Aquatic Biodiversity Assessment

Proposed Tourism Development on Portion 11 of Melkhoutefontein Farm 449, Hessequa District, Western Cape.

Prepared for Cape EAPrac (Pty) Ltd

by

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DECLARATION OF CONSULTANTS INDEPENDANCE

I consider myself bound to the rules and ethics of the South African Council for Natural Scientific Professions (SACNASP);

• At the time of conducting the study and compiling this report I did not have any interest, hidden or otherwise, in the proposed development that this study has reference to, except for financial compensation for work done in a professional capacity;

• Work performed for this study was done in an objective manner. Even if this study results in views and findings that are not favourable to the client/applicant, I will not be affected in any manner by the outcome of any environmental process of which this report may form a part, other than being members of the general public;

• I declare that there are no circumstances that may compromise my objectivity in performing this specialist investigation. I do not necessarily object to or endorse any proposed developments, but aim to present facts, findings and recommendations based on relevant professional experience and scientific data;

• I do not have any influence over decisions made by the governing authorities;

• I undertake to disclose 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 a competent authority to such a relevant authority and the applicant;

• I have the necessary qualifications and guidance from professional experts in conducting specialist reports relevant to this application, including knowledge of the relevant Act, regulations and any guidelines that have relevance to the proposed activity;

• This document and all information contained herein is and will remain the intellectual property of Confluent Environmental. This document, in its entirety or any portion thereof, may not be altered in any manner or form, for any purpose without the specific and written consent of the specialist investigators.

• All the particulars furnished by me in this document are true and correct.

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Qualifications: BSc, BSc Honours (Entomology), MSc & PhD (Veterinary Science)

Expertise: > 13 years' experience working on aquatic ecosystems across South Africa, with a focus on the Southern Cape in the last 7 years. Includes research and consulting expertise, having published > 10 water-related research articles and compiled > 450 aquatic specialist reports. Research and consulting have been in a range of sectors including agriculture, urban developments, linear structures, renewable energy, conservation, and mining.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1. INTRODUCTION

Confluent Environmental Pty (Ltd) was appointed by Cape EAPrac to provide aquatic specialist inputs for the proposed development of chalets (low-key tourism development) on portion 11/449 Gouritzmond, Hessequa district, Western Cape (Figure 1). Portion 11/449 is approximately 4.5 km from the town of Gouritzmond and is bisected by the R325 Road. The owner proposes to develop six (6) chalets around the property in allocated areas with hiking/cycling trails within a patch of large blue gum trees (*Eucalyptus* sp.).

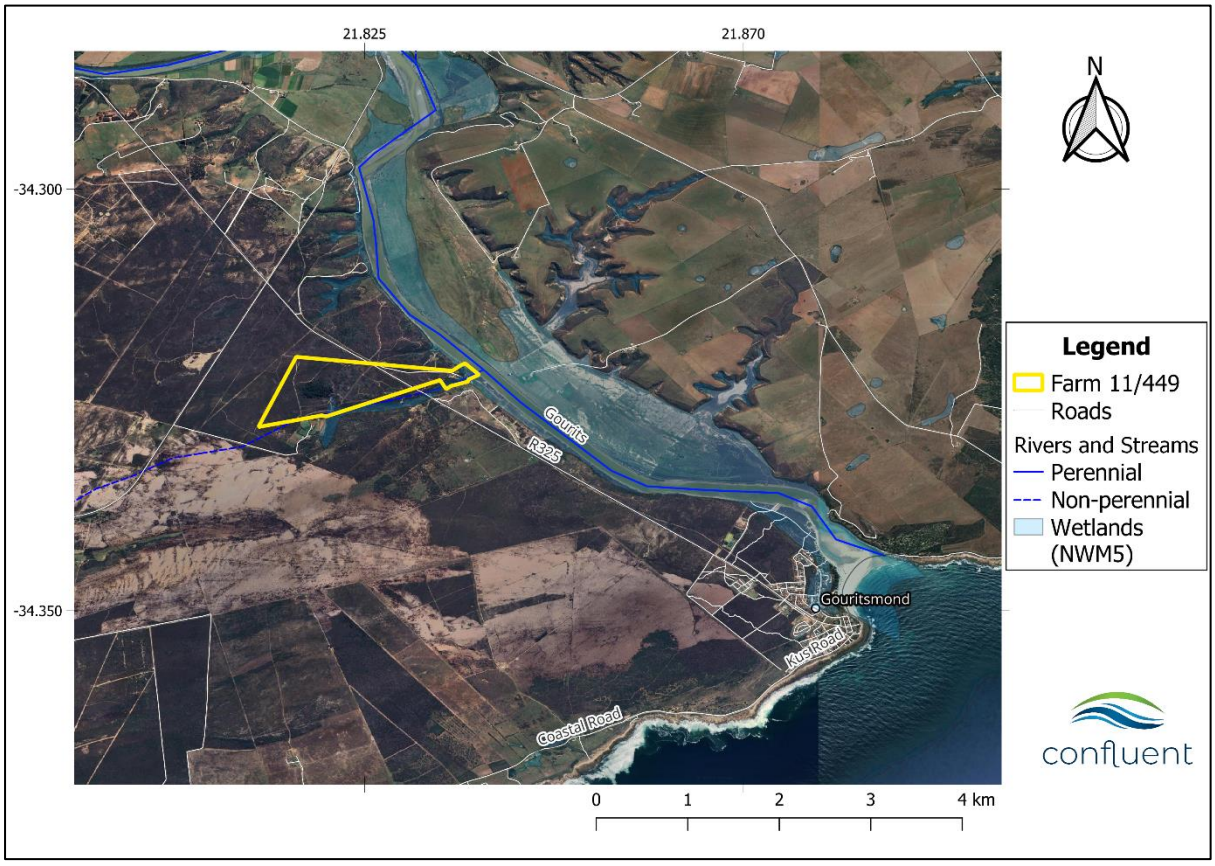

Figure 1. Portion 11/449 Melkhoutefontein Farm, Hessequa district, Western Cape.

1.1 The Proposed Development

1.1.1 Non-mitigated Layout

An initial site sensitivity verification was undertaken to determine the site constraints in terms of aquatic sensitivity. Wetland areas were delineated and buffers recommended. The first Site Development Plan (SDP) is referred to as the unmitigated plan because it located a cottage in close proximity to a wetland south of the *Eucalyptus* node (Figure 2).

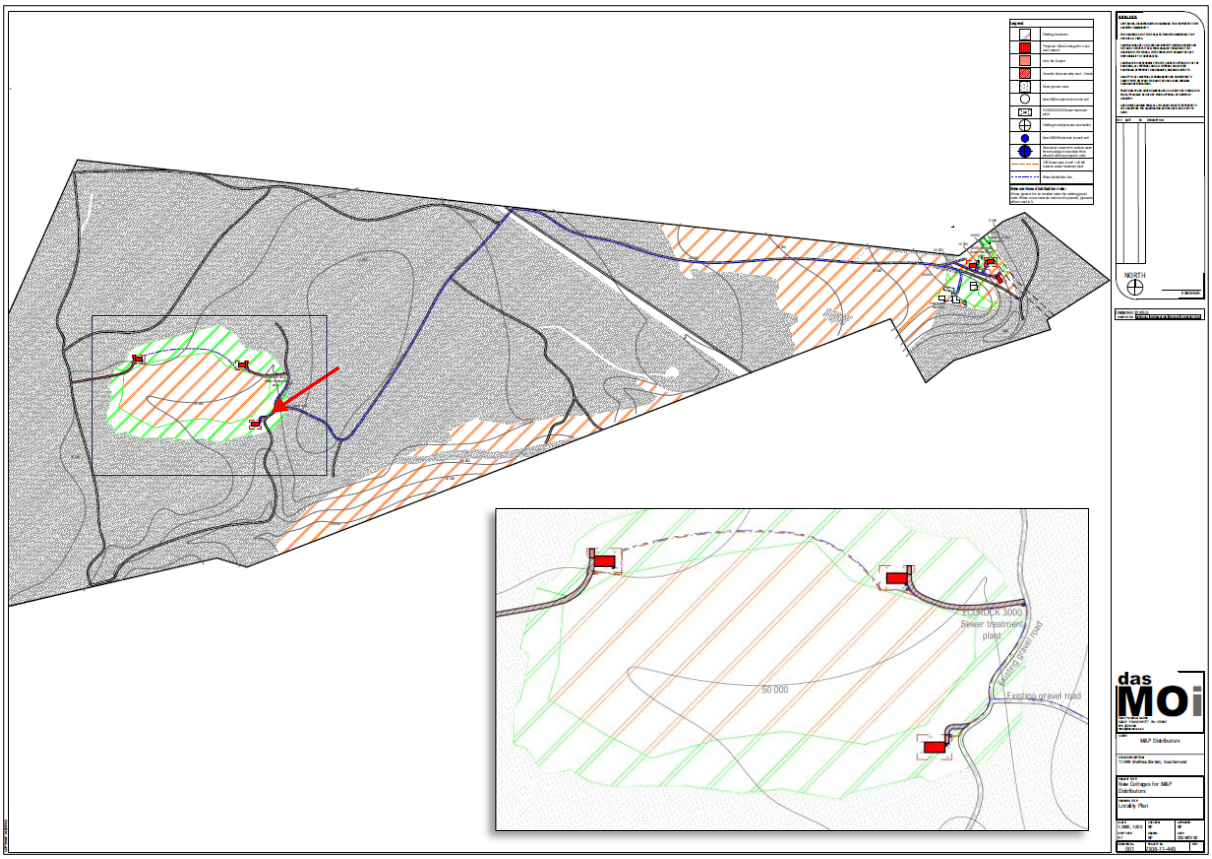

Figure 2. Unmitigated SDP showing the location of one of the cottages south-east of the *Eucalyptus* node near the start of an unchanneled valley-bottom wetland (red arrow, and enlarged inset).

1.1.2 Preferred Layout

Following feedback provided in this report that this cottage should be moved away from the vicinity of the wetland, a subsequent preferred Site Development Plan (SDP) was laid out to avoid sensitive aquatic features. The owner proposes to develop six (6) chalets around the property in two nodes with hiking/cycling trails within a patch of large blue gum trees (*Eucalyptus* sp.). The first node is located near the existing farmhouse at Eastern side of the property next to the Gouritz River (Figure 3, Figure 4 and Figure 5). This is referred to as the River Node. The second node is located North of a large blue gum (*Eucalyptus*) patch on the Western side of the property (Figure 3 and Figure 6). This is referred to as the *Eucalyptus* Node.

