Freshwater Screening of Erf 1486, Vermont Western Cape Province

Prepared for:

Lornay Environmental Consulting

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Date: August 2018

DISCLAIMER

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SPECIALIST DETAILS AND EXPERIENCE

Joshua Gericke (Pr.Sci.Nat. 117997)

Joshua holds a Bachelor of Science Honours degree in Environmental Management from the University of Cape Town and graduated in 2008. He has completed several short courses in freshwater, estuarine and coastal resource management and in identification of freshwater and marine fish, birds and plants. He has more than 8 years of experience in management of freshwater, estuarine and coastal systems with the City of Cape Town. He has also consulted periodically on topics related to freshwater, estuarine and coastal ecology and management since 2010, and in 2017 began consulting full time.

Luke Moore

Luke is a practitioner with special interests in management of coastal and estuarine systems, strategic environmental planning and applied geographic information systems and analysis. Luke has nine years of consulting experience in the private and NGO sectors, delivering project and research outcomes to national and subnational spheres of government, private clients and international donors in over ten countries in the Global South and further afield. Luke is a member of the International Association of Impact Assessment, the Society of South African Geographers and the Geo Information Society of South Africa.

Natasha van de Haar (Pr.Sci.Nat. 400229)

Natasha is a registered Professional Natural Scientist (Pr.Sci.Nat) with the South African Council for Natural Scientific Professions (SACNASP). She also holds a Masters Degree in Science (M.Sc.) in the field of Botany. Over the course of Natasha's career, she completed a number of floral identification short courses and also obtained a certificate of competence for wetland assessments from Rhodes University. She is also a member of the South African Wetland Society, Botanical Society of SA as well as the Western Cape Wetlands Forum.

Her career kicked off as a field ecologist in 2009, focusing on floral biodiversity and ecological functioning, with special mention of wetland ecology and functioning within South Africa (all provinces). She further worked as a specialist project member in Mauritius, Lesotho and Ghana. During the course of her career she obtained extensive experience in conducting terrestrial as well as wetland related surveys in the mining, residential and infrastructure development industries as well as development of several alternative energy facilities. Natasha also gained experience in Biodiversity Offset Initiatives as well as RDL/protected plant permit applications. Presently her main focus is wetland assessments including delineation as well as present ecological state and function assessments.

SPECIALIST DECLARATION

I, Joshua Gericke, as the appointed independent specialist, in terms of the 2014 EIA Regulations, hereby declare that:

I act as the independent specialist in this application;

I perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;

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

I declare that there are no circumstances that may compromise my objectivity in performing such work;

I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;

I will comply with the Act, Regulations and all other applicable legislation;

I have no, and will not engage in, conflicting interests in the undertaking of the

activity; I have no vested interest in the proposed activity proceeding;

I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;

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

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

All the particulars furnished by me in this specialist input/study are true and correct; and

I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the specialist: 

Name of Specialist: Joshua Gericke

Date: 20.08.2018

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1 Introduction

The owner of Erf 1486, Vermont (refer to Figure 1 for location) proposes subdivision of the property to create several erven for single residential use and one erf in the south for group housing, in accordance with Figure 4. The site development plan is not final however and the proponent is open to amendments to accommodate environmental constraints. Wetland conditions are known to exist within the erf and were previously delineated during a 2006 study by Job and Ratcliff of the Freshwater Consulting Group, commissioned by the Overstrand Municipality. Wetland boundaries do vary however with time and the 2006 delineation is outdated particularly in light of the recent housing development to the south. EnviroSwift Western Cape was therefore appointed to conduct a freshwater screening assessment of the property to inform feasibility, layout of any proposed construction.

The study area for this screening assessment is the extent of Erf 1486, located within Overstrand Local Municipality. The study area is bordered to the north by the R43 road reserve, to the west by the Hoek van der Berg Private Nature Reserve, to the south by a small residential housing estate and to the east by Lynx Road (refer to Figure 2). The study area contains a gravel access road which enters the site from Lynx Road and terminates at the derelict buildings in the northwest corner of the study area (refer to Figure 2 and Figure 3).

The wetland within the erf is part of a 1.4km long wetland system that originates within the study area and ends at the Vermont Pan to the southeast. A depression has been excavated towards the centre of the study area, with an overflow pipe that crosses beneath Lynx Road and flows into the wetland on the far side thereby creating a hydrological link between the wetlands within the study site and the greater wetland to the southeast (refer to Figure 2 and Figure 3). An additional stormwater outlet is found in the southeast corner of the study area, which discharges runoff from the neighbouring housing development into the wetland (refer to Figure 2). The remainder of the 1.5 ha study area is extensively disturbed and characterised by a mixture of alien and indigenous vegetation.

