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20.11.2025

Enviro-EAP Environmental Consultants
Att: Nicolaas Hanekom

PROPOSED HOUSING DEVELOPMENT ON ERVEN 3677, 3680 AND 3617 AND NEW RESERVOIR ON REMAINDER PORTION 4 OF FARM 555, CEDARBERG MUNICIPALITY, WESTERN CAPE

PEER REVIEW OF AQUATIC BIODIVERSITY ASSESSMENT (ENVIRO-EAP, 2025)

1 Background

The Cedarberg Municipality proposes the development of affordable/low-cost housing including the development of a new water supply reservoir in Citrusdal in the Western Cape as indicated in Figure 1. The proposed development requires environmental authorisation in terms of the NEMA EIA Regulations (2014, as amended) and Water Use licence (WUL) in terms of the National Water Act (Act 36 of 1998) given that the development triggers NEMA-listed activities and NWA Section 21 c and i activities.

The Cedarberg Municipality appointed Enviro-EAP Environmental Consultants ("Enviro-EAP") as the Environmental Assessment Practitioner (EAP) to manage the required environmental applications including the preparation of the required Aquatic Biodiversity Assessment, given that the Screening Tool Report indicated the site to have a VERY HIGH sensitivity for the Aquatic Biodiversity Theme. However, the authority with competency over the NEMA EIA Regulations, the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP), indicated the Enviro-EAP does not have the requisite expertise to conduct specialist aquatic biodiversity assessments and therefore a SACNASP registered scientist with expertise in the field of aquatic ecology must conduct a peer review of the study and confirm if the study is compliant with the gazetted Protocol for Aquatic Biodiversity Assessments. EnviroSwift Western Cape ("EnviroSwift") was accordingly appointed by Enviro-EAP to conduct the independent peer review. The CV of the review specialist, Mr Nick Steytler, is provided as Appendix A.

In order to provide this input EnviroSwift conducted a site visit on 26 September 2025. This letter-format report outlines the findings of this peer review.

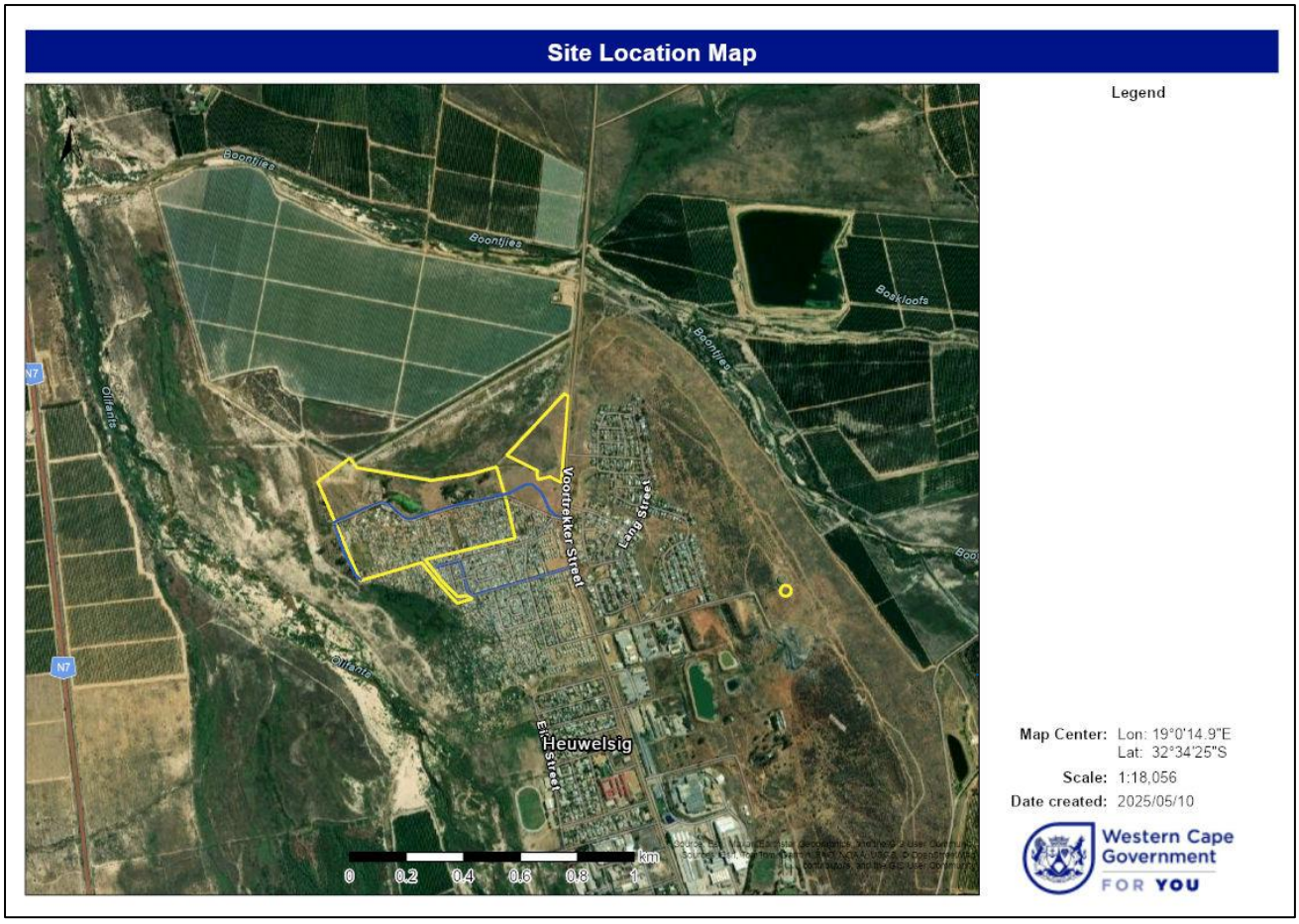

Figure 1: Location of the proposed areas for development (larger western area and smaller eastern area) indicated as yellow polygons. The reservoir site is indicated as a yellow circle. The track followed by EnviroSwift during the site visit is shown as a blue line.

2 Description of the proposed development

The proposed housing project comprises the following:

- Phase B: Erf 3677 with a total development footprint of ±3.3282ha
  - 8 Residential Zone 2 erven with an average erf size: ±120m²
  - 2 General Residential Zone erven
  - 2 Business Zone 2 erven
  - 2 Transport Zone 2 erven
- Phase C: Erf 3617 with a total development footprint of ±19.6085ha
  - 167 Residential Zone 2 erven Average erf size: ±120m²
  - 222 Residential Zone 2 erven Average erf size: ±120m² - 2 families per erf
  - 7 Open Space Zone 1 erven
  - 1 Community Zone 2 (church) erf
  - 1 Community Zone 1 (crèche) erf
  - 1 Community Zone 1 (community centre) erf
  - 1 Business Zone 2 erven
  - Transport Zone 2 erven
- Erf 3617 with a total development footprint of ± ±19.6085ha
  - 150 Residential Zone 2 erven Average erf size: ±120m²
  - 318 Residential Zone 2 erven Average erf size: ±120m² - 2 families per erf
  - Open Space Zone 1 erven
  - Transport Zone 2 erven

The proposed housing development has a development footprint of ±22.9367ha. Figure 2 presents the Spatial Development Plan for the Phases B & C of the proposed development. Note that Phase A is located between

the two development areas and has already received environmental authorisation. The only aspect not shown in the SDP is the proposed development of a new 3 Megalitre (ML) potable water supply reservoir which will be located adjacent to the existing reservoir on a remainder of Portion 4 of Farm No. 555, Citrusdal. In EnviroSwift's opinion this aspect of the proposed development is not associated with any aquatic biodiversity constraints and therefore is not considered further in this assessment.

