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# **WATERCOURSE VERIFICATION FOR THE PROPOSED AGRICULTURAL DEVELOPMENT ON PORTION 3 OF THE FARM 143, VIERFONTEIN NEAR NAPIER, WESTERN CAPE PROVINCE**

**Prepared for**

**EnviroAfrica CC**

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## GLOSSARY OF TERMS

<b>Alien vegetation:</b>	Plants that do not occur naturally within the area but have been introduced either intentionally or unintentionally. Vegetation species that originate from outside of the borders of the biome -usually international in origin.
<b>Catchment:</b>	The area where water is collected by the natural landscape, where all rain and run-off water ultimately flows into a river, wetland, lake, and ocean or contributes to the groundwater system.
<b>Delineation (of a wetland):</b>	To determine the boundary of a wetland based on soil, vegetation and/or hydrological indicators.
<b>Ecoregion:</b>	An ecoregion is a "recurring pattern of ecosystems associated with characteristic combinations of soil and landform that characterise that region".
<b>Facultative species:</b>	Species usually found in wetlands (76%-99% of occurrences) but occasionally found in non-wetland areas
<b>Gleying:</b>	A soil process resulting from prolonged soil saturation which is manifested by the presence of neutral grey, bluish or greenish colours in the soil matrix.
<b>Hydromorphic soil:</b>	A soil that in its undrained condition is saturated or flooded long enough to develop anaerobic conditions favouring the growth and regeneration of hydrophytic vegetation (vegetation adapted to living in anaerobic soils).
<b>Hydrology:</b>	The study of the occurrence, distribution and movement of water over, on and under the land surface.
<b>Hydromorphy:</b>	A process of gleying and mottling resulting from the intermittent or permanent presence of excess water in the soil profile.
<b>Indigenous vegetation:</b>	Vegetation occurring naturally within a defined area.
<b>Obligate species:</b>	Species almost always found in wetlands (>99% of occurrences).
<b>Seasonal zone of wetness:</b>	The zone of a wetland that lies between the Temporary and Permanent zones and is characterised by saturation from three to ten months of the year, within 50cm of the surface
<b>Temporary zone of wetness:</b>	The outer zone of a wetland characterised by saturation within 50cm of the surface for less than three months of the year.
<b>Watercourse:</b>	In terms of the definition contained within the National Water Act, 1998 (Act 36 of 1998) a watercourse means: <ul style="list-style-type: none"> <li>• A river or spring;</li> <li>• A natural channel which water flows regularly or intermittently;</li> <li>• A wetland, dam or lake into which, or from which, water flows; and</li> <li>• Any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse;</li> <li>• and a reference to a watercourse includes where relevant, its bed and banks.</li> </ul>
<b>Wetland:</b>	"Land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil."
<b>Wetland Vegetation (WetVeg) type:</b>	Broad groupings of wetland vegetation, reflecting differences in regional context, such as geology, climate, and soils, which may, in turn, influence the ecological characteristics and functioning of wetlands.



# 1. INTRODUCTION

FEN Consulting (Pty) Ltd was requested to investigate the Portion 3 of the Farm Vierfontein 143, Napier, Western Cape Province (hereafter referred to as the 'study area'), for any watercourses which could pose a constraint to the proposed agricultural development on this property (Figures 1 and 2).

In order to identify all watercourses that may potentially be impacted by the proposed agricultural development, a 500m "zone of investigation" around the study area, in accordance with Government Notice (GN) 509 of 2016 as it relates to the National Water Act, 1998 (Act No. 36 of 1998), was used as a guide in which to assess possible sensitivities of the receiving watercourse environment. This area – i.e. the 500m zone of investigation around the study area –will henceforth be referred to as the "investigation area".

A desktop study was compiled with all relevant information as presented by SANBI's Biodiversity Geographic Information Systems (BGIS) website (<http://bgis.sanbi.org>) as well as the National Freshwater Ecosystem Priority Areas (NFEPA) database, followed by a delineation, using desktop methods that include the use of available digital satellite imagery, of all the watercourses situated within the study area as well as the investigation area. Following this, a field verification assessment was undertaken to ground truth all results.

## 1.1. Project Description

The study area is located approximately 1.5km south of the town Napier, Western Cape Province. The study area is approximately 19 hectares in extent and is an open space area consisting of a mixture of natural fynbos species and invasive alien tree species such as *Acacia saligna* and *Pinus* species. The study area is bordered by an existing agricultural development (berry farm) along the eastern boundary (Figure 1 and 2).