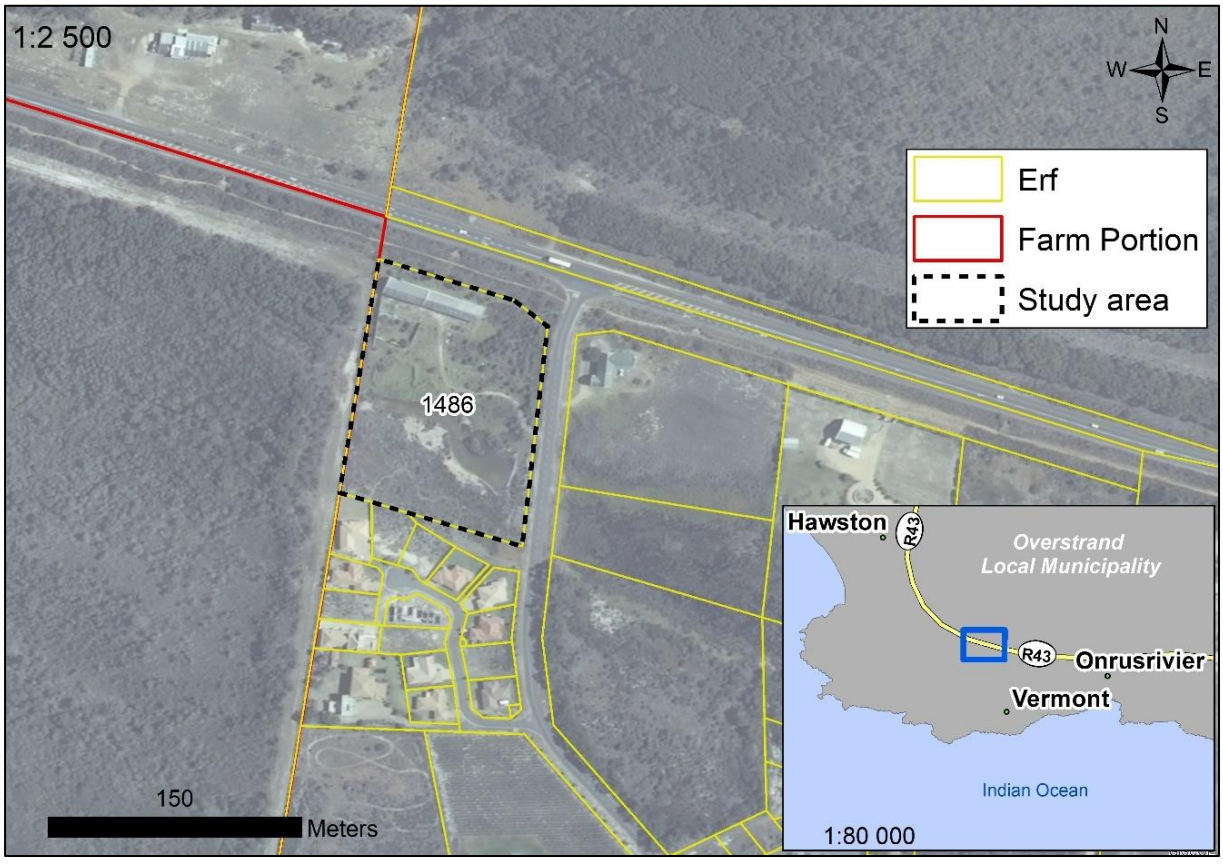

Figure 1: Location of the study area on Erf 1486, Vermont.

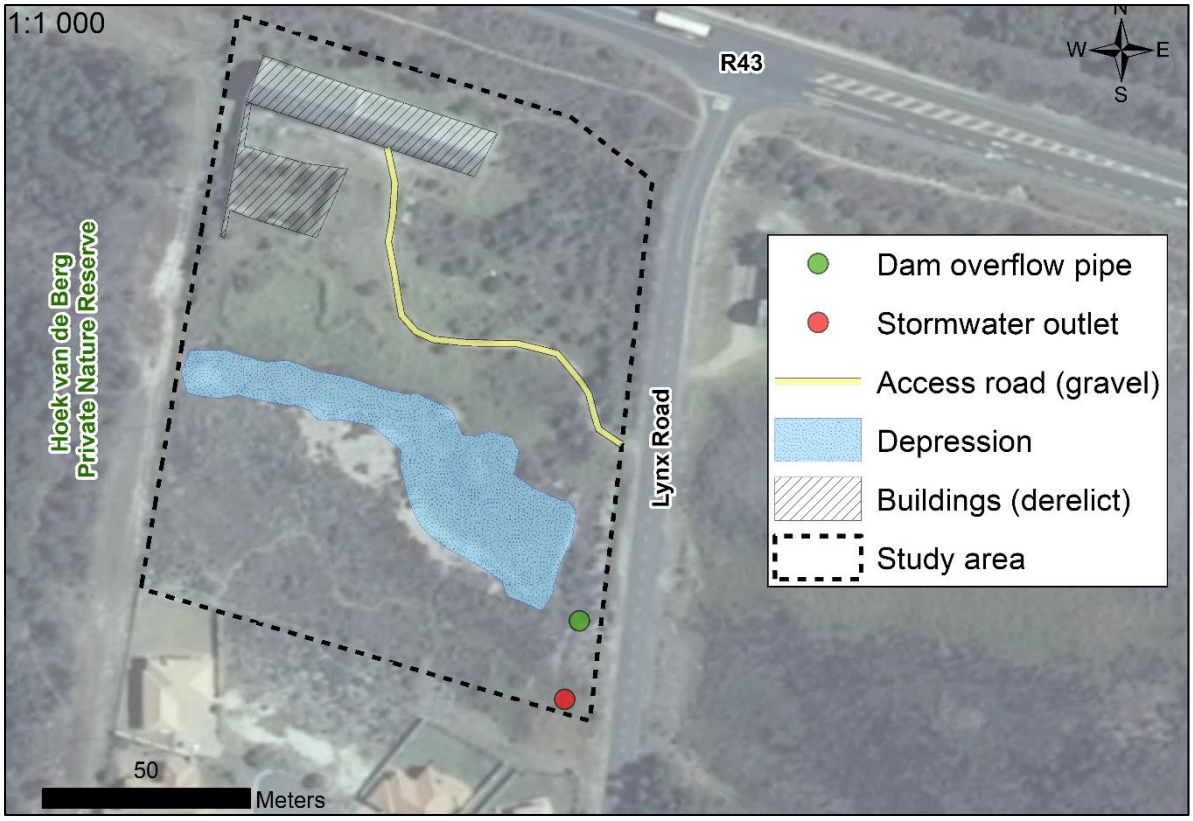

Figure 2: Location of infrastructure and landmarks within and adjacent to the study area.

Figure 3: North-facing photograph depicting the depression in the foreground and derelict buildings in the background of the study area.