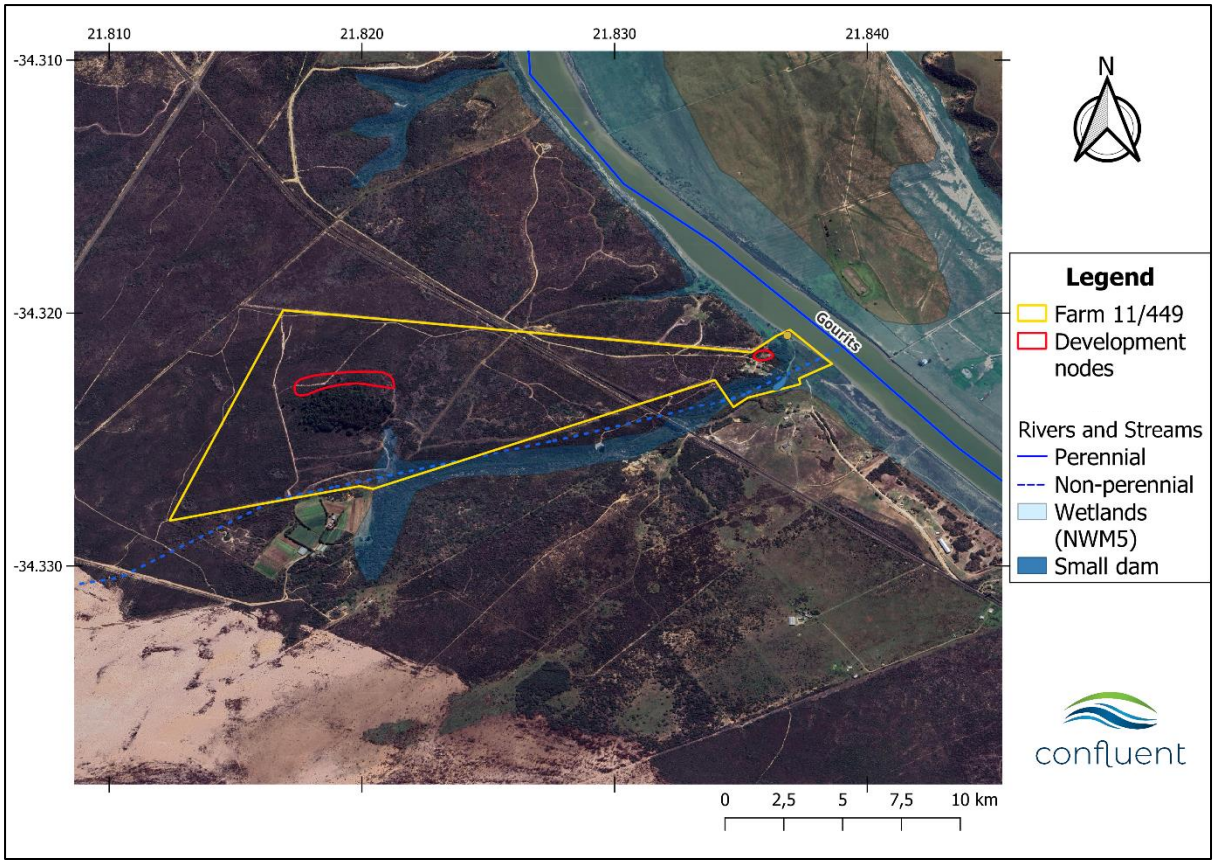

Figure 3: Project area nodes on Portion 11/449 Melkhoutfontein.

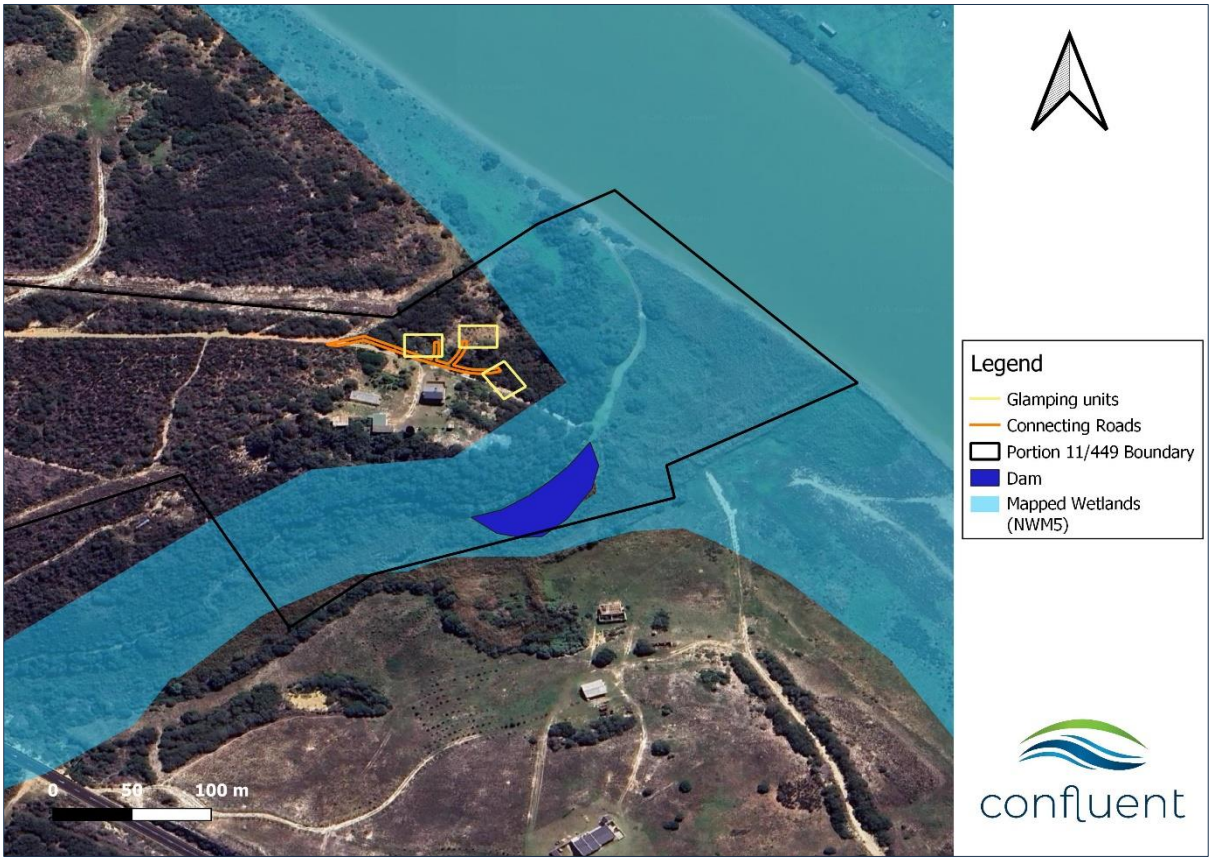

Figure 4: Project area river node on Portion 11/449 Melkhoutefontein.

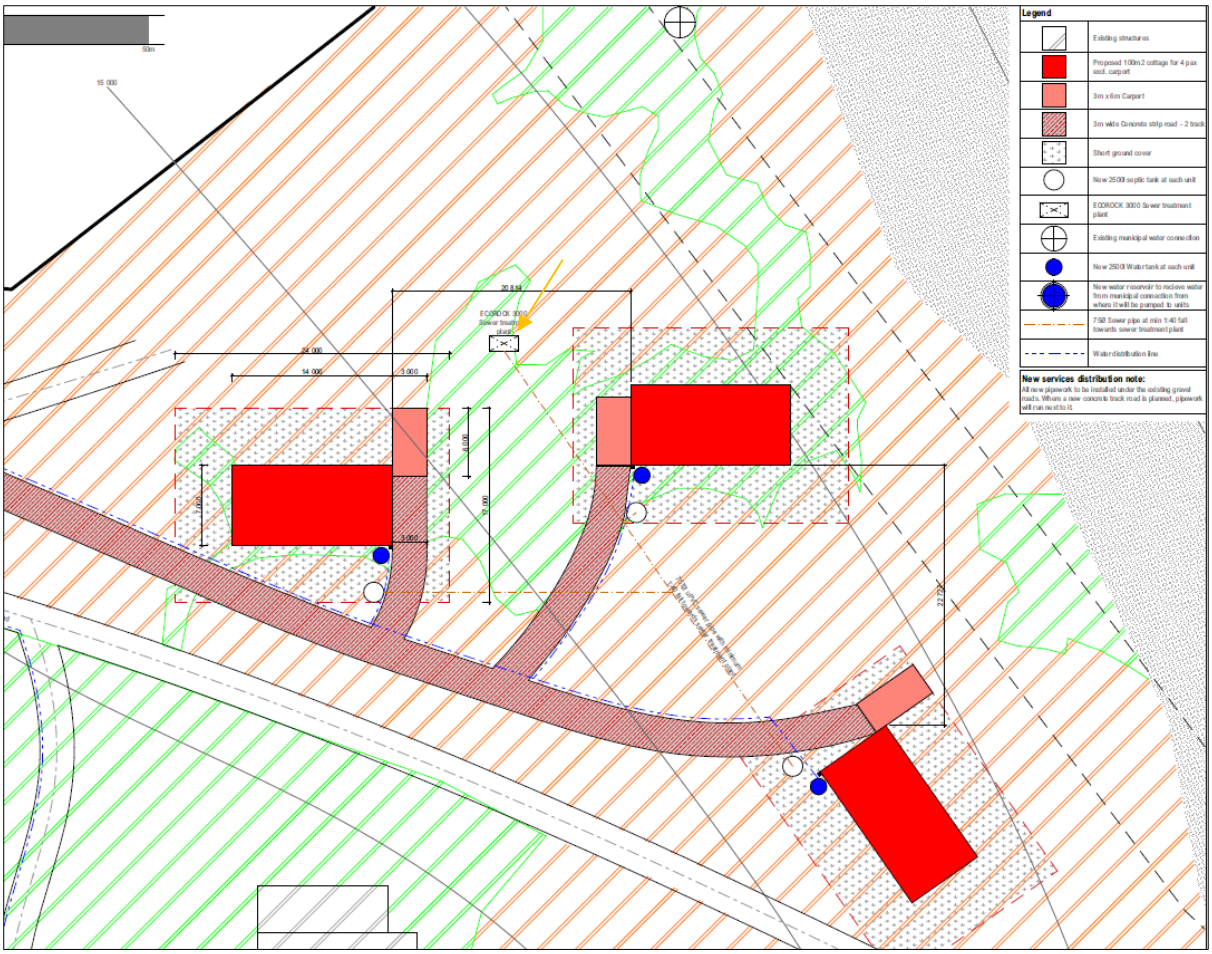

Figure 5. Plan for the River Node cottages (updated July 2024) showing the proposed layout and location of the septic tanks (open white circles) and one Ecorock 3000 sewer treatment facility (yellow arrow).