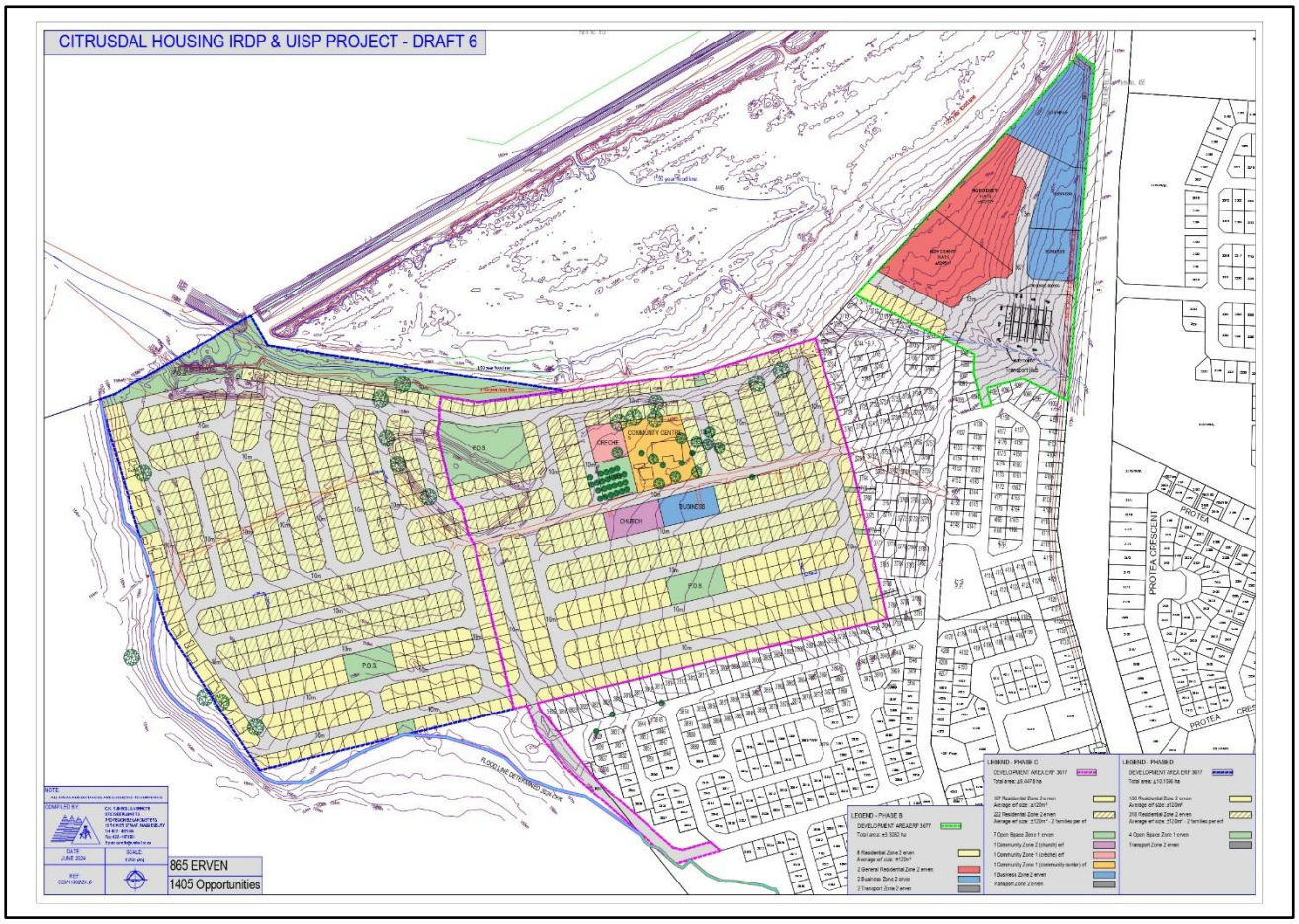

Figure 2: Spatial Development Plan.

3 Determination of the regional aquatic biodiversity context based on desktop sources

Enviro-EAP listed the following desktop sources when determining the regional aquatic biodiversity context for the site:

- 1:50 000 topographic mapping sourced from the Surveyor General's office.
- Aerial imagery sourced from Google Earth.
- Aerial imagery sourced from ESRI.
- Vegetation types and their conservation status was extracted from the South African National Vegetation Map (Mucina and Rutherford 2018).
- Information on plant and animal species recorded for the Quarter Degree Squares (QDS) was extracted from the SABIF/SIBIS database hosted by SANBI.
- The IUCN conservation status of the species in the list was also extracted from the database and is based on the Threatened Species Programme, Red List of South African Plants (2011).
- Threatened Ecosystem data was extracted from the National List of Threatened Ecosystems 2010.
- Freshwater and wetland information was extracted from the National Freshwater Ecosystem Priority Areas assessment, NFEPA (Nel et al. 2011) and National Wetlands Map.
- Important catchments and protected areas expansion areas were extracted from the National Protected Areas Expansion Strategy 2008 (NPAES).
- The CapeNature Spatial Biodiversity Plan 2017.

While the list is exhaustive certain databases have been updated and it may be the case that Enviro-EAP utilised outdated databases as follows:

- The South African National Vegetation Map (Mucina and Rutherford, 2018) has been updated and the current version is dated 2024. Note however that the applicable terrestrial vegetation type is still indicated as Leipold Sand Fynbos (most of the proposed site nearer the Olifants River) and Citrusdal Shale Renosterveld (on the higher-lying eastern part of the site), with no change in the ecosystem status (Endangered and Critically Endangered, respectively) in the current gazetted ecosystem threat status (Government Gazette No. 47526 of November 2022). As such this is of no material effect on the accuracy of the reporting.
- The currently applicable database for wetlands is the National Wetlands Map Vers. 5 (NWM5) (CSIR, 2018) and this supercedes the NFEPA wetlands map. The report did not include the NWM5 Map (see Figure 2) and only presented to the NFEPA wetlands map. This is of no material consequence as the two databases are aligned insofar as the location and extent of aquatic features in the Clanwilliam area are concerned.
- While no guidance is specifically given on the preferred database for rivers and drainage lines, the NGI Rivers database (available on Cape Farm Mapper) is regarded by EnviroSwift as a relatively accurate map that indicates the approximate position of major rivers, streams and drainage lines (both perennial and non-perennial). The NGI Rivers database identifies two non-perennial drainage lines within the proposed development footprint, one bisecting the north-eastern development area and the other running along the northern edge of the larger proposed development area. Only the eastern-most drainage line was reflected on the maps presented in the Enviro-EAP report so this is a deficiency of the desktop component of the assessment, presumably due to the drainage line not being reflected on the databases used by Enviro-EAP.
- While the CapeNature Spatial Biodiversity Plan 2017 is indicated in the list of information sources, the body of the report refers to the Western Cape Biodiversity Spatial Plan (WCBSP) as the key source for determining the biodiversity conservation importance of the site but the date of the WCBSP is not indicated. The most up-to-date database in this regard is the 2023 version (available on Cape Farm Mapper). The WCBSP (2023) map is presented as Figure 3. A comparison between the map presented in the Enviro-EAP report and the map presented as Figure 3 in this report reveals that despite the possibility of Enviro-EAP using an outdated version, the two maps are effectively similar and as such this is of no material implication.
- Most significantly, the outcome of the desktop study is that the two non-perennial drainage lines mapped to occur within the site and the wetlands associated with the Olifants River would be at risk of being impacted by the proposed development and therefore their existence and extent should be groundtruthed (see Section 4). EnviroSwift did not concern itself with the reservoir site as the site is not located near any mapped freshwater features and, given its very small development footprint, is unlikely to pose a risk to the Boontjies River and its associated wetlands which are located approximately 250m to the north-west of the reservoir site.

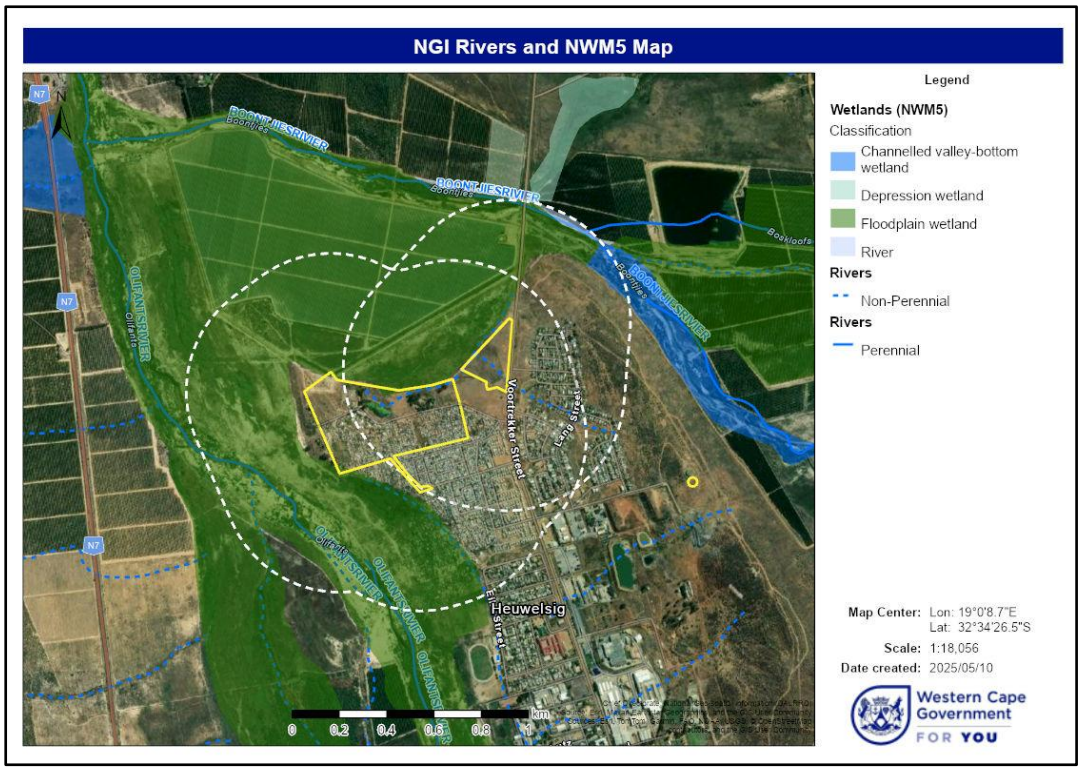

Figure 3: NGI Rivers (Cape Farm Mapper, 2025) and NWM5 Map (CSIR, 2018). The white stippled line indicates 500m from the site boundary.