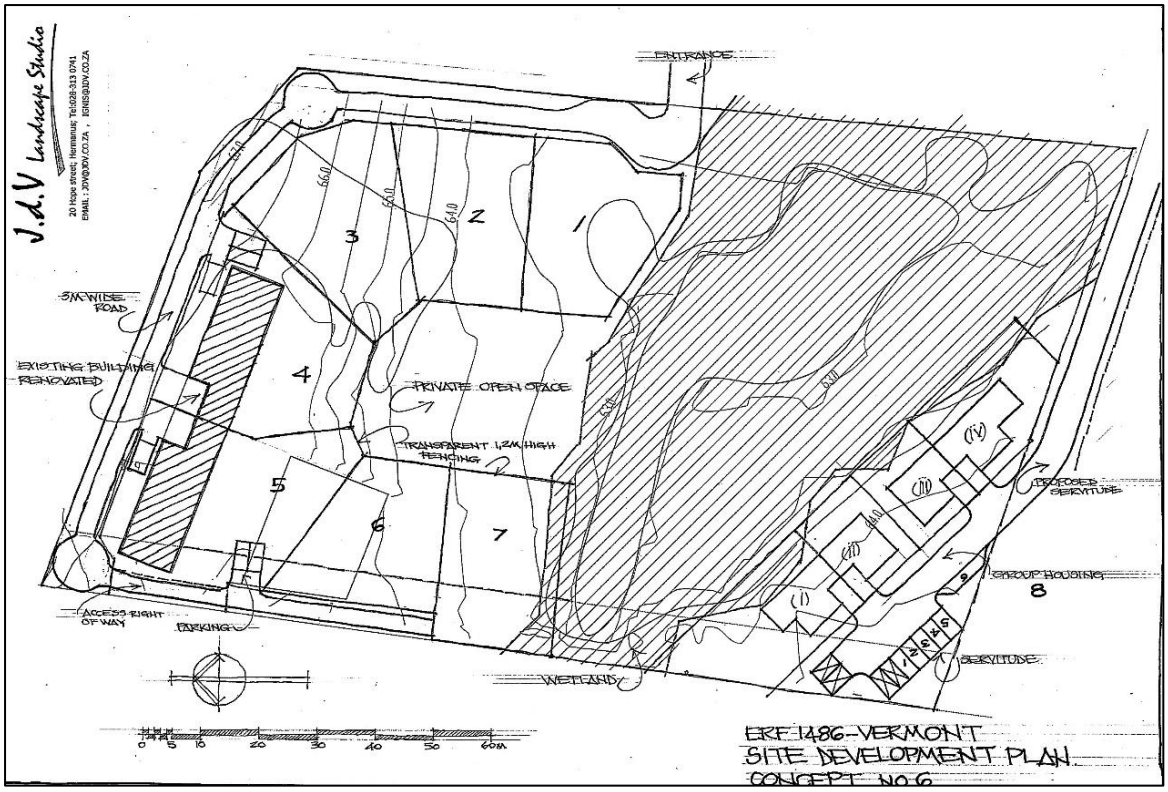

Figure 4: Preliminary site layout plan for the study area.

2 Limitations

The following limitations apply to the freshwater screening:

- Only natural watercourses within the study area were identified and delineated. Consideration has however been given to the remainder of the wetland system downstream.
- Freshwater features have been delineated using a Garmin Etrex 20 with an expected accuracy of within 3 metres. It is however the opinion of the specialist that this limitation is of no material significance and that the freshwater-related constraints have been adequately identified.
- A single site assessment was conducted on the 17th of August 2018 and comment on seasonality is therefore limited. The site assessment was however conducted during ideal conditions and hydrology could be observed directly, so no follow-up visit is required.
- This study is limited to the upper 500mm of soil in accordance with the Updated Manual for Identification and Delineation of Wetland and Riparian Areas (Department of Water Affairs and Forestry - DWAF, 2008) and the Application of the DWAF (2008) Method to Wetland Soils of Western Cape (Job, 2009).
- This study clarifies freshwater constraints only. Other constraints may also apply, but they are outside of the scope of this appointment.

3 Background Information

3.1 Ecological Setting

The study area is situated in the Southern Coastal belt ecoregion, the main features of which are summarised in Table 1. Local climatic, topographic and soil conditions for the study area are shown by Table 2, which was adapted from the Cape Farm Mapper website (https://gis.elsenburg.com/apps/cfm/). The study area is furthermore within the Breede Water Management Area (WMA), the Overberg West Sub-WMA and the G40G quaternary catchment. The applicable terrestrial vegetation type is Hangklip Sand Fynbos which is listed as Endangered according to the National Vegetation Database (Mucina & Rutherford, 2006, refer to

Figure 5). The National Freshwater Ecological Priority Areas (NFEPA, 2011) project's applicable Wetland Vegetation type is Southwest Sand Fynbos (Figure 6), within which Channelled Valley-bottom wetland types are listed as Critically Endangered.

Table 1: Overview of the Southern Coastal Belt Ecoregion (adapted from DWA, 2005).

Ecoregion Attributes	Southern Coastal Belt
Geology	Limestone, sandstone, conglomerate, quartzitic sandstone, minor shale, unconsolidated dune sand
Vegetation	South and South West Coast Renosterveld; Central Mountain Renosterveld; Limestone fynbos; Mountain Fynbos; Laterite Fynbos (limited); Dune Thicket; Patches of Afromontane Forest
Landscape	Closed hills, mountains with moderate to high relief, occasional plains
Mean altitude	0-700; 700-1500 (limited)
Rainfall seasonality	Winter to all year

Table 2: Local climate, topography and soil conditions (adapted from Cape Farm Mapper, 2015)

Parameters	Local Conditions
Mean annual precipitation (mm)	587 mm
Mean annual runoff (mm/annum)	80 mm
Mean annual temperature (°C)	16.1°C
Elevation (m above mean sea level)	30-35 m
Slope classification (%)	0-10%
Soil characteristics	Greyish, sandy, excessively drained soils
Soil depth (mm)	>= 750 mm
Soil clay content (%)	< 15%