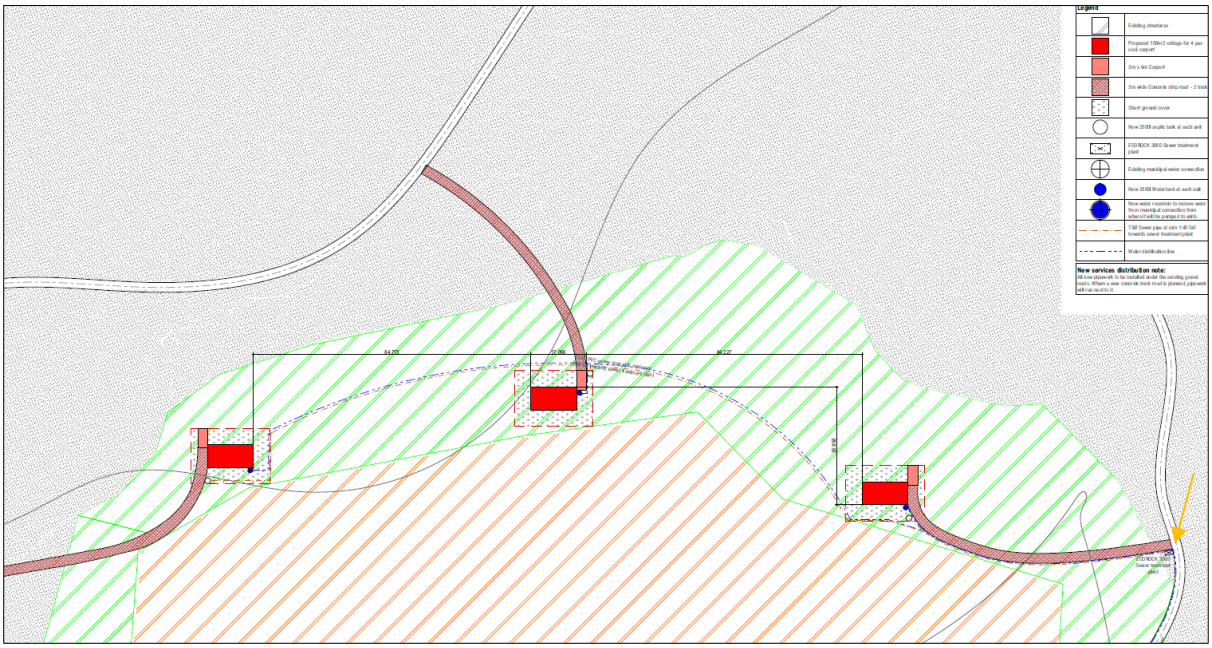

Figure 6: Project area *Eucalyptus* node location on Portion 11/449 Melkhoutefontein. Each cottage has a septic tank and the proposed Ecorock sewer treatment facility is indicated by the yellow arrow.

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Water supply for the River Node includes two water connection points where pipelines and connections will be located within the 15m buffer. Pipelines will be above ground and not buried. The first pipe is to connect the Municipal Water Connection to a new 10m^3 water tank, next to an existing storage building (drinking water). The second pipe is to extract water from the existing instream dam (Figure 4) and connect it to an existing water reservoir (emergency water supply for fire-fighting requirements). These water uses would qualify as Schedule 1 water use in terms of the National Water Act.

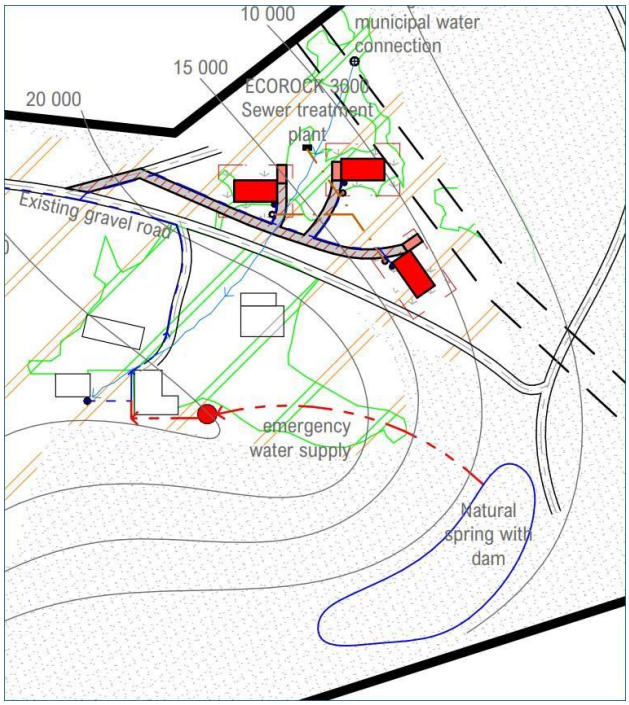

Figure 7. The location of proposed chalets showing two water connection/supply points at the River Node. The first to the municipal connection (potable water) and the second as emergency water supply for Schedule 1 use (ie. Gardening) and/or fire-fighting.

Sewage for each node will be treated using a BioRock system installed at each node (See https://biorock.com/how-biorock-works). The basic process described for this system is a three-step process:

Step 1 : Primary Tank
The Primary Tank clarifies the raw sewage by dividing fats, oils, greases and organic solids. The sewage then passes through an effluent filter, before discharging into the BIOROCK reactor.

Step 2 : Bioreactor Tank
The Bioreactor purifies further the pretreated wastewater with a biological process. To naturally treat the wastewater, our systems use our unique BIOROCK Media, an exclusive and very efficient carrier material for bacteria.

Step 3 : Discharge
Depending on the ground type, effluent will be discharged by gravity, or by a pump.

Figure 8. Stock images from BioRock website showing the arrangement of primary and bioreactor tanks.

1.2 DFFE Screening Tool Results

According to the Department of Environment, Forestry and Fisheries (DFFE) screening tool, aquatic biodiversity at the site has a **Very High** sensitivity (Figure 9). The sensitivity features identified are as follows:

- Critical Biodiveristy Area 1 (CBA): Aquatic
- CBA 2: Aquatic (degraded)
- Estuary Gouritz
- FEPA Sub-catchment
- Rivers_AB
- Wetlands_(Estuary)
- Wetlands Albany Thicket (Valley-bottom)

The scope of work for this report is guided by the legislative requirements of the National Environmental Management Act (NEMA) and the National Water Act (NWA; Act No 36 of 1998).

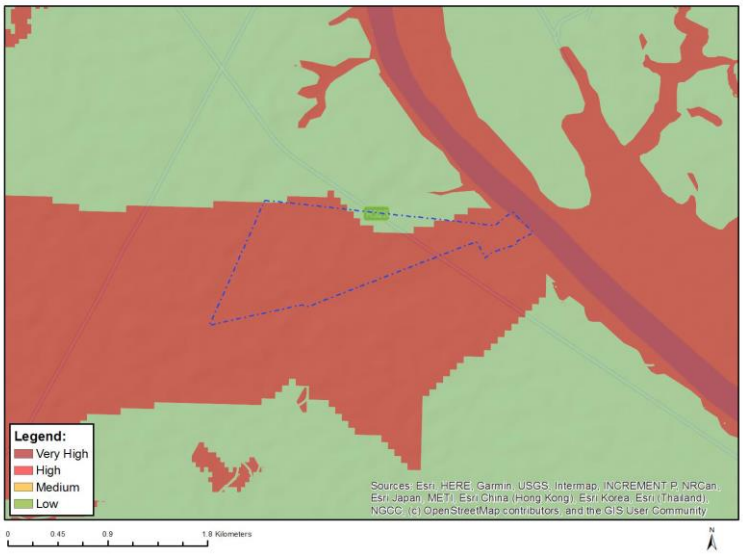

Figure 9. Results of the DFFE Screening Tool which indicate Very High Sensitivity of the Aquatic Biodiversity theme for Portion 11/449 Melkhoutefontein.

1.3 Scope of work

According to the protocols specified in GN 320 (Protocol for the specialist assessment and minimum report content requirements for environmental impacts on aquatic biodiversity) of the National Environmental Management Act (NEMA; Act No. 107 of 1998), assessment and reporting requirements for aquatic biodiversity are associated with a level of environmental sensitivity identified by the national web-based environmental screening tool (screening tool). An applicant intending to undertake an activity identified in the scope of this protocol on a site identified by the screening tool as being of:

- **Very High** sensitivity for aquatic biodiversity, must submit an Aquatic Biodiversity Specialist Assessment; or
- **Low** sensitivity for aquatic biodiversity, must submit an Aquatic Biodiversity Compliance Statement.

The objectives of this assessment included the following:

- To undertake a desktop analysis and site inspection to verify the sensitivity of aquatic biodiversity as **Very High** as indicated by the screening tool, or **Low**; and
- Compile an Aquatic Biodiversity Compliance Statement or Aquatic Biodiversity Specialist Assessment based on the site verification of the sensitivity of the site. This includes an assessment of the following:

  Interrogation of available desktop resources including:

  - DWS spatial layers (1:50 000 rivers)
  - National Freshwater Ecosystem Priority Areas (NFEPA) spatial layers (Nel *et al.,* 2011)
  - National Wetland Map 5 and Confidence Map (CSIR, 2018)

- Western Cape Biodiversity Spatial Plan (WCBSP, 2017).

Conduct a site visit to determine the site sensitivity:

- Identification and classification of watercourses within and adjacent to the site according to methods detailed by Ollis *et al*. (2013);
- Determine the watercourse Present Ecological State (PES) and Ecological Importance and Sensitivity (EIS) using an appropriate method (if watercourses are present).
- Delineate wetland / riparian areas following methods prescribed by DWAF (2015).
- Determine an appropriate buffer for wetland areas using the site-specific buffer tool developed by Macfarlane and Bredin (2016).

This report will also need to comply with GN4167 of the National Water Act (NWA; Act 36 of 1998) if the proposed development will take place in the area defined as the Regulated Area. In the case of wetlands, this is development that takes place within 500m of a wetland. In this case, a Risk Matrix must be compiled by a SACNASP-registered aquatic scientist to determine the level of risk posed by the development to the wetland assuming full implementation of all mitigation measures. If the risk is 'Low' then the development can be Generally Authorised, but if the risk is 'Medium' or 'High' then a Water Use License Application will be required.

1.4 Assumptions and Exclusions

The site was assessed on 28 September 2023 which is considered Spring. It is possible that sensitive features such as rare or unique biota (e.g. amphibians), plants or habitat were not observed during the site visit, but are influenced by season, time of day, flow level or vegetation cover. However, recent good rainfall would have meant that any wetland features would have been quite evident and easy to identify. Furthermore, spring is a very good season for assessment due to the emergence of flowers, and increased movement of animals.

The assessment of PES&EIS is limited to the watercourse areas assessed for this report and does not extend across the entire system. On the area in the vicinity of the two proposed development nodes was assessed in any detail.

Watercourse buffer determinations are site and land use specific and cannot be extrapolated beyond the area assessed in this report or applied to other types of development on the same site.

2. CATCHMENT CONTEXT

2.1 Catchment Features

The project area (Farm 11/449) is located in quaternary catchment J40E in the catchment of the Gouritz River (Figure 10). One non-perennial river flows close to the southern border of the property that crosses the boundary at several points (Figure 11). Although the rainfall intensity is classified as moderate the inherent erosion potential of soils is high, and thus erosion of soils and stormwater management are factors which must be carefully considered when planning any development in this area (Table 1 and Figure 10). The average annual rainfall in the Gouritz River catchment is between 100 and 300 mm / annum, while the coastal

area in the vicinity of Portion 11/449 is between 400 and 500 mm / a (Gouritz River Draft Estuary Management Plan, 2021).

Table 1. Summary of relevant catchment features for the proposed Project area.