The proponent wishes to expand the existing berry farming activities into the study area. As part of the environmental authorisation process of this development, the Breede Gouritz Catchment Management Agency (BGCMA) requested the verification of watercourses within the surrounding area of the study area that may trigger the need for Water Use Authorisation (WUA).





Figure 1: Digital satellite image depicting the study and investigation areas in relation to the surrounding area.



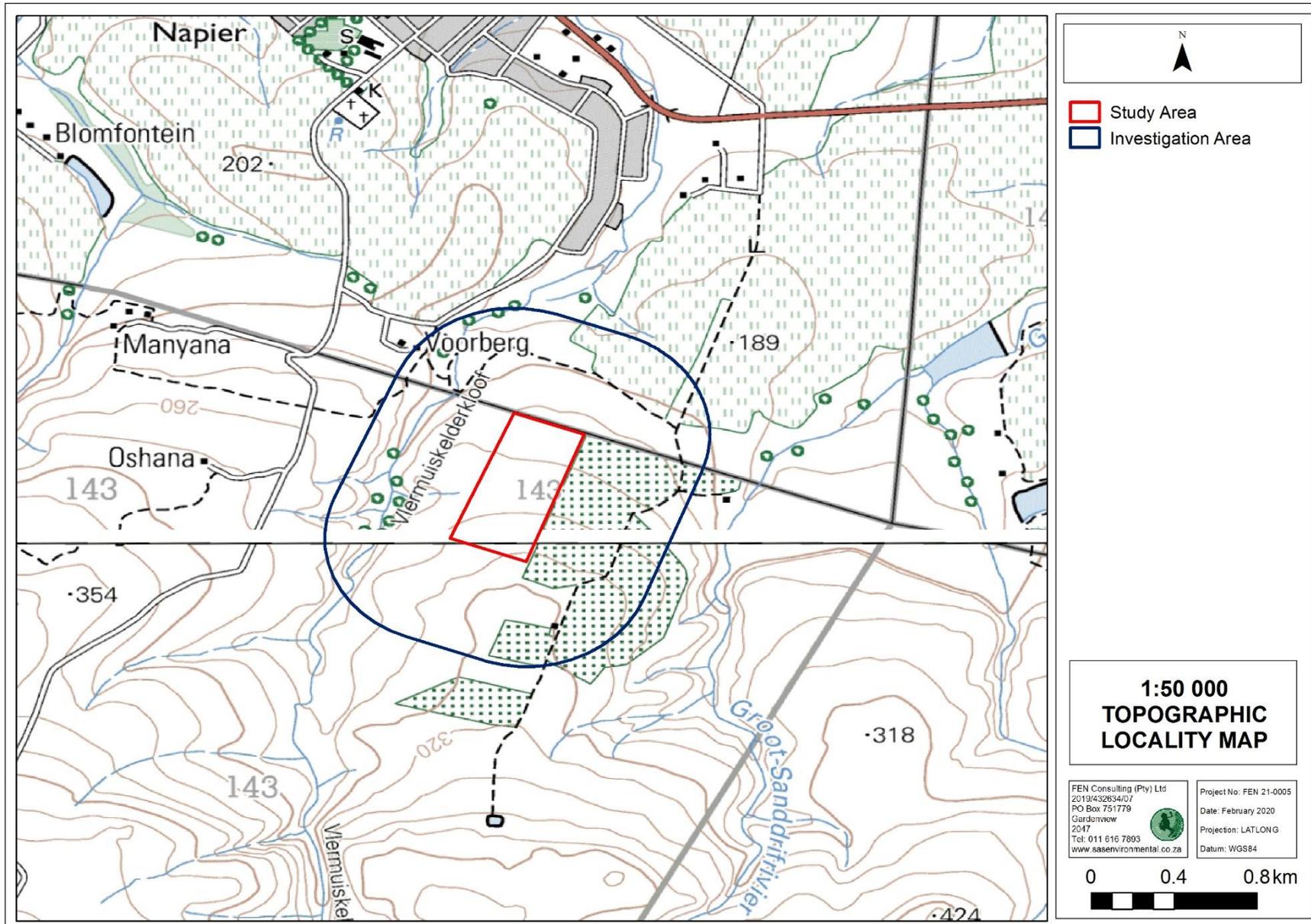


Figure 2: Location of the study and investigation areas depicted on a 1:50 000 topographical map, in relation to surrounding area.