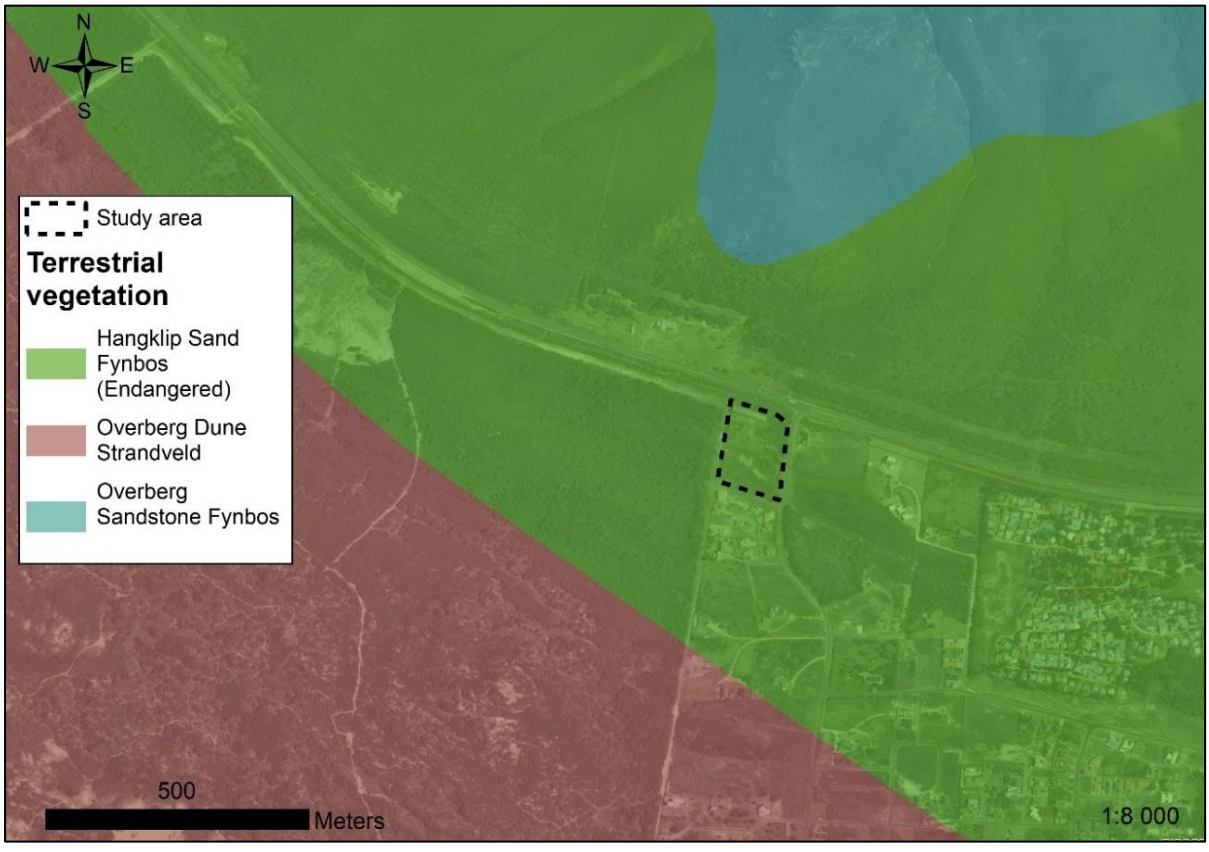

Figure 5: Terrestrial vegetation types and conservation status for the study area (Mucina & Rutherford, 2006).

Figure 6: Wetland vegetation types and their conservation status for the study area (NFEPA, 2011).

3.2 Watercourses Within 500m

The National Water Act (NWA) defines a regulated area of 500m around wetlands, within which risks to these wetlands must be considered. Additionally, the NWA requires that risks to rivers, streams and drainage lines are also considered within a regulated area defined by the 1:100- year floodline. Floodlines are not available in this case, so all rivers, streams, drainage lines and wetlands, within 500m of the study area, according to the available desktop resources, are presented below.

Within the 500m regulated area, the NFEPA wetland layer indicates the presence of a large unnatural channelled valley-bottom wetland system extending from the study area in a south-easterly direction and ultimately augmenting the Vermont Salt Pan (refer to Figure 7). It was however the opinion of both Job and Ratcliff (2006) and EnviroSwift (2018) that the wetland is a natural unchanneled valley-bottom wetland.

In addition, the National Geospatial Information Service (NGI) topo-cadastral map indicates two non-perennial drainage lines within 500m of the study area which are likely associated with the identified wetland system, refer also to Figure 7. In addition, the Western Cape Biodiversity Spatial Plan (WCBSP) identifies a range of aquatic and terrestrial Critical Biodiversity Areas[1] (CBAs) and Ecological Support Areas[2] (ESAs) within the 500m regulated area (refer to Figure 8). Within the study area itself, an aquatic ESA 2 has been identified associated with the channelled valley-bottom wetland indicated by the NFEPA dataset (refer to Figure 7).

[1] Critical Biodiversity Areas are areas that must be conserved in natural/near natural condition to meet biodiversity targets for ecosystems, species and ecological processes, as identified in a systematic biodiversity plan. CBA1s are in natural or near-natural condition, so no rehabilitation is required. CBA2s are in an impacted state and require rehabilitation.

[2] An Ecological Support Area is an area that must retain its ecological processes in order to meet biodiversity targets for ecological processes that have not been met in CBAs or protected areas; meet biodiversity targets for representation of ecosystem types or species of special concern when it is not possible to meet them in CBAs; support ecological functioning of a protected area or CBA (e.g. protected area buffers); or a combination of these. ESA1s are in a near natural state, while an ESA2 requires rehabilitation.

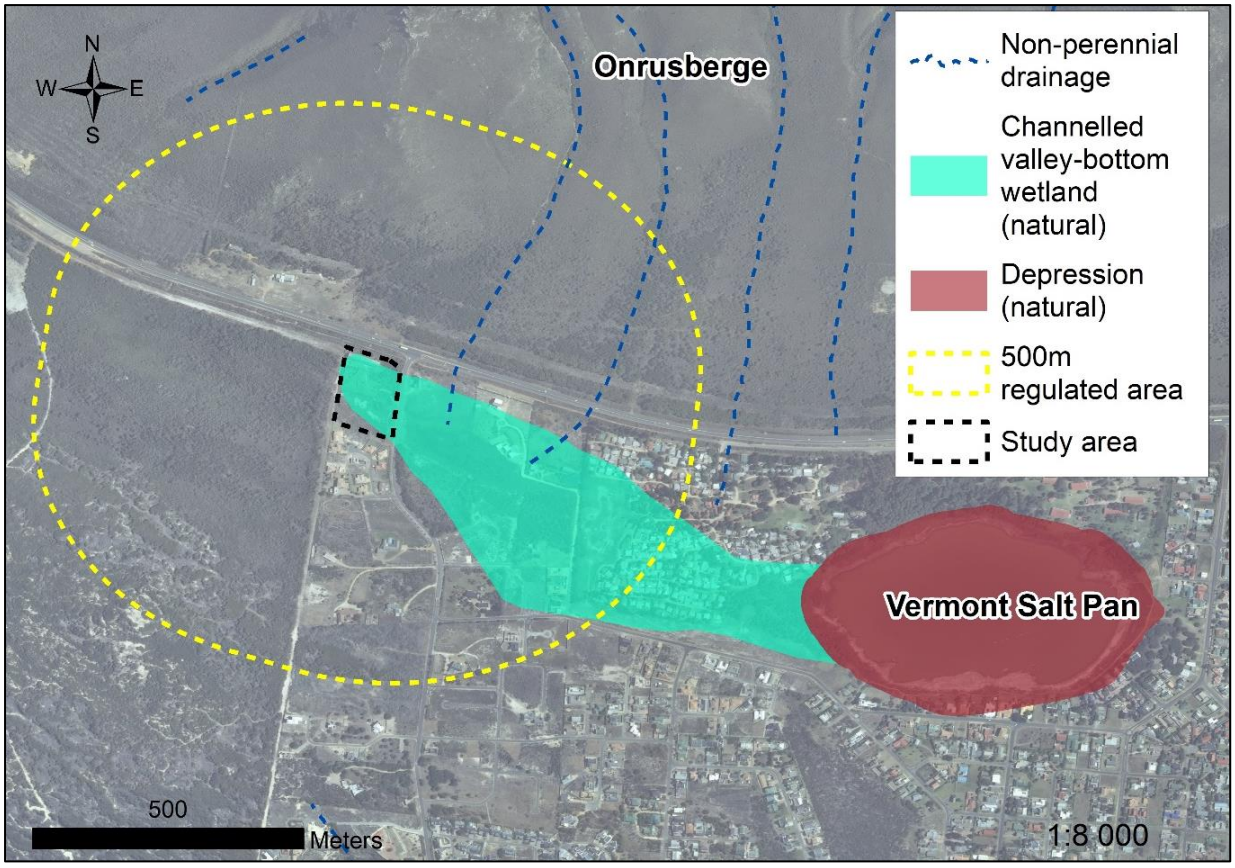

Figure 7: Watercourses within the 500m regulated area (NFEPA, 2011; NGI, 2006). The drainage lines flow from the Onrusberge in the north southwards towards the Vermont Salt Pan depression wetland system shown in purple.

