Boland Granite Fynbos (Endangered) (see Figure 6))
Wetland vegetation type:	Southwest Granite Fynbos (Critically Endangered) (see Figure 7).
Altitude:	160 m – 185 m a.s.l.
Mean annual precipitation:	875 mm
Mean annual temp:	16,5 °C
Mean daily max. temp: February	28,2°C
Mean daily max. temp: July	16,8°C
Mean daily min. temp: February	14,7 °C
Mean daily min temp: July	7,2 °C
Mean annual runoff	136,61 mm/annum

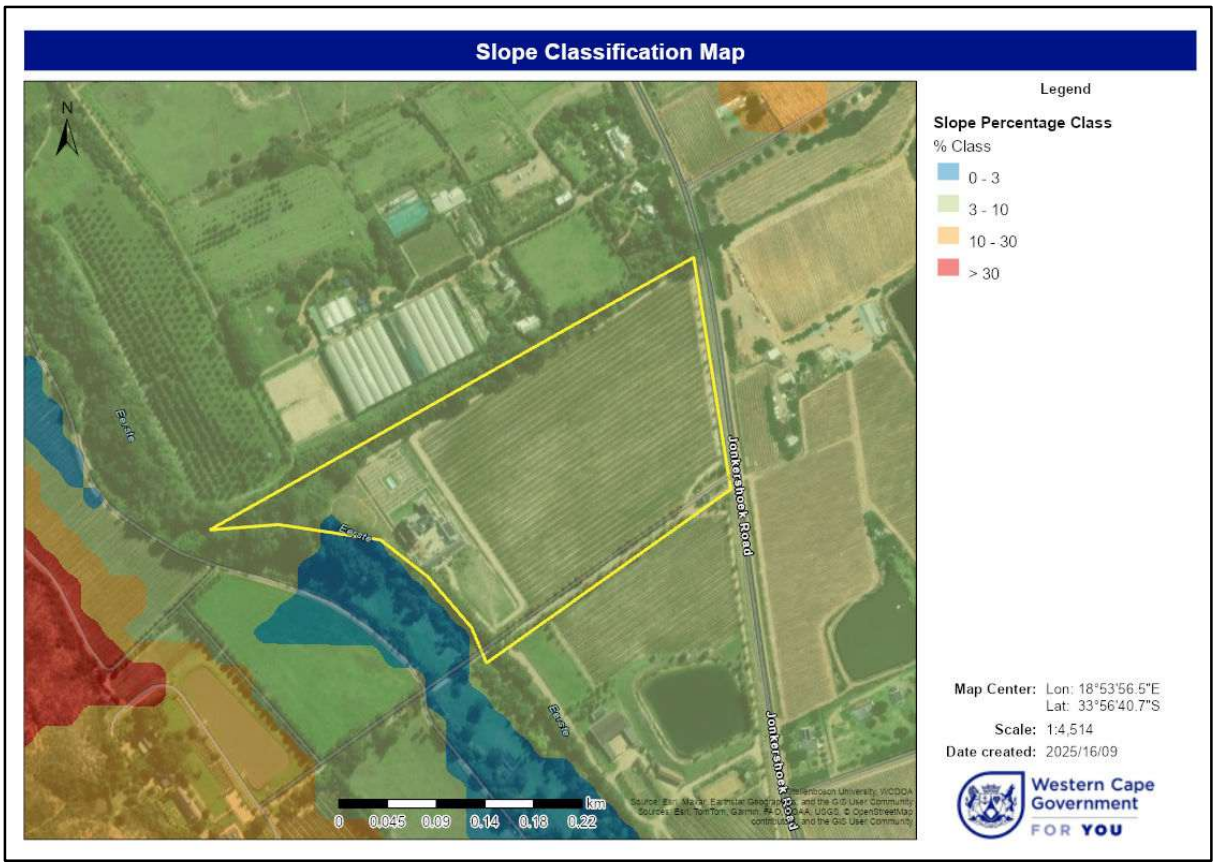

Figure 5: Slope classification Map of the site (Cape Farm Mapper, 2025).

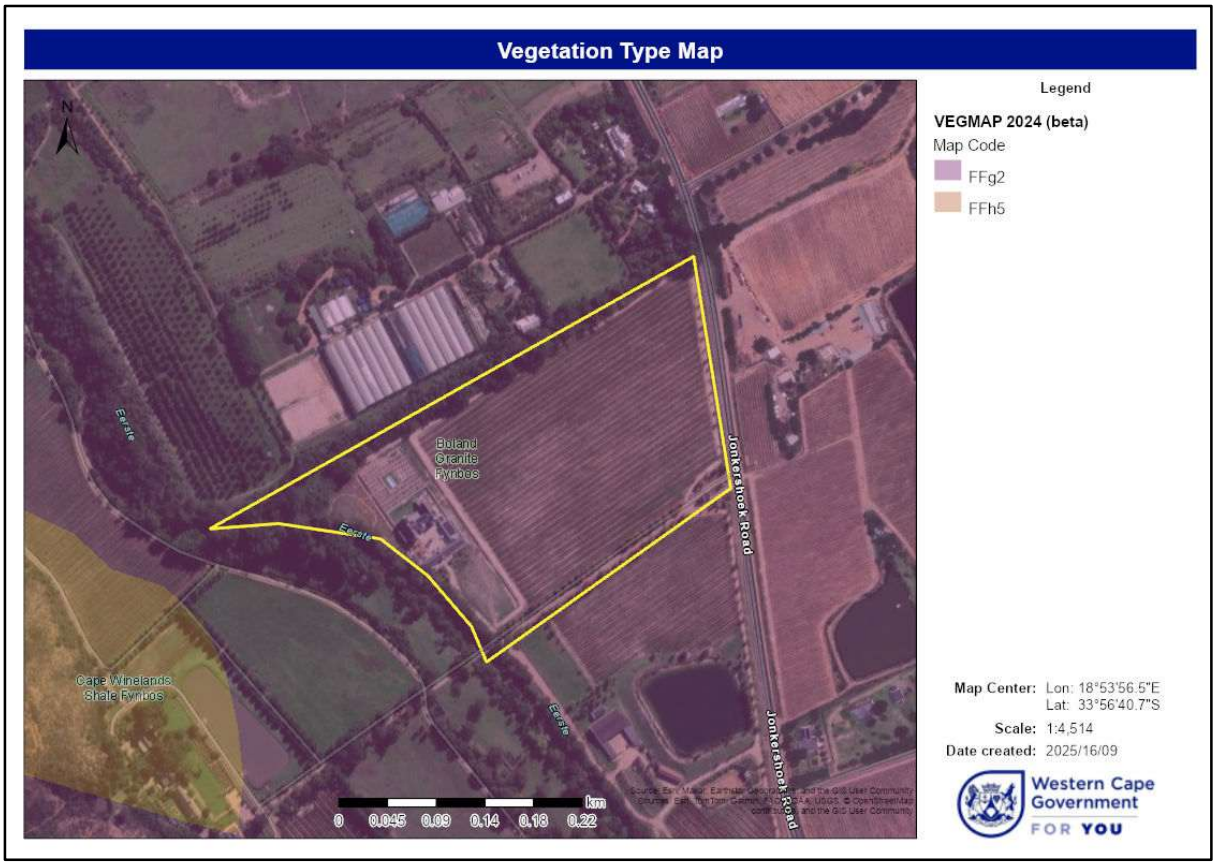

Figure 6: Terrestrial Vegetation Type Map (Vegmap, 2024).

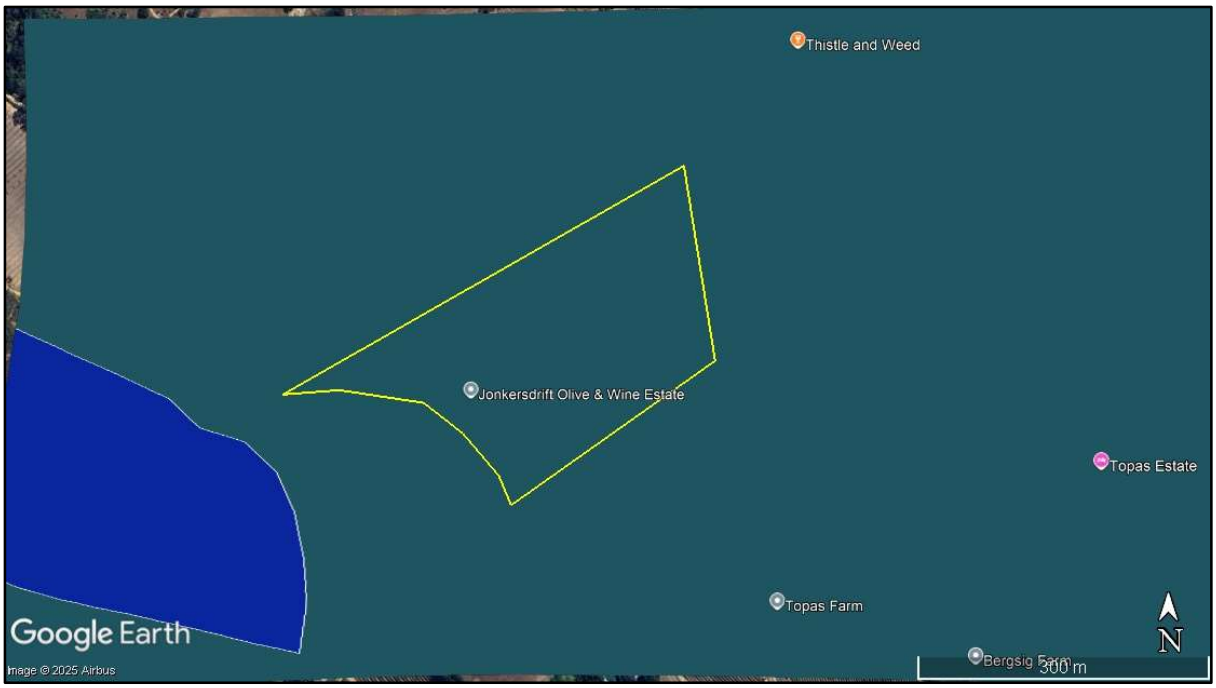

Figure 7: Wetland Vegetation Type Map (NFEPA, 2011). The applicable wetland vegetation type for the site is Southwest Granite Fynbos (CR) indicated as a grey polygon. To the east of the site as indicated by the blue polygon is Southwest Shale Fynbos (CR).

3.1.3 Watercourses falling within the Site and the NWA Regulated Zones

The National Geospatial Information (NGI) Service (Cape Farm Mapper, 2025), the National Wetlands Map Version 5 (CSIR, 2018) and the NFEPA (2011) were consulted to determine the presence of watercourses within 500m of the property boundary. Figure 8 indicates the watercourses present according to the NGI and National Wetlands Map Version 5 (NWM5) databases and Figure 9 shows the wetlands within 500m of the property boundary according to the NFEPA.

Both databases are aligned insofar as both indicate the lack of any wetlands within the NWA Regulated Area (i.e. 500m). The NGI Rivers database indicates that the Eerste River which forms the south western boundary of the site as a perennial river. In addition, a non-perennial drainage line is mapped to runs along the north western boundary and discharges into the Eerste River at the extreme western end of the property.

FEPAs are intended to provide strategic spatial priorities for conserving South Africa's freshwater ecosystems and supporting the sustainable use of water resources (Nel, et al., 2011). These areas were determined through a process of systematic biodiversity planning and were identified using a range of criteria for serving ecosystems and associated biodiversity of rivers, wetlands and estuaries. The Eerste River is within a FEPA River sub-catchment.

