Aquatic Biodiversity Impact Assessment

Portion 36 of Farm Franche Kraal 708, Overberg

For: Lornay Environmental Consulting

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Report Information

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Executive Summary

The applicant, Tanya de Villiers, is proposing the development of an eco-estate / Beach Resort on Portion 36 of Farm Franche Kraal 708. The site is located to the northeast of Franskraal, within the Overberg Municipality, Western Cape Province.

According to the national web-based environmental screening tool report generated for the proposed development area, the Combined Aquatic Biodiversity Theme Sensitivity is classified as "Very High" (DFFE, 2023). The classification trigger is the presence of mapped estuarine and floodplain wetlands (South Coast Fynbos Bioregion), as well as an aquatic CBA 1, located within the proposed site.

Following an aquatic biodiversity assessment of the proposed site conducted on the 10th of October 2023, a seep wetland was confirmed and delineated onsite. Although the development area was found to be highly disturbed in nature, given the confirmed presence of a wetland within the site, and the presence of the Uilkraals Estuary approximately 75 m downstream, the site as a whole was determined to be of "Very High" aquatic sensitivity.

As the field assessment confirmed that the Aquatic Biodiversity sensitivity of the site is "Very High", the GN320 of 2020 requires that a full aquatic biodiversity impact assessment must be submitted as set out by the National Environmental Management Act (NEMA) (Act No. 107 of 1998) Regulations of 2020 (as amended) (GN R. 320 of 2020). Delta Ecology was appointed to undertake an aquatic biodiversity impact assessment of the proposed site.

In this impact assessment, the seep wetland and Uilkraals Estuary were assessed using current best practice assessment methodologies to determine the PES, EIS, WES and REC metrics. The results of these assessments are as follows:

Table i: Results of the wetland status quo assessment

	PES	EIS / Biological Importance Rating (NBA, 2019)	WES (Highest)	REC
Seep wetland	E	Moderate	Moderate	D
Uilkraals Estuary	D (NBA, 2019)	Important		D

The condition of the seep wetland was poor and exhibited a high degree of transformation as a result of dense alien invasive vegetation, and adjacent land use transformation such as vegetation clearing, invasive alien vegetation, SW inundation, and infilling. The Moderate EIS and WES scores indicated that the wetland is moderately sensitive / important in terms of conservation planning or provision of ecosystem services largely due to the seep's hydrological connection to the Uilkraals Estuary downslope.

The Uilkraals estuary's tidal regime, salinity gradient, mixing process, and connectivity has been compromised as a result of land use changes in the surrounding catchment area (Van Niekerk *et al.,* 2019). This estuary, which was once predominantly open, has closed as a result of excessive flow modifications (such as abstraction and the presence of dams upstream) (Van Niekerk *et al.,* 2019).

Aquatic biodiversity impacts associated with the development were identified and assessed using both an impact assessment methodology compliant with NEMA requirements and the Risk Assessment Matrix prescribed by GN509 of 2016.

The results of the assessment of wetland loss along with four more minor impacts during the construction and operational phases, given implementation of the listed mitigation measures, are summarised in **Table ii.**

Table ii: Summary of impact/risk assessment results (with mitigation)

	Rating	Risk Class	Applicable to	Mitigation Measures
Construction Phase				
Impact 1: Wetland Loss	Medium	Moderate	Seep Wetland	As per Section 8 and Annexure A
Impact 2: Altered flow	Very Low	Low	Seep Wetland & Uilkraals Estuary	As per Section 8 and Annexure A
Impact 3: Water Quality Impairment	Very Low	Low	Seep Wetland & Uilkraals Estuary	As per Section 8 and Annexure A
Operational Phase				
Impact 4: Altered flow	Very Low	Low	Seep Wetland & Uilkraals Estuary	As per Section 8 and Annexure A
Impact 5: Water quality impairment	Very Low	Low	Seep Wetland & Uilkraals Estuary	As per Section 8 and Annexure A
"No Go" Scenario: Gradual decrease in ecological condition in wetlands	Very Low	Not Assessed	Seep Wetland & Uilkraals Estuary	None

Four out of five of the post-mitigation scores fell within the "Very Low" impact categories. Wetland loss received the highest impact significance score, which fell within the 'Medium' category. Ordinarily wetland loss would fall within the 'high' category, but the degraded nature of the wetland has reduced the impact significance.

Although it is unknown whether the development area would be further developed in future, it is assumed that the site would remain as is, which is in a disturbed condition consisting of unused, degraded land. The No-Go option would result in the continuation of impact to the seep wetland and Uilkraals Estuary due to adjacent land uses – and would therefore still result in negative impact to the wetland onsite.

The Uilkraals Estuary is unlikely to be significantly impacted should the 75 m buffer surrounding the estuary be designated as a No-Go during construction. It is recommended that the project engineers design the SW management system onsite in such a way as to ensure that flow is maintained to the Uilkraals Estuary downstream of the development. In addition, the potential for flood risk posed by the location of the development in the upper limit of an estuarine functional zone should be taken into account during the design process by the project Engineers.

The Moderate risk rating confirms that a Water Use Licence will be required for this project. It is furthermore highlighted that a suitable Wetland Offset will be required for the project in terms of the DHSWS 'no net loss' policy (Macfarlane *et al*, 2014). A detailed wetland offset, rehabilitation, and

management plan is likely to be required to investigate the viability of rehabilitating a portion of the remaining seep wetland onsite to offset the wetland loss due to the proposed development.

It is recommended that the relatively natural portion of the seep wetland indicated by the red arrow in **Figure i** below is avoided by construction activities, and maintained within a likely larger area to be rehabilitated during the Offset process:

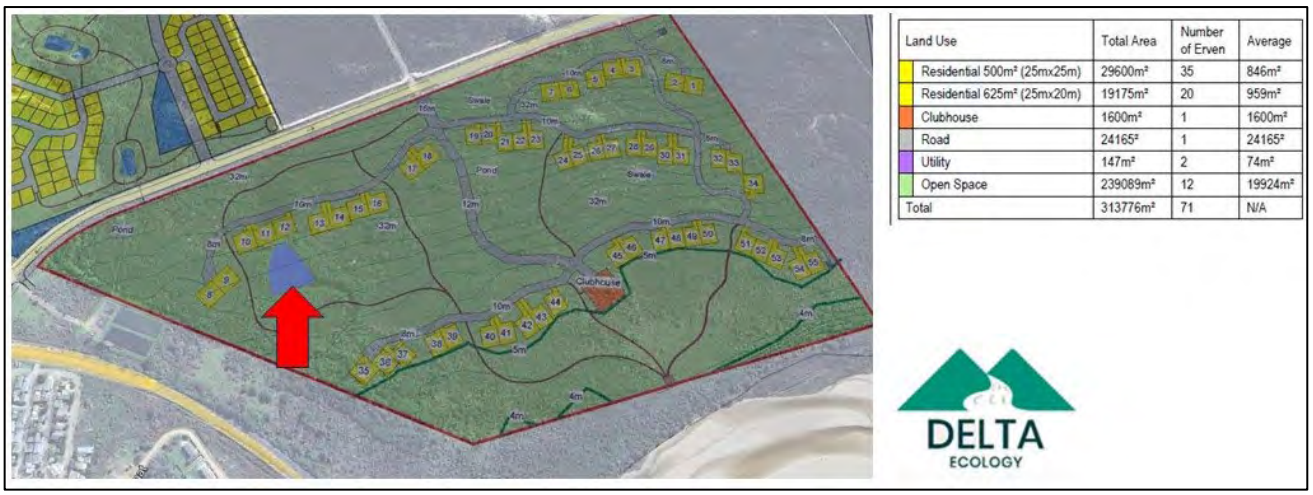

Figure i: Wetland area to be conserved and rehabilitated.

It is the opinion of the specialist that the proposed development should be approved, subject to application of the mitigation measures listed in this report, as well as the implementation of a suitable Wetland Offset, Rehabilitation and Management Plan.

Table of Contents

List of Figures

List of Tables

Specialist Details

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Kimberley van Zyl is an ecologist and environmental scientist with over 7 years' experience in the environmental management field. She holds a MSc. degree in Water Resource Management from the University of Pretoria and her professional affiliations include the South African Council for Natural Scientific Professions (SACNASP) and the Southern African Society of Aquatic Scientists (SASAqS). Kimberley's work experience has exposed her to a range of projects across various business sectors such as mining, agriculture, and construction, as well as the public sector. A full CV can be provided on request.

A signed statement of independence will be provided as a separate document.

1. Introduction

The applicant, Tanya de Villiers, is proposing the development of an eco-estate / Beach Resort on Portion 36 of Farm Franche Kraal 708 (**Figure 1-1**) (**Figure 1-2**). The site is located to the northeast of Franskraal, within the Overberg Municipality, Western Cape Province.

According to the national web-based environmental screening tool report generated for the proposed development area, the Combined Aquatic Biodiversity Theme Sensitivity is classified as "Very High" (DFFE, 2023). The classification trigger is the presence of mapped estuarine and floodplain wetlands (South Coast Fynbos Bioregion), as well as an aquatic CBA 1, located within the proposed site.

Following an aquatic biodiversity assessment of the proposed site conducted on the 10th of October 2023, a seep wetland and the estuarine functional zone of the Uilkraals Estuary were confirmed and delineated onsite. Given the confirmed presence of wetland areas within the proposed site which will likely be impacted by the proposed development, the site as a whole was determined to be of "Very High" aquatic sensitivity.

If the specialist determines that the Aquatic Biodiversity sensitivity of the site is "Very High", the GN320 of 2020 requires that a full aquatic biodiversity impact assessment must be submitted as set out by the National Environmental Management Act (NEMA) (Act No. 107 of 1998) Regulations of 2020 (as amended) (GN R. 320 of 2020). Delta Ecology was appointed to undertake an aquatic biodiversity impact assessment of the proposed development on the onsite wetlands.

The aim of this aquatic biodiversity impact assessment is to (1) determine the Present Ecological State (PES) and ecological importance of the wetland systems present, (2) to assess the potential impact of the proposed development on the mapped and confirmed wetland systems, and (3) to provide recommendations for impact mitigation and development layout.

Figure 1-1: Location of the proposed site, Portion 36 of Farm Franche Kraal 708.

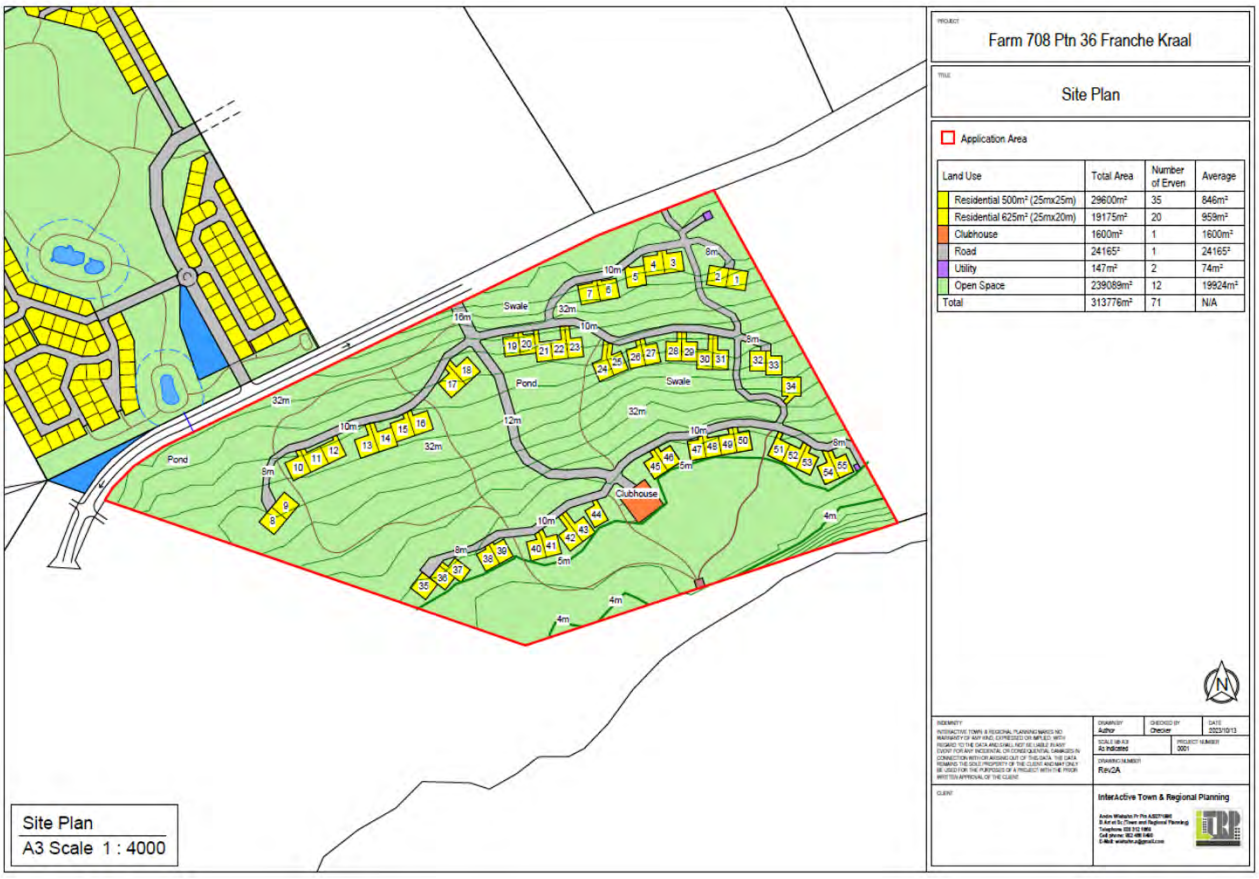


Figure 1-2: Alternative Layout 1 of the proposed eco-estate (subject to changes).