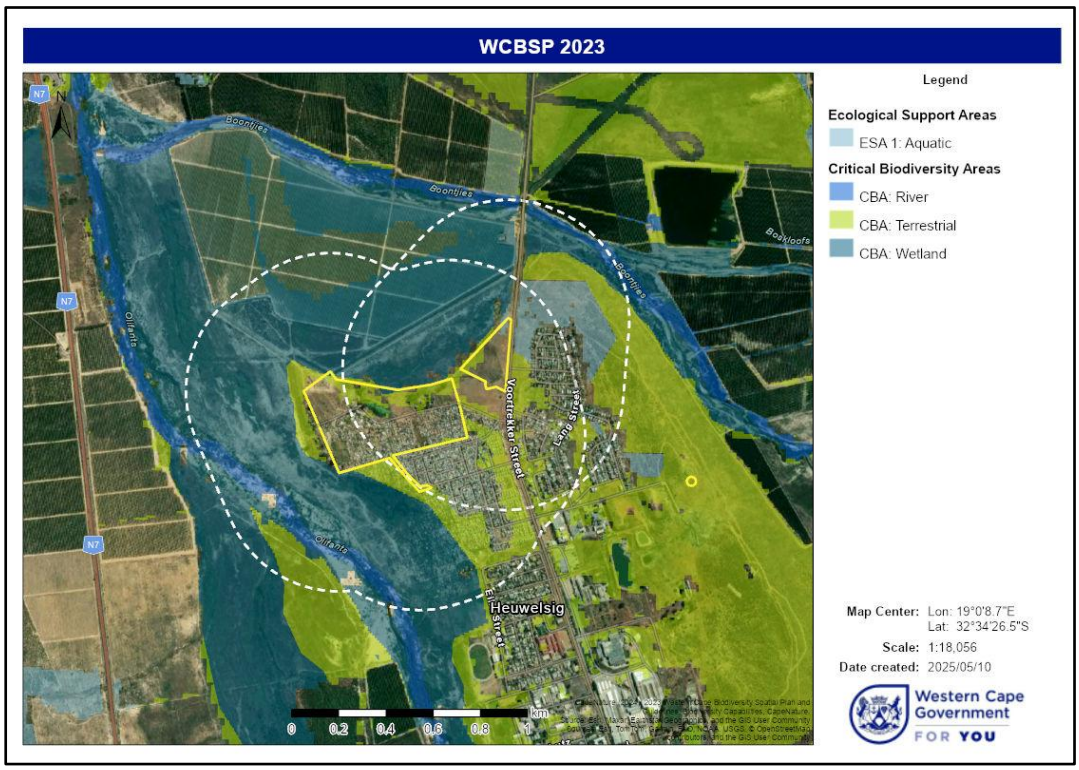

Figure 4: WCBSP map (2023). The white stippled line indicates 500m from the site boundary.

4 Groundtruthing and delineation of watercourses

Enviro-EAP (2025) presents a watercourse delineation map based on field work (see Figure 5). In describing the method of delineation, Enviro-EAP indicates that drainage lines and rivers were visually assessed and that wetlands were identified and delineated using the DWAF (2005) method (i.e. by considering the terrain unit indicator; soil form indicator; soil wetness indicator; and vegetation indicator). Arguably, for wetland delineation the most important method entails augering to determine the temporary/seasonal wetland boundary based on soil characteristics and best-practise dictates that auger samples should be presented in Aquatic Biodiversity Assessments as proof of the presence/absence of wetland habitat. Enviro-EAP did not undertake any augering in the area to the north of the proposed site due to personal safety reasons.

EnviroSwift visited the site on 26 September 2025 and focussed attention on the mapped features as areas of interest. Unfortunately, EnviroSwift was also unable to conduct any site-based delineation methods in the area to the north of the site because of personal safety issues and also because the area to the north was enclosed by a security fence and was off-limits. Given EnviroSwift raising this as a concern, Enviro-EAP returned to the site in November 2025 to undertake further site-based investigations in the area to the north of the proposed development. This resulted in confirmation that the southern edge of a wetland reaches the northern site boundary but does not encroach the proposed site. The northern site boundary is marked by a fence-line and a dirt road as indicated in Figure 6.

On the basis of the photograph supplied by Enviro-EAP (see Figure 6), observations made by EnviroSwift during site investigation and the desktop delineation presented in Figure 7, the following comments regarding the delineation of freshwater features as presented by Enviro-EAP (see Figure 5) apply:

- Enviro-EAP mentions that one of the mapped non-perennial drainage lines no-longer exists. EnviroSwift assumes that the non-perennial drainage line indicated in Figure 5 that transects the smaller eastern-most development site does in fact exist but it has simply been re-aligned and channelised in the past. If the assumption is correct then the statement that it no-longer exists is inaccurate as the drainage line still conveys flow from the upper catchment towards the historical tributary of the Olifants River that occurs to the north of the proposed development sites. The Enviro-EAP report therefore needs to be corrected in this regard.
- The November site visit conducted by Enviro-EAP indicates the existence of wetland conditions to the north of the site boundary (see Figure 6).
- Google Earth aerial imagery shows areas of likely elevated levels of soil saturation due to the presence of green-coloured vegetation in the area to the north of the proposed development (see Figure 7). This further suggests that a wetland exists in this area.

Enviro-EAP therefore needs to update the Wetland Delineation Map to indicate that wetlands occur immediately to the north of the proposed site. Enviro-EAP delineated the wetlands associated with the Olifants River to the west of the proposed development site based on site methods which is supported and as such the temporary/seasonal boundary of the Olifant's River's floodplain wetlands is considered accurate.

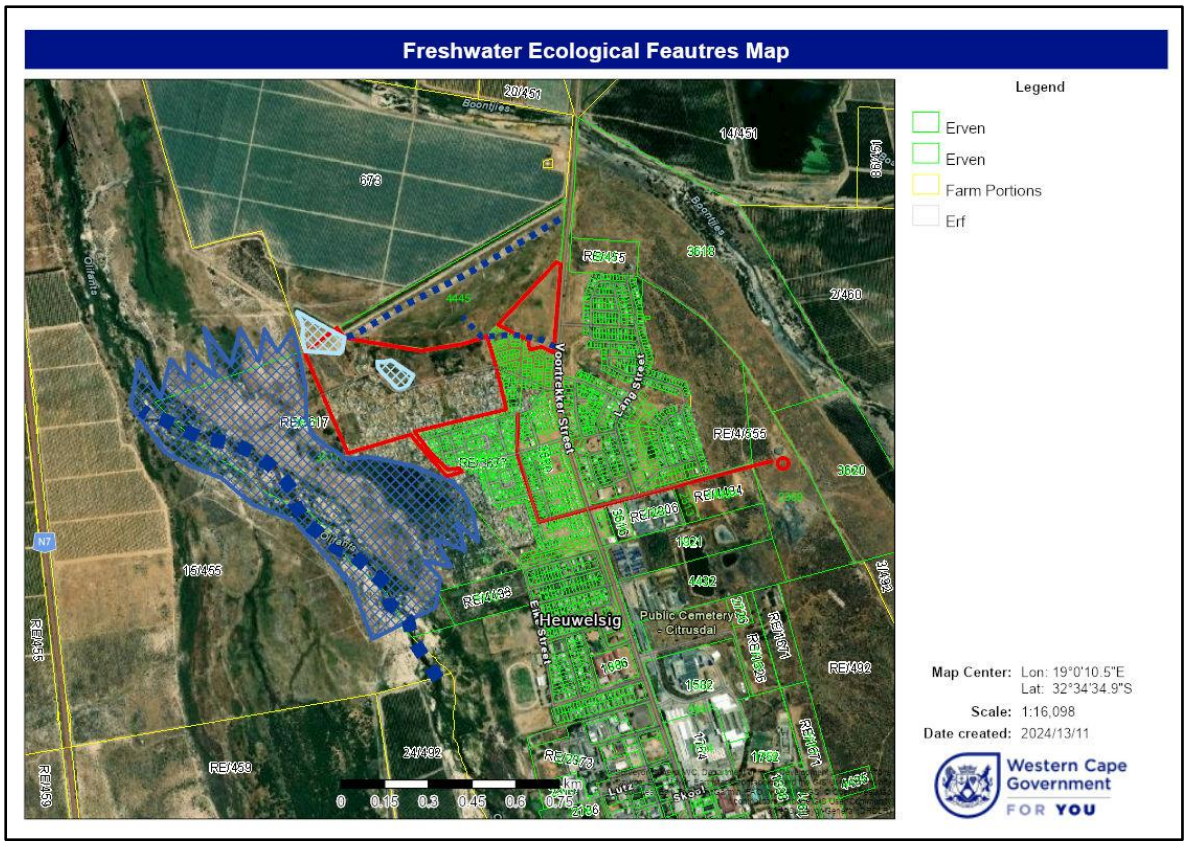

Figure 5: Watercourse Delineation Map as presented as Figure 4 in Enviro-EAP (2025). Note that no wetlands are indicated to the north of the two proposed sites.

Figure 6: Photograph of the fence-line and dirt road which marks the northern boundary of the proposed site. Wetland vegetation can be seen on the far side of the dirt road as indicated by the white arrow.

Figure 7: Location of likely wetland area indicated as a green polygon based on vegetation colouration.

Enviro-EAP mapped two dams, both within the larger development site. The northern-most dam appears to impound the mapped tributary of the Olifants River whereas the southern-most dam appears to have been created as a result of excavation (see Figure 8) and accordingly the feature cannot be classified as a "watercourse" and is not of aquatic biodiversity significance as indicated by Enviro-EAP. The northern-most dam would be regarded as an in-stream dam and therefore the feature is classified as a "watercourse" albeit transformed as a result of impoundment. The feature is at direct risk of being impacted and it should either be set aside or the dam could be decommissioned and the original alignment and extent of the tributary of the Olifants River restored. It is imperative that hydrological connection between the wetlands and drainage lines to the north and north-east of the site and the Olifants River be maintained or restored.

Given these findings it is EnviroSwift's opinion that the detailed ecological assessment and impact/risk assessments should focus on the following areas:

- The non-perennial drainage line that occurs within the development footprint of the smaller eastern development site;
- The floodplain wetlands associated with the Olifants River mapped to occur to the west and to the north of the larger development site.

This is further addressed in the next section.

Figure 8: Photograph of the eastern-most, smaller development site proposed for residential development. Note the terrestrial nature of the site.

Figure 9: Freshwater feature within the proposed development footprint containing *Juncus* sp., known to be associated with wetlands. This feature was identified by Enviro-EAP to comprise an artificial pond.

Figure 10: View from the proposed development site looking towards the downstream portion of the Olifants River. The existing building will be retained and incorporated into the proposed development.