A review of the WCBSP (2023) indicates that narrow bands of terrestrial CBAs occur along the north western and south eastern property boundaries and that the entire portion of the Eerste River and its associated riparian zone comprises an Aquatic CBA (see Figure 10). The conservation objective for CBAs is to obtain appropriate legal conservation status for the area. Natural ecosystems should be maintained and degraded land should be restored to natural condition and the areas need to be managed for no further degradation.

The land to the south of river (beyond the privately-owned farmland that lies immediately adjacent to the river lies the formally protected Hottentots-Holland Mountain Catchment Area. The Jonkershoek Nature Reserve is located to the east of the subject area and is listed as a Type 2 World Heritage Site. Within the same locality and surrounding the Jonkershoek Nature Reserve is the Hottentots-holland Nature Reserve and the Cape Floral Region Protected Areas. Both are listed as a SAPAD Protected Area (PA).

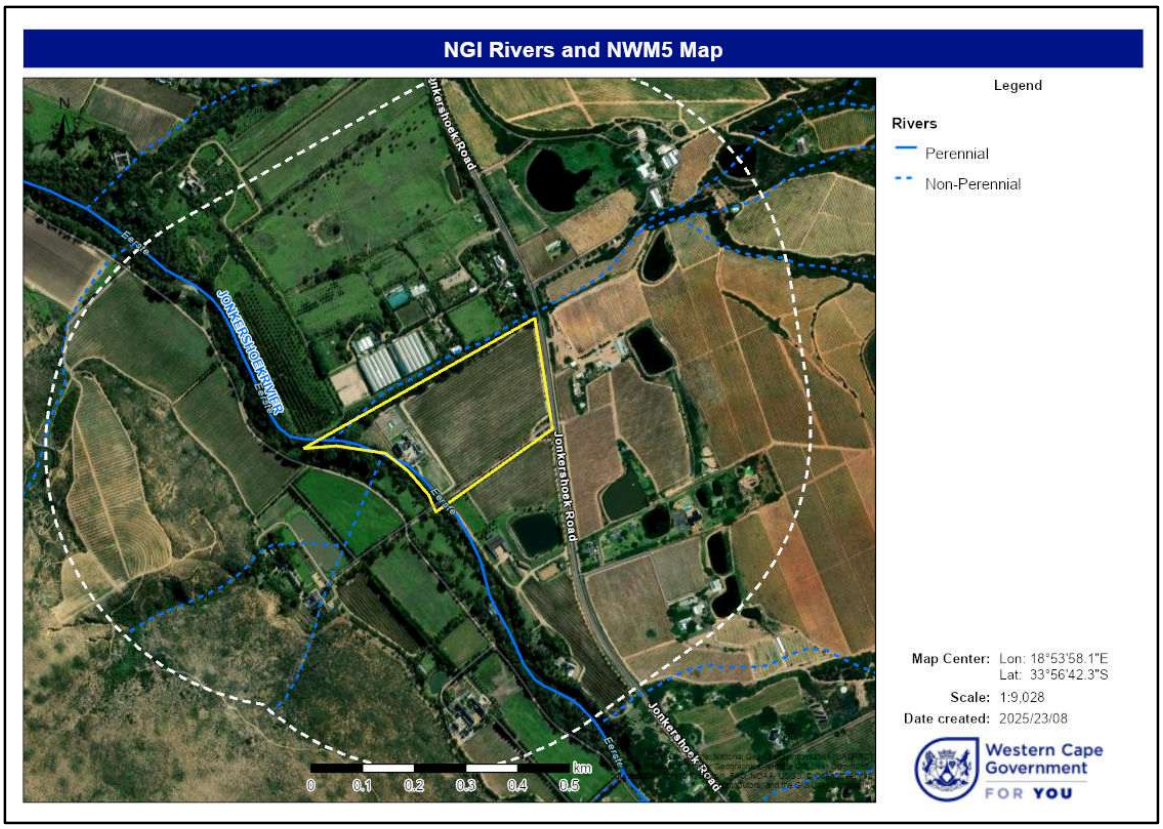

Figure 8: NGI Rivers and NWM5 Map (Cape Farm Mapper, 2025).

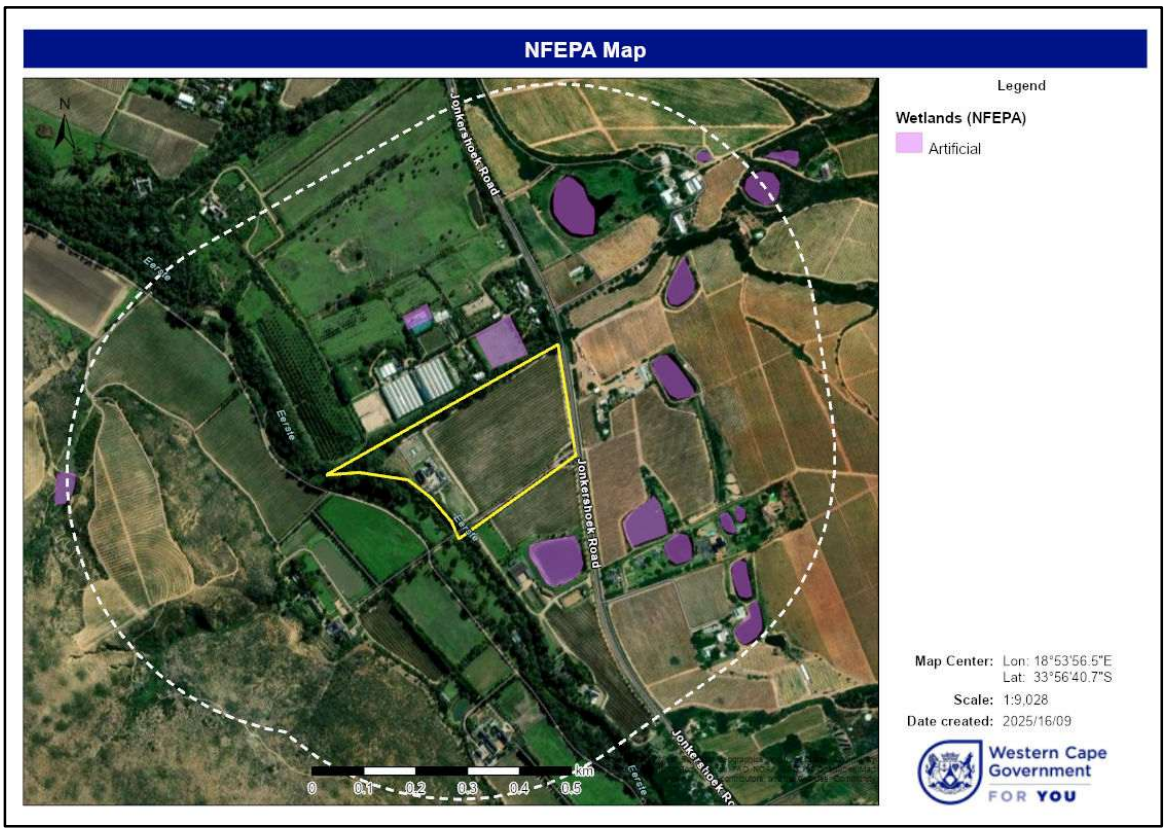

Figure 9: NFEPA Wetlands Map (Cape Farm Mapper, 2025). The yellow polygon shows the proposed site and the yellow circles show the 100m and 500m zone around Farm 1620 Stellenbosch.

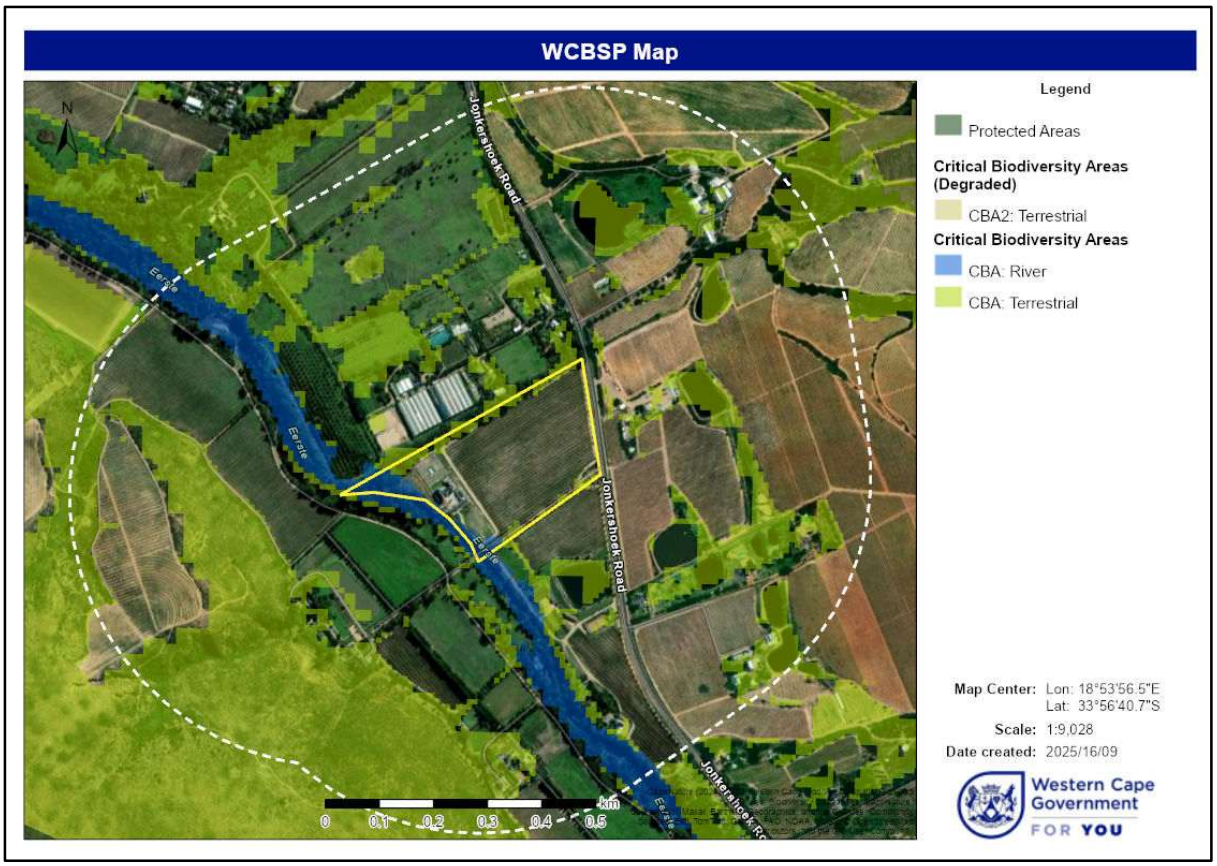

Figure 10: Critical Biodiversity Areas Map (WCBSP, 2023). The yellow polygon shows the proposed site and the white stippled line the 500m zone.

3.2 Description and Delineation of Watercourses

Freshwater habitat was identified on the basis of the definitions and criteria explained in Section 2.3 and the delineation took place according to the method supplied by DWAF (2005, updated 2008). Several indicators are prescribed in the watercourse delineation guideline to facilitate the delineation of either the temporary wetland zone or the riparian zone.