1.1. Terms of Reference

The terms of reference agreed upon for this aquatic biodiversity assessment include:

- A desktop background assessment to identify potential aquatic biodiversity constraints within the proposed site and within the 500 m regulated proximity thereof.
- A site assessment to confirm aquatic biodiversity constraints.
- Delineation of the watercourse (s) likely to be impacted by proposed development activities using a combination of site-based and desktop methodologies as appropriate.
- Verification of the aquatic site sensitivity as either "Very High" or "Low".
- Drafting of an aquatic biodiversity impact assessment report including the following:
    - General site description;
    - Site sensitivity verification;
    - Determination of the Present Ecological State (PES), Ecological Importance and Sensitivity (EIS) and the contribution to Wetland Ecosystem Services (WES);
    - Assessment of potential aquatic biodiversity impacts of the proposed development on the watercourses present onsite;
    - Application of the Risk Assessment matrix stipulated by GN509 of 2016 promulgated in terms of the National Water Act (Act 36 of 1998) to determine the risk of the proposed development activities on the delineated watercourses onsite;
    - Provision of mitigation measures to reduce aquatic biodiversity impact as far as possible.

1.2. Limitations and Assumptions

The following limitations and assumptions apply to this assessment:

- The site assessment was undertaken on the 10th of October 2023, during Spring in the Western Cape. Therefore, this assessment does not cover complete seasonal variation in conditions at the site. This is however, in the opinion of the specialist, of no material consequence to outcome of this assessment.
- The duration of the site assessment was approximately 5 hours which was sufficient to adequately assess the wetland areas present, and the aquatic biodiversity risk posed by the proposed project.
- The watercourse was delineated using a Garmin handheld GPSMAP 66i with an expected accuracy of 3 m or less at the 95% confidence interval. In the opinion of the specialist, this limitation is of no material significance to the assessment and all aquatic biodiversity constraints have been adequately identified.
- Significant encroachment of woody vegetation has taken place within the proposed development area. The woody nature of the terrestrial vegetation, as well as the encroachment of woody alien species into the wetland areas, created a limitation when determining the boundary of the onsite watercourses. However, infield delineation was supplemented with the use of digital satellite imagery (Google Earth Pro) in combination with contour maps for the area. The delineation as presented in this report is therefore regarded as a best estimate of the watercourse boundaries based on the site conditions present at the time of assessment, and the general findings and results were considered sufficient to inform the assessment of any potential impact that could occur as a result of the proposed development activities.

- The information provided by the client forms the basis of the planning and layouts discussed.
- Formal vegetation sampling was not done by the specialist, however general observations pertaining to vegetation were recorded based on onsite visual observations. Furthermore, only dominant, and noteworthy plant species were recorded. Thus, the vegetation information provided has limitations for true botanical applications.
- Deriving a 100% factual report based on field collecting and observations can only be done over several years and seasons to account for fluctuating environmental conditions, species' seasonality, and migrations. Since environmental impact studies deal with dynamic natural systems, additional information may come to light at a later stage.
- Description of the depth of the regional water table and geohydrological and hydro pedological processes falls outside the scope of the current assessment.
- Flood line calculations fall outside the scope of the current assessment.
- A Species of Conservation Concern (SCC) scan, fauna and flora assessments were not included in the current study.
- Watercourse delineation plotted digitally may be offset by at least five meters to either side. Furthermore, it is important to note that, during the course of converting spatial data to final drawings, several steps in the process may affect the accuracy of areas delineated in the current report. It is therefore suggested that the no-go area identified in the current report be pegged in the field in collaboration with the surveyor for precise boundaries. The scale at which maps and drawings are presented in the current report may become distorted should they be reproduced by, for example, photocopying and printing.
- The calculation of buffer zones does not consider climate change or future changes to watercourses resulting from increasing catchment transformation.

Notwithstanding the above limitations, the specialist is of the opinion that the aquatic biodiversity constraints for the site have been adequately identified for the purposes of this aquatic biodiversity assessment.

1.3. Use of this report

This report reflects the professional judgement of its author and, as such, the full and unedited contents of this should be presented in any application to relevant authorities. Any summary of the findings should only be produced with the approval of the author.

2. Site Sensitivity Verification

According to the national web-based environmental screening tool report generated for the site, the Combined Aquatic Biodiversity Theme Sensitivity is classified as "Very High" (DFFE, 2023). The classification trigger is the presence of mapped estuarine and floodplain wetlands (South Coast Fynbos Bioregion), as well as an aquatic CBA 1, located within the proposed site.

As per the National Environmental Management Act (NEMA) (Act No. 107 of 1998) Regulations of 2020 (as amended) (GN R. 320 of 2020), prior to initiation of specialist assessments, the current land use, and the potential environmental sensitivity of the site (s) - as identified by the national web-based environmental screening tool - must be confirmed by undertaking an Initial Site Sensitivity Verification. This Initial Site Sensitivity Verification aims to confirm or dispute the current

use of the land and environmental sensitivity as identified by the national web based environmental screening tool.

If the specialist agrees that the aquatic biodiversity sensitivity of the site (s) is "Very High" upon conducting an Initial Site Sensitivity Verification, then a full "Aquatic Biodiversity Impact Assessment" must be compiled during the Basic Assessment process. However, if the specialist determines that the sensitivity of the site (s) is of "Low" aquatic biodiversity sensitivity then an "Aquatic Biodiversity Compliance Statement" must be compiled.

The South African National Biodiversity Institute (SANBI, 2018) National Wetland Map 5 (NWM5) and the National Freshwater Ecological Priority Areas (NFEPA) spatial data (CSIR, 2011), indicates the presence of the Uilkraals estuarine functional zone within the site. The NWM5 also indicates the presence of a floodplain wetland within the site. The perennial Boesmans River is located approximately 30 m to the south and southeast of the site, according to the DRDLR NGI river line vector data. Additional watercourses within the 500 m regulated proximity include two NWM5 and NFEPA Channelled Valley Bottom (CVB) wetlands to the north of the site and three NGI non-perennial streams.

The Initial Site Sensitivity Verification was undertaken by a desktop assessment of the development area, and a field assessment conducted on the 10th of October 2023. The development area was deemed to be of "Very High" aquatic sensitivity.

During the field assessment, a seep wetland was confirmed and delineated along the northwestern portion of the site. Additionally, the functional zone of the Uilkraals estuary was confirmed and delineated along the southeastern boundary of the site. Both wetlands are in a degraded state due to dense infestation of alien invasive *Acacia saligna* (Port Jackson).

The proposed development is likely to impact the hydrology, water quality and, in the event of encroachment, the geomorphology of the onsite seep wetland. According to GN R. 320 of 2020, if the specialist determines that the Aquatic Biodiversity sensitivity of the site is "Very High", then a full Aquatic Biodiversity Impact Assessment must be compiled as part of the Basic Assessment (BA) process.

3. Methodology

The methodology used in this Impact Assessment report, including a desktop background assessment, one site visit, and the delineation, and classification of the wetlands associated with the proposed development area, is outlined in the subsections below.

3.1. Desktop Assessment

A review of desktop resources was undertaken to determine the nature of the proposed site, the presence of watercourses in the vicinity, and the significance of the site in terms of biodiversity planning. The following desktop resources were consulted:

- Topographical and watercourse information from the Department of Rural Development and Land Reform (DRDLR);
- The South African Atlas of Climatology and Agrohydrology (1997, 2007, and 2009);
- Geological information from the Council for Geoscience;
- The SANBI (2018) National Vegetation Map (NVM);
- The South African National Biodiversity Institute National Wetlands Map 5 (NWM5 – CSIR 2018);
- The National Freshwater Ecosystem Priority Areas (NFEPA – CSIR, 2011) wetland, wetland vegetation group classification, river, and FEPA datasets;
- The Chief Directorate: National Geo-spatial Information (DRDLR) Rivers dataset;
- The Western Cape Biodiversity Spatial Plan (WCBSP, 2017).

3.2. Wetland Identification & Delineation

Watercourses were identified and delineated using the method described in the Manual for the Identification and Delineation of Wetlands and Riparian Areas for field-based delineation (DWAF, 2008). This method is the accepted best practice method for delineating watercourses in South Africa and its use is required by GN 509.

For wetlands, the method makes use of four key field indicators to guide the delineation process (refer to **box 1**):

Box 1. Four indicators of wetland presence as described in DWAF (2008):

1. The **position in the landscape** – Identifies parts of the landscape where wetlands are more likely to occur;
2. The **soil form** – Wetlands are generally associated with certain soil types;
3. The presence of **aquatic vegetation communities**;
4. The presence of **hydromorphic soil features**, which are morphological signatures that appear in soils with prolonged periods of saturation (associated with anaerobic conditions). Key hydromorphic features include:
    a. Mottling – Formation of clumps of iron oxide within the soil matrix in the form of orange, yellow, black, or reddish-brown speckling. Mottling occurs in most soils and reaches maximum density in the centre of the seasonal zone with sparse mottling in the temporary zone and no mottling in the permanent zone.
    b. Gleying – Shift in soil colour from the terrestrial baseline towards a blue, green, or grey colour and an overall reduction in soil chroma. This phenomenon is normally difficult to identify in the temporary zone, noticeable in the seasonal zone and most significant in the permanent zone.
    c. Organic Surface Layers – surface layers with very high organic content that typically occur in the wetland seasonal and permanent zones.
    d. Organic Streaking – Streaks of organic matter within the soil column which may be present in all zones, but particularly the temporary and seasonal zones.

Soil samples were taken for inspection by hand augering to determine soil form and presence of redoximorphic and other hydromorphic soil features. Aquatic vegetation communities were identified using the DWAF, 2008 classification of wetland plant species and descriptions of communities, along with auxiliary information (Van Ginkel *et al*., 2011). Wetland plant species classification categories are as follows:

- Obligate species (occurring in wetlands >99% of the time – usually in the permanent or seasonal zone);
- Facultative Positive species (67 to 99% of the population occurs within wetlands – typically in the seasonal and temporary zones with the remaining 1 to 33% in the adjacent area on the wetland periphery);
- Facultative Species (33 – 67% of the population occurs within wetlands – usually in seasonal or temporary zones with the remaining 67 – 33% in the adjacent area on the wetland periphery);
- Facultative Negative Species (1 – 33% of the population occurs within wetlands – usually in the temporary zone with the remaining 99 to 67% in the adjacent area on the wetland periphery);
- Wetland Cosmopolitan Species (No specific affinity for wetlands and colonise wetland and terrestrial areas).

3.3. Wetland Classification

The Ollis *et al* (2013) Classification System for Wetlands and Other Aquatic Ecosystems in South Africa, as used in this assessment, is a tiered structured classification system that provides a uniform description of wetland types based on their hydrogeomorphic characteristics. This classification system categorises wetlands into 7 distinct hydrogeomorphic units described in **Figure 3-1**.

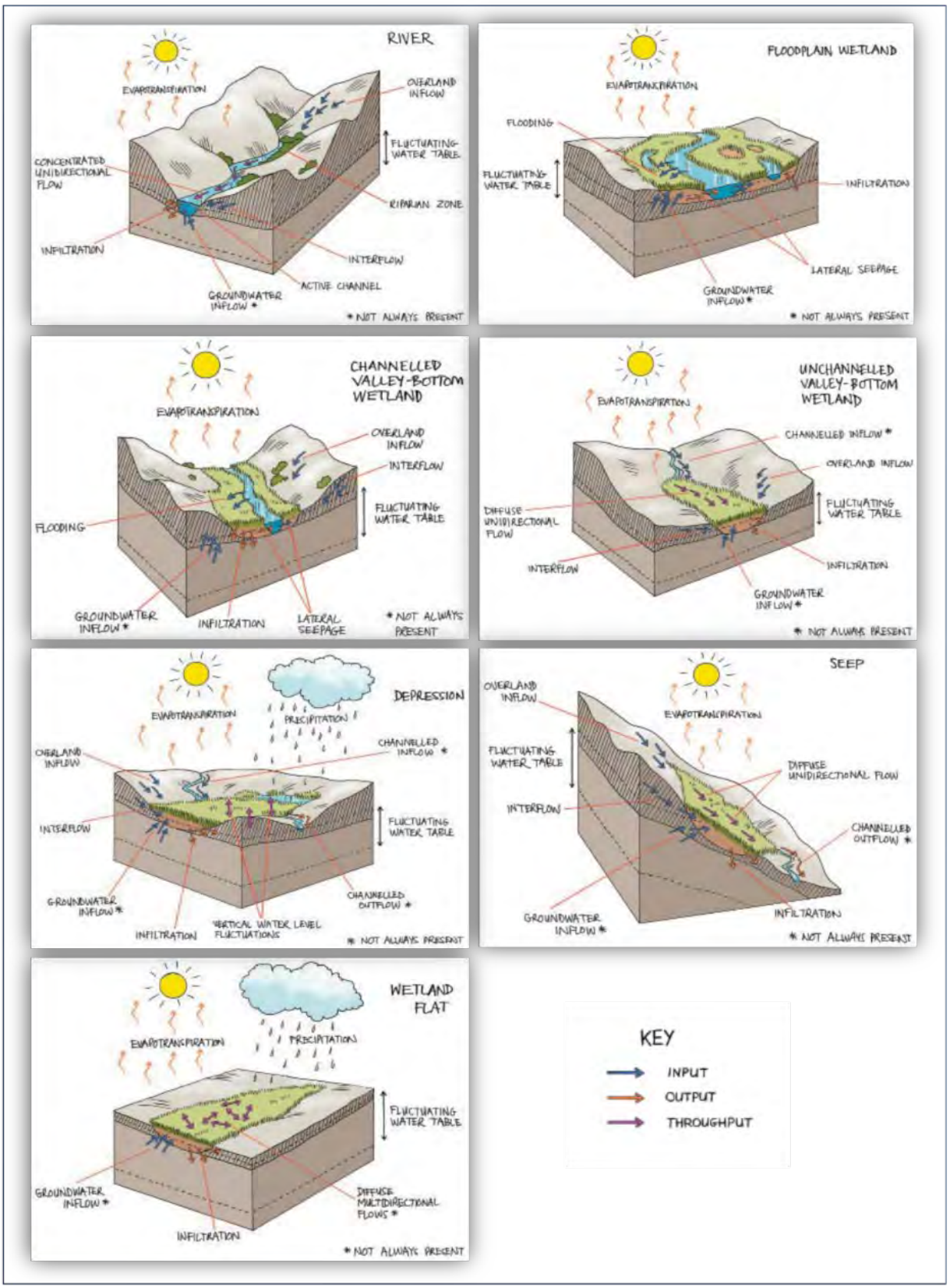


Figure 3-1: Wetland Hydrogeomorphic Types as defined in the Classification System for Wetlands and Other Aquatic Ecosystems in South Africa (Ollis *et al.*, 2013).