Figure 11: View from the proposed development site looking towards the upstream portion of the Olifants River. This area containing livestock pens forms part of a buffer between the new residential area and the Olifants river floodplain wetlands.

A further aspect of the groundtruthing that was not evident in the Enviro-EAP report (2025) is a description of the aquatic habitat and in particular the vegetation community associated with the aquatic features at primary risk of being impacted *viz-a-viz* the non-perennial drainage line and the floodplain wetlands. In providing a description of the biota, Enviro-EAP provides photographs but no associated written description with an identification of the key hydrophytic plant species.

5 Detailed freshwater ecological assessment

Enviro-EAP utilised the following aquatic ecological assessment indices:

- PES: The Rapid Habitat Assessment Method (RHAM) which is a simplified approach to measure and estimate habitat conditions according to cross sections through broadly defined morphological units (Kleynhans & Louw, 2007); and
- EIS: The EIS method is based on the approach adopted by the Department of Water Affairs (DWA) as detailed in the document “Resource Directed Measures for Protection of Water Resources” (1999).

These indices were only applied to the non-perennial drainage line that occurs in the smaller development site to the east and the Olifants River to the west of the larger development site. However, no ecological assessment of the floodplain wetlands that are associated with the Olifants River were undertaken nor the wetlands that have subsequently confirmed to occur immediately north of the larger development site (see Section 4). All three aquatic biodiversity features are at direct risk of being impacted because, in the case of the wetlands, they extend right up to the western and northern boundary of the larger development site and, in the case of the non-perennial drainage line, it occurs within the smaller development site.

When undertaking the detailed ecological assessment of wetlands current best practise dictates that the following indices be utilised:

- PES: WET-Health Version 2 (Macfarlane *et al.*, 2020) is a tool designed to assess the health or integrity of a wetland. Wetland health is defined as a measure of the deviation of wetland structure and function from the wetland’s natural reference condition. This technique attempts to assess hydrological, geomorphological, water quality and vegetation health in four separate modules. The modules are then combined to determine the overall Present Ecological State (PES) of the wetland.
- EIS: The EIS method applied to wetlands is based on the assessment tool developed by Rountree *et. al,* (2014) and is used to determine the ecological importance and sensitivity of wetlands, incorporating the traditionally examined criteria used in EIS assessments of other water resources by the Department of Water Affairs and Sanitation (DWS) and thus enabling consistent assessment approaches across water resource types.

A third index, WET-Ecoservices Version 2 (Kotze et al., 2021) to assess the ecosystem goods and services delivered by wetlands can also be used in addition to the PES and EIS assessments and its application is invaluable in understanding the ecological functioning of the wetland. Such an assessment is identified in the Protocol for Aquatic Biodiversity Assessment as a key component (see Section 3.5 in Table 1).

The results of the application of the detailed ecological indices by Enviro-EAP to the non-perennial drainage line and the Olifants River is as follows:

- Non-perennial drainage line: PES F for both the instream and riparian components and EIS High; and
- Olifants River: PES A for both the instream and riparian components and EIS Very High.

While EnviroSwift has not applied ecological assessment indices (as the present study is an independent peer review of a report), EnviroSwift believes that the PES of the floodplain wetlands associated with the Olifants River would be in the order of a Category “C” due to impacts associated with informal settlement which Enviro-EAP acknowledges in the report as being significant and requiring corrective measures. Presenting a PES rating of Category “A” for the Olifants River is therefore meaningless in terms of the objectives of an Aquatic Biodiversity Assessment. While the non-perennial drainage line was also assessed and rated to have a PES of Category “F” as it has been critically modified as a result of channelisation, re-alignment and historic agricultural activities, it is likely that it still performs some catchment functionality given its connectivity with the now confirmed wetlands to the north of the site which are indicted as an Aquatic CBA. The PES therefore seems to be rated lower than expected. If this rating of PES is being used as motivation for the elimination of the drainage line then this presents a significant flaw in the reasoning of Enviro-EAP. The fact that the drainage line

discharges into a CBA wetland needs to be taken into consideration. Factors such as the functional aspects of wetlands within the context of the wider catchment should be considered and not the current condition of the wetland. If one takes consideration of the Aquatic CBA status assigned by the WCBSP (2023) to the wetlands to the north of the site and the Olifants River (see Figure 4), one would conclude that any habitat or function associated with any watercourse within either proposed development site should be maintained if not improved through rehabilitation.

The EIS assessment of the aquatic features undertaken by Enviro-EAP came out at High for the non-perennial drainage line and Very High for the Olifants River. EnviroSwift is of the opinion that if anything these ratings have over-inflated the ecological importance and sensitivity of the aquatic biodiversity features. Given their over-inflation, this has no implications regarding the overall outcome of the assessment. What is lacking in the assessment, relating to the EIS ratings, is the determination of the Recommended Ecological Category (REC) which is a Resource Quality Objective for the feature under assessment (identified as an aspect requiring assessment in the Protocol). The general rule is that for features that have been determined to have an EIS of High (or Very High), the Resource Quality Objective should be set at a minimum of Category “C” meaning that the feature should be rehabilitated to reach the REC if there is a reasonable opportunity to do so. A development application such as the affordable/low-cost housing scheme currently being proposed, would certainly present such an opportunity and therefore the report should have provided such an analysis and the recommendation for rehabilitation. It is likely that the removal of structures from within the floodplain wetland areas and the formalisation of potable water supply, sewerage and stormwater would have a beneficial effect and thereby increasing the PES. However, it is EnviroSwift’s opinion that the REC should be presented in the report with the recommendation that a SACNASP accredited freshwater ecologist undertake a post-development PES assessment to confirm whether the REC has been achieved after the development has been constructed.

6 Assessment of potential impacts on aquatic biodiversity

The standard methods for identifying and assessing potentially significant impacts during the life-cycle of the project have been implemented. However, Enviro-EAP has provided the assessment by means of impact rating tables only and has not provided a separate written description and assessment of the identified potentially significant impacts. Best practise dictates that the tables should be used primarily to summarise the findings of a more detailed written assessment. Also, the recommended mitigation measures are only presented in the impact rating tables. It would have made for better reading had all the recommended mitigation measures been summarised in the report.

Enviro-EAP identified the following two potentially significant impacts associated with the construction and operational phases of the proposed dam:

- Soil erosion and dust; and
- Loss of freshwater habitat.

Soil erosion and dust emissions generated during the construction phase are undoubtedly a potential impact that would affect aquatic biodiversity and its mitigation would be achieved through the implementation of an EMP, as indicated by Enviro-EAP. EnviroSwift is however of the opinion that the aquatic specialist should recommend specific measures to address erosion, and for that matter any other freshwater ecological impacts associated with the construction phase, that in turn need to be incorporated into an EMP. Such measures have not been identified. It is a further requirement that the recommended measures should be articulated in terms of their outcomes to allow some flexibility in the manner in which developers can achieve the intended outcome. The recommended mitigation measures have not been articulated in this manner.

Regarding the loss of freshwater habitat, Enviro-EAP indicates that “The aquatic biodiversity features on the property will not be impacted on as the development is outside the 1:100 year flood line areas and delineated wetlands”. While it is accepted that loss of aquatic habitat associated with the floodplain wetlands associated with the Olifants River to the west of the site will not occur, aquatic habitat associated with the non-perennial drainage line that transects the smaller development site would be lost. There is no description of the aquatic habitat associated with the drainage line therefore it cannot be confirmed if there will be habitat loss.

Regarding the possibility of other freshwater ecological impacts such as alteration of flow regime, water quality impairment, erosion and sedimentation and biota loss, occurring Enviro-EAP indicates that these will not occur because either the aquatic features at risk are severely degraded or because the features are off-site. This reasoning is flawed because, regardless of the state of degradation, further degradation is still possible,

particularly associated with the construction phase which, aside from generating dust and erosion, would likely cause at least the following potentially significant impacts:

- Alteration of flow regime: site preparation and clearing of vegetation and shacks would cause a reduced catchment roughness which would then exacerbate run-off and cause an increase in flow velocity and food peaks; and
- Water quality impairment: The use and placement of construction materials upslope and in close proximity to wetlands and drainage lines can lead to water quality impairment as cement is likely to be used as well as many chemicals such as paints and solvents. Also, given the scale of the project which is significant, the use of construction vehicles and machinery in close proximity to aquatic features can contribute to toxicant loading if any vehicles or machinery present unchecked leaks or if these are refuelled on-site without any containment.

These impacts are typically managed and mitigated through the implementation of an EMPr. It may well be the case that the EMPr is sufficiently detailed in this respect but EnviroSwift is firmly of the opinion that detailed management and mitigation measures need to be provided initially in the specialist report and then incorporated into the EMPr.

Further evidence of the lack of any sufficiently detailed recommendations pertaining to the management and mitigation of potentially significant freshwater ecological impacts are the following responses given by Enviro-EAP to the question of the nature, severity and mitigation of potentially significant impacts:

- "*High negative impacts have already occurred and can continue to occur if management and mitigation measures are not implemented*";
- The proposed development "*will not alter the hydrological functioning at a landscape level and across the site and will not lead to changes to flood regimes. The development is located outside the 1:100 year flood line. Stormwater from site will be controlled and release into the existing hydrological systems*".
- "*Waste management control is however very important to prevent water quality impacts*".

While the need for management and mitigation measures is recognised, the report does not indicate what these management and mitigation measures are. Regarding the statement that the hydrological/flood regime will not be altered because the development is outside the 1:100 year floodline and because stormwater will be controlled and released into the existing "hydrological systems" is also flawed reasoning. Stormwater, if not attenuated on-site to ensure that post-development flows do not exceed pre-development flows, would cause an alteration in the flow regime of the receiving aquatic features. Only if this is presented as a key mitigation in the report, and accordingly included as a condition of environmental authorisation, would the statement be supported. It is therefore a critical short-coming that impact management and mitigation measures have not been detailed in the report.