The Eerste River is the site's most obvious freshwater feature which marks the south western boundary of the site. This section of the river comprises an upper foothills river in terms of river zonation (Rowntree *et al*., 2000) with an alluvial channel characterised by an undulating bed that defines a sequence of coarse bars (cobbles or gravel) (riffles) and scour pools (see Figures 11 & 12). Immediately adjacent to the site the scour pools are flanked by isolated stands of *Prionium serratum* (palmiet). The riparian zone adjacent to the site comprises a moderate to low density indigenous and alien macrophytes such as *Olea capensis* (wild olive) *Salix mucronata* (willow), *Virgilia* sp. (keurboom) *Quercus* sp. (oak), *Acacia mearnsii* (black wattle) with the latter being a Category 1 listed alien invasive species.

The right-hand bank of the river[6] adjacent to the location of the residential dwelling has been impacted both as a result of historical anthropogenic influences (mostly associated with the agricultural use of the property over many decades) and the development of the residential dwelling. These impacts have mostly affected the riparian zone as the instream zone of the river has been impacted by the extreme flood events in recent years and include:

- Removal of indigenous vegetation from the riparian zone: This would have mostly occurred historically but it is likely that in landscaping the site and in particular the portion of land between

[6] This refers to when one faces downstream.

the dwelling and the river (see Figures 13 & 14), indigenous shrubs and small trees would have been removed;

- Introduction of alien invasive vegetation: While alien invasive grass, *Pennisetum clandestinum* (kikuyu), occurred on the site prior to the development of the residential dwelling, the grass has been maintained in a lawned area adjacent to the river thereby facilitating the spread of this listed alien invasive plant.
- Bank de-stabilisation as a result of landscaping near the river bank: The owner has landscaped flower beds near the river as depicted in Figure 14. The soil is in part exposed and during periods of rainfall will erode and cause sedimentation of the river.
- Compaction within and near the riparian zone to create a pedestrian walkway: The owners have created a pedestrian walkway near the edge of the river (see Figure 15). The compacted gravels retard infiltration and therefore accelerate run-off potentially causing flow regime alteration (increased flood peaks) and increase the risk of streambank erosion.
- Water quality impairment: A fire pit has been created at the edge between the riparian zone and the active river channel and is of brick-and-mortar construction (see Figure 16). Cement is alkaline and alters the acidity of the region's natural acidic waters. Biota that are associated with these acidic waters are often highly sensitive to changes in water quality and therefore the use of the cement at the river's edge would probably have caused contamination with possible secondary impacts on biota including mortalities.

While no aquatic faunal surveys were conducted as part of the present study, the river is known for its relatively high diversity of aquatic invertebrates occurs, as well as frogs (Cape River Frog and Cape Ghost Frog), fish (Berg River redfin) and birdlife (Ekologik, 2024). The endangered Berg River threadfin is however reported to have become extinct in the Jonkerhsoek Valley due to the alien fish predation, mainly rainbow trout (State of Rivers Report – Greater Cape Town's Rivers, 2005). None of the activities associated with the development of the residential dwelling are likely to have caused any impacts to aquatic fauna.

At the properties extreme western boundary a non-perennial drainage line meets the river just within the property boundary. At this point a stand of mature *Phragmites australis* (common reed) were evident (see Figure 17) suggesting the presence of a wetland. Other plant species encountered in this area included *Carpha glomerata* (vlei sedge), *Juncus* sp., *Zantedeschia aethiopica* (arum lily) and *Tropaeolum* sp. (nasturtium), all associated with above-normal levels of soil saturation.

The wetland is located approximately 60m to the north of the residential dwelling and also at the same elevation as the dwelling. Given that the topography slopes towards the west and any run-off from the construction site would therefore enter the river and not the wetland, the wetland is considered to not have been affected in any way by the development of the residential dwelling. As such no further descriptions or assessments of this wetland are provided.

Figure 11: Photograph looking upstream from the proposed site. Note the pool in-stream habitat with *Prionium serratum* (palmiet) clusters on the banks.

Figure 12:. Photograph showing the downstream reach comprising riffle in-stream habitat.

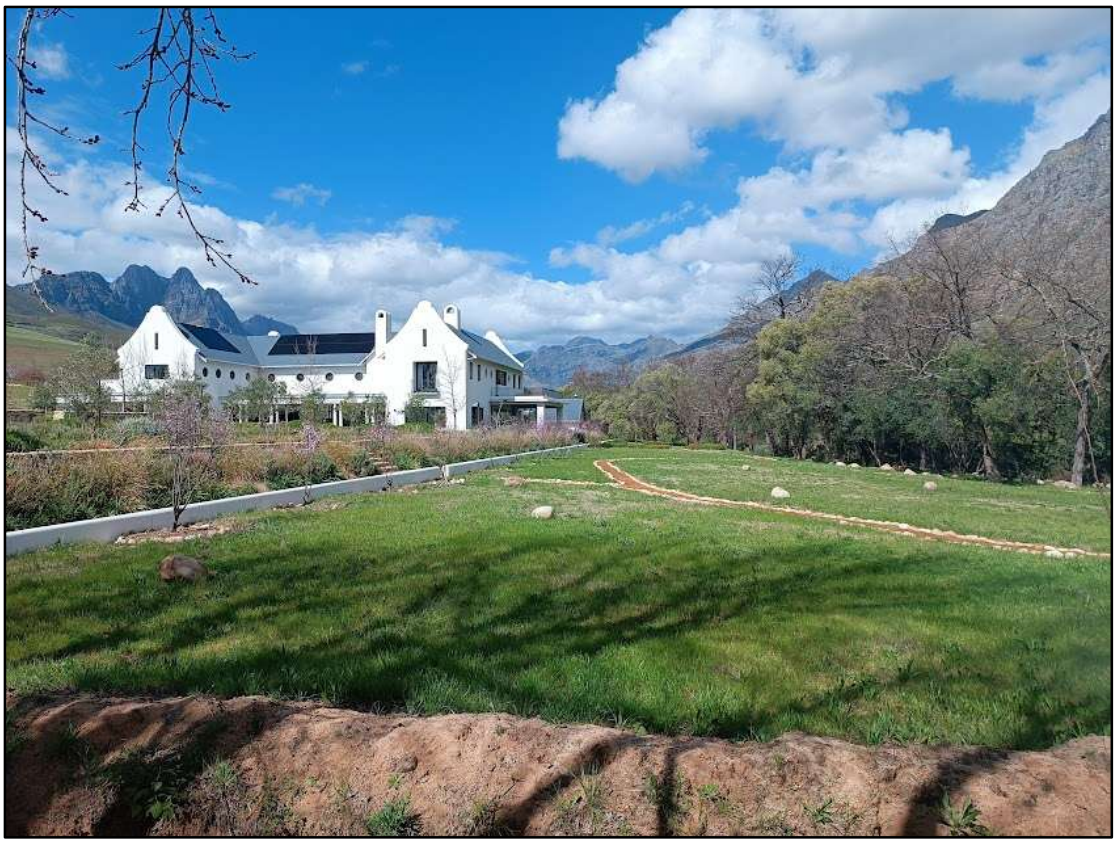

Figure 13: View towards the residential dwelling showing the lawned area between the dwelling and the river. Note the predominantly alien macrophytes lining the river bank including *Quercus* sp. (oak).

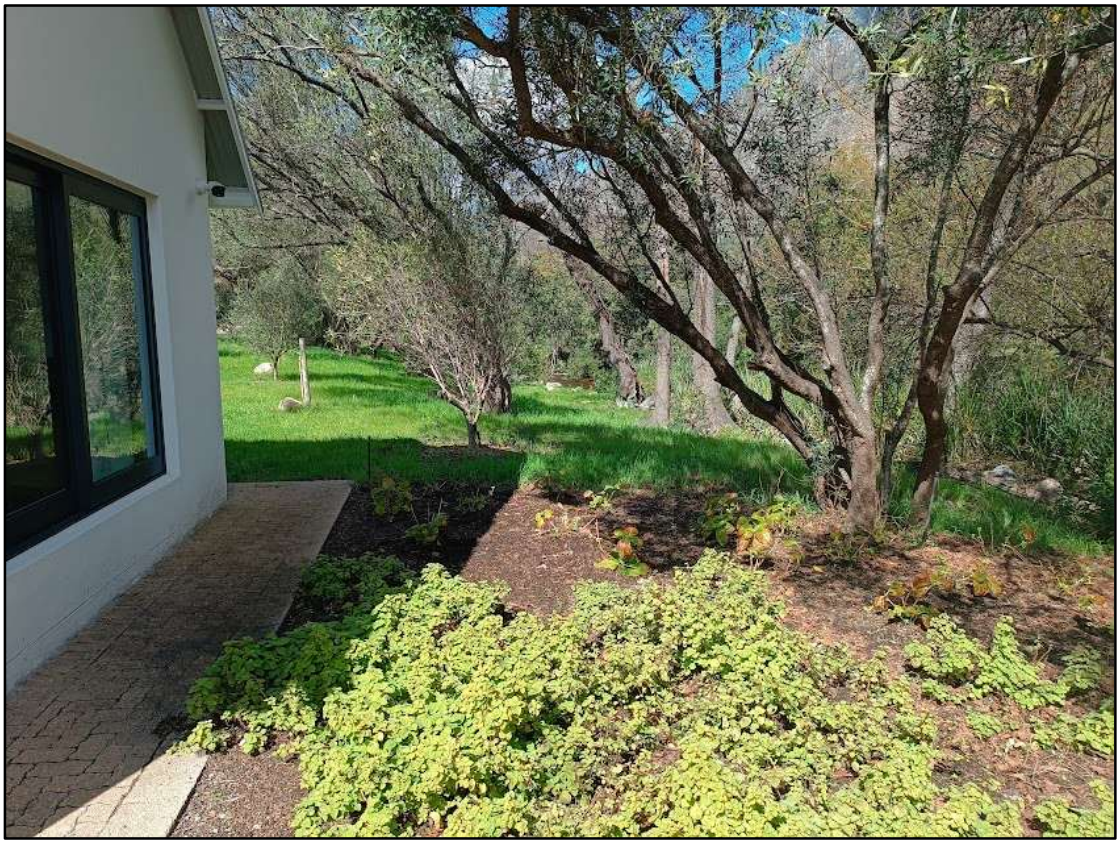

Figure 14: Photograph of the corner of the house that comes to several metres from the river. The trees in the background are *Olea capensis* (wild olives).

Figure 15: Photograph of the lawned area adjacent to the river with a pedestrian walkway comprised of compacted gravels.

Figure 16: Photograph of the edge of a fire pit located within the watercourse. The blue pipe is an overflow for rainwater that accumulates in the pit.

Figure 17: Photograph of a patch of Phragmites australis (common reed) that indicates the presence of a wetland. Note the drainage ditch which carries run-off from a farm road towards the wetland.

Figure 18: Watercourse delineation map. The yellow line indicates the property boundary, the red line the right hand edge of the riparian zone, the green polygon a wetland and the blue stippled line the approximate alignment of a non-perennial drainage line.

3.3 Watercourse Classification

The study area falls within the Southwestern Coastal Belt ecoregion (Kleynhans *et al*, 2005), the Breede Olifants WMA, the Greater Cape Town Sub-WMA and the G22F quaternary catchment. The table below summarises the results from **Level 3** through to **Level 6** of the aquatic ecosystem classification user manual (Ollis *et al.* 2013) applied to the Eerste River.