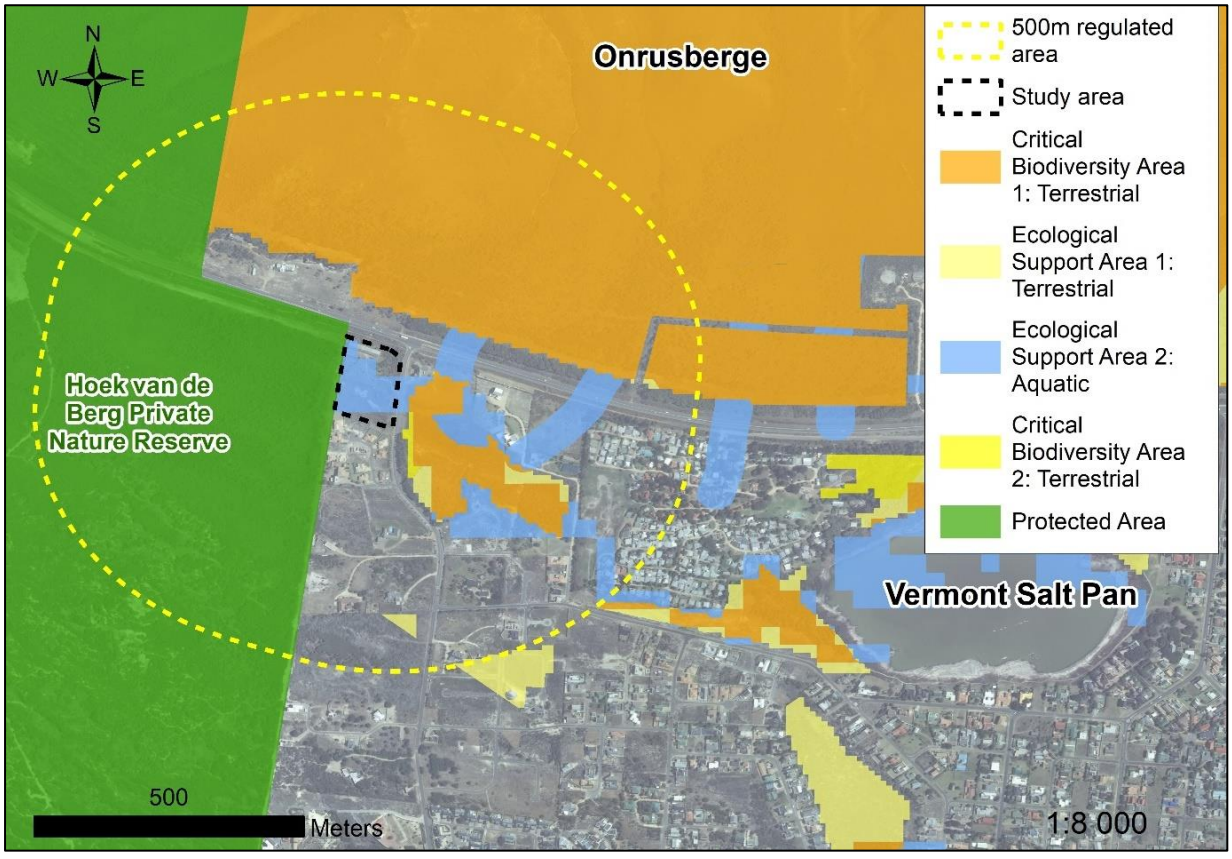

Figure 8: Critical Biodiversity Areas, Ecological Support Areas and Protected Areas within the 500m regulated area (Western Cape Biodiversity Spatial Plan, 2017).

4 Watercourses Identified and Delineated

4.1 Method of Assessment

A site assessment was undertaken on 17 August 2018. Watercourses within the site were identified and delineated using the methods defined in the Updated Manual for Identification and Delineation of Wetlands and Riparian Zones (DWAF, 2008) and the Application of the DWAF (2008) Method to Wetland Soils of Western Cape (Job, 2009).

The methods employed make use of hydrophytic vegetation and hydromorphic soil features to determine the presence and temporary boundaries of wetlands. Hydrophytic vegetation includes plant species that are adapted to saturated soil conditions. These may be wetland obligate species that can only survive under prolonged soil saturation, or wetland facultative species that are often found within saturated soil but may also be found outside of wetland conditions.

Hydromorphic soil features form in soils that are saturated for long periods of time. Mottling and gleying are the two most common hydromorphic features. Mottling occurs when iron leaches out of the soil when wet and clumps together, and then oxidises to form iron oxide when exposed to air. The clumps may be recognised as spots or mottles within the soil of a rusty orange or yellow colour. Mottling density increases from the temporary zone to the centre of the seasonal zone, and then decreases again and is completely absent from the permanent zone. Gleying occurs under anoxic or anaerobic conditions and may be recognised as a change in colour from a terrestrial soil baseline toward a grey, blueish or greenish hue. Gleying tends to increase from the wetland temporary zone towards the permanent zone.

Delineations within much of the sandy, coastal soils of the Overberg region are noted as particularly difficult special cases as the soil does not readily form mottles and falls within the gley colour band under terrestrial conditions. The wetland in question was noted in Job (2009) as an example of such a case. Other less commonly used indicators such as organic surface layers, the presence of generally elevated organic content throughout the upper soils and the presence of a sulphurous odour must be employed (Job, 2009).

Riparian zones are delineated according to the presence of alluvial soils, the presence of hydrophytic vegetation and changes in terrestrial vegetation including vegetation height, density, species composition and other factors associated with the river or drainage line. Ephemeral drainage lines often lack riparian zones and are then delineated along the banks of the defined channel.

4.2 Watercourse Description and Delineation

The study area has been extensively disturbed through the excavation of the depression, construction of the buildings (now derelict) and the access road. Human waste and building rubble were found in various places within the study area.