## 1.2 Assumptions and Limitations

- The determination of the watercourse boundaries is confined to the watercourses associated with the study area. All watercourses identified within the investigation area were delineated in fulfilment of GN509 of the National Water Act, 1998 (Act No. 36 of 1998) using various desktop methods including use of topographic maps, historical and current digital satellite imagery and aerial photographs;
- No Present Ecological State (PES) and Ecological Importance and Sensitivity (EIS) assessment of the watercourses were undertaken as part of the scope of work;
- Global Positioning System (GPS) technology is inherently somewhat inaccurate, and some inaccuracies due to the use of handheld GPS instrumentation may occur; however, the delineations as provided in this report are deemed appropriately accurate to fulfil the authorisation requirements;
- Watercourses and terrestrial zones create transitional areas where an ecotone is formed as vegetation species change from terrestrial to obligate/facultative species. Within this transition zone, some variation of opinion on the watercourse boundaries may occur. However, if the Department of Water Affairs and Forestry (DWA) (2008) <sup>1</sup> method is followed, all assessors should get largely similar results; and
- With ecology being dynamic and complex, certain aspects (some of which may be important) may have been overlooked. However, the delineations as provided in this report are deemed appropriately accurate to guide any future development plans.

## 2. RESULTS

### 2.1. Desktop Assessment Findings

In preparation for the field assessment, aerial photographs, digital satellite imagery and provincial and national watercourse databases were used to identify points of interest in the surrounding area at a desktop level. Based on the historical aerial photograph (Figure 3), a diversity of signatures are identifiable that correspond with watercourses. In this regard, specific mention is made of the following:

- Linear features: since water flows/moves through the landscape, watercourses often have a distinct linear element to their signature which makes them discernable on aerial photography or satellite imagery;
- Vegetation associated with watercourses: a distinct increase in density as well as shrub size near flow paths;
- Hue: with water flow paths often show as white/grey or black and outcrops or bare soils displaying varying chroma created by varying vegetation cover, geology and soil conditions. Changes in the hue of vegetation with watercourse vegetation often indicated on black and white images as areas of darker hue (dark grey and black). In colour imagery these areas mostly show up as darker green and olive colours or brighter green colours in relation to adjacent areas where there is less soil moisture or surface water present; and
- Texture: with areas displaying various textures, created by varying vegetation cover and soil conditions.

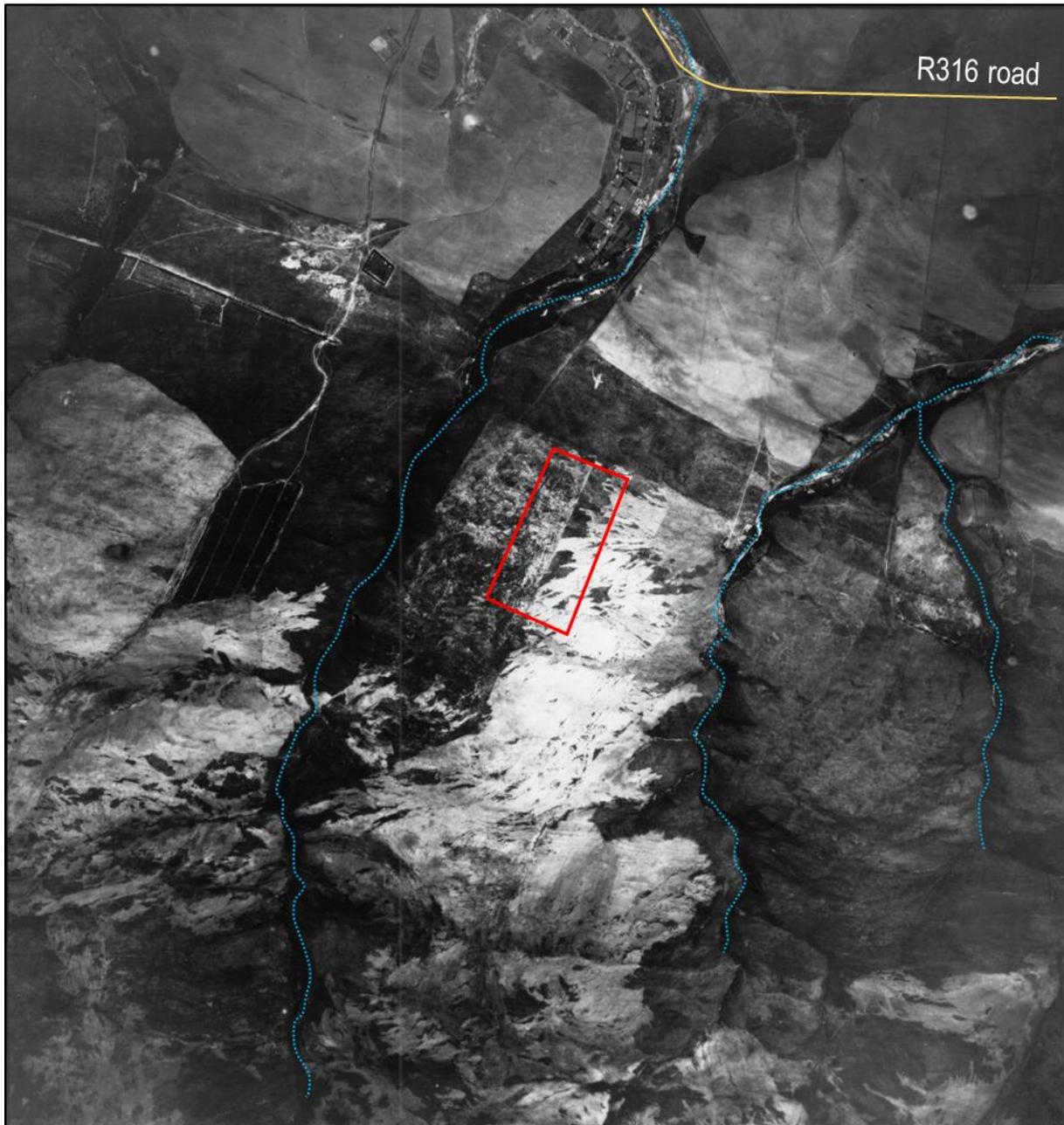
On review of historical imagery dating back to 1949 (Figure 3), it is evident that the study area and the area surrounding the study area has been disturbed (however, the nature of the disturbance is unclear). Two distinct watercourses can be identified east and west of the study area. Based on the mountainous