Table 7: Level 3, 4, 5 and 6 of the wetland and aquatic ecosystem classification.

Level 3 (Landscape Setting)	**Valley Floor:** the base of a valley, situated between two distinct valley side-slopes, where alluvial or fluvial processes typically dominate.
Level 4 (Hydrogeomorphic unit)	**Upper foothills river (as relates to river zonation):** Moderately steep, cobble-bed or mixed bedrock-cobble bed channel, with plane bed, pool-riffle or pool-rapid reach types. Length of pools and riffles/rapids similar. Narrow floodplain of sand, gravel or cobble often present. Characteristic gradient greater than 0.005-0.019.
Level 5 (Hydrological regime)	**Perennial:** Flows continuously throughout the year.
Level 6 (Descriptors)	**Natural:** may be impacted, or even realigned, but of natural origins.

3.4 Ecological Assessment of the Eerste River

3.4.1 Present Ecological State

Table 8 presents the Impact Scores for a number of instream and riparian zone health criteria for the Eerste River.

Table 8: Results of the IHIA for the Eerste River.

	Impact Score, Post-development	Weight	IHI Score, Post-development
Instream criteria			
Water abstraction	0	14	0
Flow modification	0	13	0
Bed modification	8	13	4,16
Channel modification	14	13	7,28
Water quality	5	14	2,8
Inundation	0	10	0
Exotic macrophytes	0	9	0
Exotic fauna	18	8	5,76
Solid waste disposal	5	6	1,2
Provisional Instream Habitat Integrity Score			78,8
Riparian zone criteria			
Indigenous vegetation removal	16	13	8,32
Exotic vegetation encroachment	10	12	4,8
Bank erosion	16	14	8,96
Channel modification	15	12	7,2
Water abstraction	0	13	0
Inundation	0	11	0
Flow modification	0	12	0
Water quality	5	13	2,6
Provisional Riparian Zone Habitat Integrity Score			68,12
Overall Habitat Integrity			**73,46**
PES Score			**"C"**

The river has been determined to have a PES of Category "C" which means that the river is Moderately Modified. This means that a loss and change of natural habitat and biota have occurred but the basic ecosystem functions are still predominantly unchanged.

The most noticeable instream modifications are bed and channel modification and invasion by exotic fauna (alien trout have caused the elimination of the Berg River Redfin from the upper reaches of the river). Bed and channel modification is largely as a result of the several flood events which have scoured the bed and caused bank erosion. Water quality impairment and solid waste disposal were assessed to have had a minor impact on the instream component. These impacts have occurred as a result of the construction of bridges and other cementitious structures and in the case of solid waste, was as result of wind-blown litter visible in small volumes within the channel.

Indigenous vegetation removal, streambank erosion, channel modification and exotic vegetation encroachment have also had a clearly detrimental impact on riparian habitat quality, diversity, size and variability. Historical construction within the riparian zone of concrete structures would have also led to minor water quality impacts. Overall, the riparian component has been modified to a greater extent that the instream component.

3.4.2 Ecological Importance and Sensitivity

Table 9 presents the results of the Ecological Importance and Sensitivity (EIS) Assessment of the river.

Table 9: Results of Ecological Importance and Sensitivity (EIS) Assessment for the site's river.

ECOLOGICAL IMPORTANCE AND SENSITIVITY	Score (0-4)	Confidence (1-5)
Primary Determinants		
Presence of rare and endangered species	2	3
Populations of unique species	2	3
Species/taxon Richness	2	4
Diversity of habitat types and features	2	4
Migration/breeding/feeding site for river species: Importance in terms of the link it provides for biological functioning	2	4
Sensitivity to changes in the natural hydrological regime*: Determined by the size of the feature, available habitat types and frequency of flood events.	2	4
Sensitivity to water quality changes*: Determined by the size of the feature, available habitat types and frequency of flood events	3	4
Energy dissipation and particulate/element removal: Roughness coefficient/Storage capacity and size.	2	4
Modifying Determinants		
Protected status: Ramsar Site, National Park, Wilderness area and Nature Reserve.	2	4
Ecological integrity: Degree of change of the flood regime, water quality and habitat from reference conditions.	2	4
TOTAL	21	
MEDIAN	**2**	
OVERALL EIS	**Moderate**	

Score guideline Very high = 4; High = 3, Moderate = 2; Marginal/Low = 1; None = 0
Confidence rating Very high confidence = 4; High confidence = 3; Moderate confidence = 2; Marginal/low confidence = 1
* a rating of zero is not appropriate in this context.

The overall EIS for the river reach and its riparian zone was determined to be **Moderate**. This rating for the river reach means that the river is ecologically important and sensitive on a provincial or local scale. The biodiversity of these systems is not usually sensitive to flow and habitat modifications. They play a small role in moderating the quantity and quality of water of major drainage lines. The EIS assessment of the river reach nearest the site are summarised as follows:

- The river is assessed as being of Moderate importance for biodiversity support for the following reasons:

  - The river may support endangered or rare biota or populations of unique species, given it falling within historical distribution of Boland Granite Fynbos (see Figure 5) which is listed as EN and is identified as an Aquatic CBA on the WCBSP (2023).
  - It is likely to be an important site for species migration, breeding and/or feeding, particularly for riparian and instream fauna and flora.
  - The river is recognised in the WCBSP (2023) as being of regional importance from an aquatic biodiversity conservation perspective as it is identified as an Aquatic CBA.
  - At the landscape scale the river has zero protection status, has a PES of C (Moderately modified) but is considered to be a river of notable size and moderate rarity.
- In terms of sensitivity the river is regarded as being moderately sensitive to changes in floods and changes in low-flow, owing primarily to its classification as a upper foothills river, and is also sensitive to changes in water quality due to the low nutrient levels in the general area's freshwater systems (in their unimpacted, reference condition).

3.4.3 Recommended Ecological Category

The PES has been determined to be a "C" ecological category and therefore the EIS components need to be evaluated to determine if any of the aspects of importance and sensitivity are high or very high. Given that the EIS category was determined to be **Moderate,** which means that the site's river is ecologically important and sensitive on a provincial or local scale. However, it is not considered necessary to increase the PES as would be the case if the river was found to have an EIS of **High**. The REC for the river is therefore a Category "C".

4 Assessment of Impacts

4.1 Activity Description & Impact Identification

The farm dwelling and outbuilding cover 1 058m² and have a total floor area of 1 288m². The dwelling and outbuildings are laid out in typical farm yard fashion in an enclosed yard with hard and soft landscaping forming part of the so-called "werf". The "werf" is laid out in an east-west orientation parallel to the river, with the southeastern portion thereof encroaching on the river buffer.

Services were provided in the following way:

- **Potable water supply:** Provided from the farm's water allocation.
- **Sewerage:** All sewage is discharged into the municipal water-borne sewerage reticulation system.
- **Power supply:** Power supply is provided by Eskom.

As such the provision of services is assumed not to have resulted in any freshwater ecological impacts and it is only the building which has impacted on the river during its construction and operational phases. A Site Plan which indicates the proximity of the residential building to the Eerste River is provided in Figure 17.

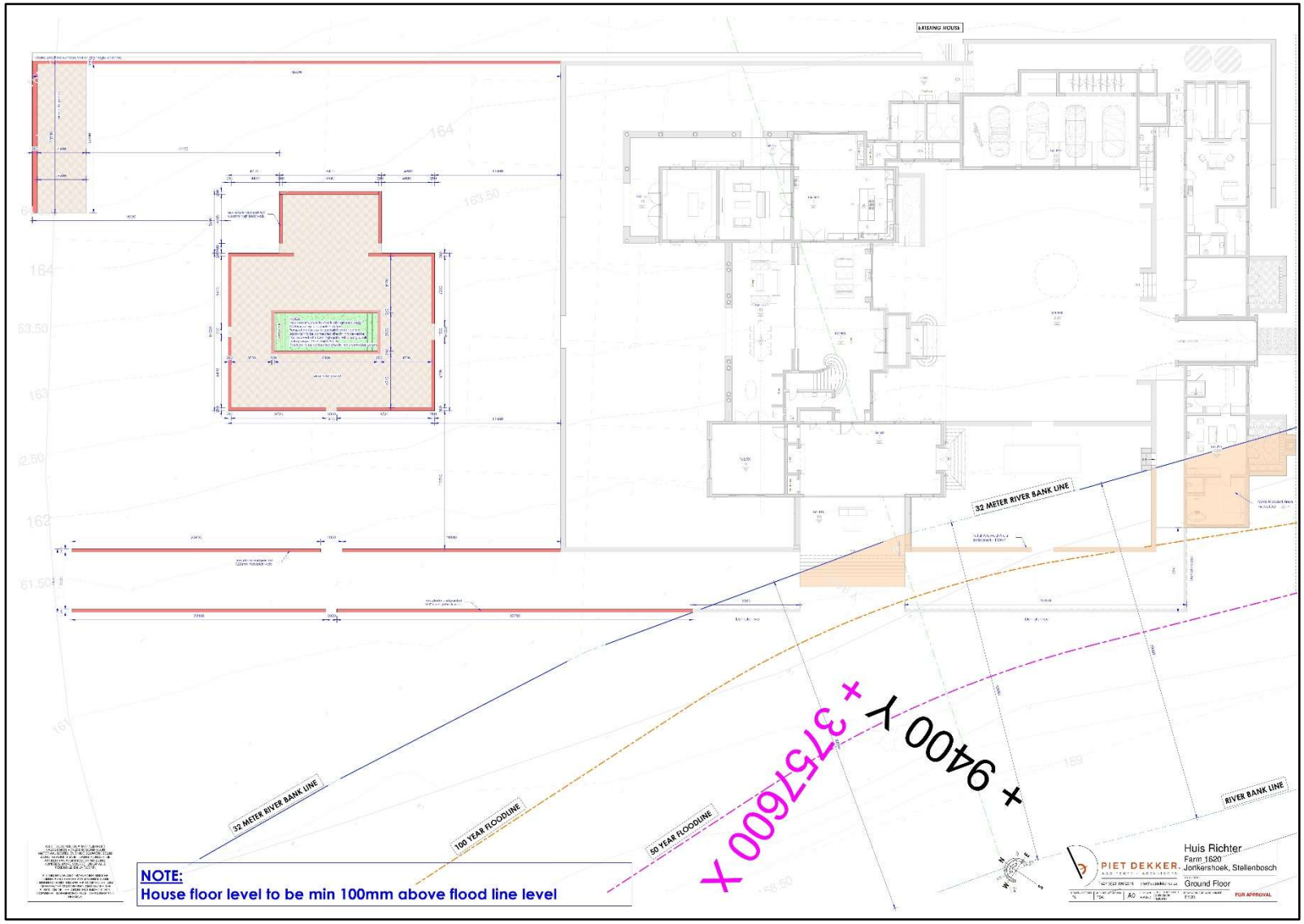

Figure 19: Site Plan showing the proximity of the residential dwelling to the Eerste River on Farm 1620 Stellenbosch.

The construction of the residential dwelling is likely to have caused the following significant impacts on freshwater ecosystems (the impacts are highlighted in bold and the activity causing the impact is also described):

- The operation of construction vehicles and machinery, stockpiling of construction materials and also the presence of construction workers within or in close proximity to aquatic habitat would have caused **disturbance to riparian habitat** associated with the river.
- The use of cementitious materials when constructing the fire pit on the riverbank would have resulted in **water quality impairment** of the river.
- When clearing the site of vegetation and preparing the levelled building platform soil would have been exposed. During periods of rainfall the exposed areas would have been prone to **erosion** and where this occurred would have contributed to **sediment loading** of the river.