Feature	Description
Quaternary catchment	J40E
Mean Annual Runoff	48.81 mm
Mean Annual Precipitation	283.00 mm
Inherent erosion potential of soils (K-factor)	0.59, High
Rainfall intensity	Moderate
Ecoregion Level II	20.02, Southeastern coastal belt
Geomorphological Zone	Lowland river
NFEPA area	Sub-quaternary reach 9292, FEPA.
Mapped Vegetation Type	FFd9: Albertinia Sand Fynbos (Endangered), AT40: Hartenbos Dune Thicket (Endangered) and AZa2: Cape Lowland Alluvial Vegetation (Endangered)
Conservation	Ecological Support Area2, Critical Biodiversity Area 1 (Terrestrial & Aquatic), Critical Biodiversity Area 2 (Terrestrial) WCBSP (2017)

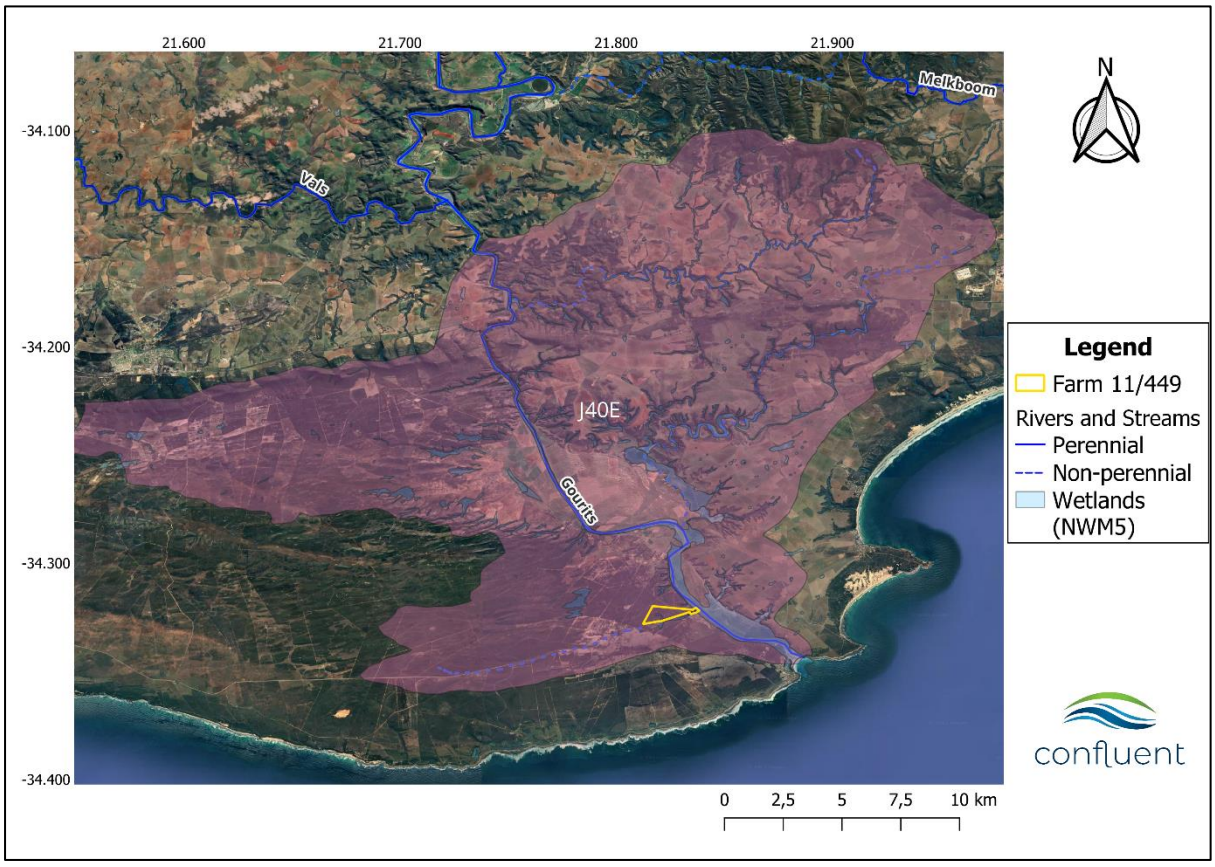

Figure 10. Location of Portion 11/449 Melkhoutfontein in the quaternary catchments J40E.

Development nodes are both located proximal to mapped wetlands (Figure 4 and Figure 6). The southern boundary is mapped as a non-perennial drainage line grading to a channelled valley-bottom wetland and closer to the Gouritz River below the 5 m.a.m.s.l. contour, the

Estuarine Functional Zone (EFZ). This wetland appears to be connected to a seep wetland mapped on the southern side of the *Eucalyptus* sp. clump where development node 2 is located. Development node 1 is near the confluence of the wetland with the Gouritz River near an area mapped as wetland grading to the EFZ.

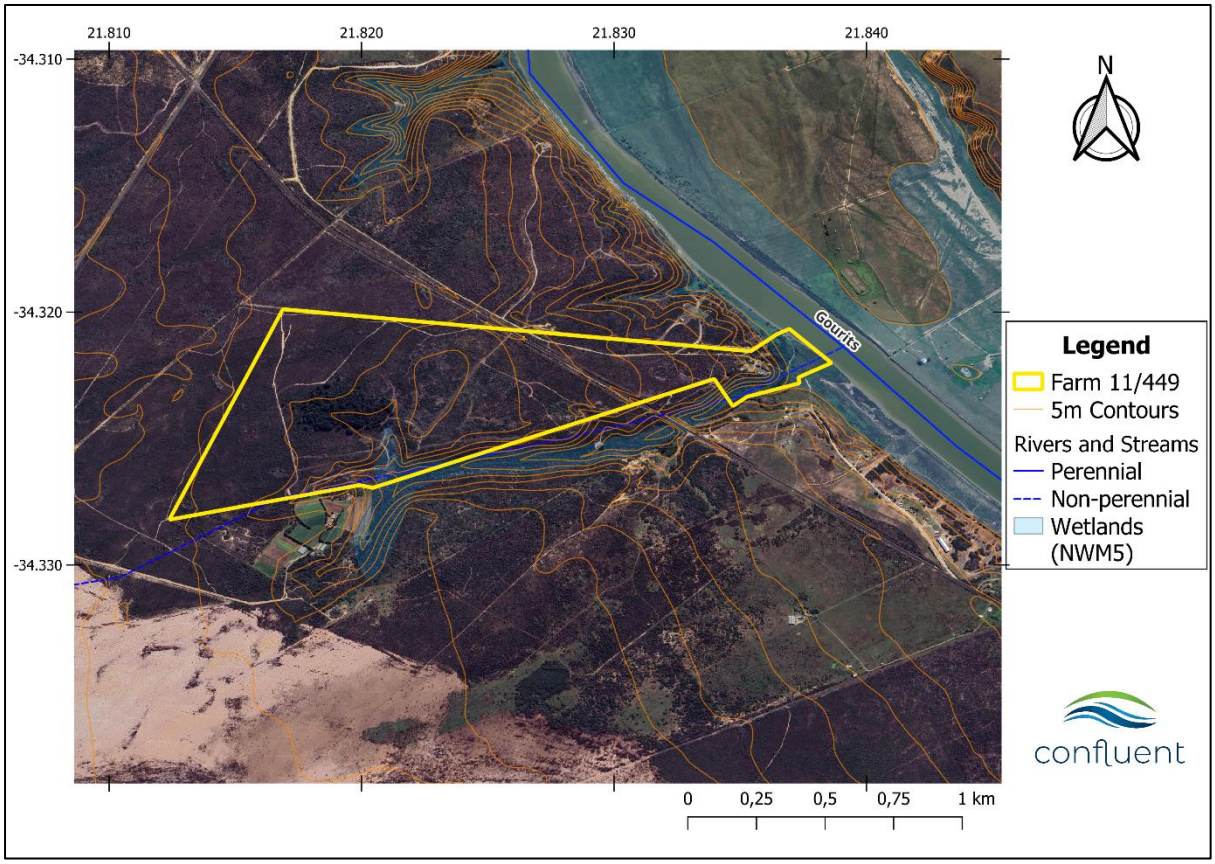

Figure 11: Location of Portion 11/449 Melkhoutfontein in relation to mapped watercourses.

The project area is located within the southeastern coastal belt (Ecoregion Level 2:20.02). The terrain is described as closed hills of moderate and high relief and moderately undulating plains. Altitude ranges between 0 – 1 300 m.a.m.s.l.

2.2 Vegetation

The mapped vegetation type at the site is **Albertinia Sand Fynbos** (FFd9; **Endangered**; National Vegetation Map of South Africa (NVM), 2018), **Hartenbos Dune Thicket** (AT40; **Endangered**; NVM, 2018) and **Estuarine Salt Marsh** is mapped in a narrow strip along the Gouritz River (NVM, 2018), and has been categorised to have Very High sensitivity in the screening tool report. A detailed botanical specialist assessment is available for the site (Confluent Environmental, Botanical Specialist Assessment 2023). Development Node 1 is located in the mapped Hartenbos Dune Thicket and Development Node 2 is in Albertinia Sand Fynbos. A detailed assessment of the vegetation on site has been compiled by Bianke Fouche of Confluent Environmental (July 2024).

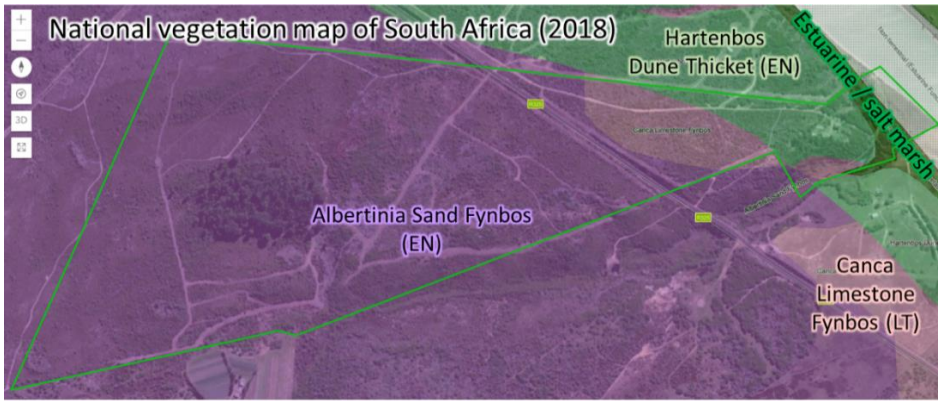

Figure 12. Mapped vegetation types according to VegMap (2018) from Botanical Specialist Report by Bianke Fouche (Jul 2024).

2.3 Conservation and catchment management

2.3.1 Western Cape Biodiversity Spatial Plan (WCBSP)

The Western Cape Biodiversity Spatial Plan (WCBSP; 2017) indicated the following categorised areas on the property and surrounding area; An Ecological Support Area 2 (ESA2), along with a terrestrial and aquatic Critical Biodiversity Area 1 (CBA1) and a terrestrial Critical Biodiversity Area 2 (CBA2; Figure 13). Development node 1 is in an area mapped as a mix of CBA1 Aquatic and Terrestrial with a few areas of ESA2 (Restore), while Development node 2 is in CBA2 Terrestrial with no mapped aquatic areas nearby.