A key mitigation measure recommended by freshwater ecologists is the width of the ecological buffer. Ecological buffers, provided they remain vegetated, perform a number of key functions that protect the watercourse in question from *inter alia* stormwater-driven water quality impairment during the construction phase and edge effects of developments during their operational phase. However, EnviroSwift firmly believes that the incorporation of buffers in situations such as the one affecting the proposed Citrusdal housing scheme where informal settlements have encroached on wetlands and were overcrowding is severe, buffer areas that are set aside and vegetated will either be re-invaded by informal settlers or will be utilised by informal farmers to keep livestock which will remove all vegetation from within the buffer thereby rendering the buffer ineffective. EnviroSwift therefore supports the approach to not include buffers between the development edge and the site's watercourses (i.e. wetlands and drainage lines). This position has been accepted by CapeNature and the regional office of the Department of Water and Sanitation (DWS) at an on-site meeting (*pers.comm*. N. Hanekom).

7 Compliance with the gazetted Protocol for Aquatic Biodiversity Assessment

Given that the report comprises an Aquatic Biodiversity Assessment its compliance with the gazetted Protocol needs to be reviewed. Table 1 overpage presents the findings of the assessment of compliance.

Table 1: Compliance with the reporting requirements as per the Protocol for Aquatic Biodiversity Assessments

No.	Reporting Requirements as per the Protocol for Aquatic Biodiversity Specialist Assessments	Compliance of current report
1	The assessment must provide a baseline description of the site which includes, as a minimum, the following aspects:	
1.1	a description of the aquatic biodiversity and ecosystems on the site, including;	
	(a) aquatic ecosystem types; and	Compliant although the aquatic ecosystem to the north of the proposed development sites was possibly incorrectly classified as a drainage line. In the opinion of EnviroSwift it had the appearance of a wetland and was mapped on the NWM5 as a wetland (see Section 4).
	(b) presence of aquatic species, and composition of aquatic species communities, their habitat, distribution and movement patterns	Partially compliant as indigenous hydrophytic vegetation was not described or key species identified but photographs of the vegetation communities were provided. EnviroSwift observed several species of Cyperaceae, *Cynodon dactylon* (kweek), *Stenotaphrum secondatum* (buffalo grass), *Phragmites australis* (common reed) and *Zantedeschia aethiopica* (arum lily). Faunal communities have not been identified, described or assessed. Given the FEPA status of the river acknowledged by Enviro-EAP, a brief description of any Species of Conservation Concern (SCC), whether observed on-site or not, should have been gleaned from literature.
1.2	the threat status of the ecosystem and species as identified by the Screening Tool	Partially compliant due to the incorrect focus of the assessment on drainage lines and rivers whereas evidence suggests that wetlands were also at direct risk. Had the floodplain wetlands associated with the Olifants River and the valley bottom wetland to the north of the site been the primary focus of the assessment then the threat status of the applicable wetland vegetation type and the wetland hydrogeomorphic type would have been gleaned from NFEPA. Instead, Enviro-EAP only provided the threat status of the terrestrial ecosystem type.
1.3	an indication of the national and provincial priority status of the aquatic ecosystem, including a description of the criteria for the given status (i.e. if the site includes a wetland or a river freshwater ecosystem priority area or sub catchment, a strategic water source area, a priority estuary, whether or not they are free -flowing rivers, wetland clusters, a critical biodiversity or ecologically sensitivity area)	In addressing this aspect Enviro-EAP has referred to the NFEPA status of the aquatic ecosystems at risk of being impacted. However, reference should have been made to the WCBSP (2023), which indicates that the wetlands that lie at the northern and western edges of the proposed site comprise Aquatic CBAs (see Figure 3).
1.4	a description of the Ecological Importance and Sensitivity (EIS) of the aquatic ecosystem including:	Compliant although methodologically questionable given the fact that the floodplain wetlands associated with the Olifants River and the wetland to the north of the site should have been assessed (see Section 5).

No.	Reporting Requirements as per the Protocol for Aquatic Biodiversity Specialist Assessments	Compliance of current report
	(a) the description (spatially, if possible) of the ecosystem processes that operate in relation to the aquatic ecosystems on and immediately adjacent to the site (e.g. movement of surface and subsurface water, recharge, discharge, sediment transport, etc.); and	Partially compliant because no description was provided in the report although such an understanding would have informed the PES and Eis assessment.
	(b) the historic ecological condition (reference) as well as Present Ecological State (PES) of rivers (in- stream, riparian and floodplain habitat), wetlands and/or estuaries in terms of possible changes to the channel and flow regime (surface and groundwater).	Compliant although methodologically questionable given the incorrect focus on the Olifants River and not its floodplain wetlands which are mapped to occur immediately adjacent to the site boundary while the river channel is some away off.
2	The assessment must identify alternative development footprints within the preferred site which would be of a "low" sensitivity as identified by the screening tool and verified through the site sensitivity verification and which were not considered appropriate.	No alternative scheme is being assessed.
3	Related to impacts, a detailed assessment of the potential impacts of the proposed development on the following aspects must be undertaken to answer the following questions:	
3.1	Is the proposed development consistent with maintaining the priority aquatic ecosystem in its current state and according to the stated goal?	Given that informal settlement has expanded along the edge of the floodplain wetlands associated with the Olifants River and is currently causing ongoing degradation of the wetlands as a result of uncontrolled, contaminated stormwater discharges into the wetlands, open access for livestock grazing and deposits of solid waste, the formalisation of the settlement as is currently proposed would help to mitigate these impacts. As such the proposed development indirectly helps to maintain if not improve the current PES of the wetlands. This is acknowledged by Enviro-EAP so the response is considered compliant although no REC was set for the affected wetlands by Enviro-EAP (see Section 5).
3.2	Is the proposed development consistent with maintaining the resource quality objectives for the aquatic ecosystems present?	No resource quality objectives have been established for the aquatic ecosystem under assessment (see Section 5).
3.3	How will the proposed development impact on fixed and dynamic ecological processes that operate within or across the site? This must include:	
	(a) impacts on hydrological functioning at a landscape level and across the site which can arise from changes to flood regimes (e.g. suppression of floods, loss of flood attenuation capacity, unseasonal flooding or destruction of floodplain processes);	Enviro-EAP indicates that the proposed development will not impact on hydrological functioning at a landscape level but EnviroSwift differs in opinion in this regard (see Section 6).
	(b) will the proposed development change the sediment regime of the aquatic ecosystem and its sub -catchment (e.g. sand movement, meandering river mouth or estuary, flooding or sedimentation patterns);	Briefly assessed as a potential impact in the report by stating that “the proposed development will not result in changes to the sediment regime of the aquatic ecosystem and its sub-catchment”. EnviroSwift differs in opinion in this regard (see Section 6).
	(c) what will the extent of the modification in relation to the overall aquatic ecosystem be (e.g. at the source, upstream or downstream portion, in the temporary / seasonal / permanent zone of a wetland, in the riparian zone or within the channel of a watercourse, etc.); and	The report identifies that loss of aquatic habitat would occur but fails to discuss the implications of this loss, particularly in relation to the CBA wetland that the non-perennial drainage line discharges into (see Section 5).
	(d) to what extent will the risks associated with water uses and related activities change	Partially compliant as a risk Assessment has been undertaken based on the 2016 Risk Assessment Matrix (RAM) but this

No.	Reporting Requirements as per the Protocol for Aquatic Biodiversity Specialist Assessments	Compliance of current report
		RAM has been updated and the current 2023 RAM should have been used. Note that the finding of the Risk Assessment is "High". This seems to be in contradiction to the findings of the impact assessment which identifies the potential impact as being of "Low" significance. While it is accepted that risk and impact are fundamentally different criteria, the outcomes of the impact assessment and risk assessments should be more or less aligned.
3.4	How will the proposed development impact on the functioning of the aquatic feature? This must include:	
	(a) base flows (e.g. too little or too much water in terms of characteristics and requirements of the system);	Enviro-EAP indicated that base flows will not be affected. In the opinion of EnviroSwift, it is likely that there would be impacts on base flow as a result of persistent leaking pipes and taps and discharges of domestic wash water which are commonly associated with low-income housing developments.
	(b) quantity of water including change in the hydrological regime or hydroperiod of the aquatic ecosystem (e.g. seasonal to temporary or permanent; impact of over -abstraction or instream or off stream impoundment of a wetland or river);	While Enviro-EAP indicated that the proposed development would not alter the flow regime of the aquatic resource, EnviroSwift believes this not to be the case (see Section 6).
	(c) change in the hydrogeomorphic typing of the aquatic ecosystem (e.g. change from an unchannelled valley- bottom wetland to a channelled valley -bottom wetland); (d) quality of water (e.g. due to increased sediment load, contamination by chemical and/or organic effluent, and/or eutrophication);	Compliant. EnviroSwift agrees with the statement by Enviro-EAP that the proposed development would not lead to changes in the hydrogeomorphic typing of the aquatic ecosystem but does not mention that one hydrogeomorphic type, a non-perennial drainage line, would be eliminated. Regarding water quality, Enviro-EAP indicates that the proposed development would not affect the quality of the water and in fact will improve water quality provided the recommended management and mitigation measures are implemented as per the EMPr. While this may be the case, EnviroSwift is of the opinion that the proposed development may well impact on water quality during the construction phase and without recommending any mitigation measures in the report, there is no way of knowing whether the impact would be satisfactorily mitigated (see Section 6).
	(e) fragmentation (e.g. road or pipeline crossing a wetland) and loss of ecological connectivity (lateral and longitudinal); and	EnviroSwift agrees with Enviro-EAP that the proposed development would not cause wetland fragmentation.
	(f) the loss or degradation of all or part of any unique or important features associated with or within the aquatic ecosystem (e.g. waterfalls, springs, oxbow lakes, meandering or braided channels, peat soils, etc.);	N/A as no such unique or important features were identified on or near the site.
3.5	How will the proposed development impact on key ecosystems regulating and supporting services especially:	No assessment was conducted of the ecological services provided by the floodplain wetlands associated with the
	(a) flood attenuation;	