Potential impacts associated with the ongoing residential land use of the site would be as follows:

- **Alteration of flow regime** affecting the river as a result of increased run-off from hard surfaces (primarily roofs and paved areas) which in turn increases peak flow in the river.
- Riparian habitat would endure ongoing, long term **habitat disturbance and edge effects** due to the fact that part of the residential dwelling is not sufficiently setback from the edge of the riparian area.

4.2 Assessment of Direct Impacts

4.2.1 Impacts that have already occurred as a result of the construction of the dwelling and associated infrastructure

Impact 1 – Disturbance of riparian habitat

The construction of the dwelling would have caused disturbance of riparian habitat given that construction activities took place in close proximity to the river. Disturbance would have come in the form of damage to the riparian vegetation components through trampling, stockpiling of construction materials, infilling and the indiscriminate driving of construction vehicles through and across the river. It is also possible that, as part of the site's landscaping, that smaller bushes and shrubs were removed from the riparian zone leaving only the mature trees to line the riverbank.

Given that the river is a perennial, upper foothills river, its riparian zone in its reference condition would be relatively narrow given the narrow width of the floodplain (see Table 6). In its reference state the biodiversity associated with such aquatic ecosystems is of moderate diversity with moderate habitat diversity and conservation importance as reflected in the EIS assessment (see Section 3.4.2). Ordinarily this would result in a Medium intensity rating for habitat disturbance but given the historic agricultural use of the site, the riparian habitat at the site would have already been degraded which results in a Low intensity rating.

The extent of the disturbance caused by the construction of the dwelling is considered to be limited to the extent of the site and hence a Local rating for extent is applied for this criterion. Given that the disturbance was caused during the construction phase the duration was Short Term. In summary the impact is rated to have a **Low (-ve)** significance with no mitigation being applicable as the impact has already taken place.

Summary of Results

Table 10: Impact significance rating for the disturbance of riparian habitat (vegetation clearing and site preparation).

CRITERIA	WITHOUT MITIGATION	WITH MITIGATION
Extent of impact:	LOCAL	*Mitigation not possible as impact has already occurred.*
Duration of impact	SHORT TERM	
Consequence of impact or risk:	NEGATIVE	
Intensity	LOW	
Probability of occurrence:	PROBABLE	
Indirect impacts:	N/A	
Cumulative impacts	HIGH	
Significance rating of impact	LOW (-ve)	
Degree to which the impact may cause irreplaceable loss of resources:	LOW (disturbance is unlikely to result in actual loss of resources)	
Degree to which the impact can be reversed:	FULLY REVERSIBLE	
Degree to which the impact can be avoided:	The impact cannot be avoided because the impact has already taken place.	
Degree to which the impact can be managed:	The impact cannot be managed because the impact has already taken place.	
Degree to which the impact can be mitigated:	The impact cannot be mitigated because the impact has already taken place.	
Residual impacts:	LOW (-ve)	

Impact 2 – Alteration of Flow Regime

Vegetation clearing during site preparation would have reduced catchment roughness which results in lowered infiltration and increased acceleration of run-off from the affected part of the river's catchment. The intensity of the impact would have been rated to be Medium given the extent of vegetation in preparation for the construction of the large residential dwelling, however the historic agricultural land use would have resulted in a low catchment roughness pre-development and therefore the intensity is rated Low.

The duration of the impact is rated to be Short term duration because the vegetation has become re-established and there are few areas that remain devoid of vegetation. Most of the vegetation established in the area between the dwelling and the river comprise landscaped lawns (see Figure 13, 14 and 15) which has a low roughness and therefore limited infiltration compared to the vegetation of the site in its reference condition. The site however has been used for agricultural for many decades and as a result catchment roughness was already significantly reduced. Overall, the alteration of flow regime associated with the removal of vegetation during the construction phase is rated to be of **Low (-ve)** significance (see Table 10 below). In reaching this impact significance the extent was rated to extend downstream beyond the limits of the site and is therefore rated to be of Regional extent. The Intensity of the impact is rated to be Low, given that the catchment roughness was already significance reduced by historic land uses and of Probable likelihood. The impact cannot be mitigated as it has already occurred. Mitigation opportunity for the ongoing impact on flow regime are presented in Section 4.2.2.

Summary of Results

Table 11: Impact significance rating for alteration of flow regime (construction of the residential building platform and landscaping).

CRITERIA	WITHOUT MITIGATION	WITH MITIGATION
Extent of impact:	REGIONAL	*Mitigation not possible as impact has already occurred.*
Duration of impact	SHORT TERM	
Consequence of impact or risk:	NEGATIVE	
Intensity	LOW	
Probability of occurrence:	PROBABLE	
Indirect impacts:	N/A	
Cumulative impacts	HIGH	
Significance rating of impact	LOW (-ve)	
Degree to which the impact may cause irreplaceable loss of resources:	LOW	
Degree to which the impact can be reversed:	IRREVERSIBLE	
Degree to which the impact can be avoided:	The impact cannot be avoided because the impact has already taken place.	
Degree to which the impact can be managed:	The impact cannot be managed because the impact has already taken place.	
Degree to which the impact can be mitigated:	The impact cannot be mitigated because the impact has already taken place.	
Residual impacts:	LOW (-ve)	

Impact 3 – Increased Erosion and Sedimentation

Sediment loading of the river would have taken place as a result of site preparation and construction activities near and within the river. During earthworks soils would have become exposed and, coupled with rainfall, would have been transported in run-off and deposited in the river.

It is likely that some riparian vegetation would also have been cleared during the construction activities further increasing the erosion risk. During the site visit which took place a few years after the vegetation clearing had taken place, there was evidence of natural re-vegetation. Accordingly, the duration of the impact unmitigated is rated to have been Short term and with a Regional extent, given that sediment would have been transported off-site. Overall, the construction phase was rated to have contributed to sedimentation of a Medium intensity with the result that the overall impact significance being rated to be **Medium (-ve)**. Sedimentation that has already occurred cannot be mitigated but there is an opportunity to reduce the duration and probability of the impact by revegetating the areas exposed to erosion thereby resulting in a with mitigation impact significance rating of **Low (-ve)**.

Summary of Results

Table 12: Impact significance rating for sedimentation (site clearing and earthworks).

CRITERIA	WITHOUT MITIGATION	WITH MITIGATION
Extent of impact:	LOCAL	*Mitigation not possible as impact has already occurred.*
Duration of impact	SHORT TERM	
Consequence of impact or risk:	NEGATIVE	
Intensity	LOW	
Probability of occurrence:	PROBABLE	
Indirect impacts:	N/A	
Cumulative impacts	HIGH	
Significance rating of impact	LOW (-ve)	
Degree to which the impact may cause irreplaceable loss of resources:	LOW	
Degree to which the impact can be reversed:	REVERSIBLE – sediment can be removed and lost topsoil replenished.	
Degree to which the impact can be avoided:	The impact cannot be avoided because the impact has already taken place.	
Degree to which the impact can be managed:	The impact cannot be managed because the impact has already taken place.	
Degree to which the impact can be mitigated:	The impact cannot be mitigated because the impact has already taken place.	
Residual impacts:	LOW (-ve)	

Impact 4 – Water Quality Impairment

The construction of the fire pit entailed the use of cement (see Figure 6). It is therefore Probable that the watercourse was contaminated as a result of the use of cement and other construction-related materials, either entering the watercourse directly or transported to the river as run-off. Other likely sources of contamination include the operation of construction machinery and vehicles where, as a result of unchecked leaks and spillages, would have caused contamination of the river. Additionally, any discharge of wash-water or contaminants such as solvents or paints into the surrounding environment during this time would have contaminated run-off which would have probably entered the river.

The contamination probably caused during the construction activities which took place in close proximity to the river has now ceased and any contaminants would have transported off downstream making it impossible to determine the actual levels of contamination. However, based on the scale of the project the intensity of the impact is rated to be Low. Water quality impairment would have only been limited to the time of actual construction activity in close proximity to the river and given that this has ceased is rated to be Short Term. The extent of the impact would have been Regional as contaminants would have been transported off-site by the river.

Based on these ratings the construction phase is assessed to have contributed to an impact significance rating of **Low (-ve)** for water quality impairment. As the contamination of the site's freshwater ecosystems has already occurred with no ongoing contamination likely, the impact is irreversible and therefore no measures can be recommended to mitigate the impact.

Summary of Results

Table 13: Impact significance rating for water quality impairment (construction of fire pit).

CRITERIA	WITHOUT MITIGATION	WITH MITIGATION
Extent of impact:	REGIONAL	*Mitigation not possible as impact has already occurred.*
Duration of impact	SHORT TERM	
Consequence of impact or risk:	NEGATIVE	
Intensity	LOW	
Probability of occurrence:	PROBABLE	
Indirect impacts:	N/A	
Cumulative impacts	HIGH	
Significance rating of impact	LOW (-ve)	
Degree to which the impact may cause irreplaceable loss of resources:	LOW	
Degree to which the impact can be reversed:	IRREVERSIBLE	
Degree to which the impact can be avoided:	The impact cannot be avoided because the impact has already taken place.	
Degree to which the impact can be managed:	The impact cannot be managed because the impact has already taken place.	
Degree to which the impact can be mitigated:	The impact cannot be mitigated because the impact has already taken place.	
Residual impacts:	LOW (-ve)	

4.2.2 Potential impacts associated with the ongoing residential land use

Impact 1 – Alteration of Flow Regime

Run-off from the proposed residential development's hard, impermeable surfaces would have the effect of increasing flow and flood peaks in the receiving watercourse, the Eerste River. This in turn would increase flood peaks and increase the risk of floods taking place in the downstream areas which includes the residential area of Stellenbosch. Accordingly, the impact is rated to be of Regional exten. The flow contribution as a result of hard surfaces is however unlikely to cause any flooding impacts, given the limited extent of hard surfaces constructed.

The overall intensity of the impact is rated to be Low due to the fact that only a single residential dwelling has been developed on the site, with the majority of the farm remaining undeveloped. This intensity rating coupled with the Long-Term duration of the impact and Probable probability of occurrence, results in an impact significance rating of **Low (-ve)**. Effective mitigation can only be achieved by installing rainwater harvesting tanks to capture retain the rainwater during the winter wet season and make the water available for garden irrigation or domestic consumption. With the implementation of this mitigation measure the impact would be **Very low (-ve)**.

Summary of Results

Table 14: Impact significance rating for the alteration of flow regime (operational phase).

CRITERIA	WITHOUT MITIGATION	WITH MITIGATION
Extent of impact:	REGIONAL	REGIONAL
Duration of impact	LONG TERM	MEDIUM TERM
Consequence of impact or risk:	NEGATIVE	NEGATIVE
Intensity	LOW	LOW
Probability of occurrence:	PROBABLE	POSSIBLE
Indirect impacts:	N/A	N/A
Cumulative impacts	HIGH	HIGH
Significance rating of impact	MEDIUM (-ve)	VERY LOW (-ve)
Degree to which the impact may cause irreplaceable loss of resources:	LOW	
Degree to which the impact can be reversed:	REVERSIBLE	
Degree to which the impact can be avoided:	LOW	
Degree to which the impact can be managed:	MEDIUM	
Degree to which the impact can be mitigated:	MEDIUM	
Residual impacts:	VERY LOW (-ve)	

Essential mitigation measures:

- Install rainwater harvesting tanks with sufficient capacity to contain roof run-off for a significant proportion of the winter rainy season.
- Utilise the stored water in the dry summer season for garden / landscaping irrigation or alternatively use the water for domestic consumption (e.g. as grey water for ablutions etc).