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<sup>1</sup> The Department of Water Affairs and Forestry (DWA) was formerly known as the Department of Water Affairs (DWA). At present, the Department is known as the Department of Water and Sanitation (DWS). For the purposes of referencing in this report, the name under which the Department was known during the time of publication of reference material, will be used.



area south of the study area, it can be concluded that the watercourses are headwater systems. These watercourse signatures are also evident on digital satellite imagery from 2019 (Figure 4).



**Figure 3: Historical photograph of the study area (location of the study area indicated in red) (Flight Plan 05618 of Job 228). The blue dashed lines indicate signatures representative of watercourses.**





**Figure 4: Digital satellite imagery (2019) of the study area (red outline) relative to digital signatures of potential watercourses (blue dashed lines).**

The following table contains data accessed as part of the desktop assessment and is presented as a “dashboard-style” report below (Table 1). It is important to note that although all data sources used provide useful and often verifiable, high-quality data, the various databases used do not always provide an entirely accurate indication of the actual site characteristics associated with the study area at the scale required to inform the environmental authorisation and/or water use authorisation processes. Given these limitations, this information is considered useful as background information to the study, is important in legislative contextualisation of the risks and impacts, and was thus used as a guideline to inform the assessment and to focus on areas and aspects of increased conservation importance during the field survey. It must however be noted that site verification of key areas may potentially contradict the information contained in the relevant databases, in which case the site verified information must carry more weight in the decision making process.



**Table 1: Desktop data relating to the characteristics of the watercourses associated with the study area and surroundings.**