No.	**Reporting Requirements as per the Protocol for Aquatic Biodiversity Specialist Assessments**	**Compliance of current report**
	(b) streamflow regulation; (c) sediment trapping; (d) phosphate assimilation; (e) nitrate assimilation; (f) toxicant assimilation; (g) erosion control; and (h) carbon storage?	Olifants River or the wetland to the north of the larger development site (see Section 5). This is considered a deficiency as the wetlands are more at risk of being impacted than the Olifants River channel which is situated further from the proposed development sites. This would have resulted in the identification of ecological services provided by the affected wetlands which in turn would have resulted in the accurate determination of the PES of the wetlands which was not done as no wetlands were assessed in terms of PES.
3.6	How will the proposed development impact community composition (numbers and density of species) and integrity (condition, viability, predator - prey ratios, dispersal rates, etc.) of the faunal and vegetation communities inhabiting the site?	Unable to confirm whether impacts on aquatic biota would occur. While the wetlands at risk occur immediately adjacent to the site and therefore it is unlikely that any loss in habitat of these wetlands would occur with concomitant biota loss. However, there is a high likelihood that habitat disturbance would occur as a result of construction activity during the construction phase (this typically causes to mobile fauna moving away) and as a result of edge effects associated with the operational phase of low-income, high density residential areas near aquatic ecosystems, biota loss would occur.
No.	**Minimum information requirements for an Aquatic Biodiversity Specialist Assessment Report**	
1	contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae	Compliant
2	a signed statement of independence by the specialist	Complaint
3	a statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment	Compliant
4	the methodology used to undertake the site inspection and the specialist assessment, including equipment and modelling used, where relevant	Compliant
5	a description of the assumptions made, any uncertainties or gaps in knowledge or data	Compliant
6	the location of areas not suitable for development, which are to be avoided during construction and operation, where relevant	EnviroSwift is of the opinion that ecological buffers between the development edge and the various watercourses should not be recommended as these would simply be invaded by informal settlers or would be used for animal husbandry which would render the buffers ineffective. As such the only areas unsuitable for development comprise the watercourses as delineated.
7	additional environmental impacts expected from the proposed development	Compliant
8	any direct, indirect and cumulative impacts of the proposed development on site	Compliant
9	the degree to which impacts and risks can be mitigated, reversed and can cause loss of irreplaceable resources	Compliant although the identification of detailed mitigation measures and an explanation of their mitigatory effect is lacking in the report.

No.	**Reporting Requirements as per the Protocol for Aquatic Biodiversity Specialist Assessments**	**Compliance of current report**
10	a suitable construction and operational buffer for the aquatic ecosystem, using the accepted methodologies	EnviroSwift is of the opinion that ecological buffers between the development edge and the various watercourses should not be recommended as these would simply be invaded by informal settlers or would be used for animal husbandry which would render the buffers ineffective. This position was supported by CapeNature and DWS at a site meeting.
11	proposed impact management actions and impact management outcomes for inclusion in the Environmental Management Programme (EMPr)	Recommended mitigation measures are not sufficiently detailed in the report.
12	a motivation must be provided if there were development footprints identified as per requirement No. 2 above that were identified as having a "low" aquatic biodiversity sensitivity and that were not considered appropriate	N/A
13	a substantiated statement, based on the findings of the specialist assessment, regarding the acceptability or not of the proposed development and if the proposed development should receive approval or not	Partially compliant. The reasoned authorisation opinion ventured by Enviro-EAP is that "*the development of the site as per the proposed development will have a low negative impact on aquatic biodiversity due to the transformed nature of the site. High negative impacts have already occurred and can continue to occur if management and mitigation measures are not implemented"*. While this is largely accurate, a more detailed assessment would have resulted in a more detailed reasoned opinion as the opinion would have been drawn from a sufficiently detailed desktop assessment, groundtruthing and impact/risk assessment.
14	any conditions to which this statement is subjected	While the statement is made that this is conditional upon the implementation of management and mitigation measures these have not been listed or described in sufficient detail in the report.

8 Conclusion and Recommendations

The independent peer review of the Enviro-EAP (2025) Aquatic Biodiversity Assessment for the proposed housing development in Citrusdal has identified a number of short-comings in terms of alignment with best practice in the field of aquatic biodiversity assessment. The key shortcoming of the assessment is the failure to identify the presence and extent of the valley bottom wetland that lies immediately to the north of the proposed site. A key reason for this is the failure to undertake augering of the soils as this would have allowed for a confirmation of whether the wetland still exists and its current extent. Both Enviro-EAP and EnviroSwift were concerned of personal safety and this was the primary reason why augering was not undertaken, in addition to the fact that the wetland lies beyond a security fence prohibiting access to the wetland. Trial pits were however dug and analysed and, in combination with Google Earth imagery and a follow-up site visit by Enviro-EAP, resulting in confirmation that the wetland occurs immediately to the north of the larger development site. As such this wetland is at risk of being impacted and should be subject to a detailed ecological assessment utilising the applicable indices.

This short-coming also applies to the Olifants River because the floodplain wetlands that reach the western site boundary were not assessed in terms of PES and EIS as a wetland system but rather as a river. The assessment of the aquatic feature as a river and not a wetland is not altogether problematic due to the hydrogeomorphic type, *viz-a-viz* a floodplain wetland, which is partly driven by alluvial processes and partly by groundwater interaction (i.e. the feature comprises a channel which has the attributes of an alluvial system and floodplain wetlands which have the attributes of both wetland and alluvial systems (i.e. the key hydrological driver of riparian systems is also bank overtopping). As such the use of the assessment indices used by Enviro-EAP which apply to rivers and drainage lines would be of some applicability to floodplain wetlands and as such this is not considered a material flaw in the assessment.

When assessed in terms of compliance with the gazetted Protocol for Aquatic Biodiversity Assessment the report is found to have the following critical flaws:

- Failure to undertake soil augers within areas suspected as comprising wetland habitat. Had auger samples been taken within the various features, any evidence of alluvial processes versus wetland soil characteristics would have been identified and the feature correctly identified as either a wetland or a river/drainage line. In this regard it must be noted that the area, being an extensive informal settlement is associated with personal safety risks, made augering difficult due to personal safety risk. EnviroSwift has undertaken a desktop delineation of the valley bottom wetland mapped to occur to the north of the proposed development site and on this basis has confirmed that the wetland lies immediately north of the larger development site (see Figure 5).
- As a result of (incorrectly in the opinion of EnviroSwift) assessing the aquatic features at direct risk of being impacted as riverine systems driven primarily by alluvial processes, the detailed ecological assessment failed to correctly assess the PES of these features and no assessment of the ecological services and products that wetlands are typically associated with was undertaken. The implication is that Enviro-EAP would have had a limited understanding of the functional and habitat value of the aquatic ecosystems in order to undertake a comprehensive assessment of risk and impact significance.
- Failure to provide detailed impact management and mitigation measures (designation of No-Go areas, measures to adopted by the Contractor to avoid and minimise impacts associated with construction activities near wetlands) and the failure to articulate these in terms of the desired mitigation outcome; and
- Failure to present a sufficiently detailed reasoned authorisation opinion based on a thorough evaluation of the assessment criteria (both as part of the desktop assessment and site investigation) that comprises an Aquatic Biodiversity Assessment.

Regarding the latter, Enviro-EAP presented the opinion that the proposed development is appropriate as it will not affect the status of the on-site aquatic biodiversity features on the basis of the existing level of disturbance to the features. This reasoning is flawed as the overall aim of an impact assessment is to determine, based on the assessments made, whether the proposed development should be supported and under what conditions. While the impacts have been assessed in impact rating tables and mitigation measures recommended, a synthesis of the impact ratings insofar as how they inform an authorisation opinion is required, as is a summarised list of the recommended essential mitigation measures.

In conclusion, provided the following is undertaken and the impact management and mitigation measures are implemented then EnviroSwift supports the authorisation opinion that the proposed development should be supported from an aquatic biodiversity perspective:

- Update the Watercourse Delineation Map as follows:
    - Indicate that the extent of the wetlands associated with the Olifants River and to the north of the larger development site);
    - Indicate the larger dam as an aquatic biodiversity feature and either set it aside as a No-Go area or decommission the feature and restore the hydrological connectivity to the Olifants River;
- Indicate the delineated aquatic biodiversity features on the Spatial Development Plan;
- Design and implement a Stormwater Management Plan that is based in Sustainable Urban Drainage Systems (SUDS) for the polishing of stormwater and that ensures that post-development stormwater emanating from the developed areas does not exceed pre-development flows. Note that in this regard the fact that a non-perennial drainage line will be eliminated as a result of the development necessitates that the volume of flows entering the site from this drainage line's upper catchment are accommodated in determining the capacity of any stormwater attenuation facilities; and
- Provide a detailed list of impact mitigation measures to inform the compilation of the EMPr.

Prepared by:

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Nel, JL, Driver, A., Strydom W.F., Maherry, A., Petersen, C., Hill, L., Roux, D.J, Nienaber, S., Van Deventer, H., Swartz, E. & Smith-Adao, L.B. 2011a. Atlas of Freshwater Ecosystem Priority Areas in South Africa: Maps to support sustainable development of water resources. Water Research Commission Report No. TT 500/11, Water Research Commission, Pretoria, RSA.