3.4. Present Ecological State Assessment

WET-Health Version 2 (Macfarlane *et al*. 2020) is a modular tool designed to evaluate and assess the Present Ecological State (PES) of wetland hydrogeomorphic units based on the degree to which the wetland has deviated from its natural reference condition. The tool accounts for four inter-related components that influence wetland health. These consist of three core drivers of wetland change namely hydrology, geomorphology, and water quality, along with vegetation as a responding variable. A separate PES score is derived for each of these components, which are then combined into a single PES score for the wetland hydrogeomorphic unit. The scores for each component and the overall score fall into one of six Ecological Categories defined in **Table 3-1** below.

The tool offers three levels of assessment:

1. Level 1A, a low-resolution desktop-based assessment;
2. Level 1B, a high-resolution desktop-based assessment; and
3. Level 2, a detailed rapid field-based assessment.

Level 1A is applied to provincial and national scale assessments of many wetlands, while Level 1B is applied to catchment scale assessments or to rapid individual assessments. The Level 2 assessment incorporates information from a direct onsite assessment of the wetland and its catchment and adds detail by separately assessing the various disturbance units within the wetland. The level 2 PES assessment was applied in this case.

Under normal circumstances, the Present Ecological State (PES) of the wetland is assessed prior to relevant development activities taking place. However, in this case development activities had been initiated prior to recognition of the need for a PES assessment. This necessitated the assessment of the wetland in a state that specialists had not seen first-hand, immediately prior to the current owner acquiring the property. As such reasonable assumptions were made and clearly outlined based on the known disturbance history of the site and satellite imagery where available.

Table 3-1: Present Ecological Status Categories Scores as defined WET-Health Version 2 (Macfarlane *et al.*, 2020)

Ecological Category	Description	Impact Score	PES Score (%)
A	Unmodified, natural.	0-0.9	90-00
B	Largely natural with few modifications. A slight change in ecosystem processes is discernible and a small loss of natural habitats and biota may have taken place.	1-1.9	80-89
C	Moderately modified. A moderate change in ecosystem processes and loss of natural habitats has taken place but the natural habitat remains predominantly intact.	2-3.9	60-79
D	Largely modified. A large change in ecosystem processes and loss of natural habitat and biota and has occurred.	4-5.9	40-59

E	Seriously modified. The change in ecosystem processes and loss of natural habitat and biota is great but some remaining natural habitat features are still recognizable.	6-7.9	20-39
F	Critically modified. Modifications have reached a critical level and the ecosystem processes have been modified completely with an almost complete loss of natural habitat and biota.	8-10	0-19

3.5. Ecosystem Service Assessment

WET-EcoServices Version 2 (Kotze *et al*. 2020) is a structured and rapid field-based evaluation tool designed to assess the wetlands ecosystem services based on its Hydrogeomorphic (HGM) unit. The tool accounts for 16 ecosystem services which are derived from regulating (e.g., flood attenuation), provisioning (e.g., water supply), supporting (e.g., biodiversity maintenance), and cultural (e.g., tourism and recreation) services (refer to **Annexure 1**). The tool evaluates the scale of ecosystem services supplied (in terms of a score out of 4 per service) relative to other wetlands and furthermore compares the scale of service supply to the demand for each service. The scores are divided into seven categories as per **Table 3-2**.

The tool offers two levels of assessment, namely Level 1 (a rapid desktop assessment) and Level 2 (a detailed field-based indicator assessment). Level 1 is designed for conducting rapid desktop assessments of many wetlands across provincial and national scales. Ratings are assigned based on the Hydrogeomorphic unit of the wetland. Level 2 is designed for conducting robust in-field assessments of ecosystem services for respective wetland types. The level 2 Ecosystem Service assessment was applied in this case.

Table 3-2: Ecosystem Services Importance Categories Scores as defined in WET-EcoServices Version 2 (Kotze *et al*. 2020)

Importance Category		Description
Very Low	0-0.79	The importance of services supplied is very low relative to that supplied by other wetlands.
Low	0.8 – 1.29	The importance of services supplied is low relative to that supplied by other wetlands.
Moderately-Low	1.3 – 1.69	The importance of services supplied is moderately-low relative to that supplied by other wetlands.
Moderate	1.7 – 2.29	The importance of services supplied is moderate relative to that supplied by other wetlands.
Moderately-High	2.3 – 2.69	The importance of services supplied is moderately-high relative to that supplied by other wetlands.
High	2.7 – 3.19	The importance of services supplied is high relative to that supplied by other wetlands.
Very High	3.2 - 4.0	The importance of services supplied is very high relative to that supplied by other wetlands.

3.6. Ecological Importance and Sensitivity Assessment

The Ecological Importance and Sensitivity (EIS) method (Rountree *et al*. 2013) is a rapid scoring system designed to identify the ecological importance and sensitivity of wetlands to disturbances across multiple scales (i.e., catchment to international scales). The full EIS method integrates three important components, namely, ecological importance and sensitivity, hydro-functional importance, and basic socio-economic importance. The hydro-functional and socio-cultural benefits were however assessed using the updated WET-EcoServices assessment methodology and these two components were therefore omitted from this EIS assessment. The EIS score ranges from 0-4, and it provides an index for prioritisation and management of water resources. The EIS categories are presented in **Table 3-3**.

Table 3-3: Ecological Importance and Sensitivity Categories (DWAF, 1999)

EIS Category	Description	Range of Median
Very high	Ecologically important and sensitive on a national or even international level. These river systems and their biota are usually very sensitive to flow and habitat modifications and provide only a small capacity for use.	>3 and <=4
High	Ecologically important and sensitive on a regional or national scale. These river systems may be sensitive to flow and habitat modifications.	>2 and <=3
Moderate	Watercourses that are considered to be ecologically important and sensitive on a provincial or local scale. The biota of these watercourses is not usually sensitive to flow and habitat modifications.	>1 and <=2
Low/marginal	Watercourses that are not ecologically important and sensitive at any scale. The biota within these watercourses is not sensitive to flow and habitat modifications.	>0 and <=1

3.7. Recommended Ecological Category

The method for determining the Recommended Ecological Category (REC) for water resources is described in Rountree *et al*. (2013). The objective of the REC is to define the management objective for wetlands and does so in accordance with the following rules:

- A wetland within PES Category A (unmodified) cannot be rehabilitated. The management objective will therefore always be to maintain the existing PES Category.
- A wetland within PES Category B, C or D with a "Low-marginal" or "Moderate" EIS score must also be maintained in the pre-development PES category.
- A wetland within PES Category B, C or D with a "High" or "Very High" EIS score must, where practically possible, be rehabilitated to a PES category that is one higher than the pre-development category. E.g. a wetland with a pre-development PES score of C and a "High" EIS score must be rehabilitated to a PES category B. Where this is not practically possible, maintenance of the pre-development PES category will be the management objective.
- PES Categories E or F are considered unsuitable and always require rehabilitation to a PES Category D.

3.8. Impact and Risk Assessment

The impact assessment utilised the Delta Ecology impact assessment methodology as specified in **Annexure 2**. The risk assessment utilised the methodology and risk matrix specified in GN. 509 of 2016 for the purpose.

4. Desktop Assessment

A review of desktop resources was undertaken. A summary of key desktop information relevant to this assessment is provided below.

4.1. Biophysical Context

According to the South African Atlas of Climatology and Agrohydrology (Schulze, 2009) obtained from CapeFarmMapper ver.2.6.10, the mean annual rainfall received for the area is 462 mm, obtained mostly during the winter months with the highest rainfall occurring from May to August.

According to the Council for Geoscience geological map (ENPAT), the soils in this region are dominated by Calcareous aeolianite of the Waenhuiskrans Formation, partially covered by sand and coastal dunes of the Strandveld Formation, Bredasdorp Group. The soil types and descriptions map developed by the Department of Agriculture, Forestry and Fisheries (DAFF) indicates that this region has greyish sandy, excessively drained soils, with limited pedological development. The soils in this region tend to be low in clay (<15%).

According to the SANBI Vegetation Map 2018, the natural vegetation in this area consists of Agulhas Sand Fynbos which is listed as Critically Endangered (CR) and Moderately Protected (MP) (**Table 4-1**). According to the NFEPA (CSIR, 2011) spatial dataset, this area corresponds to the South Coast Sand Fynbos wetland vegetation type, which where floodplain wetlands are present, is listed as Endangered (EN) and Poorly Protection (PP) and where seep wetlands are present, is also listed as Critically Endangered (CR) and with Zero Protection (ZP).

The general biophysical characteristics of the proposed site is summarised in **Table 4-1**.

Table 4-1: General characteristics of the proposed site

Site attribute	Description	Data source
Eco-region	Southern Coastal Belt	Department of Water Affairs Level 1 Ecoregions (DWS, 2011)
Terrestrial Vegetation Type	Agulhas Sand Fynbos (CR – MP)	National Vegetation Map of South Africa, 2018 (SANBI, 2018)
Dominant Geology and Soils	This region is characterised by Calcareous aeolianite of the Waenhuiskrans Formation, partially covered by sand and coastal dunes of the Strandveld Formation, Bredasdorp Group.	Cape Farm Mapper (ENPAT, 2021)
Soil Erodibility Factor (K)	0.63 (High Erodibility)	SA Atlas of Climatology and Agrohydrology (Schulze, 2009)
Soil Depth & Clay Percentage (%)	>= 750 mm & <15%	Soil types and descriptions for the Western Cape, Department of Agriculture, Forestry and Fisheries (DAFF, 2021)
Mean Annual Precipitation (mm)	462 mm	SA Atlas of Climatology and Agrohydrology (Schulze, 2009)
Rainfall seasonality	Winter rainfall	
Mean Annual Temperature (°C)	16.1 °C	
Water Management Area	Breede - Gouritz WMA	Water Management Areas (DWAF, 2011)
Quaternary Catchment	G40M	South African Quaternary Catchments Database (Schulze *et al.* 2007)
Wetland Vegetation Group (for wetlands within the applicable terrestrial vegetation type)	South Coast Sand Fynbos (EN - PP)	NFEPA Wetland Vegetation Types (CSIR, 2011)

4.2. Biodiversity Planning Context

The site under evaluation is located within the Breede-Gouritz Water Management Area, quaternary catchment G40M. The applicable sub-quaternary catchment is demarcated as a Phase 2 Freshwater Ecosystem Priority Area (FEPA) (CSIR, 2011). The regional setting, in terms of the Level 1 Department of Water Affairs (DWA) (now Department of Water and Sanitation) Ecoregions is within the Southern Coastal Belt (**Table 4-1**).

According to the NWM5 and NFEPA, the majority of the site is located within the estuarine functional zone of the Uilkraals estuary (SANBI, 2018; CSIR, 2011) (**Figure 4-4**). The NWM5 also indicates the presence of a floodplain wetland within the site (SANBI, 2018). The perennial Boesmans River is located approximately 30 m to the south and southeast of the site, according to the DRDLR NGI river line vector data. Additional watercourses within the 500 m regulated proximity include two NWM5 and NFEPA Channelled Valley Bottom (CVB) wetlands to the north of the site and three NGI non-perennial streams.

The Western Cape Biodiversity Spatial Plan (WCBSP) dataset illustrates areas of biodiversity that are significant throughout the Western Cape, which includes Protected Areas (PAs), Critical Biodiversity Areas (CBA1 and CBA2), Ecological Support Areas (ESA1 and ESA2), and Other Natural Areas (ONAs). The WCBSP dataset indicates the presence of an aquatic CBA 1 (estuary) located within the study area. The WCBSP also identifies aquatic CBA 1 (river and estuary) surrounding the site to the south and a Protected Area (PA) (Uilkraalsmond Nature Reserve) within the 500 m regulated proximity. This is indicative that the site is of high biological value for conserving biodiversity and maintaining ecosystem functioning.

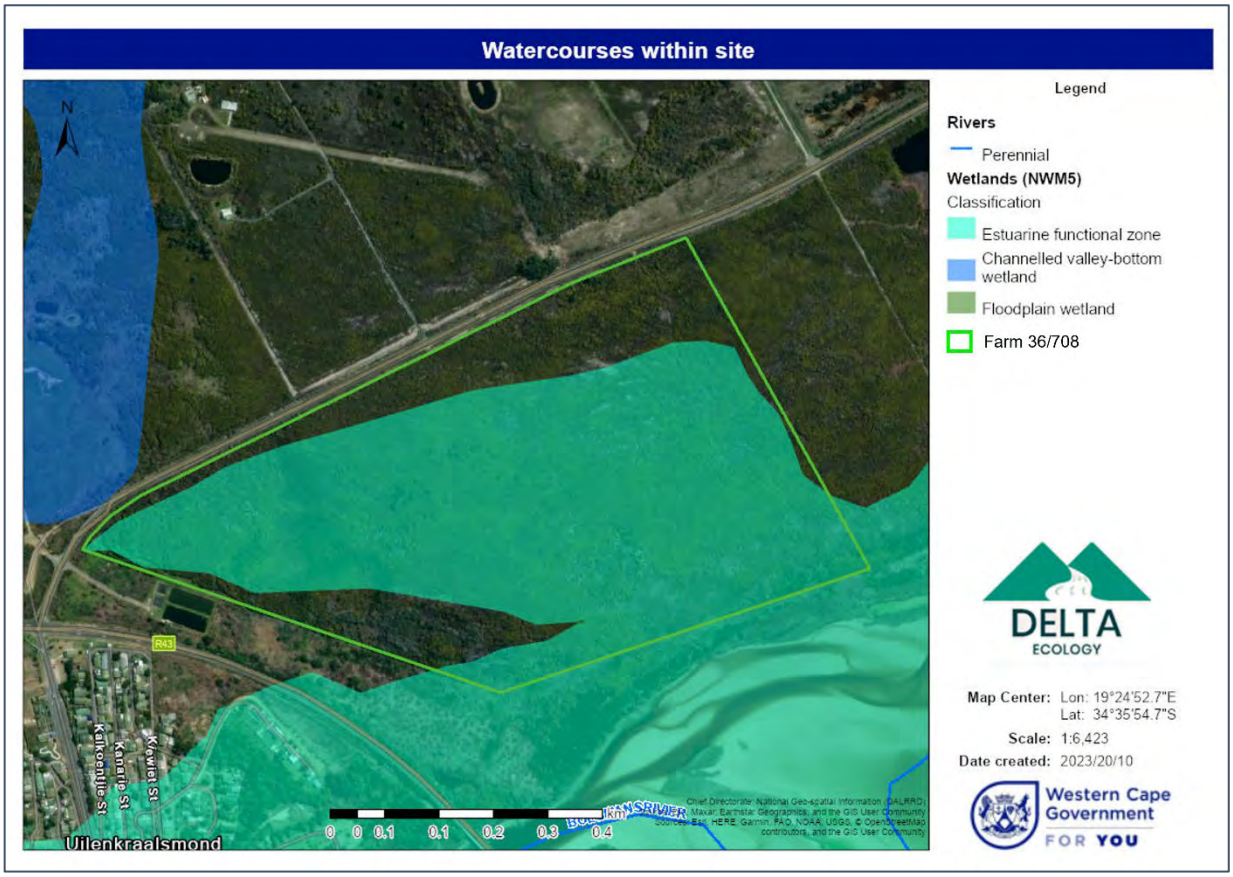


Figure 4-1: Watercourses indicated by desktop resources (NWM5) (SANBI, 2018).