Topography

The study site is situated on a gentle slope in a southerly direction at a gradient of between 1 and 3%. The gradient rises steadily from the northern study area boundary across the R43 trunk road to the Onrusberge mountains, where slopes in excess of 60% are visible (refer to Figure 9). Figure 10 shows elevation (height above mean sea-level [AMSL] in metres) over distance via a straight line transect from the northern boundary to the southern boundary of the study area. The highest point of the study area is at the northern boundary approximately 34m AMSL, while the lowest point is towards the centre, and associated with the wetland at about 28,5m. The elevation rises slightly from this point to approximately 30m AMSL at the southern boundary (refer to Figure 10).

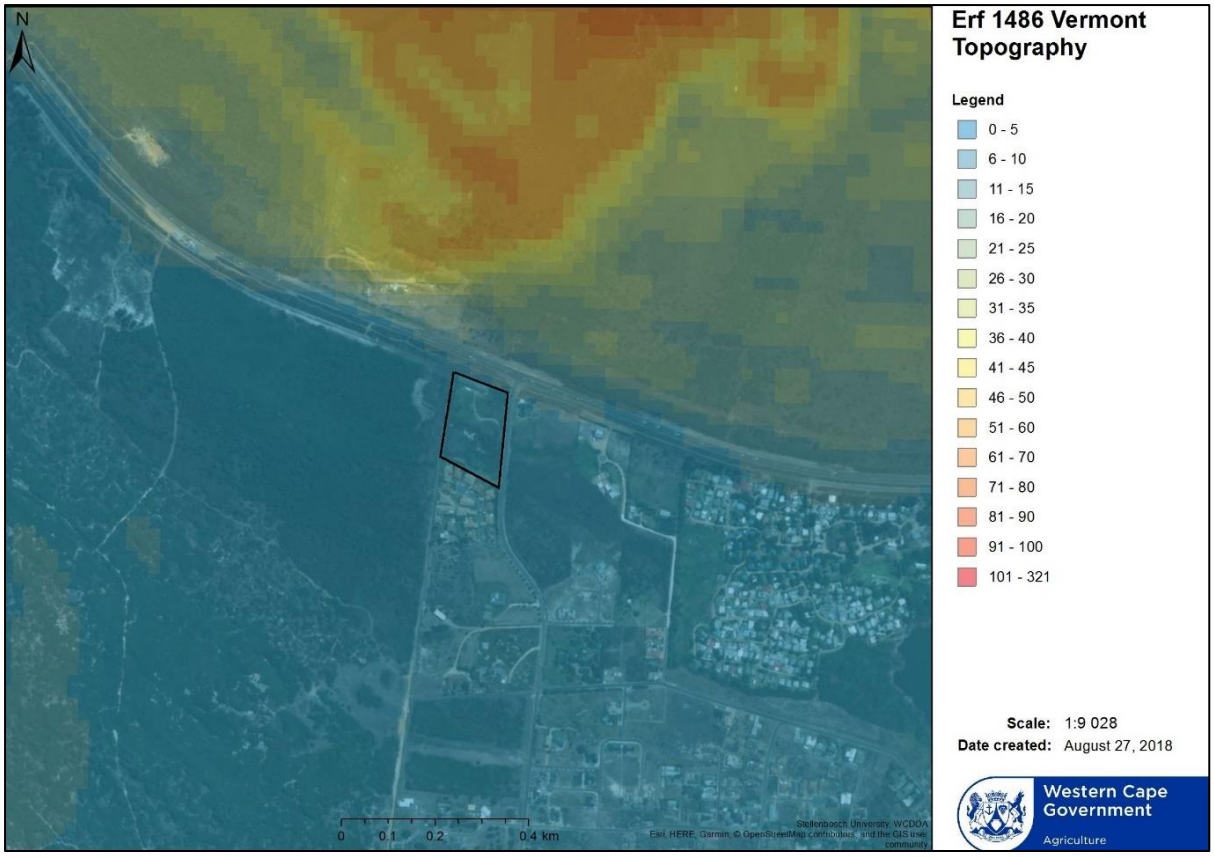

Figure 9: Topography of the study area and surrounds.

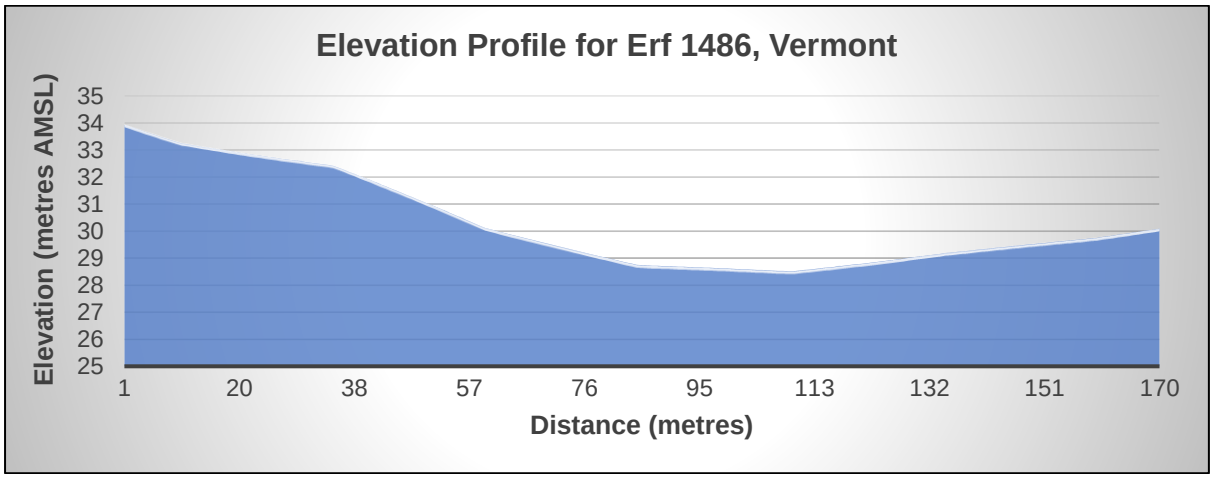

Figure 10: Elevation profile for the study area, showing height over distance from north to south (data from Cape Farm Mapper, 2018, based on a digital elevation model with 24m resolution).

Soils and hydrology

Rainfall had occurred the day prior to the site assessment, and hydrology could be observed, with runoff from the neighbouring housing estate's stormwater system into the depression clearly visible. Terrestrial soils within the study area are dark grey, sandy and appear to be well drained (refer to Figure 11). Soils that were sampled in wetter areas near the depression did not differ markedly from terrestrial soils, aside from appearing darker and with a higher organic content than the terrestrial baseline (refer to Figure 12).