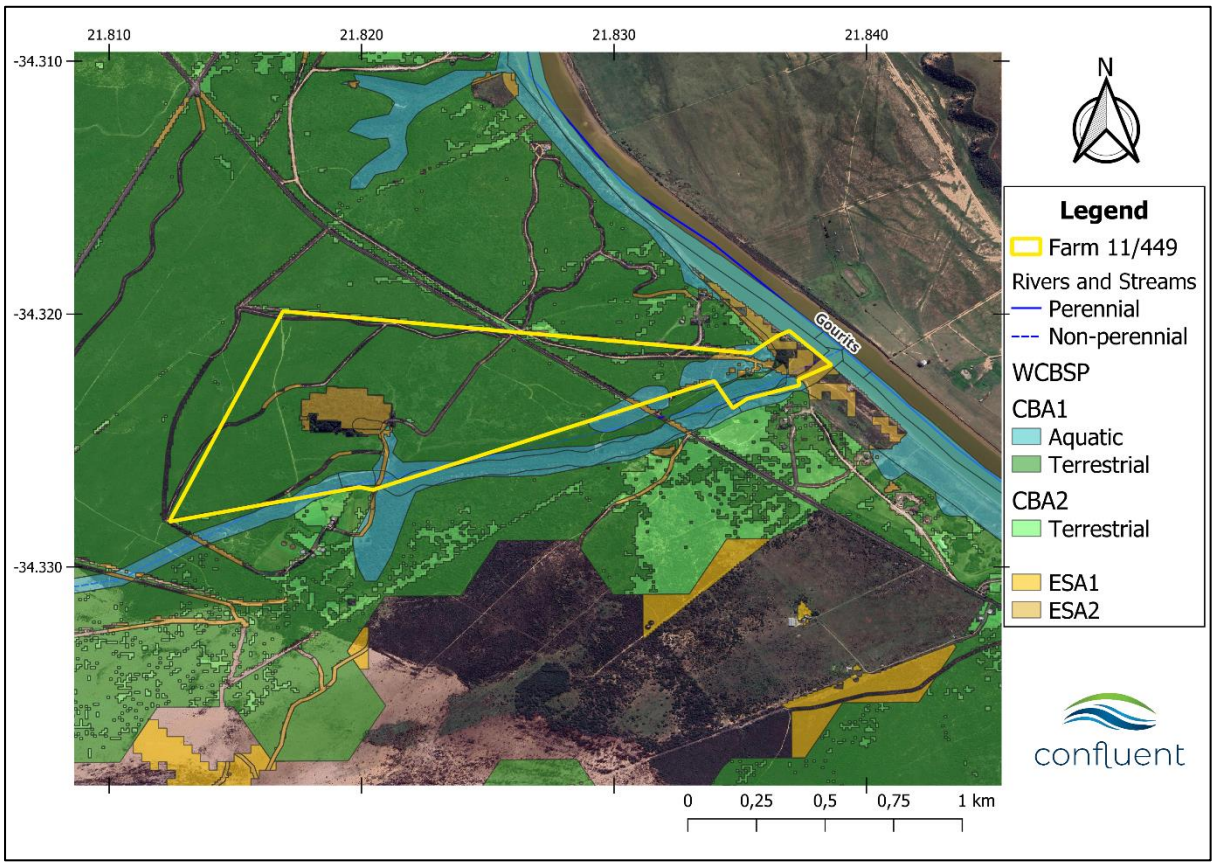

Figure 13. Portion 11/449 Melkhoutefontein with mapped conservation features of the Western Cape Biodiversity Spatial Plan (2017).

Necessary actions in relation to the WCBSP are to ensure that development on the site does not result in negative impacts on the ecological structure and function of watercourses adjacent to the site. It is also important to ensure that development is consistent with the objectives of the designated conservation units. In the case of the proposed glamping sites, it seems feasible that they could meet the management objectives for CBA1 if they are kept as low footprint, low impact developments (Table 2). It is also important to note that the objectives of ESA2 include restoration, which should form part of the development plan.

Table 2. Definitions and objectives for conservation categories identified in the Western Cape Biodiversity Spatial Plan (WCBSP, 2017).

WCBSP Category	Definition	Management Objective
Critical Biodiversity Area 1 (CBA1)	**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 natural habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land uses are appropriate.**
Critical Biodiversity Area 2 (CBA2)	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.
Ecological Support Area 2 (ESA2)	**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 minimize impact on ecological processes and ecological infrastructure functioning, especially soil and water-related services, and to allow for faunal movement.**

2.3.2 NFEPA

According to the National Freshwater Ecosystem Priority Atlas (NFEPA; Nel *et al*., 2011) the sub-quaternary reach (SQR 9371) is classified as a Freshwater Ecosystem Priority Areas (FEPA). A FEPA is an area prioritised for conserving freshwater ecosystems and associated biodiversity. The selection of FEPAs is determined through a process of systematic biodiversity planning using data on freshwater ecosystem types, species and ecological processes. FEPAs should be maintained in a good condition to manage and conserve freshwater ecosystems and to protect water resources for human users. This does not mean that FEPAs should be fenced off from humans, but they should be supported by good planning, decision-making and management. The recommended condition for all river FEPAs is an A or B ecological category (Nel *et al*., 2011).

2.4 Historical Assessment

Historical imagery was sourced from the CD:NGI as well as Google Earth satellite imagery. The assessment focusses primarily on the proposed development nodes, as well as other events or developments which may have affected watercourses on the property in general.

In 1964 vegetation was cleared along the Western boundary, possibly as a fire break or for agriculture, but a decade later appeared to have regenerated natural cover to a large extent. Dense vegetation growth in the vicinity of the present *Eucalyptus* patch was evident and may have been the start of the current vegetation feature at this point. The *Eucalyptus* patch was depleted and then regenerated several times over the last decades, but it isn't known whether it was ever actively harvested or potentially impacted by fire events.

In the 1964 and 1974 images the main access road to Gouritzmond passed through the wetland in the vicinity of development node 1. This road was in use for many decades until the new R325 road was constructed. This was first visible on the photo in 1984 with the bridge across the wetland visible later in 1991.

More recent imagery in 2004 at Node 1 shows the area clear of dense vegetation. Dense growth of trees and shrubs steadily expanded in this area to the present extent indicated in 2022. The boathouse that is presently there was built between August 2011 and April 2012.

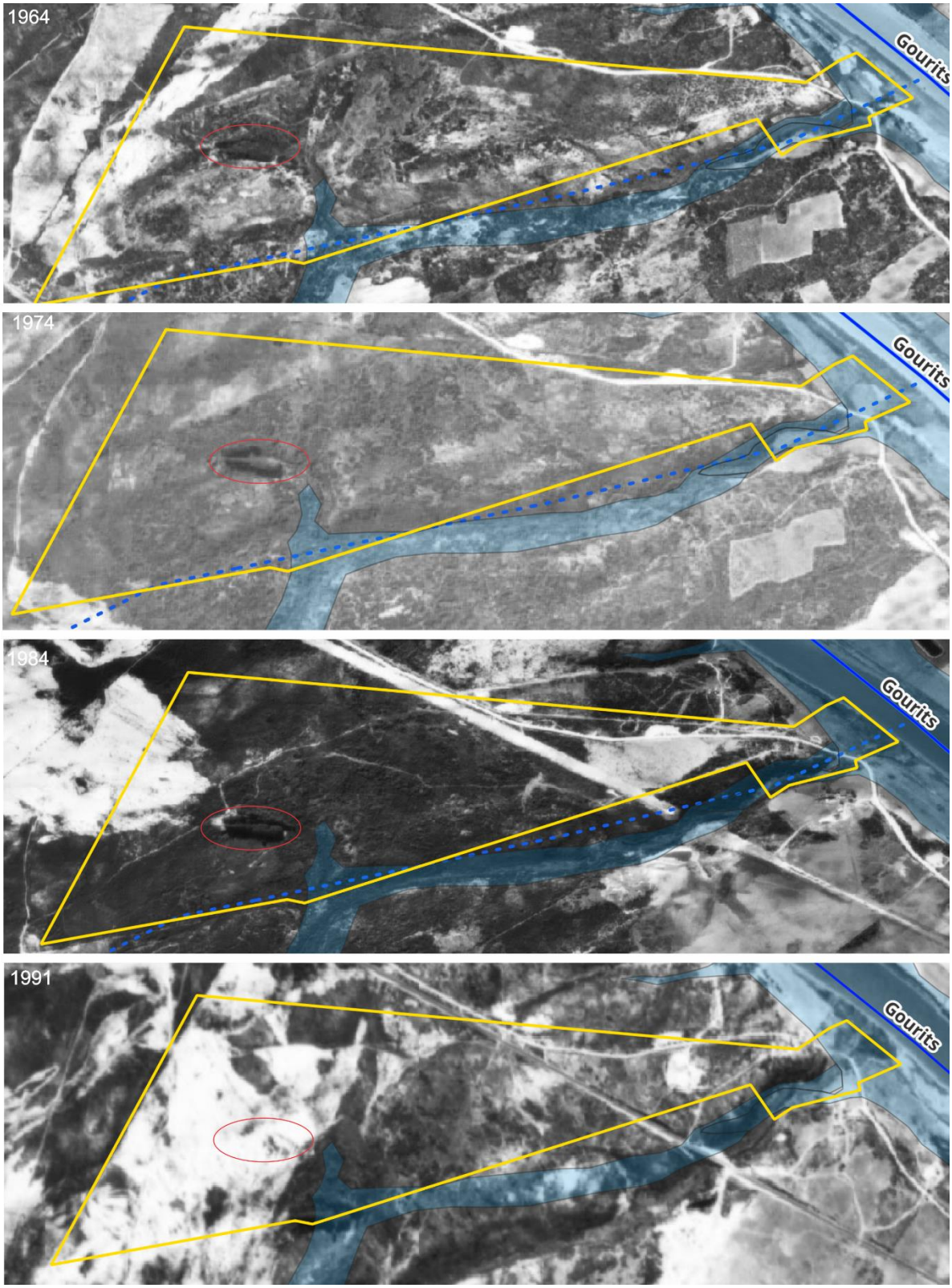

Figure 14: Historical photos showing Portion 11/449 Melkhoutefontein through notable changes between 1964 and 1991 (CD:NGI & Google Earth imagery).