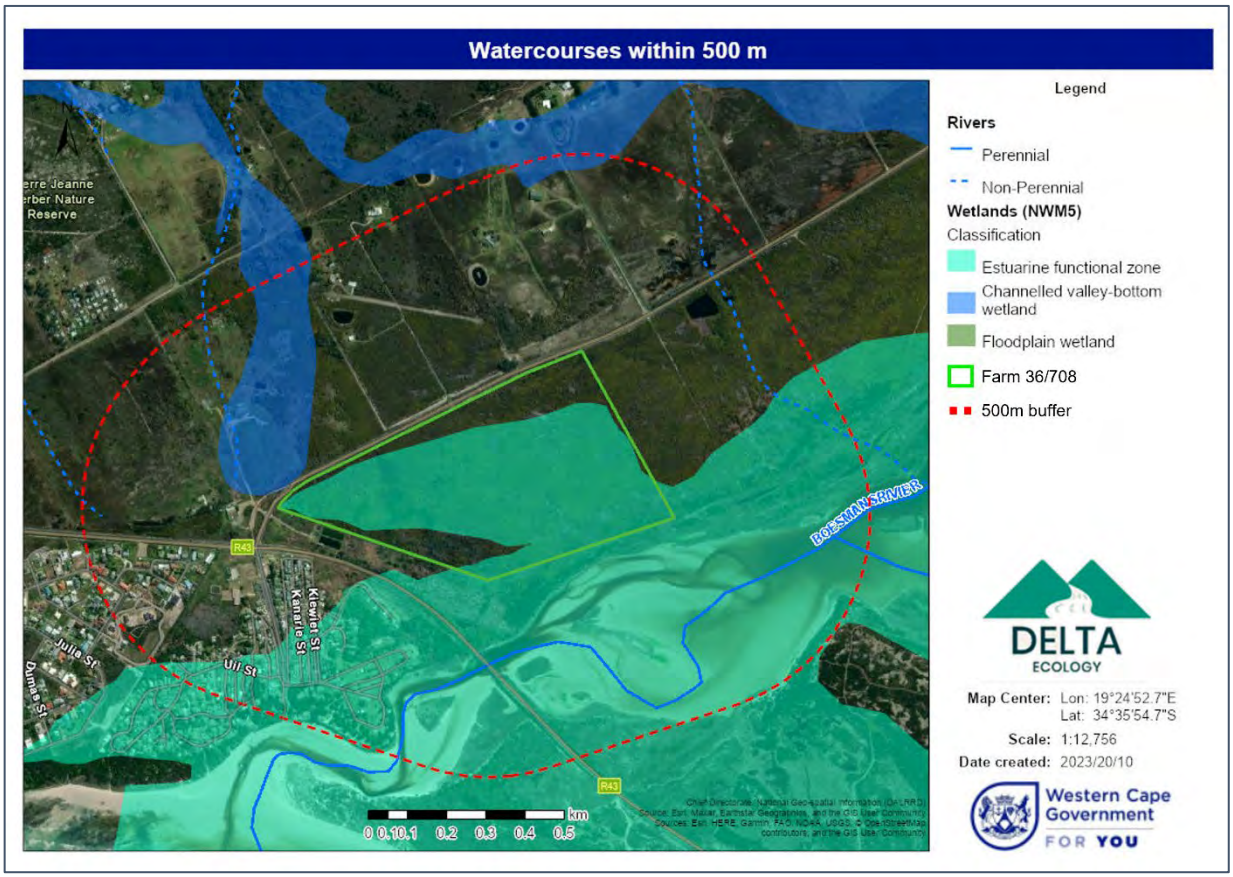


Figure 4-2: Watercourses indicated within 500m of the site (NWM5) (SANBI, 2018).

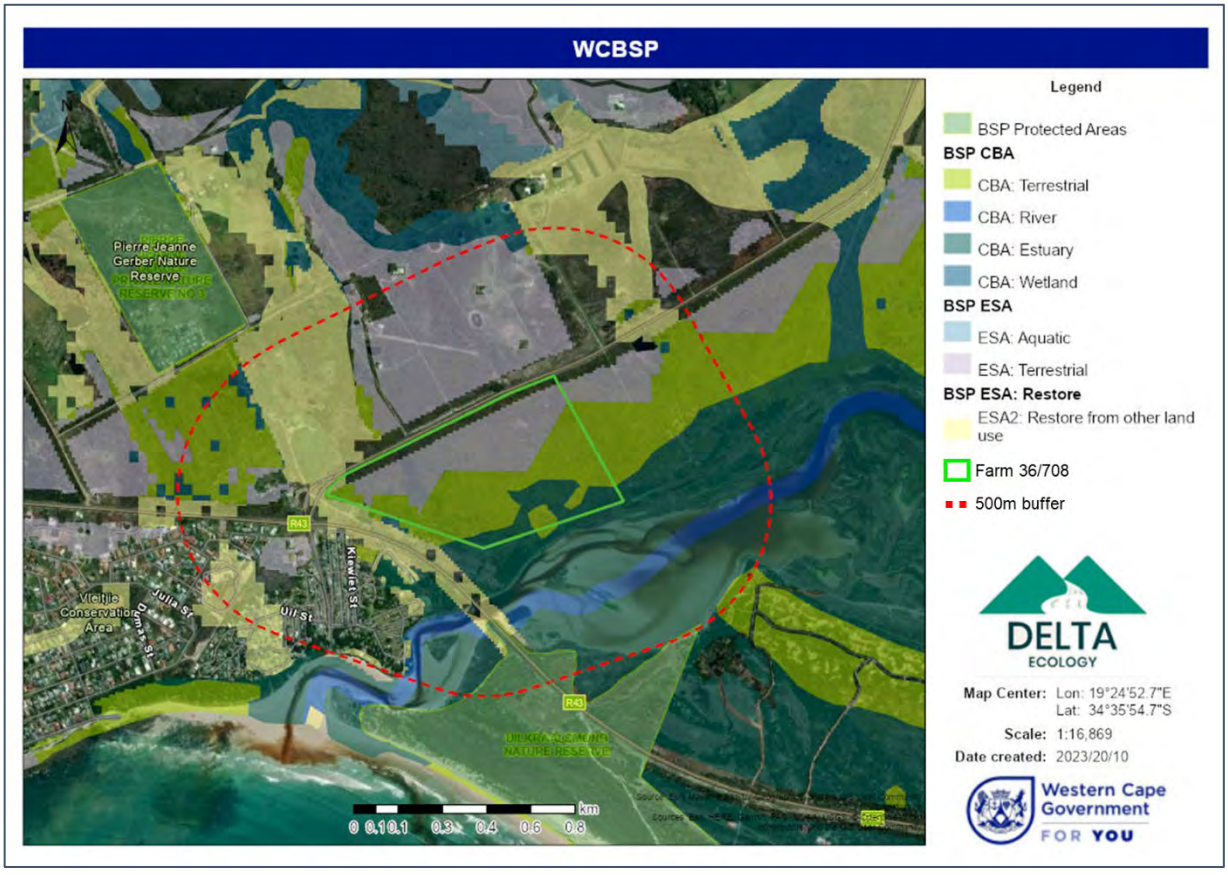


Figure 4-3: Western Cape Biodiversity Spatial Plan (WCBSP, 2017).

4.3. Climate Change Perspective

The Beck *et al.* (2018) 1 km^2 climate model which utilises the Köppen-Geiger climate classifications to represent measured present and predicted future climate scenarios was consulted to determine the expected climatic shift by the end of the present century at the project location. The project site is predicted to shift from the BSk Cold semi-arid climate zone to the BSh Hot semi-arid climate zone. The BSh Hot semi-arid climate zone would be associated with significantly hotter conditions (**Figure 4-4**).

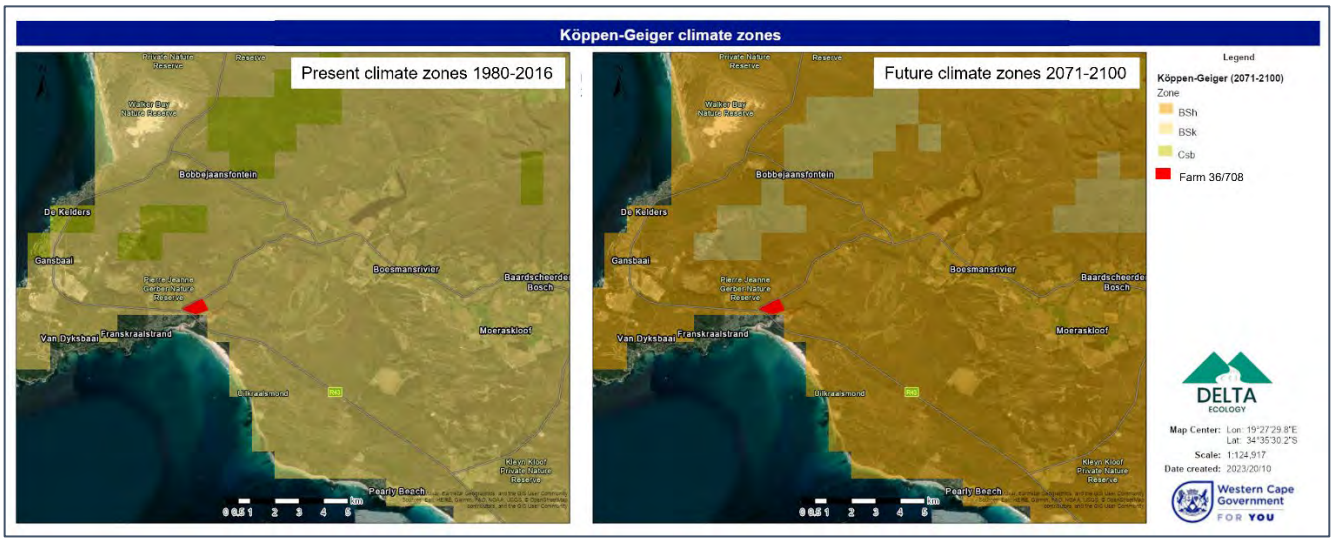


Figure 4-4: Beck *et al.* (2018) Köppen-Geiger climate zones for present day and for the close of the century.

The Western Cape Climate Response Strategy (DEADP, 2014) acts as a provincial level strategy modelled on the NCCRP. The strategy sets out the priorities for the Western Cape with regards to climate change adaptation and mitigation. The overarching intention of the strategy is to reduce climate vulnerability and increase adaptive capacity within the Western Cape in a manner that contributes to the attainment of the province's socio-economic and environmental goals.

Wetlands are a key factor in determining climate resilience due to the nature of ecosystem services offered. Streamflow regulation is important for maintaining baseflow of perennial rivers during climate-change induced droughts. During increased intensity rainfall events, attenuation and sediment trapping services reduce the risk of flooding downslope/stream. Furthermore, peat wetlands trap substantial carbon, reducing the impact anthropogenic carbon emissions. Conversely, peat removal or disturbance can release substantial volumes of carbon thereby increasing climate change impacts.

The wetland in question does not contain peat, though the soils present do contain high amounts of carbon. The wetland is however degraded in nature and is therefore unlikely to contribute significantly towards climatic-change resilience. Construction within the wetland is unlikely to lead to a significant release of carbon into the atmosphere. No further assessment of potential climate impact is necessary.

5. Site Description

The site is located just east of the town of Franskraal, within the Overberg Municipality, Western Cape Province. Franskraal and the R43 borders the site to the west and southwest, an unnamed road and farmland is located to the north, the Boesmans River / Uilkraals estuary to the south and southeast, while dense Port Jackson forests surrounds the site to the east.

The majority of the site is considered to be highly degraded, consisting of dense stands of alien invasive *Acacia saligna* (Port Jackson) which competes with and replaces indigenous vegetation (**Figure 5-1**). Indigenous wetland vegetation was therefore lacking across much of the site. The alien plant *Myoporum insulare* (Common Boobialla) and *Cenchrus clandestinum* (Kikuyu grass) was also noted onsite (**Figure 5-2** and **Figure 5-7**).

Located in the west of the site is a slight depressional area where vegetation consists of indigenous wetland obligate / facultative plant species including *Hellmuthia membranaceae* (Helmet Sedge), *Elegia tectorum* (Cape Thatching Reed), *Typha capensis* (Cape Bulrush) and *Schoenus nigrica* (Black Bog-Rush)(**Figure 5-3**-**Figure 5-6**).