Mottling and gleying are not expected in this wetland. Mottling was however found in isolated patches on the southern periphery of the depression in brown soils that are likely the result of limited historical infilling (refer to Figure 13).

Figure 11: Near-surface soil sample, showing typical terrestrial soil conditions within the study area. Terrestrial soils within the study area are sandy, characterised by a uniform grey colour, with no mottling, gleying or organic matter visible.

Figure 12: Near-surface soil sample, taken within a wet area. Little variation from the terrestrial baseline is visible, aside from slightly darker chroma.

Figure 13: Near-surface soil sample, taken alongside the depression within the study area. Wetland soil indicators in the form of mottles are visible as rusty orange features.

Vegetation

Vegetation within the study area was extensively disturbed, with a mixture of indigenous species such as *Senecio halimifolius* and the wetland obligate *Juncus kraussi* (refer to Figure 14) alongside alien invasive species such as *Pennisetum clandestinum* (Kikuyu Grass, refer to Figure 15). While the latter species is not wetland obligate, it is commonly found in wetlands where it grows particularly densely (van Outshoorn, 2014). An additional wetland obligate species, *Cyperus textilis,* was also found in isolated patches during the site assessment, refer to Figure 16.

Figure 14: *Senecio halimifolius* indicated by the green arrow, with wetland obligate *Juncus kraussi* indicated by the blue arrow. These two species were used as primary indicators of the outer boundary of the wetland within the study area.

Figure 15: South facing photo, with the orange arrow showing alien invasive *Pennisetum clandestinum* growing in dense clumps along the edges of the depression within the study area, particularly where sediment dredged from the depression was dumped.

Figure 16: Wetland obligate *Cyperus textilis* in front of the derelict buildings on site, facing south.

Watercourse Delineation

The presence of saturated, high carbon soils and isolated instances of mottling within the upper 500mm of the soil was used in conjunction with the presence of hydrophytic vegetation to delineate the outer boundary of temporary zone of the wetland. The excavated depression represented the permanent zone (refer to Figure 17).

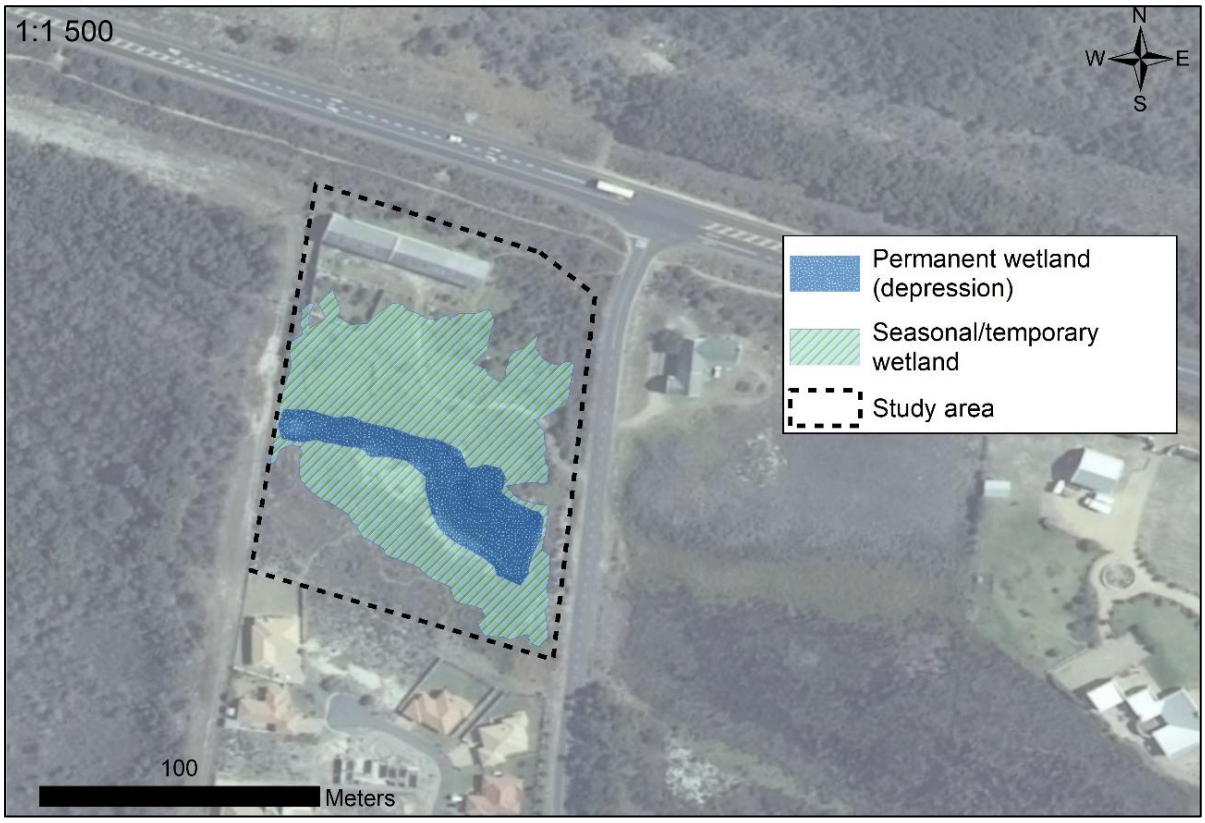

Figure 17: Delineated wetlands within the study area.

5 Legislative Constraints

5.1 The National Water Act

In terms of the NWA, the regulated area around a wetland is 500m from its outer boundary. As the study area in its entirety is within the 500m regulated area (refer to Figure 7) the following applies throughout the study area:

- Should a freshwater ecologist consider the proposed development to be of no risk to any of the wetlands within 500m, a letter may be provided to this effect. This is usually only applicable if the development is sufficiently far downslope of a wetland or is within a separate catchment to the wetland and is therefore entirely hydrologically and physically decoupled from the wetland. Given that the delineated wetland footprint accounts for more than half of the study area, this is unlikely to apply.
- In all other cases, a risk assessment in terms of GN 509 of 2016 must be undertaken to determine the degree of risk posed to the wetlands by the development.
- Should the development pose a low risk, registration of the water use under the General Authorisation (GA) would be required.
- Should the development pose a medium risk, application for a Water Use License (WUL) would be required.
- High risk developments also require a WUL but are not readily approved.