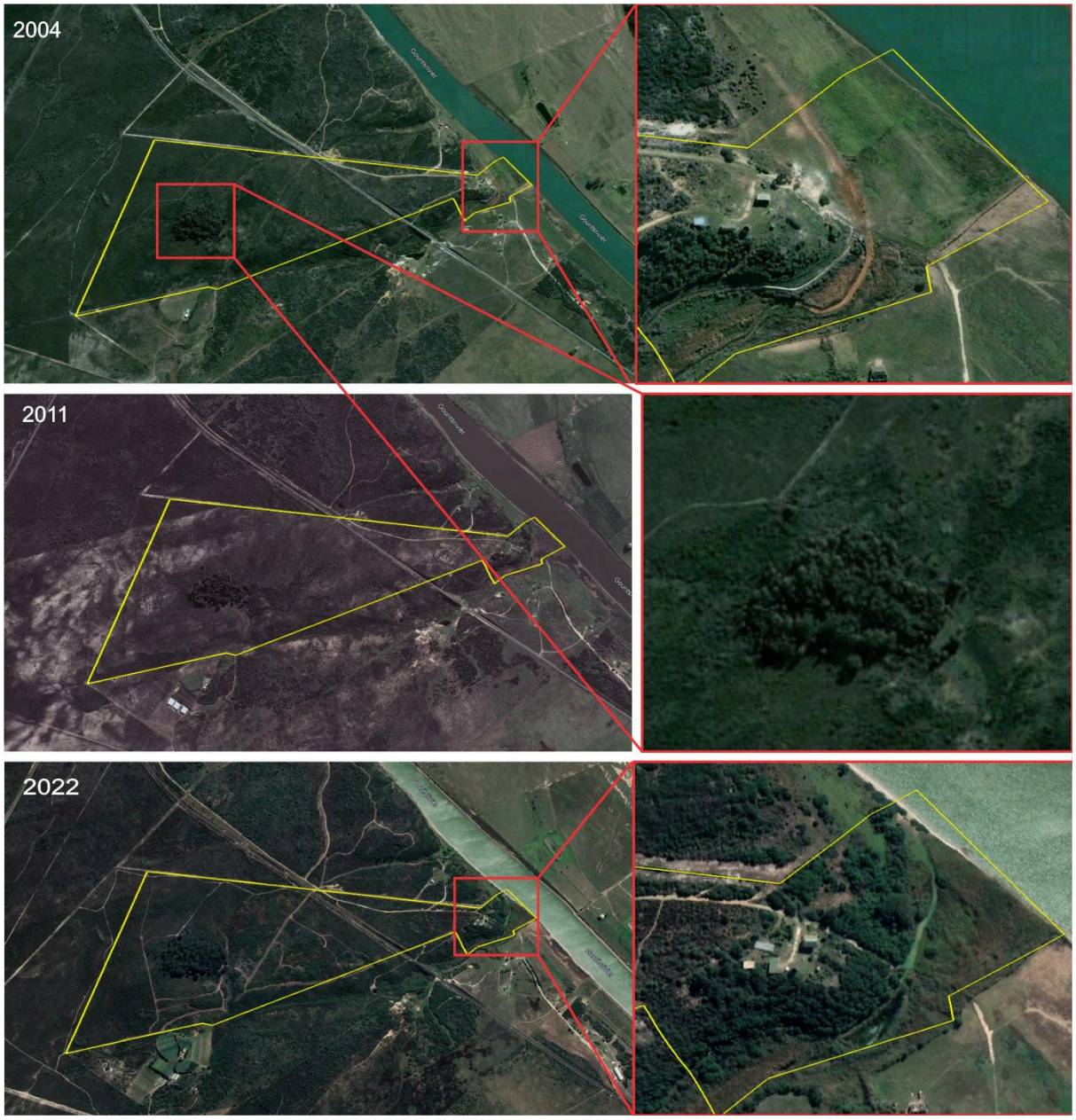

Figure 15: Historical photos showing Portion 11/449 Melkhoutefontein through notable changes between 2004 and 2022 (CD:NGI & Google Earth imagery).

3. SITE ASSESSMENT

3.1 Site Visit

The site was visited on 28 September 2023 two days after a significant rainfall event caused by a cut-off low system (23-26 Sep 2023). The Gouritz River was still flowing strongly and the water level was high. At the time of the site visit the weather was clear and all mapped watercourses were visually assessed. The full extent of both Node 1 and Node 2 were assessed by walking extensively through the area (Figure 16), identifying any plant species indicative of wetland conditions and inspecting soil auger samples for signs of redoximorphic indicators of saturation. A drone was used to take photos providing an aerial overview of the two nodes and other relevant features (Figure 16, Figure 17, Figure 18).

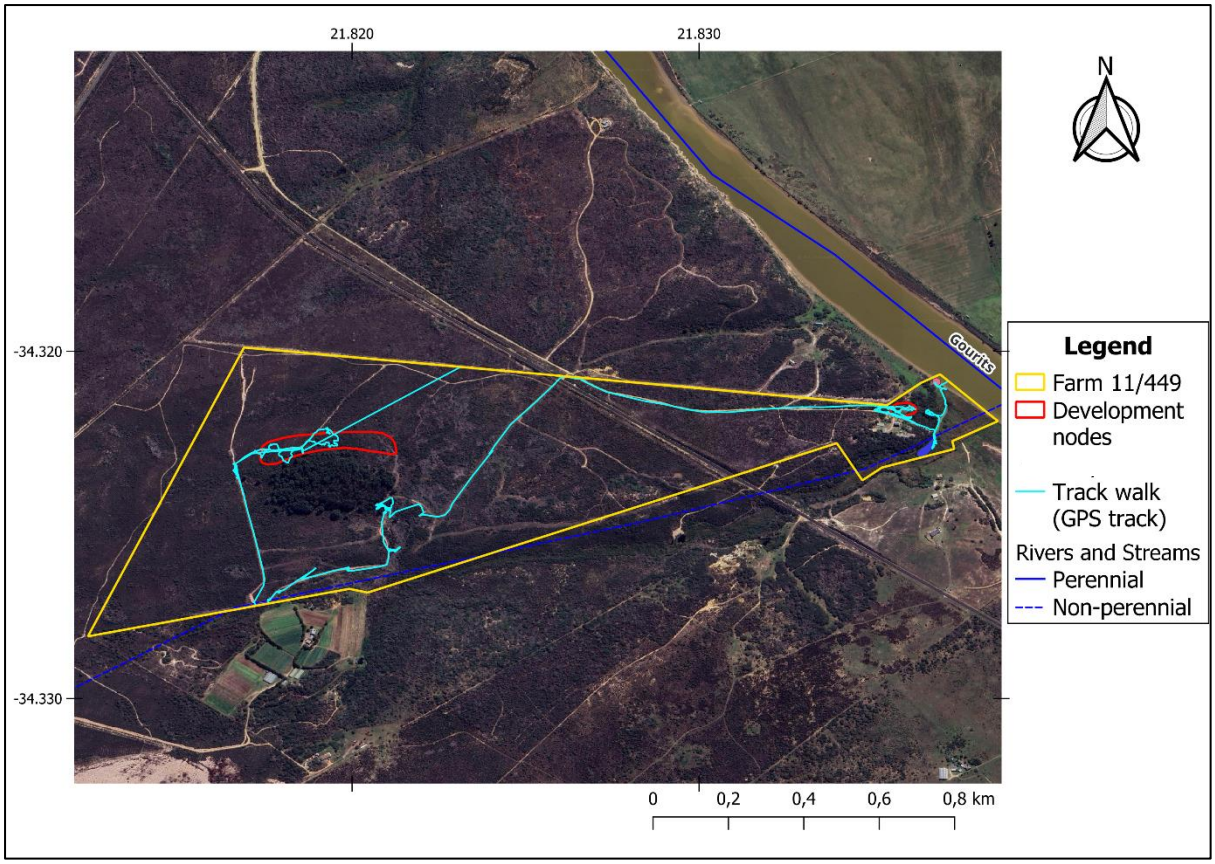

Figure 16: Portion 11/449 Melkhoutfontein with of the development nodes indicating the site assessment GPS track.

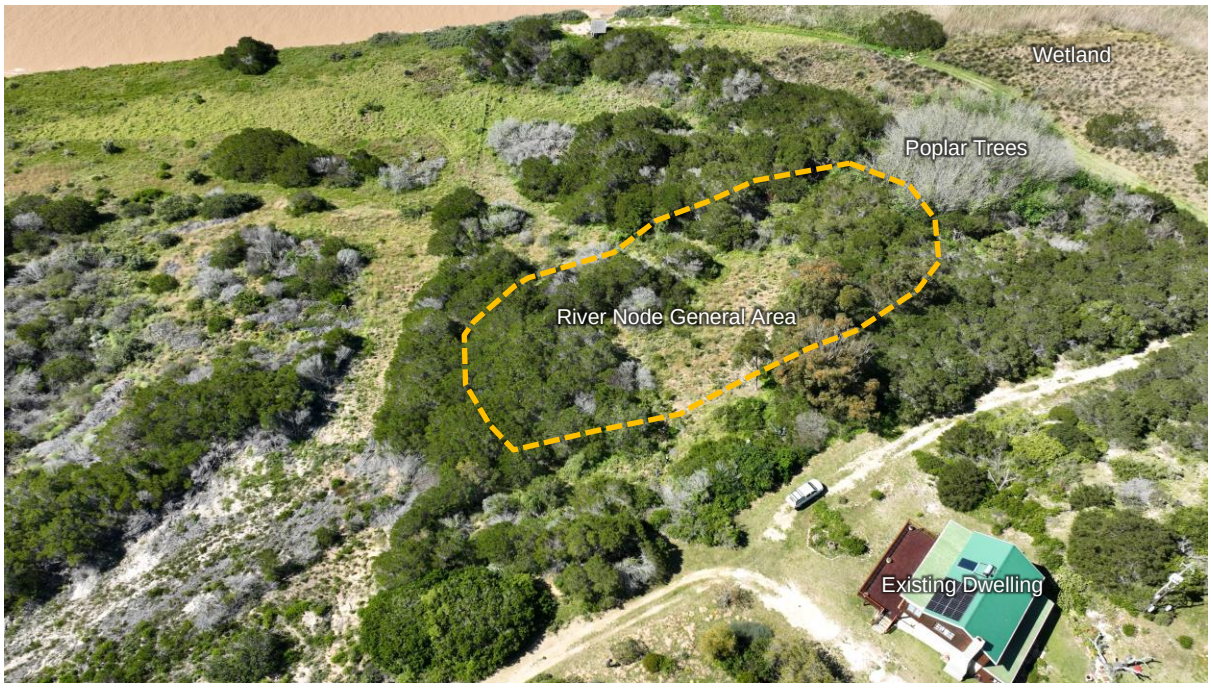

Figure 17. Drone photo showing the general area of the River Node with Rooikrans-invaded bush in front of existing dwelling and Poplar stand invading wetland habitat.

Figure 18. Drone photo showing the general area of Node 2 with *Eucalyptus* stand to the right and a Rooikrans-invaded (*Acacia cyclops*) edge beyond which is dominated by fynbos.

3.2 Watercourse Classification

The wetland along the southern property boundary is classified as a channelled valley-bottom wetland as per the classification system determined by Ollis *et al*. (2013). The Gouritz River and adjacent saltmarsh / estuarine vegetation are confirmed as being estuarine features due to the presence of vegetation associated with estuarine habitats. At the confluence of the Gouritz River and the wetland near the River Node, the northern shoreline exhibits wetland features for a substantial area extending upslope to a degree near the stand of Poplar trees. This area forms part of the valley-bottom wetland feature.

3.3 Watercourse Delineation

3.3.1 River Node

The River Node is close to the confluence of the channelled valley-bottom wetland with the Gouritz River which creates a complex ecotone of estuarine and freshwater habitat. Distinguishing where the one habitat type ends and the other begins is beyond the scope of this report. Therefore, the wetland and EFZ were delineated as a single unit. Most of the wetland and the Gouritz system are below the 5 m.a.m.s.l. which is classified as the Estuarine Functional Zone (EFZ). Although wetland indicators including vegetation and soil features extend into the stand of Poplar trees. However, the extent of the wetland assessed on site was found to be reduced in comparison to that mapped in the NWM5 wetland layer. The revised wetland delineation based on the site assessment is presented in Figure 19.