Hydrology was clearly evident onsite, with various instances of open water including small channels, shallow streams, shallow and deep pools likely formed as a result of Stormwater (SW) flow from the surrounding roads and associated SW infrastructure (**Figure 5-7**-**Figure 5-9**).

Hydromorphic soil indicators were used to determine wetland extent. These indicators included mottling, gleying, soil saturation, leaching and organic streaking, all within the upper 50 cm (**Figure 5-10**-**Figure 5-11**), along with the presence of hydrophytic vegetation communities.

The majority of the site exhibited wetland indicators, and was subsequently classified as a seep wetland, apart from a small terrestrial portion in the north of the site (**Figure 5-13**). The Uilkraals Estuary and associated estuarine functional zone borders the site to the south - southeast (**Figure 5-12** and **Figure 5-13**).

Figure 5-1: Dense stands of alien invasive *Acacia saligna*.

Figure 5-2: Dense stand of alien invasive *Acacia saligna*, along with standing water.

Figure 5-3: Indigenous wetland plant species interspersed by *Acacia saligna* in the west of the site / seep wetland.

Figure 5-4: Wetland obligate *Typha capensis* present in the west of the site / seep wetland.

Figure 5-5: Wetland obligate *Hellmuthia membranaceae*.

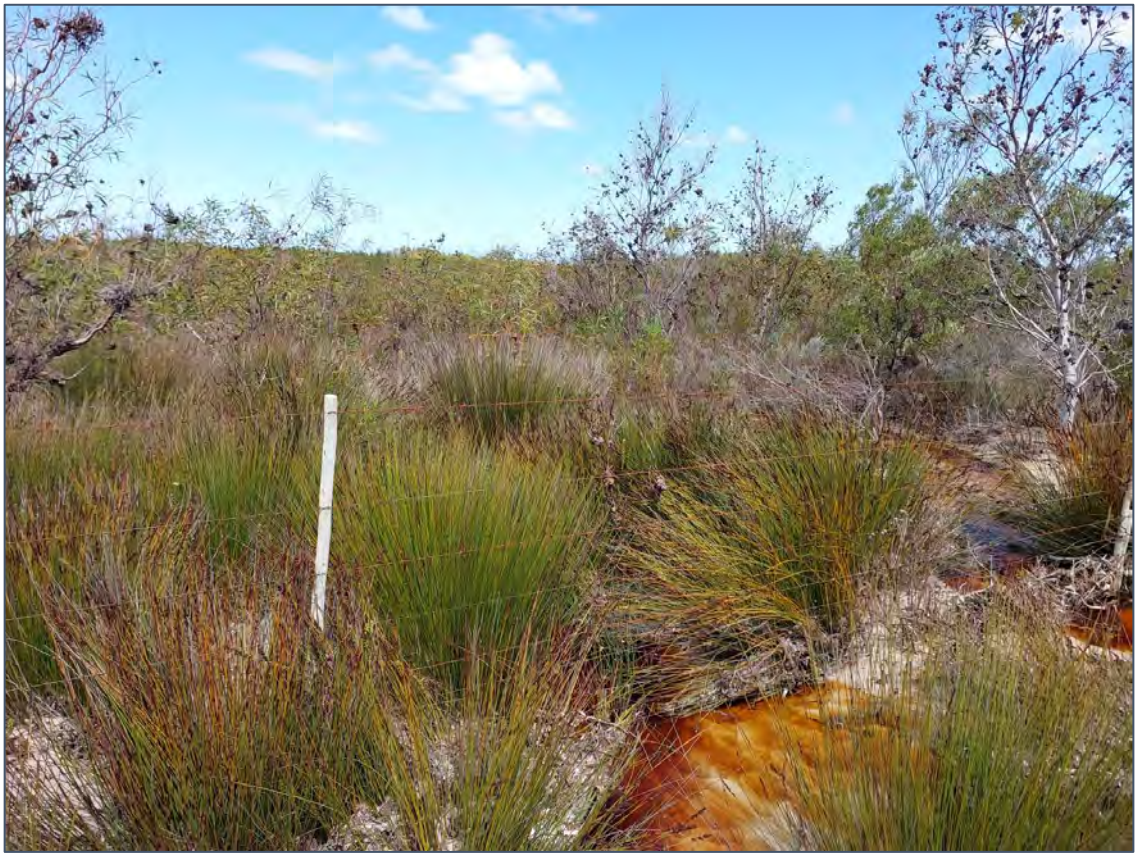


Figure 5-6: SW flowing into the onsite seep wetland. Wetland plant species *Elegia tectorum* present.

Figure 5-7: Open water surrounded by *Acacia saligna* and *Myoporum insulare*.

Figure 5-8: Small channel of water with *Acacia saligna* in the background.

Figure 5-9: Culvert and SW flowing through the site.

Figure 5-10: Soil sample illustrating organic surface layer & gleying typical of the permanent/seasonal wetland zone.

Figure 5-11: Soil sample with organic streaking.

Figure 5-12: Uilkraals Estuary and associated estuarine functional zone.

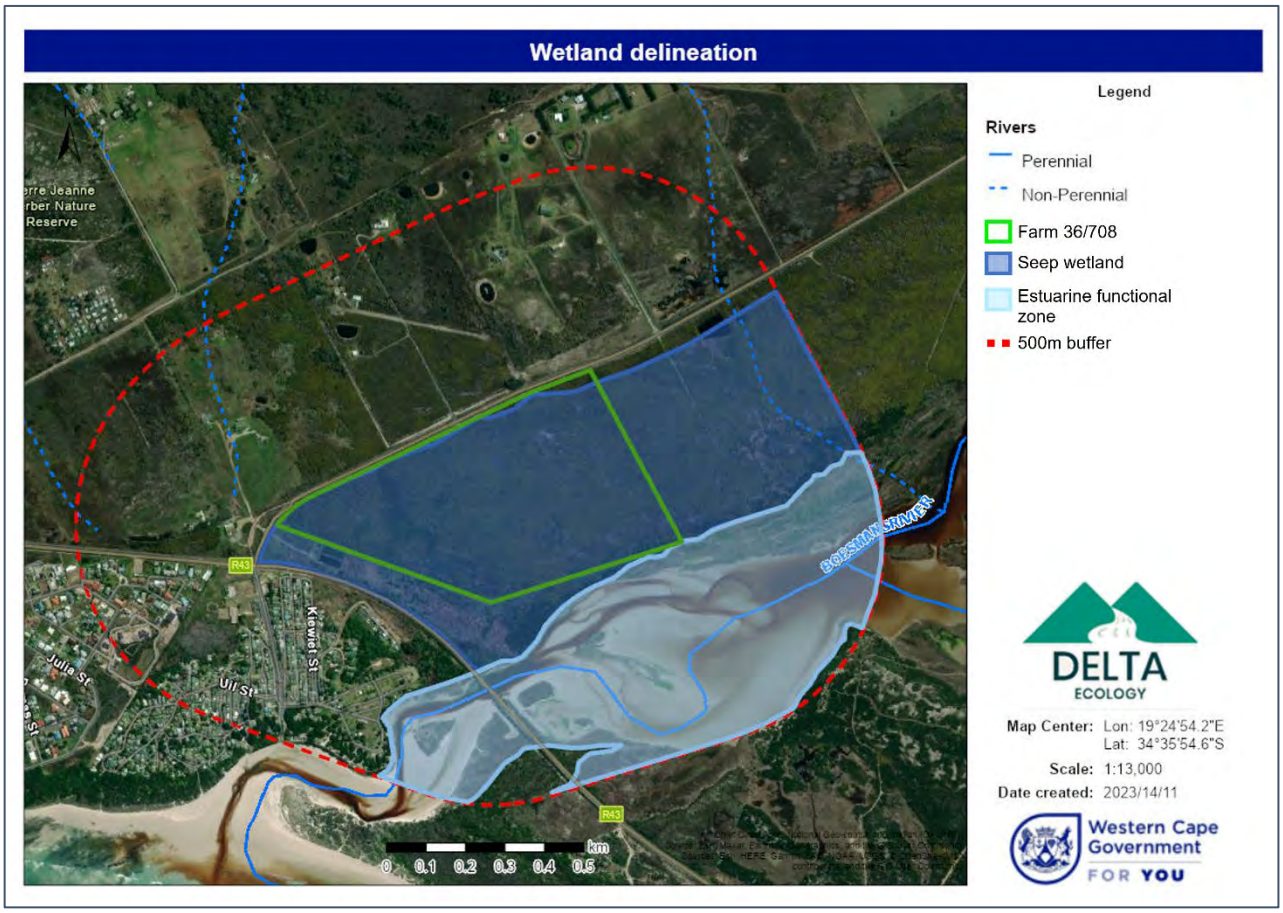


Figure 5-13: Wetland delineation of seep wetland and Uilkraals Estuarine Functional Zone.

Table 5-1: Classification of the seep wetland

Factor	Wetland
System	Inland with some tidal influence
Ecoregion	Southern Coastal Belt
Landscape Setting	Hillslope
Hydrogeomorphic type	Seep
Drainage	Rainfall and Interflow
Seasonality	Seasonal
Anthropogenic influence	Alien invasive vegetation & inundation by SW flow
Vegetation	South Coast Sand Fynbos
Geology	Calcareous aeolianite of the Waenhuiskrans Formation
Substrate	Dunes of sand and calcareous sand and calcrete
Salinity	Fresh – Slightly Saline

6. Status Quo Assessment

In this study, the wetland present within the proposed site was assessed to determine its Present Ecological State (PES), Ecological Importance and Sensitivity (EIS), and contribution to Wetland Ecosystem Services (WES). These metrics were used to determine the management objective expressed in terms of the Recommended Ecological Category (REC).

6.1. Seep Wetland

6.1.1. Present Ecological State

The Present Ecological State (PES) of the seep wetland was assessed using the Macfarlane *et al.* (2020) WET-Health Version 2.0 method which includes four assessment units, namely hydrology, geomorphology, water quality, and vegetation.

The Macfarlane *et al.* (2020) WET-Health Version 2.0 assessment produced an overall Present Ecological State (PES) score within category E (**Table 6-1**). This indicates that the wetland was in a seriously modified condition at the time of the assessment. The assessment results for the wetland are presented in **Table 6-1** and the definitions of the ecological categories are presented in **Table 6-2**. The key factors that influenced the scoring are summarised below.

Hydrology

- The delineated wetland area is fed primarily by rainfall and interflow. However, the road above the wetland (upslope) intercepts flow, and the associated SW infrastructure concentrates flow thereby altering the natural flow regime of the seep. Several dirt tracks within the wetland area similarly intercept and concentrate flow, although to a lesser extent than the road and SW infrastructure. The SW infrastructure associated with the R43 and unnamed road to the north of the seep wetland result in peak flows during storm events which inundates the wetland area (particularly in the western portion of the wetland).
- The presence of dense stands of invasive species particularly the Port Jackson seen onsite, leads to altered flow regimes in the wetland.

Vegetation

- Several indigenous hydrophytic species were noted onsite, particularly in the west of the site. However, the majority of the vegetation within the seep wetland consisted of dense stands of woody alien Port Jackson. The alien plant *Myoporum insulare* (Common Boobialla) and *Cenchrus clandestinum* (Kikuyu grass) was also noted onsite. No species of conservation concern were noted.

Geomorphology

- The geomorphology of the delineated wetland area was largely intact. Located in the western portion of the wetland is a slight depressional area which may have been created artificially.

Water Quality

- It is likely that runoff entering the wetland through the R43 stormwater infrastructure is polluted by the surrounding catchment area for example, runoff from roads is likely to contain contaminants such as laterite, oil, fuel, rubber from car tires and other pollutants.

Table 6-1: Outcome of the WET-Health Assessment

PES Assessment	Hydrology	Geomorphology	Water Quality	Vegetation
Impact Score	6.2	3.2	6.4	8.0
PES Score (%)	38%	68%	36%	20%
Ecological Category	**E**	**C**	**E**	**E**
Trajectory of change	↓	↓	↓	↓
Confidence (revised results)	Not rated	Not rated	Not rated	Not rated
Combined Impact Score	6.1			
Combined PES Score (%)	39%			
Combined Ecological Category	**E**			
Hectare Equivalents	11.8 Ha			

Table 6-2: Descriptions and definitions of the impact scores

ECOLOGICAL CATEGORY	DESCRIPTION	IMPACT SCORE*	PES SCORE (%)*
A	Unmodified, natural.	0-0.9	90-00
B	Largely natural with few modifications. A slight change in ecosystem processes is discernible and a small loss of natural habitats and biota may have taken place.	1-1.9	80-89
C	Moderately modified. A moderate change in ecosystem processes and loss of natural habitats has taken place but the natural habitat remains predominantly intact	2-3.9	60-79
D	Largely modified. A large change in ecosystem processes and loss of natural habitat and biota and has occurred.	4-5.9	40-59
E	Seriously modified. The change in ecosystem processes and loss of natural habitat and biota is great but some remaining natural habitat features are still recognizable.	6-7.9	20-39
F	Critically modified. Modifications have reached a critical level and the ecosystem processes have been modified completely with an almost complete loss of natural habitat and biota.	8-10	0-19

6.1.2. Ecosystem Services

The wetland's contribution to ecosystem services was assessed using the WET-Health Version 2 methodology. The method includes the assessment of sixteen potential ecosystem services including both direct and indirect human benefits.

Importance scores were within the 'Very Low' – 'moderately Low' category for the wetland indicating negligible – moderately low contribution to ecosystem services apart from toxicant assimilation and biodiversity mainenance which fell within 'Moderate' importance scores.