Ollis, D.J., Snaddon, C.D., Job, N.M. and Mbona, N. 2013 Classification System for Wetlands and other Aquatic Ecosystems in South Africa. User Manual: Inland Systems. SANBI Biodiversity Series 22. South African National Biodiversity Institute, Pretoria.

WCBSP. 2023. Western Cape Biodiversity Spatial Plan. Department of Environmental Affairs and Development Planning. Cape Town.

APPENDIX A:
CV of the Specialist

Curriculum Vitae

of

NICHOLAS STEYTLER

Director – EnviroSwift Western Cape

CONTACT DETAILS	
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PERSONAL INFO	
Full Names	Nicholas Sean Steytler
Date of Birth	28 March 1970
Nationality	South African
Languages	English, Afrikaans, isiZulu (fair)
Identity Number	7003285202088

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

PUBLICATIONS

Steytler, NS and Samways, 1995. MJ. Biotope selection by adult male dragonflies (Odonata) at an artificial lake created for insect conservation in South Africa. Biological Conservation Volume 72 Issue 3, December 1995, Pages 381 – 386.

Samways, MJ and Steytler, NS. 1996. Dragonfly (Odonata) distribution patterns in urban and forest landscapes, and recommendations for riparian management. Biological Conservation Volume 78 Issue 3, December 1996, Pages 279 – 288.

MEMBERSHIP OF PROFESSIONAL ASSOCIATIONS

Registered Environmental Scientist (Pr Sci Nat 400029/02)

Member of IAIA SA

FIELDS OF EXPERTISE	**Years experience**
Integrated Environmental Management	25 years +
Natural Resource Management Planning	25 years +
Freshwater Ecological Specialist Studies	5 years +

EMPLOYMENT HISTORY

2019 – present: EnviroSwift Western Cape. Director / owner

2007 – present: KHULA Environmental Consultants. Director / owner

2005 – 2009: DJ Environmental Consultants. Associate Consultant.

2000 – 2005: SRK Consulting, Cape Town, Environmental Department. Senior Environmental Scientist.

1996 – 2000: Institute of Natural Resources, Pietermaritzburg. Associate Researcher: Natural Resources Management Programme.
WORK EXPERIENCE (note IEM experience not listed below)
Freshwater ecological specialist studies:
Freshwater ecological impact assessment of the development of housing opportunities on Portion 22 of the Farm Koopmans Kloof No. 221, Kraaifontein, City of Cape Town (2025)
Freshwater ecological impact assessment to support a S24G Rectification Application for the development of a residential dwelling on Farm 1620 Stellenbosch, Western Cape (2025)
Freshwater ecological risk assessment and preparation of a Rehabilitation Plan for the establishment of a Construction Site Camp in a wetland on Erf 65266 Wynberg, City of Cape Town (2025)
Freshwater ecological impact assessment for the proposed residential development of Erf 534 Bantry Bay, City of Cape Town (2025)
Freshwater ecological impact assessment for the proposed residential development of Erf 2534 Yzerfontein, Western Cape (2025)
Freshwater screening study for the proposed redevelopment of Erf 3129 Oranjezicht, City of Cape Town (2025)
Freshwater screening study for the proposed agricultural expansion at Rio Largo Olive Farm (Farms 757 and 758), Scherpenheuwel, Worcester, Western Cape (2025)
Freshwater screening study for the proposed residential development of Remainder Erf 474 St. Helena Bay, Western Cape (2025)
Freshwater screening study for the proposed residential development of Erf 919 Constantia, City of Cape Town (2025)
Freshwater screening study for the proposed redevelopment of Erf 2762 Camps Bay, City of Cape Town (2025)
Freshwater screening study for the proposed expansion of a school at Erf 4929 Lekkerwater Road, Sunnydale, City of Cape Town (2025)
Freshwater ecological impact assessment for the proposed residential development of Erf 3368 Higgovale, City of Cape Town (2025)
Freshwater screening study for the proposed residential development of Erf 17678 Capri, City of Cape Town (2024)
Freshwater screening study for the proposed Eersteriver Station Development, Erven 18-21, 25-29 and 1072, Eersteriver, City of Cape Town (2024)
Freshwater ecological impact assessment as part of a NEMA Section 24G Rectification process for the unlawful expansion of an egg-laying poultry farm on Portion 128 of the Farm Stocklands and Oatlands No. 878, Currys Post, KwaZulu-Natal (2024)
Freshwater ecological impact assessment as part of a NEMA Section 24G Rectification process for the unlawful clearance of indigenous vegetation on Portion 48 of the Farm 708, Franskraal, Overstrand Municipality (2024)
Freshwater ecological impact assessment for the proposed single residential development of Portions 125 & 126 of Farm 599 Bettys Bay, Overstrand Municipality (2024)
Freshwater ecological impact assessment for the proposed development 4 residential dwellings and associated infrastructure on Portion 86 of the Farm Bosjesmans Valley No. 218, Worcester (2024)
Freshwater screening study for the proposed development of Erf 1847 Hout Bay, City of Cape Town (2024)
Freshwater screening study as part of a NEMA Section 24G Rectification process for the proposed single residential development of Erf 5629 Bettys Bay, Overstrand Municipality (2024)
Freshwater ecological impact assessment for the proposed development of Erf 8384 Hout Bay, City of Cape Town (2024)
Freshwater screening study for the proposed development of Erf 4502 Hout Bay, City of Cape Town (2024)
Freshwater screening study for the proposed subdivision of Erf 4476 in Waterfall Lane, Hout Bay, City of Cape Town (2024)
Freshwater ecological impact assessment as part of a NEMA Section 24G Rectification process for the unlawful development of tourism accommodation facilities at the Portion 1 of Farm 866, Bot River, Theewaterskloof Municipality (2024)
Freshwater screening study for the proposed development of Erf 1472 Hout Bay, City of Cape Town (2024)
Freshwater screening study for the proposed expansion of the Montana Seed Processing Facility, Joostenbergvlakte, City of Cape Town (2024)
Freshwater screening study for the German School, Kloof Neck, City of Cape Town (2024)
Freshwater screening study for the proposed telecommunications mast on Portion 6 of the Farm Harkerville No 423, Knysna Road, Plettenberg Bay (2024)
Freshwater screening study for the proposed residential development of Erven 3233 and 3234 Hout Bay, City of Cape Town (2024)
Freshwater screening study for the proposed residential development of Portion 3 of Farm 1643, Franschhoek, Drakenstein Municipality (2024)
Freshwater screening study for the proposed new in-stream dam on the Remaining extent of Farm Sevilla No. 135, Clanwilliam (2024)
Freshwater screening study for the proposed Morning Star affordable housing scheme, Durbanville, City of Cape Town (2024)
Freshwater screening study for the proposed temporary staging facility for the proposed Wynberg IRT bus depot, City of Cape Town (2024)
Freshwater screening study for the proposed subdivision of Erf 4795 Noordhoek, City of Cape Town (2024)

Freshwater screening study for the proposed single residential development of Erf 88844 Clovelly, City of Cape Town (2023)
Wetland delineation at the propsoed Eagles Rest Private Nature Reserve, Cape Point (2024)
Freshwater ecological impact assessment for external services for Welmoed Urban Node, Stellenbosch (2024)
Freshwater screening study for proposed solar PV facilities on the Remainder of Portion 5 of the Farm Rietvallei No. 167, Montagu (2023)
Amendments to freshwater specialist reports submitted in support of the applications for environmental approval for the Calcutta Cemetery, Farm 29 Stellenbosch (2023)
Freshwater screening study for the proposed development of Erf 325 Atlantis, City of Cape Town (2023)
Freshwater screening study for the proposed development of solar PV facilities on Farms 788-6 and 792-RE, Philippi, City of Cape Town (2023)
Freshwater screening study for the Proposed development of solar PV facilities on Erven 551 and 553, Schaapkraal, City of Cape Town (2023)
Freshwater ecological impact assessment for the proposed expansion of the Rusty Gate Mountain Retreat, Greyton (2023)
Freshwater screening study of the proposed redevelopment of portions of Stikland Hospital, Erf 6300 Stikland, Bellville (2023)
Freshwater ecological specialist review & assessment for the proposed amendment to the scope of the authorised extension of Erica Drive, Belhar, City of Cape Town (2023)
Freshwater Screening study for the proposed telecommunications base station on Portion 20 of the Farm Matroosberge No. 57, De Doorns (2023)
Freshwater ecological impact assessment for the proposed subdivision of Erf 10546 Hout Bay (2023)
Freshwater screening study for the proposed expansion of Louwville township, Vredenburg (2023)
Freshwater ecological impact assessment for the residential development of Erf 178092 Newlands, City of Cape Town (2023)
Freshwater screening study for Erf 2068 Somerset West, City of Cape Town (2023)
Freshwater screening study for Portion 3 of Farm 1025 Wemmershoek, Stellenbosch Municipality (2023)
Freshwater ecological impact assessment for a new Wastewater Treatment Works for Matjiesfontein, Laingsburg Municipality (2023)
Freshwater ecological impact assessment for the development of tourism accommodation facilities at the Farm Hemelrand, Hemel en Aarde Valley, Overstrand Municipality (2023)
Freshwater screening study for residential development at Oude Bosch, Hermanus Lagoon, Overstrand Municipality (2022)
Freshwater ecological impact assessment for a proposed shopping centre at Erf 666 Hout Bay, City of Cape Town (2022)
Freshwater screening study for the proposed formalisation of the Valhalla Park informal settlement, Cape Flats, City of Cape Town (2022)
Freshwater screening study for a proposed telecommunications mast, Overhex, Breede Valley Winelands Municipality (2022)
Freshwater ecological impact assessment for the proposed expansion of the Leopard Rock residential estate, Onrusrivier, Overstrand Municipality (2022)
Freshwater screening study for the proposed low cost housing development at Wolwerivier, City of Cape Town (2022)
Freshwater ecological impact assessment for the proposed low cost housing development of Erf 148 Philadelphia, City of Cape Town (2022)
Freshwater screening study of Erf 10932 Constantia, City of Cape Town (2022)
Freshwater screening study of Erf 49 Faure, City of Cape Town (2021)
Freshwater screening study for a proposed concrete factory on the Remainder of the Farm Bultfontyn 128, near Middelburg in the Eastern Cape (2021)
Freshwater ecological impact assessment for the proposed expansion of vineyards at Mountain Rose Farm, Hemel en Aarde Valley, Overstrand Municipality (2022)
Freshwater ecological impact assessment for unlawful agricultural expansion at Plennegy Farm, Oudtshoorn, Western Cape (2021)
Freshwater screening study for the development of erven 41 and 59, Knole Park, City of Cape Town (2021)
Freshwater ecological impact assessment for proposed truck stop on Portion of Erf 10229, Beaufort West, Western Cape (2021)
Freshwater screening study for the proposed redevelopment of the Mowbray Golf Course, Pinelands, City of Cape Town (2021)
Provision of rehabilitation specifications for the unlawful excavation of a trench in a non-perennial drainage line at the Farm Vergelegen, Robertson, Western Cape (2021)
Freshwater ecological impact assessment for unlawful agricultural expansion at Samber Farms, Riversdale, Western Cape (2021)
Freshwater ecological impact assessment for proposed expansion of an in-stream irrigation dam at Farm Hartebeest Kuil, George, Western Cape (2021)
Freshwater screening study for the proposed residential development of Erf 208 Bishopscourt, City of Cape Town (2021)
Freshwater screening study for the proposed agricultural processing facility, Maqinqi communal area, Port St. Johns Municipality, Eastern Cape (2021)