Impact 2 – Riparian habitat disturbance and edge effects

Residential land uses are associated with a number of activities that cause impacts on riparian and instream habitat including the dumping of garden waste into the watercourse, landscaping with garden ornamentals within the riparian zone and access to the watercourse for pets which can cause mortalities of aquatic fauna, particularly birds and small mammals. Residential land uses can also promote the invasion of the riparian zone with alien invasive plats and exotic garden escapees.

While it cannot be confirmed whether the owners have pets which roam freely on the property and whether garden waste is dumped in the river as this was not witnessed during the site visit, there was evidence of landscaping within the riparian zone (see Figure 14). The figure shows a flower bed where a significant portion of the flower bed comprises exposed soil and as such is exposed to erosion. Given the proximity of the river the eroded soils would enter the river channel causing sedimentation. Given that the river flows with a significant velocity it is likely that the impact would extend beyond the site (i.e. the extent is Regional).

Overall, the operational phase would cause a Low impact intensity as the impact would occur sporadically (i.e. during periods of heavy rainfall) over the Long Term. The impact significance is therefore rated to be Medium (-ve) and can be effectively mitigated through removal of the flower bed and complete revegetation ensuring that no areas of exposed soil remain.

Summary of Results

Table 15: Impact significance rating for riparian habitat disturbance (operational phase).

CRITERIA	WITHOUT MITIGATION	WITH MITIGATION
Extent of impact:	REGIONAL	REGIONAL
Duration of impact	LONG TERM	MEDIUM TERM
Consequence of impact or risk:	NEGATIVE	NEGATIVE
Intensity	LOW	LOW
Probability of occurrence:	PROBABLE	POSSIBLE
Indirect impacts:	N/A	N/A
Cumulative impacts	HIGH	HIGH
Significance rating of impact	MEDIUM (-ve)	VERY LOW (-ve)
Degree to which the impact may cause irreplaceable loss of resources:	LOW	
Degree to which the impact can be reversed:	REVERSIBLE	
Degree to which the impact can be avoided:	LOW	
Degree to which the impact can be managed:	MEDIUM	
Degree to which the impact can be mitigated:	MEDIUM	
Residual impacts:	VERY LOW (-ve)	

Essential mitigation measures:

- Ensure that the dumping of any form of waste into the river does not take place;
- Decommission the landscaped flower bed and replant the area with a suitable groundcover that results in no areas of exposed soil;
- Inspect the riparian zone for the presence of invasive alien plants and remove with immediate effect. For effective best practise methods for invasive alien vegetation removal consult Martens *et al*. (2021).

4.3 'Decommissioning' Scenario

In a rectification application it does not make any sense to assess site or activity alternatives because the development has already been undertaken (i.e. these are not reasonable or feasible alternatives). It is however considered appropriate to assess the potential impacts associated with decommissioning the development as an alternative to permitting the continued operation of the development. While some of the historical impacts cannot be reversed by decommissioning the dwelling, removal of structures and infrastructure followed by ecological restoration provides an opportunity to remedy some of the impacts that have occurred.

The residential dwelling has already been developed so demolishing the dwelling would be associated with a suite of freshwater ecological impacts, not dissimilar to the impacts identified and assessed a being associated with the construction of the dwelling.

The potential impacts associated with the decommissioning of the dwelling are considered to be associated with an overall **Medium (-ve)** impact significance rating without mitigation. The decommissioning would be subject to a Remediation Plan which in all likelihood would minimise the significance of these impacts to an overall **Low (-ve)** rating (refer to Table 16) but the implementation of such a plan would come at a considerable cost, particularly given the fact that the owner would have incurred significant costs for demolition and the lost-opportunity cost of not being able to develop the site.

Summary of Results

Table 16: Impact significance rating for all impacts associated with the decommissioning phase.

CRITERIA	WITHOUT MITIGATION	WITH MITIGATION
Extent of impact:	LOCAL	LOCAL
Duration of impact	LONG TERM	SHORT TERM
Consequence of impact or risk:	NEGATIVE	NEGATIVE
Intensity	LOW	LOW
Probability of occurrence:	PROBABLE	POSSIBLE
Indirect impacts:	N/A	N/A
Cumulative impacts	HIGH	HIGH
Significance rating of impact	LOW (-ve)	VERY LOW (-ve)
Degree to which the impact may cause irreplaceable loss of resources:	LOW	
Degree to which the impact can be reversed:	REVERSIBLE	
Degree to which the impact can be avoided:	LOW	
Degree to which the impact can be managed:	MEDIUM	
Degree to which the impact can be mitigated:	MEDIUM	
Residual impacts:	VERY LOW (-ve)	

4.4 Assessment of Indirect Impacts

No indirect impacts are deemed to have occurred.

4.5 Assessment of Cumulative Impacts

Cumulative impacts are impacts that result from the incremental impact of the activity being assessed on freshwater systems within a greater catchment, ecoregion and vegetation group when added to the impacts of other past, present or reasonably foreseeable future activities.

Ecological degradation in the Southwestern Coastal Belt ecoregion as a result of urban development and agriculture has been extensive and can be regarded as a highly significant cumulative impact and is accordingly rated to be **High (-ve)**. This is evident from the Endangered (EN) threat status assigned to the Boland Granite Fynbos, the applicable ecosystem type for the site (see Figure 6). Given that the residential development has caused aquatic habitat degradation, the development would have contributed to and continues to contribute directly to this highly significant cumulative impact.

The development has been assessed to contribute to a low level of riparian habitat disturbance and relatively minor direct impacts such as altered flow regime, erosion and sediment loading and water quality impairment. Given that the affected aquatic ecosystem, an upper foothills reach of the Eerste River, has been identified as an Aquatic CBA, measures should be implemented to minimise further ecological degradation. Such measures have been recommended in this report (see Section 4.2 and summarised in Section 5) and should be implemented to minimise ongoing ecological degradation caused by the development and also the historical, highly significant, cumulative impact in the ecoregion. With the successful implementation of these mitigation measures the proportionate contribution that the residential development has on the highly significant cumulative impact of urban development and agriculture in the ecoregion will be negligible.

5 Conclusion and Recommendations

The residential development can be considered a low intensity residential development given that the residential dwelling only occupies a small proportion of the 7.5 ha agricultural property. It is situated on the south-west facing, moderate sloping side-slope of the Jonkershoek valley and the Eerste River forms its south-western boundary. The only constructed a large residential dwelling within several metres of the river and because this took place within the 32m NEMA regulatory line of the watercourse, required prior environmental authorisation in terms of the NEMA EIA Regulations (2014, as amended). As this was not obtained a Section 24G Rectification Application is being submitted to retrospectively authorise the development. Given that the Eerste River is the site's most sensitive and significant environmental feature, this Aquatic Biodiversity Assessment is the most crucial specialist study to inform the application.

The NGI Rivers database identifies the presence of the perennial Eerste River at the south-western boundary of the site and a non-perennial drainage line that runs along the northern boundary and discharges into the Eerste River at the extreme western end of the site. The key national wetland database (NWM5, CSIR 2018) indicates that no wetlands occur within the site or within 500m of the site. The WCBSP (2023) identifies the river to comprise an Aquatic CBA and the strip of land associated with the mapped non-perennial drainage line to comprise a Terrestrial CBA.

The site investigation confirmed the presence of the Eerste river passing within several metres of the residential dwelling and the non-perennial drainage line at the property's northern boundary. The last part of the drainage line before its point of discharge into the Eerste River was confirmed to comprise a wetland. Only watercourses that have been and continue to be impacted by the construction and operation of the residential dwelling were subject to detailed ecological assessment. Accordingly, the IHIA method to determine PES was only applied to the Eerste River as the non-perennial drainage line and associated wetland would not have been impacted by the construction or operation of the dwelling. The river was found to be Moderately Modified (PES Category "C") and was determined to have an EIS of Moderate. Significant modifications evident in the river can be attributed to both historical activities such as agricultural use of the site and a series of extreme floods in recent years and the residential development of the site.

The activities associated with the residential development determined as having caused aquatic ecological impacts include site clearing and earthworks to create a levelled building platform, construction activities near and within the watercourse entailing the use of construction materials such as cement, machinery and vehicles and other construction materials and chemicals, the increase in hard, impermeable surfaces and the creation of flower beds. These activities have caused riparian habitat disturbance, alteration of flow regime, increased erosion and sedimentation and water quality impairment.

A summary of the impact assessment is presented in Table 17, for the without and with mitigation scenarios. Mitigation of the construction phase-related impacts is not possible because the impacts have already occurred. However, the identified ongoing or operational phase impacts of alteration of flow regime and disturbance of riparian vegetation are mitigable as follows:

Essential measures to mitigate operational phase alteration of flow regime:

- Install rainwater harvesting tanks with sufficient capacity to contain roof run-off for a significant proportion of the winter rainy season.
- Utilise the stored water in the dry summer season for garden / landscaping irrigation or alternatively use the water for domestic consumption (e.g. as grey water for ablutions etc).

Essential measures to mitigate operational phase riparian habitat disturbance and edge effects:

- Ensure that the dumping of any form of waste into the river does not take place;
- Decommission the landscaped flower bed and replant the area with a suitable groundcover that results in no areas of exposed soil;
- Inspect the riparian zone for the presence of invasive alien plants and remove with immediate effect. For effective best practise methods for invasive alien vegetation removal consult Martens *et al*. (2021).

Table 17: Summary of the impact significance ratings.

Impact	Without mitigation	With mitigation
Construction phase:		
Disturbance of riparian habitat	**Low**	*N/A*
Alteration of Flow Regime	**Low**	*N/A*
Increased erosion & sedimentation	**Low**	*N/A*
Water quality impairment	**Low**	*N/A*
Operational phase:		
Alteration of flow regime	**Medium**	**Very low**
Disturbance of riparian habitat	**Medium**	**Very low**

The only alternative to allowing the continued construction and operation of the residential development is to decommission the dwelling and associated infrastructure. Decommissioning as an activity in itself, due to the residential dwelling's location adjacent to a river, would potentially cause significant aquatic ecological impacts to the river. These impacts could be partially mitigated through formulating and implementing a Remediation Plan which would presumably include specifications to ensure that decommissioning activities have minimal impact on the site's environmentally sensitive features and also to ensure that any disturbed habitat is suitably rehabilitated. In assessing the aquatic ecological impact of the decommissioning scenario, this assessment has found that the overall impact of decommissioning would be of a **Medium (-ve)** significance and with mitigation could be reduced to a **Low (-ve)** significance.

In terms of impact significance, the continued operation of the residential development with implementation of the recommended mitigation measures outlined in this report would be similar to the decommissioning scenario (assuming the effective implementation of a Remediation Plan, should decommissioning take place). In comparing the feasibility of allowing the continued operation of the residential development with the option of decommissioning, a key consideration in support of the continued operation of the residential development is the added significant cost to the owner of decommissioning and lost opportunity cost of not realising the development aspirations for the site. These added costs constrain the likelihood of effective remediation associated with decommissioning thereby rendering decommissioning even less favourable from a freshwater ecological perspective. In summary, decommissioning with effective remediation is considered unfeasible compared to the implementation of the recommended mitigation measures and allowing the residential dwelling to remain.