Aquatic ecoregion and sub-regions in which the study area is located		Importance of the study area according to the Western Cape Biodiversity Spatial Plan (2017) (Figure 5)	
Ecoregion	Southern Coastal Belt	Critical Biodiversity Area	Critical Biodiversity Areas (CBA) are areas of high biodiversity and ecological value and need to be kept in a natural or near natural state, with no further loss of habitat or species. A distinction is made between CBAs that are likely to be in a natural condition (CBA 1) and those that are potentially degraded or represent secondary vegetation (CBA 2). The northern portion of the study area and the north eastern portion of the investigation area are indicated as a CBA 1 of terrestrial importance. A small area in the western portion of the investigation area is classified to be a CBA 2 of watercourse importance.
Catchment	Berg/Bot/Potberg		
Quaternary Catchment	G50D		
WMA	Breede		
subWMA	Overberg East		
Dominant characteristics of the Southern Coastal Belt Ecoregion Level II (22.04) (Kleynhans et al., 2007)		Ecological Support Area	Ecological Support Areas (ESAs) are areas that are not essential for meeting biodiversity targets, but that play an important role in supporting the functioning of Protected Areas (PAs) or CBAs and are often vital for delivering system services. A distinction is made between ESAs that are still likely to be functional (ESA 1) or areas that are severely degraded or have no natural cover remaining and therefore require restoration (ESA 2). The southern portion of the study area and the south western portion of the investigation area are classified as an ESA 1 of terrestrial importance. A small portion of the south western portion of the investigation area is classified as an ESA 1 of aquatic importance. A very small area in the north western corner of the investigation area is classified as an ESA 2 of watercourse importance.
Dominant primary terrain morphology	Plains; moderate relief, Closed hills, mountains; moderate and high relief.		
Dominant primary vegetation types	South and South-west Coast Renosterveld, Afromontane Forest, Mountain Fynbos, Central Mountain Renosterveld.		
Altitude (m a.m.s.l)	0 - 1500		
MAP (mm)	300 - 800		
Coefficient of Variation (% of MAP)	<20 - 35		
Rainfall concentration index	15 - 45		
Rainfall seasonality	Winter, All year		
Mean annual temp. (°C)	10 - 18		
Winter temperature (July)	4 - 18		
Summer temperature (Feb)	10 - 30		
Median annual simulated runoff (mm)	20 - > 250		
Detail of the study area in terms of the National Freshwater Ecosystem Priority Area (NFEPAs) (2011) database			
FEPACODE	The study area is located in a sub-quaternary defined as the most efficient sub-quaternary for rehabilitating to an A or B ecological condition to meet under-achieved river type targets (FEPACODE = PHASE2FEPA).		
NFEPAs Wetlands (Figure 6)	According to the NFEPAs Database, no wetlands are located in the study area. A large natural seep wetland is located in the western portion of the investigation area. This seep is indicated to be moderately modified (WETCON = C).		
Wetland Vegetation Type	The study area is located in the Southwest Sandstone Fynbos vegetation group. The northern portion of the investigation area is located in the Southwest Ferricrete Fynbos vegetation group. Both these vegetation types are critically endangered. The threat status is provided by Mbona <i>et al</i> (2015).		
NFEPAs Rivers (Figure 6)	As per the NFEPAs Database, the Groot Sand River is located approximately 740m east of the study area. This river is considered to not be intact (RIVCON = Z, NFEPAs, 2011), while the PES 1999 dataset considered it moderately modified.		

El = Ecological Importance; ES = Ecological Sensitivity; m.a.m.s.l = Metres above mean sea level; MAP = Mean Annual Precipitation; NFEPAs = National Freshwater Ecosystem Priority Area; PES = Present Ecological State; WMA = Water Management Area.