The assessment results are summarised in **Table 6-3**. The score categories and their descriptions are provided in **Table 6-2**. The reasoning behind the ecosystem services scores is summarised below:

- The seep wetland receives a moderate amount of stormwater, however considering the location of the seep topographically on a hillslope and the presence of dense stands of Port Jackson with negligible understorey, it does not provide significant flood attenuation services.
- Although seep wetlands can provide moderate levels of streamflow regulation such as low flow augmentation / maintenance, the seep wetland is disturbed as a result of a road construction upstream and the presence of dense alien invasive vegetation. It does not therefore provide streamflow regulation services.
- The seep wetland provides a limited amount of sediment trapping services. The potential effectiveness is however limited by the sparse wetland vegetation community. The sediment supply is moderate from the surrounding catchment area.
- The wetland provides a moderately low amount of erosion control due to it's location within a relatively steep slope, and the propensity for runoff from the upslope catchment. However, as the surrounding catchment area is near natural / slightly disturbed with no intensive agricultural activities (or similar land use activities), the demand for erosion control is low.
- The seep wetland fails to provide high levels of phosphate and nitrate assimilation services services given the lack of dense hydrophytic vegetation.
- The demand for toxicant assimilation within the seep is high as a result of the SW input from the surrounding roads.The supply of this service is limited in the wetland due to the invasion of alien invasive vegetation which has limited the presence of indigenous wetland species.
- The wetland received a score within the 'Low' importance range for Carbon Storage supply. There is a global demand for storage of carbon, thereby reducing total atmospheric greenhouse gas concentrations. There is however minimal organic sediment present in the wetland indicating the inability to supply this service, and this depressed the importance score.
- The wetland received a 'moderate' score for maintenance of biodiversity. The demand for this service is moderately high given the link to a downslope NFEPA estuary, and the historical Endangered (EN) wetland vegetation type. The provision of this service is limited by the present seriously modified ecological condition, and lack of SCC found within the wetland area.
- No direct human use of the water from the wetland was observed during the site visit. The seasonal nature and poor water quality of the wetland indicates that it is unlikely that there is direct use/dependance on the wetland.

- The wetland can provide high amounts of fire wood due to the Port Jackson forests present, however, there is a limited demand for this service as the site is privately owned and is not used for this purpose. There is limited restios/grasses present which could be palatable for livestock, and although the wetland area could be used for cultivation, given the wetlands location – the importance for this ecosystem services is negligable.
- The wetland does not provide any cultural ecosystem services as it is highly degraded and located in an area with security concerns (potential abalone poaching area). As such the demand and supply of cultural services is negligable.

Table 6-3: The outcome of the ecosystem services assessment for the delineated seep wetland.

		Present State			
ECOSYSTEM SERVICE		Supply	Demand	Importance Score	Importance
REGULATING AND SUPPORTING SERVICES	Flood attenuation	0.2	0.4	0.0	Very Low
	Stream flow regulation	2.7	0.0	1.2	Low
	Sediment trapping	1.7	2.0	1.2	Low
	Erosion control	1.5	0.4	0.2	Very Low
	Phosphate assimilation	1.1	2.0	0.6	Very Low
	Nitrate assimilation	1.8	2.0	1.3	Low
	Toxicant assimilation	1.8	3.0	1.8	Moderate
	Carbon storage	1.4	2.7	1.3	Low
	Biodiversity maintenance	2.0	2.5	1.8	Moderate
PROVISIONING SERVICES	Water for human use	1.0	0.0	0.0	Very Low
	Harvestable resources	3.0	0.3	1.7	Moderately Low
	Food for livestock	0.8	0.0	0.0	Very Low
	Cultivated foods	2.5	0.0	1.0	Low
CULTURAL SERVICES	Tourism and Recreation	0.0	0.0	0.0	Very Low
	Education and Research	0.0	0.0	0.0	Very Low
	Cultural and Spiritual	0.0	0.0	0.0	Very Low

Table 6-4: Score categories and descriptions

Importance Category		Description
Very Low	0-0.79	The importance of services supplied is very low relative to that supplied by other wetlands.
Low	0.8 – 1.29	The importance of services supplied is low relative to that supplied by other wetlands.
Moderately-Low	1.3 – 1.69	The importance of services supplied is moderately-low relative to that supplied by other wetlands.
Moderate	1.7 – 2.29	The importance of services supplied is moderate relative to that supplied by other wetlands.
Moderately-High	2.3 – 2.69	The importance of services supplied is moderately-high relative to that supplied by other wetlands.
High	2.7 – 3.19	The importance of services supplied is high relative to that supplied by other wetlands.
Very High	3.2 - 4.0	The importance of services supplied is very high relative to that supplied by other wetlands.

6.1.3. Ecological Importance and Sensitivity

The EIS method used to assess the wetland was based on the Rountree *et al*. 2013 method. Hydro-functional importance and direct human benefits were assessed using the updated and more detailed 2020 WET-EcoServices method and these sections were therefore omitted from the EIS assessment.

The wetland achieved a median score of 1.4 which falls within the "Moderate" category. The results of the assessment and the reasoning behind the scores are presented in **Table 6-5**.

Table 6-5: Results of the EIS assessment

Ecological Importance and Sensitivity	Seep Wetland	Reason
Biodiversity Support (Median)	**0.33**	
Presence and status of Red Data species:	0	None noted. Unlikely given the degree of disturbance. Could however be rehabilitated given the EN wetland type.
Populations of unique species/uncommonly large populations of wetland species:	0	None noted.
Migration/breeding/feeding sites: (Importance of the unit for migration, breeding sites and/or feeding):	1	Possibility to be a breeding site for hardy amphibians.
Landscape Scale (Median)	**1.4**	
Protection status of the wetland:	4	Although the wetland is located on private land which is not protected, the wetland is

Ecological Importance and Sensitivity	Seep Wetland	Reason
(National (4), Provincial/Private (3), municipal (1 or 2), public area (0 or 1)		connected to an NFEPA designated estuary (Uilkraals Estuary). It is noted that the Uilkraals Estuary has been identified by CapeNature as a priority estuary in need of improved conservation and protection (CapeNature, 2021).
Protection status of the vegetation type: (SANBI guidance on the protection status of the surrounding vegetation)	2	Historically the wetland vegetation consists of South Coast Sand Fynbos (EN - PP); however, at present the dominant vegetation within the wetland is Port Jackson.
Regional context of the ecological integrity: (Assessment of the PES (habitat integrity), especially in light of regional utilisation)	1	PES – D for the remnant floodplain wetland.
Size and rarity of the wetland type/s present: (Identification and rarity assessment of wetland types)	0	EN status indicates slight rarity, but degraded status (particularly hydrology, water quality, and vegetation) has left only common, tolerant elements of the ecosystem intact.
Diversity of habitat types: (Assessment of the variety of wetland types present within a site)	0	One wetland type present in a seriously modified ecological condition.
Sensitivity of the Wetland (Median)	**1.0**	
Sensitivity to changes in floods: (Floodplains at 4; valley bottoms 2 or 3; pans and seeps 0 or 1)	1	This wetland is located on a hillslope and has a relatively large catchment. It is marginally susceptible to flooding.
Sensitivity to changes in low flows/dry season: (Unchanneled VB's probably most sensitive)	1	Wetland is fed by interflow and surface runoff.
Sensitivity to changes in water quality: (Especially natural low nutrient waters – lower nutrients likely to be more sensitive)	1	The modified water quality within the seep at present indicates that the wetland is not highly sensitive to changes in water quality.
Ecological Importance and Sensitivity Score	**1.4**	
Ecological Importance and Sensitivity Category	**Moderate**	

6.1.4. Recommended Ecological Category

According to the Rountree *et al.* (2013) method for determining REC, the management objective for any wetland within PES Categories E or F are considered unsuitable and always require rehabilitation to a PES Category D.

The REC category for the wetland within the site is therefore set at D. Any planned rehabilitation should therefore target this category.

6.2. Uilkraals Estuary

6.2.1. Present Ecological State & Ecological Importance

The Present Ecological State (PES) of the Uilkraals Estuary was classified from the most recent comprehensive assessment of the estuarine system, the National Biodiversity Assessment, 2019 (Van Niekerk *et al.,* 2019). The Uilkraals Estuary was determined to have a PES of D, indicating a Largely Modified system (**Table 5-1**).

The Uilkraals estuary's tidal regime, salinity gradient, mixing process, and connectivity has been compromised as a result of land use changes in the surrounding catchment area (Van Niekerk *et al.,* 2019). This estuary, which was once predominantly open, has closed as a result of excessive flow modifications (such as abstraction and the presence of dams upstream) (Van Niekerk *et al.,* 2019).

The National Biodiversity Assessment (NBA) (Van Niekerk *et al.,* 2019) notes the following: "The Uilkraals Estuary requires restoration of its baseflows to ensure the mouth remains permanently open. Recently accumulated sediment in this system may need to be removed to restore tidal flows to pre-2010 conditions and ensure a permanent connection to the sea."

Table 6-6: Outcome of the Estuary Condition & Biodiversity (Conservation) Priorities (Van Niekerk *et al.,* 2019).

Estuary Name	Biogeographical Region	Natural Estuary Type	Present Transformed Functional Estuary Type	PES	REC	Biological Importance Rating	DAFF Important Fish Nurseries
Uilkraals Estuary	**Cool Temperate**	**Predominantly Open**	**Large Temporarily Closed**	**D**	**D**	**Important**	**Medium**

7. Aquatic Impact Identification

The proposed project entails the development of an eco-estate / Beach Resort (**Figure 1-2**) on Portion 36 of Farm Franche Kraal 708.

The proposed development will likely impact the hydrology, water quality, geomorphology and wetland vegetation of the seep wetland present on the site (**Annexure A**). Additionally, the NFEPA designated Uilkraals Estuary located approximately 75 m downstream of the proposed development may be impacted (**Annexure A**).

The Impact Assessment section 8 below should be read in conjunction with **Annexure A** of this report for further mitigation measures as per the Updated and Preferred Layout Alternative 2.

Construction Phase

1. Wetland loss in the delineated seep wetland (as per the Layout Alternative 1 and 2).
2. Alteration of the flow regime of the remnant seep wetland and Uilkraals Estuary during construction of the beach resort.
3. Water quality impairment due to increased sediment input, potential spillage, or release of potentially contaminated runoff into the remnant seep wetland and Uilkraals Estuary during construction of the beach resort.

Operational Phase

4. Alteration of the flow regime of the remnant seep wetland and Uilkraals Estuary.
5. Water quality impairment of the remnant seep wetland and Uilkraals Estuary due to the release of potentially contaminated stormwater (hydrocarbons).

8. Impact Assessment

The five potential aquatic impacts identified in Section 7 were assessed first without and then with application of mitigation measures. Four out of the five of the post-mitigation scores fell within the "Very Low" impact categories. Wetland loss received the highest impact significance score, which fell within the 'Medium' category. The 'no go' scenario was assessed and found to also be of "Very Low" impact significance as this scenario would result in continuation of existing impacts to the seep wetland and Uilkraals Estuary. No indirect impacts were noted.

8.1. Construction Phase

Table 8-1: Assessment results for Impact 1

Impact 1: Wetland Loss (seep wetland)				
Description		The development will result in the Infilling and loss of largely disturbed seep wetland area. The delineated seep wetland within the proposed site has a PES score in the E category (Seriously Modified), exhibits Moderate EIS and offers Very Low – Moderate ecosystem services. The historical wetland vegetation type is EN, but the degraded nature of the wetland limits the value of wetland lost.		
Mitigation Measures		None recommended as Wetland Loss cannot be mitigated. It is however recommended that a suitable amount of the remaining onsite wetland area is rehabilitated, and subsequently the wetland loss should be adequately offset.		
	Impact Without Mitigation		**Impact With Mitigation**	
Consequence				
Intensity of Impact	3	Medium / Harmful	0	Not Applicable
Duration of Impact	5	Beyond 20 years / Permanent	0	Not Applicable
Extent / spatial scale of impact	1	Limited to project site	0	Not Applicable
Reversibility	2	Low-cost rehabilitation / Moderately high likelihood of success	0	Not Applicable
Loss of irreplaceable resources	2	Low	0	Not Applicable
Cumulative Impact	5	Very High	0	Not Applicable
Probability				
Frequency of the Activity	1	Once off activity / less than once in 20 years	0	Not Applicable
Likelihood of the Incident / Impact occurring	5	Definite	0	Not Applicable
Impact Significance				
Consequence	2,6	Medium	0,00	Not Applicable
Probability	5,00	Very High	0,00	Not Applicable
Impact Significance	**3,08**	**Medium**	**0,00**	**Not Applicable**

Table 8-2: Assessment results for Impact 2

Impact 2: Altered flow regime				
Description		**Site clearance, infilling and compaction will result in alteration of the flow regime for the remnant seep wetland and potentially within the Uilkraals Estuary. The significance of this impact will be largely mitigated by effective stormwater measures, which will ensure that all runoff still drains into a suitably designated rehabilitated remnant wetland area, or into SW ponds onsite.**		
Mitigation Measures		**It is recommended that the Uilkraals Estuary, and the 75 m buffer surrounding the estuary, is designated as a No-Go area during construction activities. Install the stormwater infrastructure and conduct rehabilitation activities (as proposed in a suitable Offset and Rehabilitation Management Plan), prior to initiating other construction such that wetland flow and any stormwater leaving the construction site are attenuated in the wetland. It is recommended that the SW design onsite takes cognisance of the fact that flow should still drain into the Uilkraals Estuary downstream of the development. If possible, conduct construction and rehabilitation activities during summer months (November to March). Remove all alien invasive vegetation from the proposed site.**		
	Impact Without Mitigation		**Impact With Mitigation**	
Consequence				
Intensity of Impact	3	Medium / Harmful	1	Very Low / Non-harmful
Duration of Impact	1	Up to 1 month	5	Beyond 20 years / Permanent
Extent / spatial scale of impact	1	Limited to project site	1	Limited to project site
Reversibility	1	Passive restoration / High likelihood of success	1	Passive restoration / High likelihood of success
Loss of irreplaceable resources	1	None	1	None
Cumulative Impact	1	None	1	Very Low
Probability				
Frequency of the Activity	1	Once off activity / less than once in 20 years	1	Once off activity / less than once in 20 years
Likelihood of the Incident /	3	Possible	2	Unlikely

Impact occurring				
Impact Significance				
Consequence	1,72	Low	1,36	Very Low
Probability	2,00	Low	1,5	Very Low
Impact Significance	**1,77**	**Low**	**1,38**	**Very Low**