It is therefore the specialist's reasoned opinion that, provided the recommended mitigation measures are implemented, the continued operation of the residential development should be supported from a freshwater ecological perspective.

6 Risk Assessment

The approach taken in completing the Risk Assessment Matrix is summarised below:

- The assessment is based on the assumption that the recommended mitigation measures will be effectively implemented and as such the risk assessment reflects the with mitigation scenario.
- All of the historic activities that have generated negative impacts and the proposed activities that would potentially generate negative impacts were found to be associated with a LOW risk class.
- Most of the identified negative impacts with the recommended mitigation measures are limited to the impact site or are site-specific. The only impacts that have a regional extent with mitigation are alteration of flow regime and water quality impairment as these impacts would have been transferred downstream and off-site.
- Impacts have varying durations (mostly short-term for construction phase-related impacts and medium – long term for operational phase impacts) and probabilities of occurrence with some of the completed activities having generating impacts with an 80% probability of occurrence due to proximity of the river the residential dwelling.
- The identified risks have been assessed with a Medium level of confidence as there was little direct,

current evidence of flow regime, erosion and sedimentation and water quality impacts having occurred. These impacts are by there nature difficult to detect.

Given that all of the activities have been determined to be associated with a LOW risk rating, the proposed development qualifies for a General Authorisation (GA) as far as the Section 21 (c) and (i) water uses are concerned.

Please refer to the Risk Assessment Matrix provided in Appendix 4 for further detail.

7 References

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Appendix 1 – Impact Assessment Methodology[7]

Impact Rating Methodology

The methodology used in this EIA process to assess and rate the significance of potential impacts is outlined in this section.

The significance of an impact is defined as a combination of the consequence of the impact occurring and the probability that the impact will occur.

The criteria used to determine impact consequence are presented in Table 1 below.

Table 1: Criteria used to determine the Consequence of the Impact

Rating	Definition of Rating	Score
A. Extent– the area over which the impact will be experienced		
None		0
Local	Confined to project or study area or part thereof (e.g. site)	1
Regional	The region, which may be defined in various ways, e.g. cadastral, catchment, topographic	2
(Inter) national	Nationally or beyond	3
B. Intensity– the magnitude of the impact in relation to the sensitivity of the receiving environment		
None		0
Low	Natural and/or social functions and processes are negligibly altered	1
Medium	Natural and/or social functions and processes continue albeit in a modified way	2
High	Natural and/or social functions or processes are severely altered	3
C. Duration– the time frame for which the impact will be experienced		
None		0
Short-term	Up to 2 years	1
Medium-term	2 to 15 years	2
Long-term	More than 15 years	3

The combined score of these three criteria corresponds to a Consequence Rating, as set out in Table 2:

Table 2: Method used to determine the Consequence Score

Combined Score (A+B+C)	0 – 2	3 – 4	5	6	7	8 – 9
Consequence Rating	Not significant	Very low	Low	Medium	High	Very high

Once the consequence is derived, the probability of the impact occurring will be considered, using the probability classifications presented in Table 3.

[7] Adapted from SRK Impact assessment methodology

Table 3: Probability Classification

Probability of impact – the likelihood of the impact occurring	
Improbable	< 40% chance of occurring
Possible	40% - 70% chance of occurring
Probable	> 70% - 90% chance of occurring
Definite	> 90% chance of occurring

The overall significance of the individual impacts will be determined by considering consequence and probability using the rating system prescribed in Table 4.

Table 4: Impact Significance Ratings

Significance Rating	**Consequence**		**Probability**
Insignificant	Very Low	&	Improbable
	Very Low	&	Possible
Very Low	Very Low	&	Probable
	Very Low	&	Definite
	Low	&	Improbable
	Low	&	Possible
Low	Low	&	Probable
	Low	&	Definite
	Medium	&	Improbable
	Medium	&	Possible
Medium	Medium	&	Probable
	Medium	&	Definite
	High	&	Improbable
	High	&	Possible
High	High	&	Probable
	High	&	Definite
	Very High	&	Improbable
	Very High	&	Possible
Very High	Very High	&	Probable
	Very High	&	Definite

Finally, the impacts will also be considered in terms of their status (positive or negative impact) and the confidence in the ascribed impact significance rating. The prescribed system for considering impacts status and confidence (in assessment) is laid out in Table 5.

Table 5: Impact status and confidence classification

Status of impact	
Indication whether the impact is adverse (negative) or beneficial (positive).	+ ve (positive – a 'benefit')
	– ve (negative – a 'cost')
	Neutral
Confidence of assessment	
The degree of confidence in predictions based on available information, EAP's judgment and/or specialist knowledge.	Low
	Medium
	High

The impact significance rating should be considered by the authority in their decision-making process based on the implications of ratings described below:

- **Insignificant:** the potential impact is negligible and will not have an influence on the decision regarding the proposed activity/development.
- **Very Low:** the potential impact should not have any meaningful influence on the decision regarding the proposed activity/development.
- **Low:** the potential impact may not have any meaningful influence on the decision regarding the proposed activity/development.
- **Medium:** the potential impact should influence the decision regarding the proposed activity/development.
- **High:** the potential impact will affect the decision regarding the proposed activity/development.
- **Very High:** The proposed activity should only be approved under special circumstances.

In the EIA practicable mitigation measures will be recommended and impacts rated in the prescribed way both without and with the assumed effective implementation of mitigation measures.

Appendix 2 – Declaration of the Specialist

I, Nick Steytler, as the appointed independent specialist, in terms of the 2014 EIA Regulations (as amended), hereby declare that:

I act as the independent specialist in this application;

I 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 regard the information contained in this report as it relates to my specialist input/study to be true and correct, and do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 (as amended) and any specific environmental management Act;

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 have no vested interest in the proposed activity proceeding;

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;

I have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;

I have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;

All the particulars furnished by me in this specialist input/study are true and correct; and
I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the specialist:

Name of Specialist: Nick Steytler

Date: 09/10/2025

Appendix 3 – CV of the Specialist

Curriculum Vitae
of
NICHOLAS STEYTLER
Director – EnviroSwift Western Cape

CONTACT DETAILS	
Address	32 Rameron Road, Imhoffs Gift, Kommetjie 7975
Email	Nick@enviroswift.co.za
Cell	082-322 4074
PERSONAL INFO	
Full Names	Nicholas Sean Steytler
Date of Birth	28 March 1970
Nationality	South African
Languages	English, Afrikaans, isiZulu (fair)
Identity Number	7003285202088

ACADEMIC QUALIFICATIONS		
BSc	University of Natal (Pmb)	1990
BSc Honours (Zoology & Entomology) ***Cum Laude***	University of Natal (Pmb)	1991
MSc (Entomology)	University of Natal (Pmb)	1994

PUBLICATIONS
Steytler, NS and Samways, 1995. MJ. Biotope selection by adult male dragonflies (Odonata) at an artificial lake created for insect conservation in South Africa. Biological Conservation Volume 72 Issue 3, December 1995, Pages 381 – 386.
Samways, MJ and Steytler, NS. 1996. Dragonfly (Odonata) distribution patterns in urban and forest landscapes, and recommendations for riparian management. Biological Conservation Volume 78 Issue 3, December 1996, Pages 279 – 288.

MEMBERSHIP OF PROFESSIONAL ASSOCIATIONS
Registered Environmental Scientist (Pr Sci Nat 400029/02)
Member of IAIA SA

FIELDS OF EXPERTISE	**Years experience**
Integrated Environmental Management	25 years +
Natural Resource Management Planning	25 years +

Freshwater Ecological Specialist Studies	5 years +
EMPLOYMENT HISTORY	
2019 – present: EnviroSwift Western Cape. Director / owner	
2007 – present: KHULA Environmental Consultants. Director / owner	
2005 – 2009: DJ Environmental Consultants. Associate Consultant.	
2000 – 2005: SRK Consulting, Cape Town, Environmental Department. Senior Environmental Scientist.	
1996 – 2000: Institute of Natural Resources, Pietermaritzburg. Associate Researcher: Natural Resources Management Programme.	
WORK EXPERIENCE (note IEM and Public Participation experience not listed below)	
Freshwater ecological specialist studies:	
Freshwater screening study for the proposed development of Erf 1472 Stellenbosch, City of Cape Town (2024)	
Freshwater screening study for the proposed expansion of the Montana Seed Processing Facility, Joostenbergvlakte, City of Cape Town (2024)	
Freshwater screening study for the German School, Kloof Neck, City of Cape Town (2024)	
Freshwater screening study for the proposed telecommunications mast on Portion 6 of the Farm Harkerville No 423, Knysna Road, Plettenberg Bay (2024)	
Freshwater screening study for the proposed residential development of Erven 3233 and 3234 Stellenbosch, City of Cape Town (2024)	
Freshwater screening study for the proposed residential development of Portion 3 of Farm 1643, Franschhoek, Drakenstein Municipality (2024)	
Freshwater screening study for the proposed new in-stream dam on the Remaining extent of Farm Sevilla No. 135, Clanwilliam (2024)	
Freshwater screening study for the proposed Morning Star affordable housing scheme, Durbanville, City of Cape Town (2024)	
Freshwater screening study for the proposed temporary staging facility for the proposed Wynberg IRT bus depot, City of Cape Town (2024)	
Freshwater screening study for the proposed subdivision of Erf 4795 Noordhoek, City of Cape Town (2024)	
Freshwater screening study for the proposed single residential development of Erf 88844 Clovelly, City of Cape Town (2023)	
Wetland delineation at the propsoed Eagles Rest Private Nature Reserve, Cape Point (2024)	
Freshwater ecological impact assessment for external services for Welmoed Urban Node, Stellenbosch (2024)	
Freshwater screening study for proposed solar PV facilities on the Remainder of Portion 5 of the Farm Rietvallei No. 167, Montagu (2023)	
Amendments to freshwater specialist reports submitted in support of the applications for environmental approval for the Calcutta Cemetery, Farm 29 Stellenbosch (2023)	
Freshwater screening study for the proposed development of Erf 325 Atlantis, City of Cape Town (2023)	
Freshwater screening study for the proposed development of solar PV facilities on Farms 788-6 and 792-RE, Philippi, City of Cape Town (2023)	
Freshwater screening study for the Proposed development of solar PV facilities on Erven 551 and 553, Schaapkraal, City of Cape Town (2023)	
Freshwater ecological impact assessment for the proposed expansion of the Rusty Gate Mountain Retreat, Greyton (2023)	
Freshwater screening study of the proposed redevelopment of portions of Stikland Hospital, Erf 6300 Stikland, Bellville (2023)	
Freshwater ecological specialist review & assessment for the proposed amendment to the scope of the authorised extension of Erica Drive, Belhar, City of Cape Town (2023)	
Freshwater Screening study for the proposed telecommunications base station on Portion 20 of the Farm Matroosberge No. 57, De Doorns (2023)	
Freshwater ecological impact assessment for the proposed subdivision of Erf 10546 Stellenbosch (2023)	
Freshwater screening study for the proposed expansion of Louwville township, Vredenburg (2023)	
Freshwater ecological impact assessment for the residential development of Erf 178092 Newlands, City of Cape Town (2023)	
Freshwater screening study for Erf 2068 Somerset West, City of Cape Town (2023)	
Freshwater screening study for Portion 3 of Farm 1025 Wemmershoek, Stellenbosch Municipality (2023)	
Freshwater ecological impact assessment for a new Wastewater Treatment Works for Matjiesfontein, Laingsburg Municipality (2023)	
Freshwater ecological impact assessment for the development of residential dwellings facilities at the Farm Hemelrand, Hemel en Aarde Valley, Overstrand Municipality (2023)	
Freshwater screening study for residential development at Oude Bosch, Hermanus Lagoon, Overstrand Municipality (2022)	