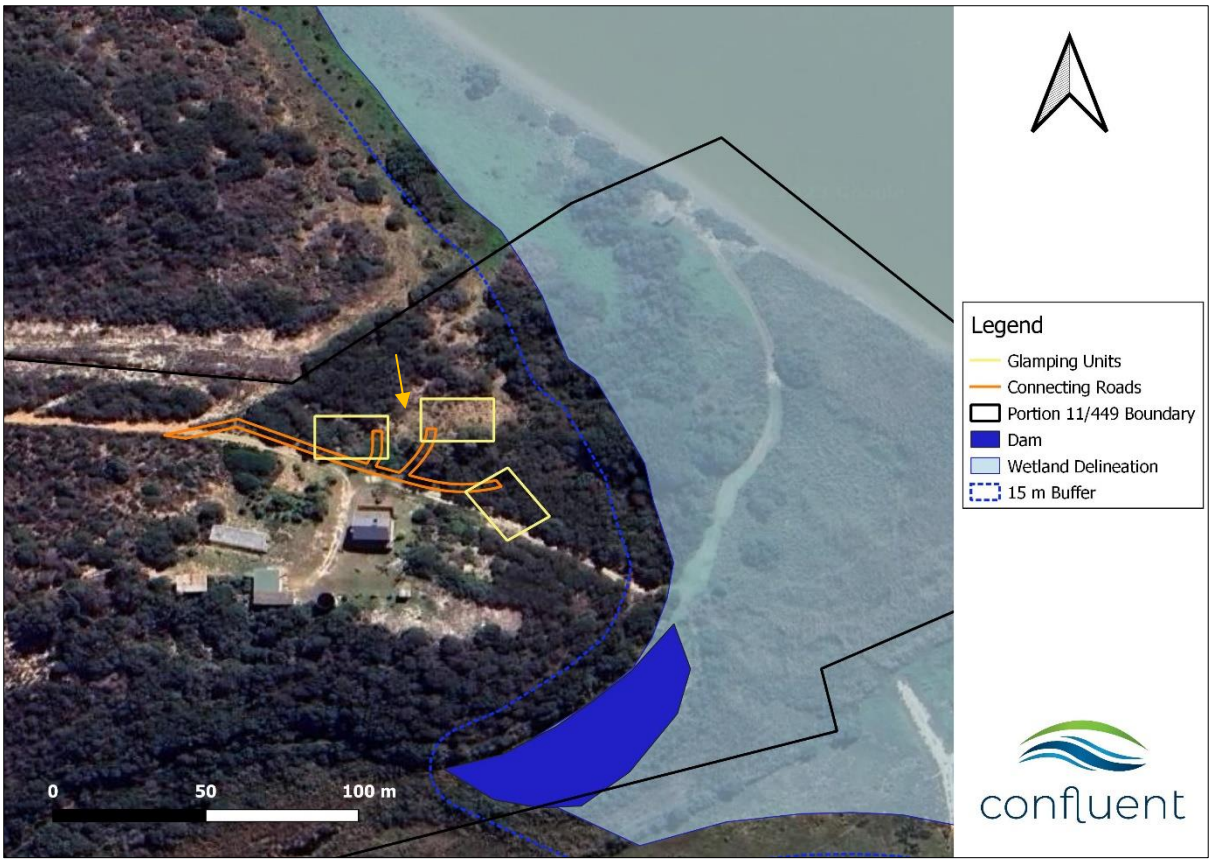

Figure 19. Delineation of wetland and Estuarine Functional Zone with 15 m buffer in relation to proposed glamping/cottage units in the River Node. Yellow arrow indicates Ecorock Biorock sewage treatment unit.

3.3.2 Aquatic Impact Buffer Zone

Aquatic buffer zones are areas where the land meets a watercourse, and refers to the interface between these two habitats. Buffer areas are linear zones adjacent to watercourses managed with the intention of protecting water resources from diffuse pollution associated with adjacent land uses. In addition, they provide habitat for wildlife and aid movement through increasingly fragmented landscapes. Some well established benefits of buffer zones include:

- ✓ Maintain channel stability
- ✓ Control microclimate and temperature
- ✓ Flood attenuation
- ✓ Maintain wildlife habitat
- ✓ Sediment removal from diffuse runoff
- ✓ Nutrient removal from diffuse runoff
- ✓ Improve habitat connectivity
- ✓ Screening adjacent disturbance
- ✓ Enhance visual quality
- ✓ Control noise levels
- ✓ Improve air quality
- ✓ Create recreational opportunities

Buffer zone width was determined using the site-based Estuarine Buffer model developed by Macfarlane & Bredin (2016) which is the more comprehensive of the two available models. The model incorporates locally determined environmental factors such as soil type, slope, annual rainfall, soil erodibility and inherent runoff potential at the site. A wetland buffer of **15m** was determined and is shown relative to the wetland in Figure 19. Note that the buffer width is land-use specific and is applicable to the proposed glamping units only. Should the land use change to an alternative use such as agriculture, the buffer would need to be recalculated.

Figure 20. Photos in the vicinity of Node 1 showing wetland features of the channelled valley-bottom system and the Gouritz River.

3.3.3 Eucalyptus Node

The stand of *Eucalyptus* trees is located on relatively flat terrain above an unchanneled valley bottom wetland which adjoins the larger channelled valley-bottom wetland along the southern boundary. It is possible that *Eucalyptus* trees established well there because the area forms part of a seep connected to the wetland. The extent and size of the *Eucalyptus* trees would seriously lower the water table and could obscure any wetland features. In the present state however, there is **no indication that a wetland occurs within the *Eucalyptus* stand or within the original area proposed for the Eucalyptus Node** (Figure 3).

The updated SDP places all 3 accommodation units to the north of the Eucalyptus stand with the closest unit 150 m from the wetland (Figure 22) (Figure 23).

Figure 21. Terrestrial habitat in the vicinity of Node 2 north of the *Eucalyptus* stand and a typical soil auger result from the area indicating no reodoxymorphic features.

Figure 22. Unchanneled valley bottom wetland south-east of *Eucalyptus* in Eucalyptus Node. Piles of dead, cleared Rooikrans have been stacked through the wetland area.

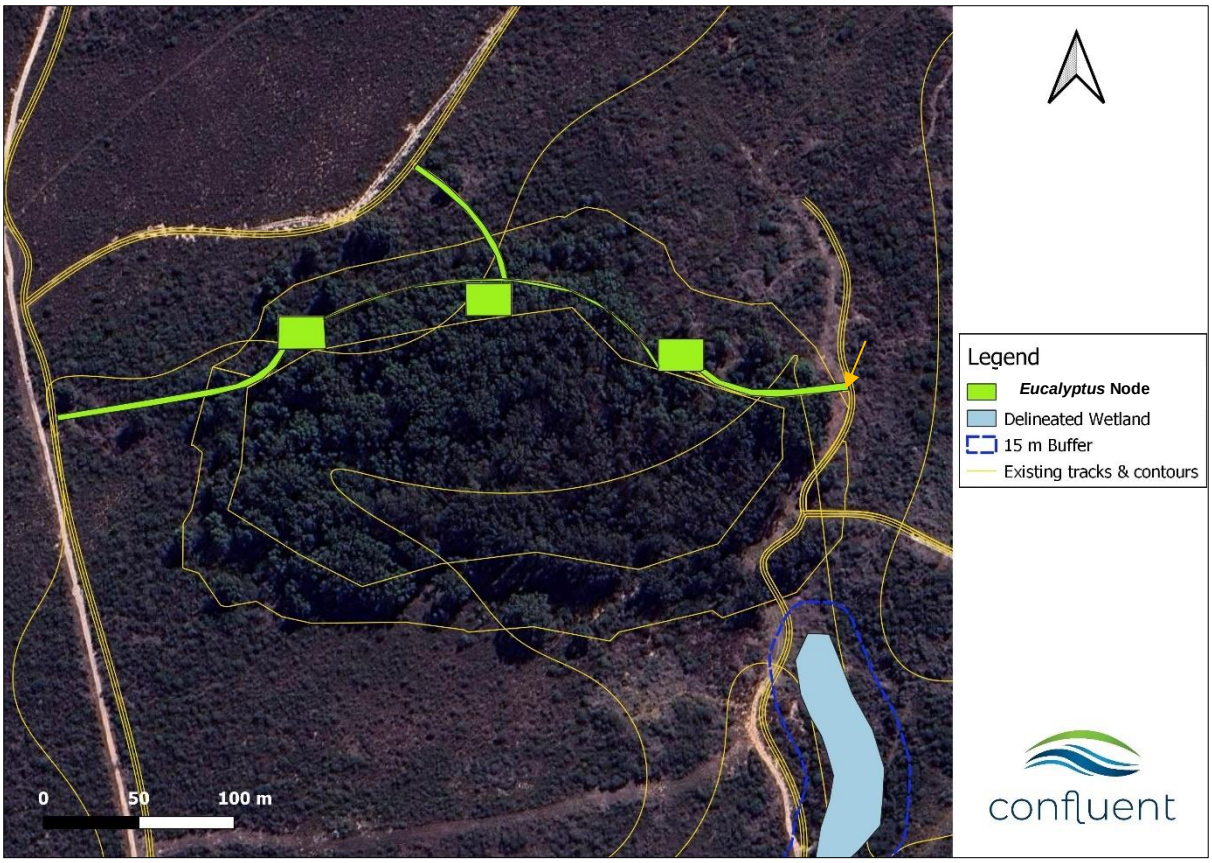

Figure 23. Delineation of wetland with 15 m buffer in relation to proposed glamping units in the *Eucalyptus* Node. Yellow arrow indicates location of Biorock Ecorock sewage treatment unit.

4. LEGISLATIVE REQUIREMENTS

4.1 Site Sensitivity Verification: NEMA

In terms of GN 320 (Protocol for the specialist assessment and minimum report content requirements for environmental impacts on aquatic biodiversity) of the National Environmental Management Act (NEMA; Act No. 107 of 1998), the desktop and field assessment determined a **Low Sensitivity** for Aquatic Biodiversity. This finding is based on provision that the following criteria are met:

- The chalets and any other built structures are kept out of the wetland and 15m buffer area at the River Node and Eucalyptus Node.
- Cycling / hiking pathways should not cross or traverse wetland areas and should use existing pathways and roads as far as possible to limit disturbance.

For this assessment to remain valid, present and future development must be excluded from any wetland or buffer areas, and these areas should be well maintained, free of alien vegetation or dumped piles of cleared alien plants.

4.2 NWA Water Uses

Possible water uses considered for the proposed development included Section 21 c) and i) which are defined as follows:

21c): Impeding or diverting the flow of water in a watercourse;

21i): Altering the bed, banks, course or characteristics of a watercourse;

The 21c) and i) water uses relate to construction of infrastructure in general in the regulated area of the watercourse. In GN4167 the regulated area of the watercourse is defined as:

“In respect of a wetland: A 500m radius around the delineated boundary (extent) of any wetland”.

A Section 21 c) and i) Risk Matrix is required to determine whether the proposed development at each node presents a risk to the wetlands present at both locations.