Table 8-3: Assessment results for Impact 3

Impact 3: Water Quality Impairment				
Description		**Accidentally spilled cement, construction chemicals, sewage from temporary toilets or petrochemicals from construction vehicles may find their way into the remnant wetland and Uilkraals Estuary. Vegetation clearing may result in increased sediment input within the estuary downstream. The potential intensity of the impact is limited by the pre-existing water quality impairment of the seep wetland; as well as the distance of the development from the estuary.**		
Mitigation Measures		**It is recommended that the It is recommended that the Uilkraals Estuary, and the 75 m buffer surrounding the estuary, is designated as a No-Go area during construction activities. Bunded, impervious areas must be designated by an Environmental Control Officer for temporary toilets, vehicle parking/servicing areas, and for pouring and mixing of concrete/cement, paint, and chemicals. These bunded areas must be at least 100 m from the demarcated estuary's boundaries.**		
	Impact Without Mitigation		**Impact With Mitigation**	
Consequence				
Intensity of Impact	3	Medium / Harmful	1	Very Low / Non-harmful
Duration of Impact	1	Up to 1 month	1	Up to 1 month
Extent / spatial scale of impact	1	Limited to project site	1	Limited to project site
Reversibility	1	Passive restoration / High likelihood of success	1	Passive restoration / High likelihood of success
Loss of irreplaceable resources	1	None	1	None

Cumulative Impact	1	None	1	None
Probability				
Frequency of the Activity	1	Once off activity / less than once in 20 years	1	Once off activity / less than once in 20 years
Likelihood of the Incident / Impact occurring	3	Possible	2	Unlikely
Impact Significance				
Consequence	1,72	Low	1,00	Very Low
Probability	2,00	Low	1,50	Very Low
Impact Significance	**1,77**	**Low**	**1,10**	**Very Low**

8.2. Operational Phase

Table 8-4: Assessment results for Impact 4

Impact 4: Altered flow regime				
Description		**Site clearance, infilling and compaction will result in alteration of the flow regime for the remnant seep wetland and potentially the Uilkraals Estuary. The significance of this impact will be largely mitigated by effective stormwater measures, which will ensure that all runoff still drains into a suitably designated rehabilitated remnant wetland area, or into SW ponds onsite. There may however still be an impact due to catchment hardening, and associated increase in peak flows.**		
Mitigation Measures		**Effective stormwater management measures – i.e. ensuring that stormwater flows into a designated rehabilitated remnant wetland area - will mitigate this impact to a large extent. It is recommended that the SW design onsite takes cognisance of the fact that flow should still drain into the Uilkraals Estuary downstream of the development. Alien invasive vegetation should be monitored onsite to ensure that Port Jackson does not re-colonise the area.**		
	Impact Without Mitigation		**Impact With Mitigation**	
Consequence				
Intensity of Impact	3	Medium / Harmful	1	Very Low / Non-harmful
Duration of Impact	1	Up to 1 month	5	Beyond 20 years / Permanent

Extent / spatial scale of impact	1	Limited to project site	1	Limited to project site
Reversibility	1	Passive restoration / High likelihood of success	1	Passive restoration / High likelihood of success
Loss of irreplaceable resources	1	None	1	None
Cumulative Impact	1	None	1	Very Low
Probability				
Frequency of the Activity	1	Once off activity / less than once in 20 years	1	Once off activity / less than once in 20 years
Likelihood of the Incident / Impact occurring	3	Possible	2	Unlikely
Impact Significance				
Consequence	1,72	Low	1,36	Very Low
Probability	2,00	Low	1,5	Very Low
Impact Significance	**1,77**	**Low**	**1,38**	**Very Low**

Table 8-5: Assessment results for Impact 5

Impact 5: Water quality impairment		
Description		**Stormwater from the proposed development areas, which may potentially be contaminated stormwater (hydrocarbons), will be directed into the remnant rehabilitated wetland area. Pollutants may also enter the remnant wetland onsite via sewage leaks (although highly unlikely).**
Mitigation Measures		**Ensure that all potentially significant pollution sources are listed in the Environmental Management Plan. Ensure that all activities that may lead to pollution take place indoors or on bunded impervious surfaces such that the pollutants cannot enter the stormwater system. Repair all sewage leaks as soon as reasonably possible after detection. Inspection of all sewage pipes should be conducted by a plumber once every 10 years. SW draining into the estuary should first flow into the rehabilitated onsite SW ponds / wetland area onsite.**

	Impact Without Mitigation		Impact With Mitigation	
Consequence				
Intensity of Impact	3	Medium / Harmful	1	Very Low / Non-harmful
Duration of Impact	1	Up to 1 month	1	Up to 1 month
Extent / spatial scale of impact	1	Limited to project site	1	Limited to project site
Reversibility	1	Passive restoration / High likelihood of success	1	Passive restoration / High likelihood of success
Loss of irreplaceable resources	1	None	1	None
Cumulative Impact	1	None	1	None
Probability				
Frequency of the Activity	1	Once off activity / less than once in 20 years	1	Once off activity / less than once in 20 years
Likelihood of the Incident / Impact occurring	3	Possible	2	Unlikely
Impact Significance				
Consequence	1,72	Low	1,00	Very Low
Probability	2,00	Low	1,50	Very Low
Impact Significance	**1,77**	**Low**	**1,10**	**Very Low**

Table 8-6: Assessment results for the "No Go" Scenario

"No Go" Scenario		
Description		**Although it is unknown whether the development area would be further developed in future, it is assumed that the site would remain as is, which is in a disturbed condition consisting of unused, degraded land. The No-Go option would result in the continuation of impact to the seep wetland and Uilkraals Estuary due to adjacent and onsite land uses – and would therefore still result in negative impact to the wetland onsite.**

Mitigation Measures		None		
	Impact Without Mitigation		Impact With Mitigation	
Factor		Initial Layout		Initial Layout
Consequence				
Intensity of Impact	2	Low / Slightly Harmful	0	Not Applicable
Duration of Impact	5	Beyond 20 years / Permanent	0	Not Applicable
Extent / spatial scale of impact	1	Limited to project site	0	Not Applicable
Reversibility	1	Passive restoration / High likelihood of success	0	Not Applicable
Loss of irreplaceable resources	1	None	0	Not Applicable
Cumulative Impact	1	Very Low	0	Not Applicable
Probability				
Frequency of the Activity	1	Once off activity / less than once in 20 years	0	Not Applicable
Likelihood of the Incident / Impact occurring	3	Possible	0	Not Applicable
Impact Significance				
Consequence	1,72	Very Low	0,00	Not Applicable
Probability	2	Very Low	0,00	Not Applicable
Impact Significance	**0,74**	**Very Low**	**0,00**	**Not Applicable**

9. Risk Assessment

The Risk Assessment Matrix prescribed by GN 509 of 2016 was applied to the preliminary layout with the following outcomes:

1. The risks associated with Impacts 2-5 were all found to fall within the Low-Risk category. The key factors included:
    - The impacts pertain to the remnant seep wetland, which has been severely impacted historically.
    - The buffer area of 75 m surrounding the Uilkraals Estuary - limits the risk of significant impacts to this estuary system particularly with the implementation of the recommended mitigation measures.
2. The risk associated with Impact 1 (wetland loss), was found to be within the Moderate Risk category.
    - The delineated wetland within the proposed site has a PES score in the E category (Seriously Modified), exhibits Moderate EIS and offers Moderate ecosystem services.
    - The historical wetland vegetation type is EN, but there is no significant wetland vegetation community, so the historical vegetation type is no longer represented.
    - The seep wetland is connected to the Uilkraals Estuary and therefore the recommended mitigation and management measures are essential to ensure the estuary is not impacted.

The completed risk assessment matrix is attached as **Annexure 3**.

10. Conclusion and Recommendation

Following an aquatic biodiversity assessment of the proposed site conducted on the 10th of October 2023, a seep wetland was confirmed and delineated onsite. Although the development area was found to be highly disturbed in nature, given the confirmed presence of a wetland within the site, and the presence of the Uilkraals Estuary approximately 75 m downstream, the site as a whole was determined to be of "Very High" aquatic sensitivity.

As the field assessment confirmed that the Aquatic Biodiversity sensitivity of the site is "Very High", the GN320 of 2020 requires that a full aquatic biodiversity impact assessment must be submitted as set out by the National Environmental Management Act (NEMA) (Act No. 107 of 1998) Regulations of 2020 (as amended) (GN R. 320 of 2020). Delta Ecology was appointed to undertake an aquatic biodiversity impact assessment of the proposed site.

In this impact assessment, the seep wetland and Uilkraals Estuary was assessed using current best practice assessment methodologies to determine the PES, EIS, WES and REC metrics. The results of these assessments are as follows:

Table 10-1: Results of the wetland status quo assessment

	PES	EIS / Biological Importance Rating (NBA, 2019)	WES (Highest)	REC
Seep wetland	E	Moderate	Moderate	D
Uilkraals Estuary	D (NBA, 2019)	Important		D

The condition of the seep wetland was poor and exhibited a high degree of transformation as a result of dense alien invasive vegetation, and adjacent land use transformation such as vegetation clearing, invasive alien vegetation, SW inundation, and infilling. The Moderate EIS and WES scores indicated that the wetland is moderately sensitive / important in terms of conservation planning or provision of ecosystem services largely due to the seep's hydrological connection to the Uilkraals Estuary downslope. The Uilkraals estuary's tidal regime, salinity gradient, mixing process, and connectivity has been compromised as a result of land use changes in the surrounding catchment area (Van Niekerk *et al.,* 2019). This estuary, which was once predominantly open, has closed as a result of excessive flow modifications (such as abstraction and the presence of dams upstream) (Van Niekerk *et al.,* 2019).

Aquatic biodiversity impacts associated with the development were identified and assessed using both an impact assessment methodology compliant with NEMA requirements and the Risk Assessment Matrix prescribed by GN509 of 2016.

The results of the assessment of wetland loss along with four more minor impacts during the construction and operational phases, given implementation of the listed mitigation measures, are summarised in **Table 10-2.**

Table 10-2: Summary of impact/risk assessment results (with mitigation).

	Rating	Risk Class	Applicable to	Mitigation Measures
Construction Phase				
Impact 1: Wetland Loss	Medium	Moderate	Seep Wetland	As per Section 8 and Annexure A
Impact 2: Altered flow	Very Low	Low	Seep Wetland & Uilkraals Estuary	As per Section 8 and Annexure A
Impact 3: Water Quality Impairment	Very Low	Low	Seep Wetland & Uilkraals Estuary	As per Section 8 and Annexure A
Operational Phase				
Impact 4: Altered flow	Very Low	Low	Seep Wetland & Uilkraals Estuary	As per Section 8 and Annexure A
Impact 5: Water quality impairment	Very Low	Low	Seep Wetland & Uilkraals Estuary	As per Section 8 and Annexure A
"No Go" Scenario: Gradual decrease in ecological condition in wetlands	Very Low	Not Assessed	Seep Wetland & Uilkraals Estuary	None

Four out of five of the post-mitigation scores fell within the "Very Low" impact categories. Wetland loss received the highest impact significance score, which fell within the 'Medium' category. Ordinarily wetland loss would fall within the 'high' category, but the degraded nature of the wetland has reduced the impact significance.

Although it is unknown whether the development area would be further developed in future, it is assumed that the site would remain as is, which is in a disturbed condition consisting of unused, degraded land. The No-Go option would result in the continuation of impact to the seep wetland and Uilkraals Estuary due to adjacent land uses – and would therefore still result in negative impact to the wetland onsite.

The Uilkraals Estuary is unlikely to be significantly impacted should the 75 m buffer surrounding the estuary be designated as a No-Go during construction. It is recommended that the project engineers design the SW management system onsite in such a way as to ensure that flow is maintained to the Uilkraals Estuary downstream of the development. In addition, the potential for flood risk posed by the location of the development in the upper limit of an estuarine functional zone should be taken into account during the design process by the project Engineers.

The Moderate risk rating confirms that a Water Use Licence will be required for this project. It is furthermore highlighted that a suitable Wetland Offset will be required for the project in terms of the DHSWS 'no net loss' policy (Macfarlane *et al*, 2014). A detailed wetland offset, rehabilitation, and management plan is likely to be required to investigate the viability of rehabilitating a portion of the remaining seep wetland onsite to offset the wetland loss due to the proposed development.

It is recommended that the relatively natural portion of the seep wetland indicated by the red arrow in **Figure 10-1** below is avoided by construction activities, and maintained within a likely larger area to be rehabilitated during the Offset process:

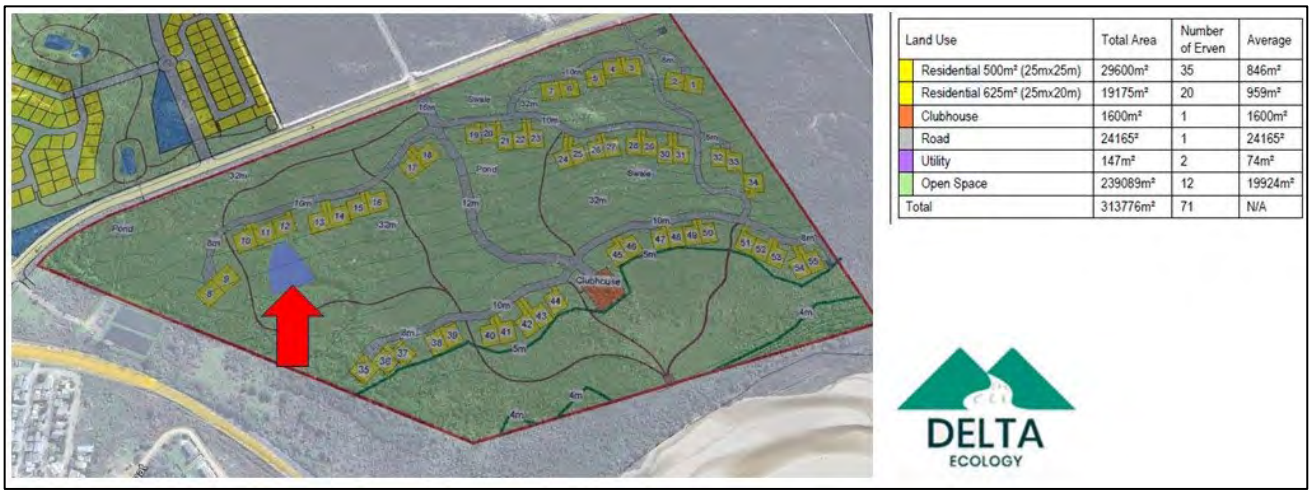


Figure 10-1: Wetland area to be conserved and rehabilitated.