Freshwater ecological impact assessment for a proposed shopping centre at Erf 666 Stellenbosch, City of Cape Town (2022)
Freshwater screening study for the proposed formalisation of the Valhalla Park informal settlement, Cape Flats, City of Cape Town (2022)
Freshwater screening study for a proposed telecommunications mast, Overhex, Breede Valley Winelands Municipality (2022)
Freshwater ecological impact assessment for the proposed expansion of the Leopard Rock residential estate, Onrusrivier, Overstrand Municipality (2022)
Freshwater screening study for the proposed low cost housing development at Wolwerivier, City of Cape Town (2022)
Freshwater ecological impact assessment for the proposed low cost housing development of Erf 148 Philadelphia, City of Cape Town (2022)
Freshwater screening study of Erf 10932 Constantia, City of Cape Town (2022)
Freshwater screening study of Erf 49 Faure, City of Cape Town (2021)
Freshwater screening study for a proposed concrete factory on the Remainder of the Farm Bultfontyn 128, near Middelburg in the Eastern Cape (2021)
Freshwater ecological impact assessment for the proposed expansion of vineyards at Mountain Rose Farm, Hemel en Aarde Valley, Overstrand Municipality (2022)
Freshwater ecological impact assessment for unlawful agricultural expansion at Plennegy Farm, Oudtshoorn, Western Cape (2021)
Freshwater screening study for the development of erven 41 and 59, Knole Park, City of Cape Town (2021)
Freshwater ecological impact assessment for proposed truck stop on Portion of Erf 10229, Beaufort West, Western Cape (2021)
Freshwater screening study for the proposed redevelopment of the Mowbray Golf Course, Pinelands, City of Cape Town (2021)
Provision of rehabilitation specifications for the unlawful excavation of a trench in a river at the Farm Vergelegen, Robertson, Western Cape (2021)
Freshwater ecological impact assessment for unlawful agricultural expansion at Samber Farms, Riversdale, Western Cape (2021)
Freshwater ecological impact assessment for proposed expansion of an in-stream irrigation dam at Farm Hartebeest Kuil, George, Western Cape (2021)
Freshwater screening study for the proposed residential development of Erf 208 Bishopscourt, City of Cape Town (2021)
Freshwater screening study for the proposed agricultural processing facility, Maqinqi communal area, Port St. Johns Municipality, Eastern Cape (2021)
Freshwater ecological impact assessment for the proposed agricultural expansion at the Farm Vergelegen, Robertson, Western Cape (2021)
Freshwater ecological impact assessment for a proposed residential development in Plattekloof, City of Cape Town (2021)
Freshwater ecological screening study for the proposed sewerage pipeline for Schulz Vlei development, Philippi, City of Cape Town (2021)
Freshwater ecological impact assessment for the proposed development of an agro-industrial facility, Wemmershoek, Western Cape (2021)
Freshwater ecological screening study for a proposed filling station in Eerste River, City of Cape Town (2020)
Freshwater ecological impact assessment for an unlawfully constructed tourist accommodation facility, Tulbagh, Western Cape (2020)
Freshwater ecological screening study and risk assessment for additions and alterations to an existing residential dwelling, Breede River, Western Cape (2020)
Freshwater ecological screening study for a proposed truck depot and filling station, Paarl, Western Cape (2020)
Freshwater ecological screening study for a proposed phosphate mine, Saldanha, Western Cape (2020)
Freshwater ecological screening study for a single residential development at Oppi Berg, Ceres, Western Cape (2020)
Freshwater ecological screening study for a proposed industrial area expansion, Bredasdorp, Overberg, Western Cape (2020)
Freshwater ecological impact assessment for proposed Canola plant at Erf 15711 Wellington, Drakenstein Municipality (2020)
Freshwater ecological impact assessment for single residential development of Ptn 13 of Farm 563 Kleinmond (2020)
Freshwater ecological impact assessment for new IRT bus depot, Wynberg, City of Cape Town (2019)
Freshwater ecological screening study for Blackheath Printers, Blackheath, City of Cape Town (2019)
Freshwater ecological screening study for La Motte residential extension, Franschoek (2019)
Freshwater ecological impact assessment for Vloedbos Resort, Overberg (2019)
Freshwater ecological screening study for Erf 3660 Stellenbosch, City of Cape Town (2019)
Freshwater ecological screening study for Erf 2145 Constantia, City of Cape Town (2019)
Freshwater ecological impact assessment for low-cost housing development in Khayelitsha (2019)
Freshwater ecological impact assessment for Kommetjie Vineyards Estate, City of Cape Town (2018)
Freshwater ecological screening study for Remainder Erf 177887 Ottery, City of Cape Town (2018)

Environmental Planning and Natural Resources Management:
Preparation of an Invasive Alien Plant Clearing Plan for Erf 6289 Stellenbosch, City of Cape Town (2021)
Preparation of an Invasive Alien Plant Clearing Plan for Shamballah Tea House, Cape Point, City of Cape Town (2019)
Preparation of an Invasive Alien Plant Clearing Plan for Imhoff Farm, Southern Peninsula, City of Cape Town (2018)
Preparation of a River Maintenance Management Plan for the Jakkals River, Elgin, Theewaterskloof Municipality (2018)
Preparation of a River Maintenance Management Plan for wetlands associated with the Bottelary River, Hazendal Wine Farm, Stellenbosch (2017)
Preparation of an Alien Plant Clearing Plan for the Farm Wildschutsbrand, Cape Point (2017).
Preparation of an Alien Plant Clearing Plan for Lalapanzi Farm, Cape Point (2017).
Preparation of a River Maintenance Management Plan for the Dawidskraal River, Bettys Bay, Overstrand (2016)
Preparation of a Site Rehabilitation and Management Plan for wetlands at Kraaifontein Shooting club, Northern Cape Metro (2015)
Preparation of a Wetland Maintenance and Management Plan for De Goede Hoop Estate, Noordhoek, South Peninsula (2014)
Application for Off-Road Vehicle Regulations licence for boat launching facility, Oceana Power Boat Club slipway, V&A Waterfront (2014)
Preparation of a Maintenance Management Plan for the Silvermine River, Clovelly Country Club, South Peninsula (2014)
Preparation of a Maintenance Management Plan for the rehabilitation and maintenance of an unnamed stream and associated infrastructure, Klein Constantia Winefarm, Cape Metropole (2014)
Environmental Screening for the proposed redevelopment of the Tygerberg Hospital, Northern Cape Metropole (2014)
Establishment of a Permanent Coastal Development Setback Line for the V&A Waterfront, City of Cape Town (2014)
Preparation of a Maintenance Management Plan for the ongoing maintenance of the access road to the West Coast Rock Lobster holding facility, Witsand Island, Scarborough, City of Cape Town (2013)
Preparation of a Maintenance Management Plan for the Kromboom River, Erf 117459 Lansdowne, Cape Metropole (2013)
Preparation of a Rehabilitation Plan for the remediation of unlawful infilling of a wetland at Lalapanzi Farm, Cape Point (2012)
Preparation of a Rehabilitation Plan for the remediation of unlawful construction of a parking area at Erf 935 Noordhoek Farm Village, City of Cape Town (2012)
Preparation of a rehabilitation plan for the closure of the Retreat Filling Station, City of Cape Town (2012)
Khayeltisha Wetlands Park – Park Delineation and Management Review, City of Cape Town (2010)
Preparation of the Coast & Estuaries Theme for the 1st review of Eastern Cape State of the Environment Report (2009)
Preparation of 2010 FIFA World Cup Greening Business Plan for Polokwane, Limpopo Province (2008)
Preparation of 2010 FIFA World Cup Greening Business Plan for Rustenburg, North West Province (2008)
Revision of the Table Mountain National Park Conservation Development Framework, City of Cape Town (2006)
Comparative Evaluation of alternative venues for the 2010 FIFA World Cup Stadium, City of Cape Town (2006)
Preparation of a Strategic Management Framework for the Kogelberg Biosphere Reserve, Overberg (2005 – 2006)
Preparation of concept document and proposal to undertake a SADC regional market survey of the indigenous fibre trade, SADC Region (2006)
Strategic Planning of Cemeteries in the Drakenstein Municipality (2006)
Environmental assessment of overnight sites for the Hoerikwaggo Trails, Table Mountain National Park, Western Cape (2005)
Preparation of the Year 1 State of the Environment Report for the Western Cape (2005)
Preparation of a Water Resources Management Strategy for Mozambique (2004)
Due Diligence Study for the proposed Mozaq Limitada Prawn Farm, Mozambique (2003)
Preparation of the Culemborg Development Framework, City of Cape Town (2001)
Restoration Planning of the Bokramspruit River, Kommetjie, City of Cape Town (2001)
Management and Maintenance Planning of the Dwars River, Ceres (2001)
Preparation of the Garden Route Spatial Development Framework, Southern Cape (2001)
Strategic Planning of the information needs of a Medicinal Plants Network in the SADC region (1999)
Research to determine potential commercial products from the Wild - Medicinal Plants component, South Africa (1999)
Economic Evaluation of the Cultivation of Nine Species of Medicinal Plants Indigenous to South Africa (1998)
Faunal specialist assessment for the proposed N2 by-pass, Natal Drakensberg, KwaZulu-Natal (1997).
Freshwater specialist assessment for the proposed construction of a bridge over the Msunduzi River, Voortrekker Highschool, Pietermaritzburg (1997)
Strategic Planning of a proposed community based indigenous forest management project, Eastern Cape (1998)
Preparation of a decision support manual for community-based urban riparian systems management (RIPARI-MAN) (1998)
Preparation of an Integrated Catchment Management Plan for the Msunduzi River Catchment, Pietermaritzburg (1997)
Development of Flood Response Strategies for the Msunduzi River Catchment, Pietermaritzburg (1997)
Evaluating community-based wildlife management projects in the SADC region as part of the international project by IIED / IUCN called “Evaluating Eden” (1996)

Appendix 4 – Risk Assessment Matrix

PROJECT: Construction of a residential dwelling on Farm 1620 Stellenbosch

RISK ASSESSMENT MATRIX for Section 21 (c) and (i) Water Use activities - Version 2.1.1

Name of Assessor: Nick Steytler
SACNASP Registration Number: 400029/02
Date of assessment: 07-Oct-25

Phase	Activity	Impact	Significance (max = 100)	Risk Rating	Confidence level
CONSTRUCTION	Site preparation including vegetation removal	Disturbance of riparian habitat	24	L	Medium
		Alteration of Flow Regime	24	L	Medium
		Erosion and sedimentation	24	L	Medium
	Operation of construction machinery and storage of construction materials	Disturbance of riparian habitat	24	L	Medium
		Water quality impairment	19,8	L	Medium
OPERATIONAL	Presence of hard surfaces	Alteration of flow regime	23,4	L	Medium
	Residential land use	Disturbance of riparian habitat	18	L	Medium
		Water quality impairment	23,4	L	Medium