5. IMPACT ASSESSMENT

5.1 No-Go Option

Given that the preferred SDP has maintained all development outside of wetlands and their buffers the No-Go option is not considered significantly superior to the preferred development option because impacts to aquatic ecosystems are expected to be minimal (see following impact assessment). The current ecological state of wetlands is predominantly impacted by alien vegetation. For which control is recommended and a legal requirement whether the development is approved or not. Therefore, the condition of the wetlands is likely to remain similar in both scenarios – the No-Go option as well as development of the Preferred layout option. The primary difference would be that with the development option there is likely to be more anthropogenic activity in general (visiting tourists, their vehicles, recreational activities such as cycling, walking etc.). This activity may result in more sensitive animals moving away from the development nodes, but the wetland habitat and cover would be adequate and retained intact to support this. No additional disturbance would occur in the No-Go option.

5.2 Preferred Development Layout

5.2.1 Design and Layout Phase

The location of proposed tourist units has been sited with extensive input from biodiversity specialists on the project team, including the aquatic specialist. Initially, one of the units was located closer to the wetland near the Eucalyptus Node (non-mitigated layout), but this was subsequently moved completely out of any wetland habitat or recommended buffers highlighted in this report. No further recommendations are therefore applicable based on the Preferred Site Development Plan assessed in this report.

5.2.2 Construction Phase

5.2.2.1 Unnecessary Disturbance of Wetland Habitat

Disturbance to wetland habitat can be effectively mitigated during the construction phase by following the mitigation measures provided in Table 3.

Table 3. Construction Phase Impact: Unnecessary disturbance of wetland habitat.

Project phase	**Construction**			
Impact	**Unnecessary disturbance of wetland habitat in either / both nodes**			
Description of impact	**Loss of wetland vegetation and disturbance / compaction of wetland soils**			
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts		
Potential mitigation	**• The wetland buffer proximal to both development nodes should be delineated using danger tape before construction commences at the site, and all staff must be made aware that this is a No-Go area for people and vehicles. • All construction materials (topsoil, subsoil, building sand) must be stockpiled and bunded with sandbags or similar near the footprint of tourist units, and well away from the wetland and buffer. • Any excavated waste materials must be taken away without delay to reduce the risk of spilling or washing down slopes into wetlands. • Vehicle refuelling areas must be located as far from the watercourse as possible, and a spill kit must be on hand in case of fuel spills. • No materials, waste or litter may be dumped into the wetland or buffer area. • Cement mixing may not take place on bare soil. This must be done on wooden boards, or within a plastic lined temporary dam made with thick plastic liner / waterproofing material. Waste cement must be removed from the site.**			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Negative	
Duration	Short term	Impact will last between 1 and 5 years	Immediate	Impact will self-remedy immediately
Extent	Limited	Limited to the site and its immediate surroundings	Very limited	Limited to specific isolated parts of the site
Intensity	Low	Natural and/ or social functions and/ or processes are somewhat altered	Negligible	Natural and/ or social functions and/ or processes are negligibly altered
Probability	Unlikely	Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur	Highly unlikely / none	Expected never to happen
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	High	The affected environment will be able to recover from the impact	High	The affected environment will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	**Negligible - negative**		**Negligible - negative**	
Comment on significance				
Cumulative impacts	Given the distance of each development node from delineated wetlands, the cumulative impacts are considered to be minimal to non-existent for wetland habitat during the construction phase.			

5.2.3 Operational Phase

5.2.3.1 Clearance of Alien Vegetation

This impact relates more the present impact of alien vegetation affecting wetlands near both development nodes. The Eucalyptus Node has extensive areas of *Eucalyptus* trees and Rooikrans is present to varying degrees closer to the wetland. Both trees represent a significant threat to wetland hydrology and habitat. Furthermore, Rooikrans that were previously cut have been packed into the wetland for disposal, smothering wetland plants and further spreading seed. Poplar trees are the biggest threat to the wetland habitat near the River Node. These alien tree species should be removed from the wetland itself as well as from the surrounding buffer. Provided the mitigation measures are followed in Table 4, the impacts will actually be positive as there would be an improvement on the current situation.

Table 4. Operational Phase Impact: Alien vegetation in wetland and buffer areas.

Project phase	**Operation**			
Impact	**Alien vegetation in wetland and buffer areas**			
Description of impact	**Reduction and transformation of wetland habitat**			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	**• No alien vegetation must be removed from wetlands or buffers using heavy vehicles or earth-moving machinery. • Existing alien slash in the wetland at the Forest Node should be removed by hand and piled in a disturbed area to be either burnt (with a permit) or chipped outside of the wetland buffer. Chipped plants can be used along pathways where emergent Rooikrans can be easily controlled. • Wetlands and their buffers must be maintained free of alien plants at all times. A few large trees can be selectively ring-barked but retained as bird roosting sites. All smaller trees should be cut with a chainsaw and the stumps painted with a registered herbicide. Emergent seedlings shoudl be hand-pulled until indigenous vegetation becomes dominant and alien plant density is substantially reduced.**			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Positive	
Duration	Long term	Impact will last between 10 and 15 years	Short term	Impact will last between 1 and 5 years
Extent	Limited	Limited to the site and its immediate surroundings	Very limited	Limited to specific isolated parts of the site
Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	Moderate	Natural and/ or social functions and/ or processes are moderately altered
Probability	Almost certain / Highly probable	It is most likely that the impact will occur	Almost certain / Highly probable	It is most likely that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	High	The affected environment will be able to recover from the impact
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Low	The resource is not damaged irreparably or is not scarce
Significance	**Minor - negative**		**Minor - positive**	
Comment on significance	This impact can be equally negative (if neglected) or positive (if addressed) and will contritube to the tourist experience of the site.			
Cumulative impacts	The cumulative impacts can be negative or positive as any source of invasion can contribut to the spread of species elsewhere.			

5.2.3.2 Recreational Use Leading to Wetland Habitat Degradation

Given the popularity of outdoor activities like mountain biking, trail running and walking, it is likely that the landowner will develop some trails to facilitate these activities for tourists. If trails are established in wetland habitats they lead to fragmentation and disturbance in these sensitive areas, reducing their value as a refuge for wildlife, and degrading habitat quality. If the mitigation measures recommended in Table 5 are followed, then the impact is likely to be a Negligible Negative.

Table 5. Operational Phase Impact: Recreational use leading to wetland habitat degradation.

Project phase+B43:F47	**Operation**			
Impact	**Recreational use leading to wetland habitat degradation**			
Description of impact	**Pathways for cycling / walking result in wetland habitat modification through direct and indirect impacts**			
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts		
Potential mitigation	**• Walking or cycling pathways should be restricted to the buffer areas only with distance of at least 10 m maintained from the wetland itself. • Wet and muddy areas of the pathway should be rerouted and left to passively rehabilitate as they are likely in the wetland. The installation of drains or bridges to dry out or navigate wet areas is not permissable without authorisation. Dry pathways should be created as an alternative in the wetland buffer.**			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Negative	
Duration	Medium term	Impact will last between 5 and 10 years	Brief	Impact will not last longer than 1 year
Extent	Limited	Limited to the site and its immediate surroundings	Very limited	Limited to specific isolated parts of the site
Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	Very low	Natural and/ or social functions and/ or processes are slightly altered
Probability	Probable	The impact has occurred here or elsewhere and could therefore occur	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur
Confidence	Medium	Determination is based on common sense and general knowledge	High	Substantive supportive data exists to verify the assessment
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	High	The affected environment will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	**Minor - negative**		**Negligible - negative**	
Comment on significance				
Cumulative impacts	More activity around the wetland areas in general can discourage use of the habitat by wetland fauna, thus reducing the benefit of the aquatic ecosystem of a wildlife refuge and corridor for movement.			

5.3 Non-mitigated Layout Alternative

The same construction phase impacts and proposed mitigation measures proposed for the Preferred Layout are applicable to the non-mitigated layout. These mitigation measures aimed to prevent unnecessary habitat destruction or loss resulting from construction of the units. Th location of the 3rd unit was already positioned outside of the wetland and recommended 15 m buffer (Figure 24).

The operational phase impacts and mitigation measures would also be the same as those for the Preferred Layout as they refer to permissible activities in and around the wetland.

The primary reason for recommending that the unit proximal to the wetland in the *Eucalyptus* Node be relocated was to reduce/eliminate the risk of leaking sewage into the wetland. This impact requires no further assessment because the recommendation was supported by moving the unit out of this higher risk area.

Figure 24. Eucalyptus Node development area showing the preferred layout (green units) and the non-mitigated layout showing the location of the unit proximal to the wetland and buffer (red unit).

6. RISK MATRIX

The second version of the Section 21 c) and i) Risk Matrix was completed in alignment with GN7167 (Dec 2023) of the National Water Act. Impacts and mitigation measures assessed in the Risk Matrix were the same as those identified in the previous section. Provided all mitigation measures recommended for the predicted construction and operational phase impacts are followed, the outcome of the Risk Matrix is a “Low Risk” rating (Table 6). This indicates that the proposed development can be authorised through a General Authorisation and would not require a Water Use License.

Table 6. Results of the Section 21 c) and i) Risk Matrix.

PROJECT:	**Melkhoutefontein development of tourist units**
Name of assessor:	Jackie Dabrowski
Date of assessment:	22-Jul-24

RISK ASSESSMENT MATRIX for Section 21 (c) and (i) Water Use activities (version 2.0): SUMMARY

[ASSUMING THAT ALL PROPOSED IMPACT CONTROL MEASURES (AS STIPULATED IN PROJECT SPECS) ARE EFFECTIVELY IMPLEMENTED]

Phase	Activity	Impact	Risk Ratings
CONSTRUCTION	Construction vehicles and workers in proximity to wetland habitat	Unnecessary disturbance of wetland habitat	L
		<1b>	#VALUE!
		<1c>	#VALUE!
OPERATIONAL	Clearance of alien vegetation	Reduction and transformation of wetland habitat	L
		<1b>	#VALUE!
		<1c>	#VALUE!
	Recreational use leading to wetland habitat degradation.	Pathways through wetlands result in habitat loss and other direct and indirect impacts.	L
		<2b>	#VALUE!
		<2c>	#VALUE!

7. CONCLUSIONS

The proposed Preferred Development of 3 tourist units each at two nodes on Portion 11/449 Melkhoutefontein was assessed in terms of potential impacts to aquatic resources in this report. An initial site survey to delineate wetlands and recommend buffers was undertaken to inform the subsequent layout of tourist units. Subsequently, the layout of units is located entirely outside of any wetland or the recommended buffers. Sensitivity of the site in terms of the DFFE screening tool is therefore considered to be 'Low'.

The proposed tourist units are however, located within 500m of two delineated wetlands. The impacts post-mitigation were rated as Negligible Negative and a Minor Positive if recommendations to clear aliens are followed. The outcome of the Risk Matrix was a Low Risk to aquatic resources if the development goes ahead, provided all mitigation measures are fully implemented. This means that a General Authorisation is applicable for the proposed development for Section 21 c) and i) water uses.

From the perspective of aquatic ecosystems, this development is supported and should not adversely affect surface water resources in any way.

8. REFERENCES

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9. APPENDIX 1: PREFERRED SITE DEVELOPMENT PLAN