It is the opinion of the specialist that the proposed development should be approved, subject to application of the mitigation measures listed in this report, as well as the implementation of a suitable Wetland Offset, Rehabilitation and Management Plan.

11. Annexure A

Following the Aquatic and Botanical specialist input during 2023, the Layout for the proposed Beach Estate was amended as depicted in the figure below. This layout (Alternative 2) is the preferred layout from an aquatic biodiversity perspective.

In particular, Layout Alternative 2 is supported as it ensures that flow is maintained to the downstream Uilkraals Estuary along the western Rehabilitated wetland area and in the central area of the site. The relatively natural portion of the seep wetland indicated by the red arrow in **Figure 10-1** is avoided and maintained within a larger area to be rehabilitated during the Offset process. Additionally, Layout Alternative 2 includes a buffer area surrounding the Uilkraals Estuary of more than 75 m (as recommended) during construction and operation of most essential aspects of the estate.

In order to ensure that water quality impairment does not occur within the offset wetland area and the Uilkraals Estuary, the following is recommended:

- Ideally, the sewage system should connect to the Municipal network. Flow rates of sewage pipelines will further inform the WUA process[1].
- Should an onsite sewage treatment plant be implemented, additional input from an Aquatic Specialist is required. The treated effluent discharged into the swale system (and ultimately draining into the downstream Estuary) must comply with the South African Water Quality Guidelines for aquatic ecosystems (DWAF, 2006). As the guidelines are specific to protection of freshwater aquatic ecosystems (and do not deal with estuarine systems), guidance from the DWS will be sought should this be the preferred option. The sewage system must be monitored and maintained into perpetuity. A water quality monitoring plan would need to form part of the Operational EMPr and/or the WULA process.
- Operational phase mitigation implemented during the design/construction phase:
    - Construct sewage pipelines in accordance with the relevant SANS / SABS specifications.
    - Design the pipelines to accommodate the operating and surge pressures.
    - Provide surge protection e.g air valves.
    - Allow for scour valves along pipelines in order to ensure sewage pipelines can be emptied in a controlled manner if required.
    - Allow for surcharge containment and emergency storage of 2 hours of peak flow at manholes located within areas upslope of the estuary. Containment/emergency storage may include a concrete box or earthen bund surrounding the manholes. The backup storage capacity of manholes may also be improved by raising the manholes by one meter.

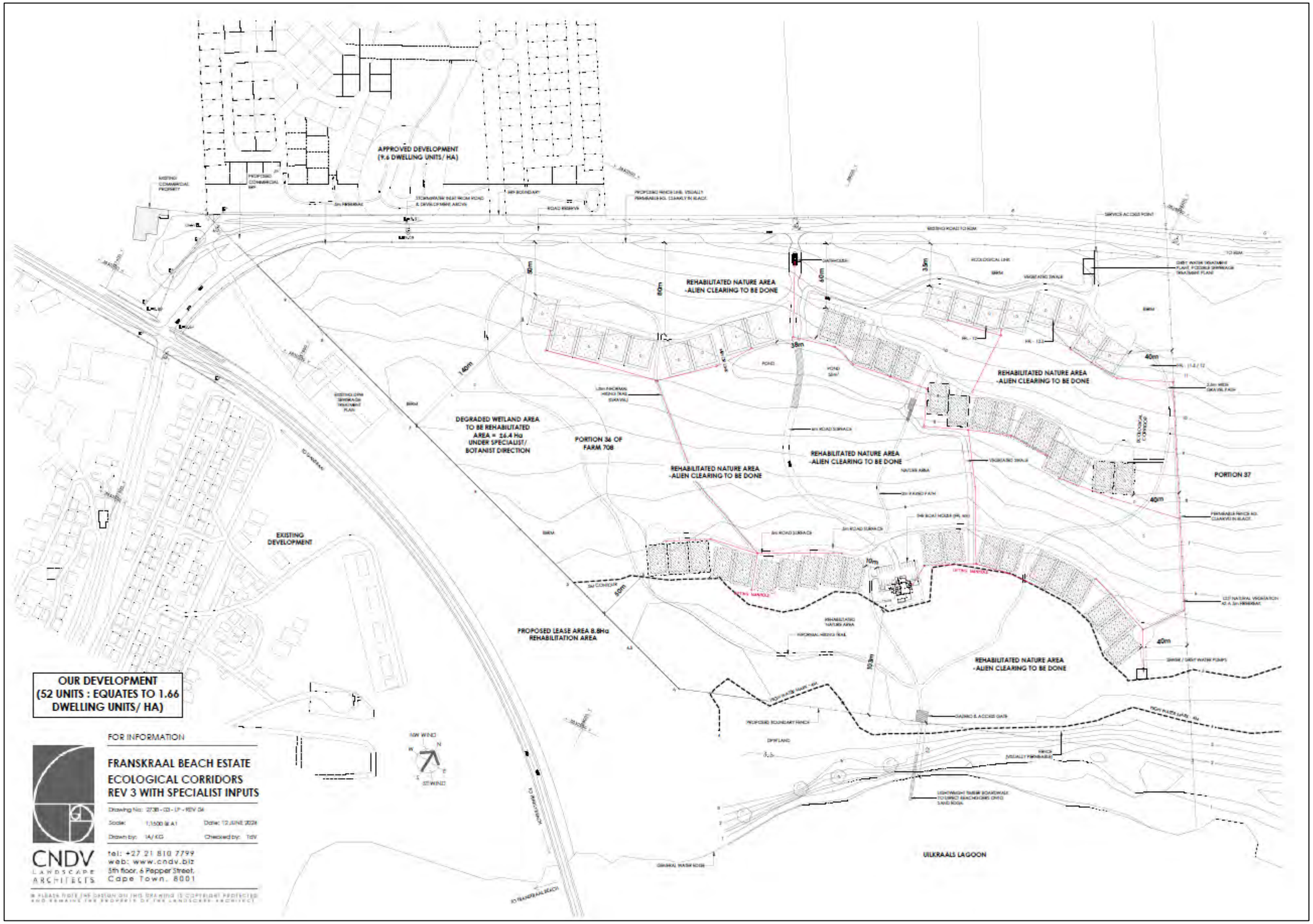
[1] According to GN509 (updated 2023) sewage pipelines with a maximum flow rate of less than 120 l/s are not excluded from a GA, and fall within the limits of a GA for Section 21 c and i.

  - A Maintenance and Monitoring Programme must be compiled for all infrastructure (e.g. pipelines) and implemented by a suitably qualified professional to ensure that all defects or leakages are identified timeously and repaired immediately.

- Stormwater associated with the internal road network may potentially contain hydrocarbons and other contaminants. It is recommended that a SW Management Plan (SWMP) is drafted. Potentially contaminated SW should ideally drain into the Grey Water Treatment Plant and be adequately treated prior to discharge into the swale system (and downstream Estuary).
- Incorporate measures into the stormwater design to trap solid waste, debris and sediment carried by stormwater. Measures may include the use of curb inlet drain grates and debris baskets/bags.
- Stormwater generated from areas with a higher risk of contamination such as parking areas and roads must receive basic filtering and treatment prior to its release into surrounding areas. Treatment methods may include sand filter traps and oil-water separators which will require maintenance.
- Stormwater systems must be monitored and maintained into perpetuity and collections of debris and solid waste removed from grates and baskets. The developer must confirm who will be responsible for this monitoring and maintenance as well as their roles.
- Further recommendations specific to the Rehabilitation of the remnant Seep Wetland area should form part of a suitable Wetland Offset, Rehabilitation and Management Plan drafted for the proposed development.
- Recommendations specific to the proposed 6 m wide road located in the buffer area of the Estuary, gazebo, access gate, and boardwalk (within the estuarine functional zone) include:
  - A method statement must be developed indicating how the contractor will minimise the passage of contaminants such as fuel and cement into the estuary. This method statement must be approved by the ECO prior to the commencement of construction activities.
  - Fuel, chemicals, and other hazardous substances should preferably be stored as far away as possible from the estuary and buffer area. These substances must be stored in suitable secure weather-proof containers with impermeable and bunded floors to limit pilferage, spillage into the environment, flooding, or storm damage.
  - Inspect all storage facilities, vehicles, and machinery (as applicable) daily for the early detection of deterioration or leaks, and strictly prohibit the use of any vehicles or machinery from which leakage has been detected.
  - Mixing and transferring of chemicals or hazardous substances must take place outside of the estuary and buffer, and must take place on drip trays, shutter boards or other impermeable surfaces.
  - Vehicles and machinery should preferably be cleaned off site. Should cleaning be required on site it must only take place within designated areas outside of the estuary and its associated buffer area and should only occur on bunded areas with a water/oil/grease separator.

- Dispose of used oils, wash water from cement and other pollutants at an appropriate licensed landfill site.
- Avoid the use of infill material or construction material with pollution / leaching potential. Where possible, in situ earthen materials must be used during construction in order to reduce the risk of leachate from imported materials contaminating the downstream areas.
- Concrete should preferably be imported as "ready-mix" concrete from a local supplier. Should onsite concrete mixing be required it must not be done on exposed soils. Concrete must be mixed on an impermeable surface in an area of low environmental sensitivity identified by the ECO outside of the no-go area. Surplus or waste concrete must be sent back to the supplier who will dispose of it.
- Construct temporary bunds around areas where cement is to be cast in situ.
- Dispose of concrete and cement-related mortars in an environmental sensitive manner (can be toxic to aquatic life). Disposal of any of these waste materials into the stormwater system or the estuary is strictly prohibited.
- Washout must not be discharged into the no-go area or the stormwater system. A washout area should be designated, and wash water should be treated on-site.
- Clean up any spillages immediately with the use of a chemical spill kit and dispose of contaminated material at an appropriately registered facility.
- Provide an adequate number of bins on site and encourage construction personnel to dispose of their waste responsibly.
- Waste generated by construction personnel must be removed from the site and disposed of at a registered waste disposal facility on a weekly basis.
- Locate site camp, laydown areas, stockpile areas, construction material, equipment storage areas, vehicle parking areas, bunded vehicle servicing areas and re-fuelling areas in designated areas of already hardened surface or disturbed areas located outside of the estuary and associated 75 m buffer area. These areas should preferably be located on level ground in a previously disturbed area of vegetation approved by the Environmental Control Officer (ECO).
- Prohibit the dumping of excavated material, building materials or removed vegetation within the estuary and its associated buffer area. Building material must be stored at the designated storage area located outside of the no-go area (estuary and buffer). Spoil material must be appropriately disposed of at a registered waste disposal facility.
- Vegetation clearance should be restricted to the relevant development components and indigenous vegetation cover should be maintained as far as practically possible.
- Vegetation which is considered suitable for rehabilitation activities after construction (such as indigenous grasses and other herbaceous species) should be carefully removed from the construction footprint and stored at an appropriate facility for use in later rehabilitation activities.

- Clear and remove any rubble or litter that may have been accidentally deposited into the no-go area as a result of construction activities and dispose of at an appropriate registered facility.
- An ECO must inspect the construction footprint on a weekly basis during construction of these elements of the development; and must take immediate measures to address unforeseen disturbances to the estuary and its associated buffer area. Any disturbed / compacted areas falling outside of the demarcated construction footprint must be immediately rehabilitated. Depending on the extent of damage the method of rehabilitation may require input from an aquatic specialist / suitably qualified contractor.
- Once construction has been completed, orange hazard fences as well as all construction waste, rubble, and equipment must be removed from the construction footprint.
- In line with the NEMBA, all AIPS listed under the amended AIPS Lists (DEFF: GN1003, 2020) must either be removed or controlled on land under the management of the proponent. An AIPS control plan must therefore be compiled which includes measures to control and prevent the proliferation of AIPS during the construction phase.
- Where possible undertake construction during the dry season.
- The site manager / ECO must check the downslope estuary as well as the recommended buffer area for erosion damage and sedimentation weekly and after every heavy rainfall event. Should erosion or sedimentation be noted, immediate corrective measures must be undertaken.
- The estuary must be monitored monthly for dumping, and any refuse or waste encountered must be removed and disposed of at a registered waste facility. The developer must confirm who will be responsible for this monitoring of the estuarine.
- An AIPS control plan must be compiled which includes measures to control and prevent the proliferation of AIPS during the operational phase.


APPROVED DEVELOPMENT
(9.6 DWELLING UNITS/ HA)
REHABILITATED NATURE AREA
-ALIEN CLEARING TO BE DONE
DEGRADED WETLAND AREA
TO BE REHABILITATED
AREA = ±6.4 Ha
UNDER SPECIALIST/
BOTANIST DIRECTION
PORTION 36 OF
FARM 708
REHABILITATED NATURE AREA
-ALIEN CLEARING TO BE DONE
REHABILITATED NATURE AREA
-ALIEN CLEARING TO BE DONE
REHABILITATED NATURE AREA
-ALIEN CLEARING TO BE DONE
PORTION 37
EXISTING
DEVELOPMENT
PROPOSED LEASE AREA 8.8Ha
REHABILITATION AREA
REHABILITATED NATURE AREA
-ALIEN CLEARING TO BE DONE
ULKRAALS LAGOON
OUR DEVELOPMENT
(52 UNITS : EQUATES TO 1.66
DWELLING UNITS/ HA)
FOR INFORMATION
FRANSKRAAL BEACH ESTATE
ECOLOGICAL CORRIDORS
REV 3 WITH SPECIALIST INPUTS
CNDV
LANDSCAPE
ARCHITECTS

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