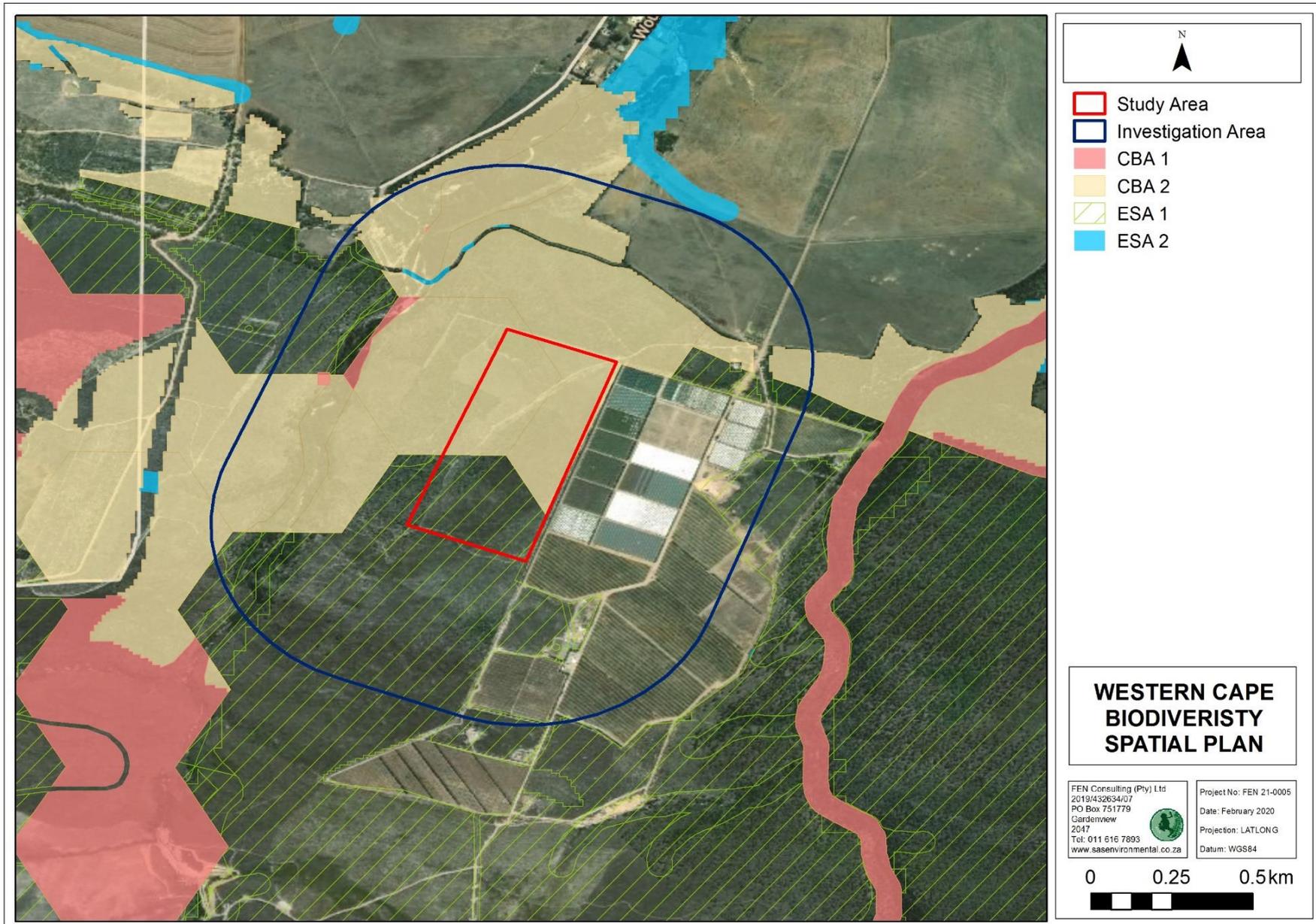


Figure 5: Areas of importance associated with the study and investigation areas, as identified by the Western Cape Biodiversity Spatial Plan (2017).