The Department of Water and Sanitation (DWS) applies a “no net loss” policy to wetlands. Therefore, should the proposed development result in permanent or long-term loss of any wetland habitat or function, the loss must be compensated by means of a wetland offset scheme. Such a scheme may

entail rehabilitation and management of another portion of wetland within the study area, or if this is not feasible or adequate, it may entail purchase, rehabilitation and management (in perpetuity) of another wetland property. Rehabilitation, purchase of an additional property (if necessary) and management of the offset may be costly processes.

5.2 The National Environmental Management Act

In terms of the NEMA, development of any infrastructure outside of the urban edge (as is the case for the study area) exceeding 100m^2 or any activity that involves infilling or removing more than 10m^3 of soil or any other material, within 32m of a watercourse requires application for an Environmental Authorisation (EA) via the Basic Assessment (BA) process in order to assess the impact on the watercourse. As the 32m regulated area around the wetland within the study includes almost the entire site (refer to Figure 18), any development within the property will fall within the 32m regulated area. Therefore, a Basic Assessment will be required for the proposed development.

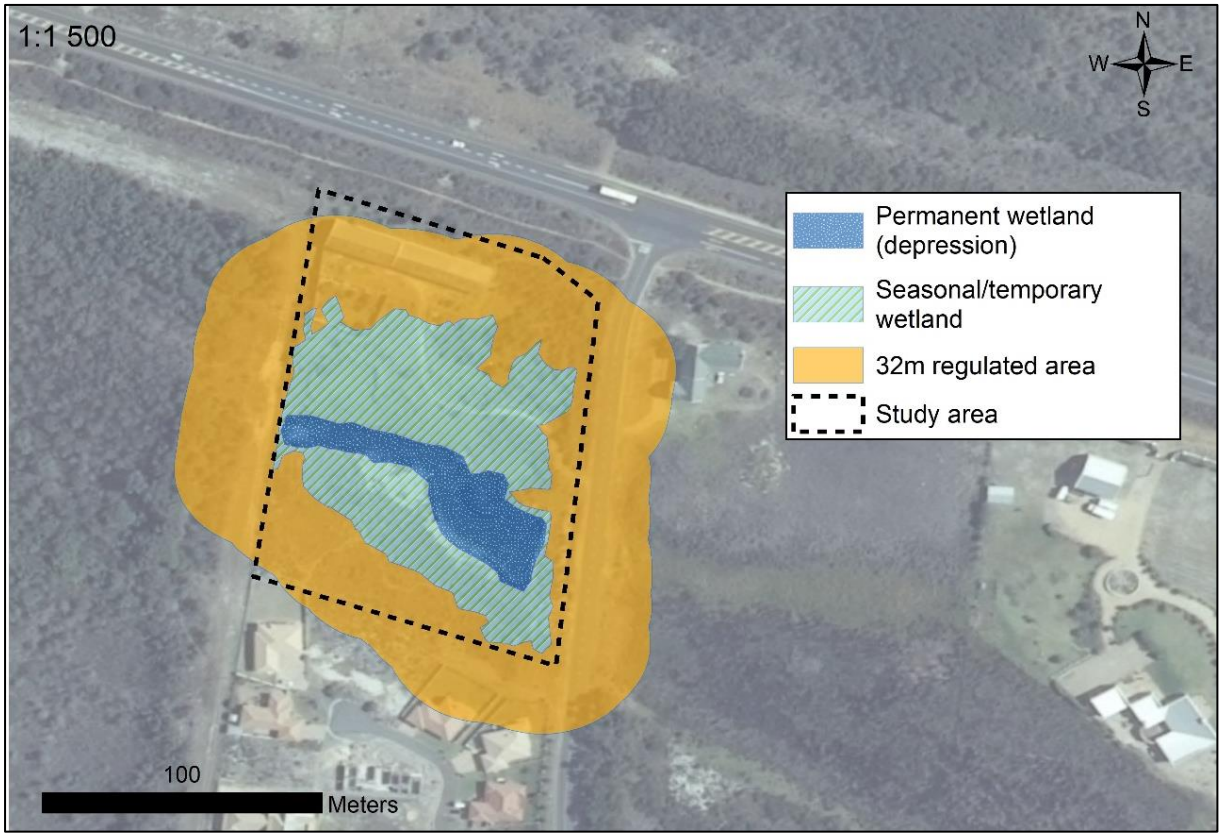

Figure 18: Delineated wetland boundaries within the study area, indicating the 32m regulated area in orange.

6 Conclusion

Erf 1486 has been extensively disturbed and transformed through the construction of the buildings, dam and access road. Despite this, it is clear from hydromorphic soil and hydrophytic vegetation indicators that both natural wetland function and habitat exist within the study area and form part of the larger wetland system of the Vermont Salt Pan. The outer boundaries of the wetland within the study area were delineated with relative ease due to the presence of the wetland obligate species *Juncus krausii*, confirmed with wetland facultative *Senecio halimifolius* and in places wetland obligate *Cyperus textilis*.

Figure 18 indicates that construction outside of the delineated wetland boundary may be possible within the study area, but that construction outside of the NEMA 32m regulated area will not be possible. This means that an EA must be applied for via a BA process in terms of the NEMA. In terms of the NWA, a freshwater risk assessment will be required for any development within the study area, the outcome of which will depend largely on the nature of the proposed development. Factors which will influence the risk rating of a development and the likelihood of being granted NEMA and NWA authorisations include but are not limited to:

- Location of the proposed development –
    - Development within the wetland would most likely result in wetland loss and therefore a high risk rating which would require a WULA and likely also a wetland offset scheme.
    - Development immediately adjacent to the wetland would likely result in a medium or high risk rating which would require a WULA.
    - Development behind a setback that allows for establishment of a buffer zone would result in a low to medium risk rating which in the former case would require registration of a water use in terms of the General Authorisation, and which in the later case would require a WULA.
- Detailed design–
    - Appropriately designed raft foundations may significantly reduce the impact on subsurface flow and therefore reduce risk.
    - Rainwater harvesting schemes that may reduce runoff intensity and thereby mitigate the impact of catchment hardening.
    - Stormwater polishing infrastructure such as artificial wetlands that may mitigate water quality impacts.

Should a wetland offset scheme be required to ensure a successful WUL/EA application, rehabilitation of the wetland onsite may be sufficient to compensate for a small loss of wetland habitat and function. Purchase, rehabilitation and management of another wetland offsite would be required to compensate for a larger loss. The scale of the offset required would be determined through application of the National Wetland Offset Guidelines and calculator (Macfarlane, *et. al*. 2014).

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