Freshwater ecological impact assessment for the proposed agricultural expansion at the Farm Vergelegen, Robertson, Western Cape (2021)
Freshwater ecological impact assessment for a proposed residential development in Plattekloof, City of Cape Town (2021)
Freshwater ecological screening study for the proposed sewerage pipeline for Schulz Vlei development, Philippi, City of Cape Town (2021)
Freshwater ecological impact assessment for the proposed development of an agro-industrial facility, Wemmershoek, Western Cape (2021)
Freshwater ecological screening study for a proposed filling station in Eerste River, City of Cape Town (2020)
Freshwater ecological impact assessment for an unlawfully constructed tourist accommodation facility, Tulbagh, Western Cape (2020)
Freshwater ecological screening study and risk assessment for additions and alterations to an existing residential dwelling, Breede River, Western Cape (2020)
Freshwater ecological screening study for a proposed truck depot and filling station, Paarl, Western Cape (2020)
Freshwater ecological screening study for a proposed phosphate mine, Saldanha, Western Cape (2020)
Freshwater ecological screening study for a single residential development at Oppi Berg, Ceres, Western Cape (2020)
Freshwater ecological screening study for a proposed industrial area expansion, Bredasdorp, Overberg, Western Cape (2020)
Freshwater ecological impact assessment for proposed Canola plant at Erf 15711 Wellington, Drakenstein Municipality (2020)
Freshwater ecological impact assessment for single residential development of Ptn 13 of Farm 563 Kleinmond (2020)
Freshwater ecological impact assessment for new IRT bus depot, Wynberg, City of Cape Town (2019)
Freshwater ecological screening study for Blackheath Printers, Blackheath, City of Cape Town (2019)
Freshwater ecological screening study for La Motte residential extension, St. Helena Bay (2019)
Freshwater ecological impact assessment for Vloedbos Resort, Overberg (2019)
Freshwater ecological screening study for Erf 3660 Hout Bay, City of Cape Town (2019)
Freshwater ecological screening study for Erf 2145 Constantia, City of Cape Town (2019)
Freshwater ecological impact assessment for low-cost housing development in Khayelitsha (2019)
Freshwater ecological impact assessment for Kommetjie Vineyards Estate, City of Cape Town (2018)
Freshwater ecological screening study for Remainder Erf 177887 Ottery, City of Cape Town (2018)

Environmental Planning and Natural Resources Management:
Preparation of an Invasive Alien Plant Clearing Plan for Erf 6289 Hout Bay, City of Cape Town (2021)
Preparation of an Invasive Alien Plant Clearing Plan for Shamballah Tea House, Cape Point, City of Cape Town (2019)
Preparation of an Invasive Alien Plant Clearing Plan for Imhoff Farm, Southern Peninsula, City of Cape Town (2018)
Preparation of a River Maintenance Management Plan for the Jakkals River, Elgin, Theewaterskloof Municipality (2018)
Preparation of a River Maintenance Management Plan for wetlands associated with the Bottelary River, Hazendal Wine Farm, Stellenbosch (2017)
Preparation of an Alien Plant Clearing Plan for the Farm Wildschutsbrand, Cape Point (2017).
Preparation of an Alien Plant Clearing Plan for Lalapanzi Farm, Cape Point (2017).
Preparation of a River Maintenance Management Plan for the Dawidskraal River, Bettys Bay, Overstrand (2016)
Preparation of a Site Rehabilitation and Management Plan for wetlands at Kraaifontein Shooting club, Northern Cape Metro (2015)
Preparation of a Wetland Maintenance and Management Plan for De Goede Hoop Estate, Noordhoek, South Peninsula (2014)
Application for Off-Road Vehicle Regulations licence for boat launching facility, Oceana Power Boat Club slipway, V&A Waterfront (2014)
Preparation of a Maintenance Management Plan for the Silvermine River, Clovelly Country Club, South Peninsula (2014)
Preparation of a Maintenance Management Plan for the rehabilitation and maintenance of an unnamed stream and associated infrastructure, Klein Constantia Winefarm, Cape Metropole (2014)
Environmental Screening for the proposed redevelopment of the Tygerberg Hospital, Northern Cape Metropole (2014)
Establishment of a Permanent Coastal Development Setback Line for the V&A Waterfront, City of Cape Town (2014)
Preparation of a Maintenance Management Plan for the ongoing maintenance of the access road to the West Coast Rock Lobster holding facility, Witsand Island, Scarborough, City of Cape Town (2013)
Preparation of a Maintenance Management Plan for the Kromboom River, Erf 117459 Lansdowne, Cape Metropole (2013)
Preparation of a Rehabilitation Plan for the remediation of unlawful infilling of a wetland at Lalapanzi Farm, Cape Point (2012)
Preparation of a Rehabilitation Plan for the remediation of unlawful construction of a parking area at Erf 935 Noordhoek Farm Village, City of Cape Town (2012)
Preparation of a rehabilitation plan for the closure of the Retreat Filling Station, City of Cape Town (2012)
Khayeltisha Wetlands Park – Park Delineation and Management Review, City of Cape Town (2010)
Preparation of the Coast & Estuaries Theme for the 1st review of Eastern Cape State of the Environment Report (2009)
Preparation of 2010 FIFA World Cup Greening Business Plan for Polokwane, Limpopo Province (2008)

Preparation of 2010 FIFA World Cup Greening Business Plan for Rustenburg, North West Province (2008)
Revision of the Table Mountain National Park Conservation Development Framework, City of Cape Town (2006)
Comparative Evaluation of alternative venues for the 2010 FIFA World Cup Stadium, City of Cape Town (2006)
Preparation of a Strategic Management Framework for the Kogelberg Biosphere Reserve, Overberg (2005 – 2006)
Preparation of concept document and proposal to undertake a SADC regional market survey of the indigenous fibre trade, SADC Region (2006)
Strategic Planning of Cemeteries in the Drakenstein Municipality (2006)
Environmental assessment of overnight sites for the Hoerikwaggo Trails, Table Mountain National Park, Western Cape (2005)
Preparation of the Year 1 State of the Environment Report for the Western Cape (2005)
Preparation of a Water Resources Management Strategy for Mozambique (2004)
Due Diligence Study for the proposed Mozaq Limitada Prawn Farm, Mozambique (2003)
Preparation of the Culemborg Development Framework, City of Cape Town (2001)
Restoration Planning of the Bokramspruit River, Kommetjie, City of Cape Town (2001)
Management and Maintenance Planning of the Dwars River, Ceres (2001)
Preparation of the Garden Route Spatial Development Framework, Southern Cape (2001)
Strategic Planning of the information needs of a Medicinal Plants Network in the SADC region (1999)
Research to determine potential commercial products from the Wild - Medicinal Plants component, South Africa (1999)
Economic Evaluation of the Cultivation of Nine Species of Medicinal Plants Indigenous to South Africa (1998)
Faunal specialist assessment for the proposed N2 by-pass, Natal Drakensberg, KwaZulu-Natal (1997).
Freshwater specialist assessment for the proposed construction of a bridge over the Msunduzi River, Voortrekker Highschool, Pietermaritzburg (1997)
Strategic Planning of a proposed community based indigenous forest management project, Eastern Cape (1998)
Preparation of a decision support manual for community-based urban riparian systems management (RIPARI-MAN) (1998)
Preparation of an Integrated Catchment Management Plan for the Msunduzi River Catchment, Pietermaritzburg (1997)
Development of Flood Response Strategies for the Msunduzi River Catchment, Pietermaritzburg (1997)
Evaluating community-based wildlife management projects in the SADC region as part of the international project by IIED / IUCN called “Evaluating Eden” (1996)