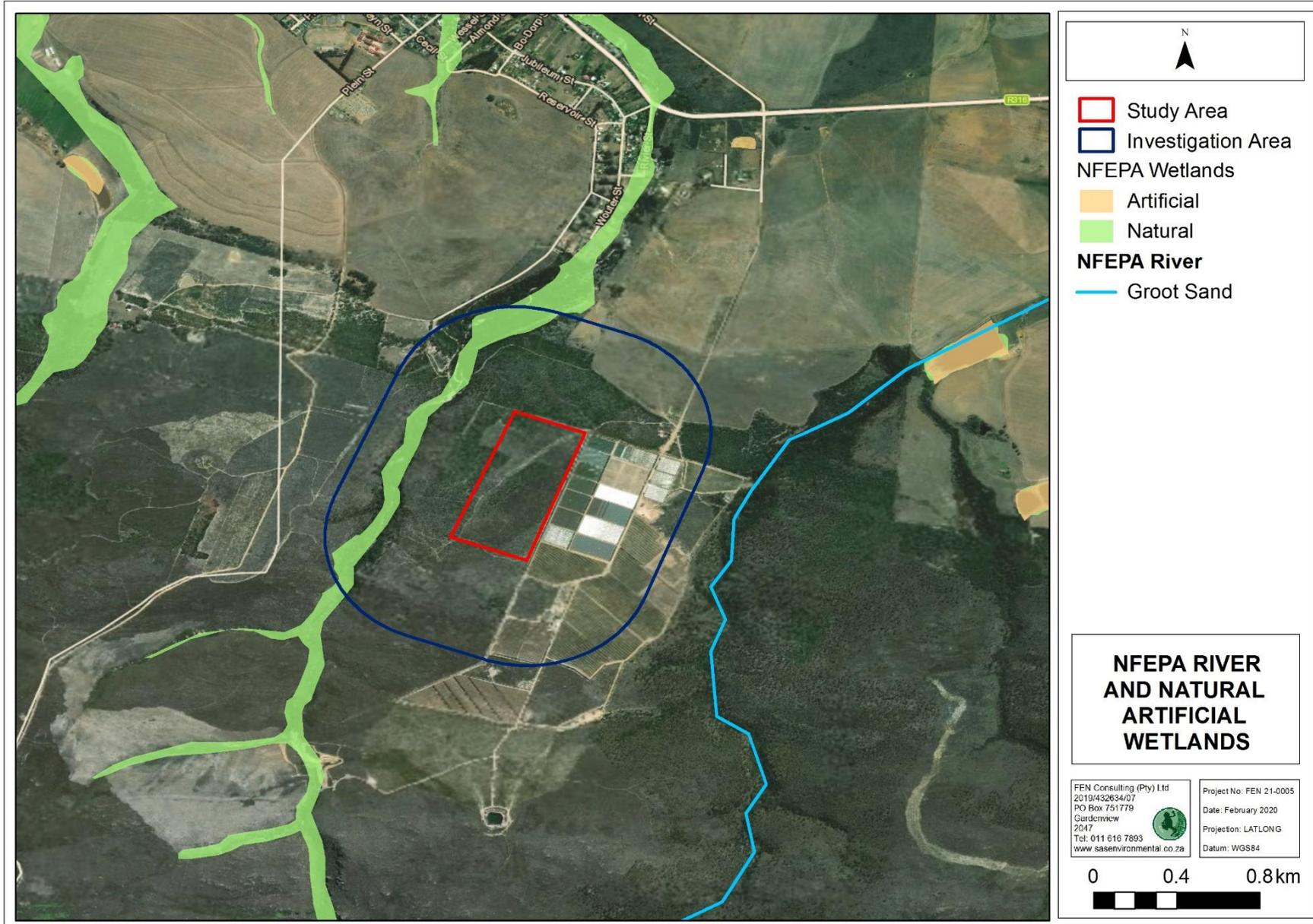


Figure 6: Watercourses associated with the study area as indicated by the NFEPA database (NFEPA, 2011).



## 2.2. Site Verification Results

A site visit was undertaken on the 13<sup>th</sup> of February 2020, during which the presence of any areas presenting with wetlands or riparian characteristics as defined by the DWAF (2008) or watercourses as defined by the National Water Act, 1998 (Act No. 36 of 1998) were identified.

For the purposes of this investigation, the definition of a watercourse, wetland and riparian habitat was taken as per that in the National Water Act, 1998 (Act No. 36 of 1998). The definitions are as follows:

A **watercourse** means:

- (a) a river or spring;
- (b) a natural channel in which water flows regularly or intermittently;
- (c) a wetland, lake or dam into which, or from which, water flows; and
- (d) any collection of water which the Minister may, by notice in the *Gazette*, declare to be a watercourse, and a reference to a watercourse includes where relevant, its bed and banks.

**Riparian habitat** includes the physical structure and associated vegetation of the areas associated with a watercourse which are commonly characterised by alluvial soils, and which are inundated or flooded to an extent and with a frequency sufficient to support vegetation of species with a composition and physical structure **distinct** from those of adjacent areas.

**Wetland** means “land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.”

During the site assessment undertaken by FEN Consulting, the Klipdrif River with associated riparian vegetation was identified in the western portion of the investigation area (See Section 3 below for more detail). No watercourses were identified in the study area. The following indicators (as described in the DWAF (2008) delineation method guide) were used to delineate the boundaries of the watercourse within the western portion of the investigation area:

- Terrain units are used to determine in which parts of the landscape a watercourse would be most likely to occur. The study area slopes predominantly in a westerly direction (approximate slope of 2.8%) towards the Klipdrif River which is located in a steep valley west of the study area (Figure 7).



Figure 7: The elevation profile of the study area.

- The presence of alluvial soils within a river system: The National Water Act, 1998 (Act No. 36 of 1998) definition of riparian zones refers to the structure of the banks and likely presence of alluvium. A good indicator of the presence of riparian zones is the occurrence of alluvial deposited material adjacent to the active channel. Alluvial soils are soils derived from material deposited by flowing water, especially in the valleys of large rivers. Riparian areas often, but not always, have alluvial soils. While the presence of alluvial soils cannot always be used as a primary indicator to delineate riparian areas accurately, it can be used to confirm the topographical and vegetation indicators;
- Vegetation associated with riparian areas: the identification of riparian areas relies heavily on vegetation indicators. Using vegetation, the outer boundary of a riparian area can be defined as the point where a distinctive change occurs:



- in species composition relative to the adjacent terrestrial area; and
  - in the physical structure, such as vigour or robustness of growth forms of species similar to that of adjacent terrestrial areas. Growth form refers to the health, compactness, crowding, size, structure and/or numbers of individual plants.
- Obligate and facultative freshwater species could be used in conjunction with terrain units as well as the point where a distinct change in the vegetation composition was observed to define the outer boundary of any watercourses. Obligate species are almost always found in a watercourse (>99% of occurrences) while facultative species are usually found in a watercourse (76%-99% of occurrences) but are also occasionally found in areas not associated with watercourses and often in areas of disturbance.

### 3. KEY OBSERVATIONS

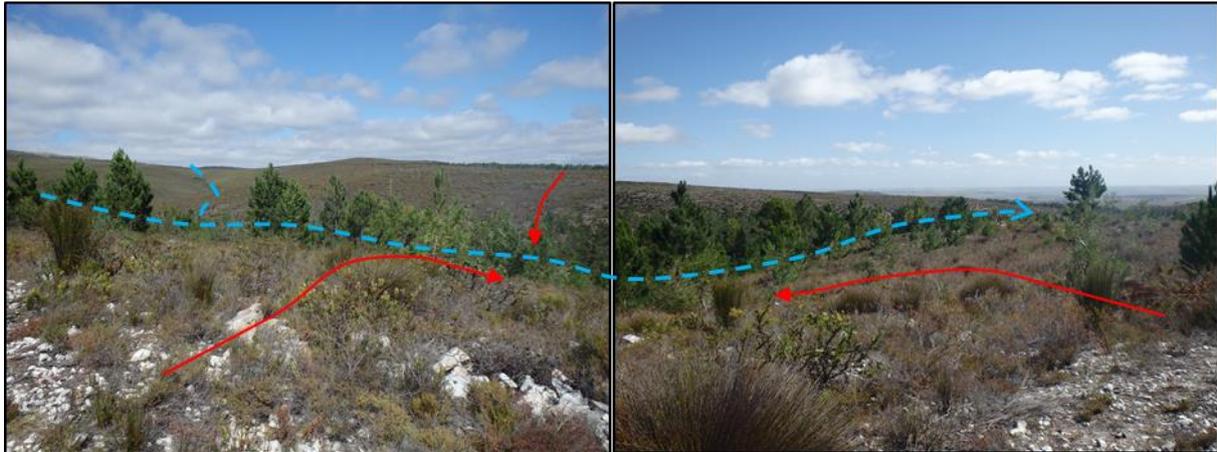
- 1) The Klipdrif River was identified in the western portion of the investigation area, draining in a northerly direction. The active channel consists of a cobble bed, while the riparian marginal vegetation is dominated by large tree species (Figure 8). The river embankment is steep (see elevation profile – Figure 7), as it is situated in a valley, named the Vlermuiskelderkloof as per the topographical map (Figure 2). Surface water within the active channel was flowing despite the field assessment undertaken in the drier summer period.



**Figure 8: Representative photographs of the Klipdrif River at the time of assessment.**

- 2) There is an obvious transition between shrub and forb vegetation to large tree species associated with the Klipdrif River (Figure 9). This distinction in vegetation structure was used as an indicator to delineate the outermost boundary of the riparian zone. It is noted that the *Acacia saligna* and *Pinus* tree species are not indigenous and may contribute to the extent of the riparian edge. As such, the distinctive change in topography was also used to delineate the outermost boundary of the riparian zone.





**Figure 9: A photograph at the top of the valley, indicating the distinction between the forb/shrub species and the tree species associated with the Klipdrif River (blue line). The red arrows indicate the change in topography.**

- 3) The soil profile of the active channel was investigated. No redoximorphic characteristics are present as the base of the river is an impermeable rock surface over which water moves longitudinally through the river system (Figure 10). The embankments are characterised by large rocky embankments comprising a thin soil layer with large cobbles. Alluvial soil deposits were also noted in shallow pool areas associated with the active channel (Figure 10).



**Figure 10: (Left) the soil profile of the river channel, indicating a rocky layer with a uniform soil colour profile. (Right) Some portions of the river are bounded by a rock embankment. Alluvial soil deposits are noted along shallow pools (red arrow).**

- 4) Although the NFEPA database (2011) classified the Klipdrif River as a natural seep wetland (see Table 1, Figure 6), based on the above description, it can be classified as a riparian watercourse as defined by the National Water Act, 1998 (Act No. 36 of 1998);
- 5) Although a full PES and EIS assessment did not form part of the scope of work, based on a visual assessment, it is the opinion of the ecologist that overall, the river is considered to be in a good ecological condition. The only significant impact evident on site was the invasion of alien tree species, however these species aid with the prevention of erosion considering the steep embankments of the valley and river. Additionally, considering that the reach of the river verified during the site assessment is located in the headwaters of the drainage network and the limited upstream land use transformation, the water quality of the river is considered to be good.

The delineation of the Klipdrif River relative to the study area is presented in Figure 11 below.



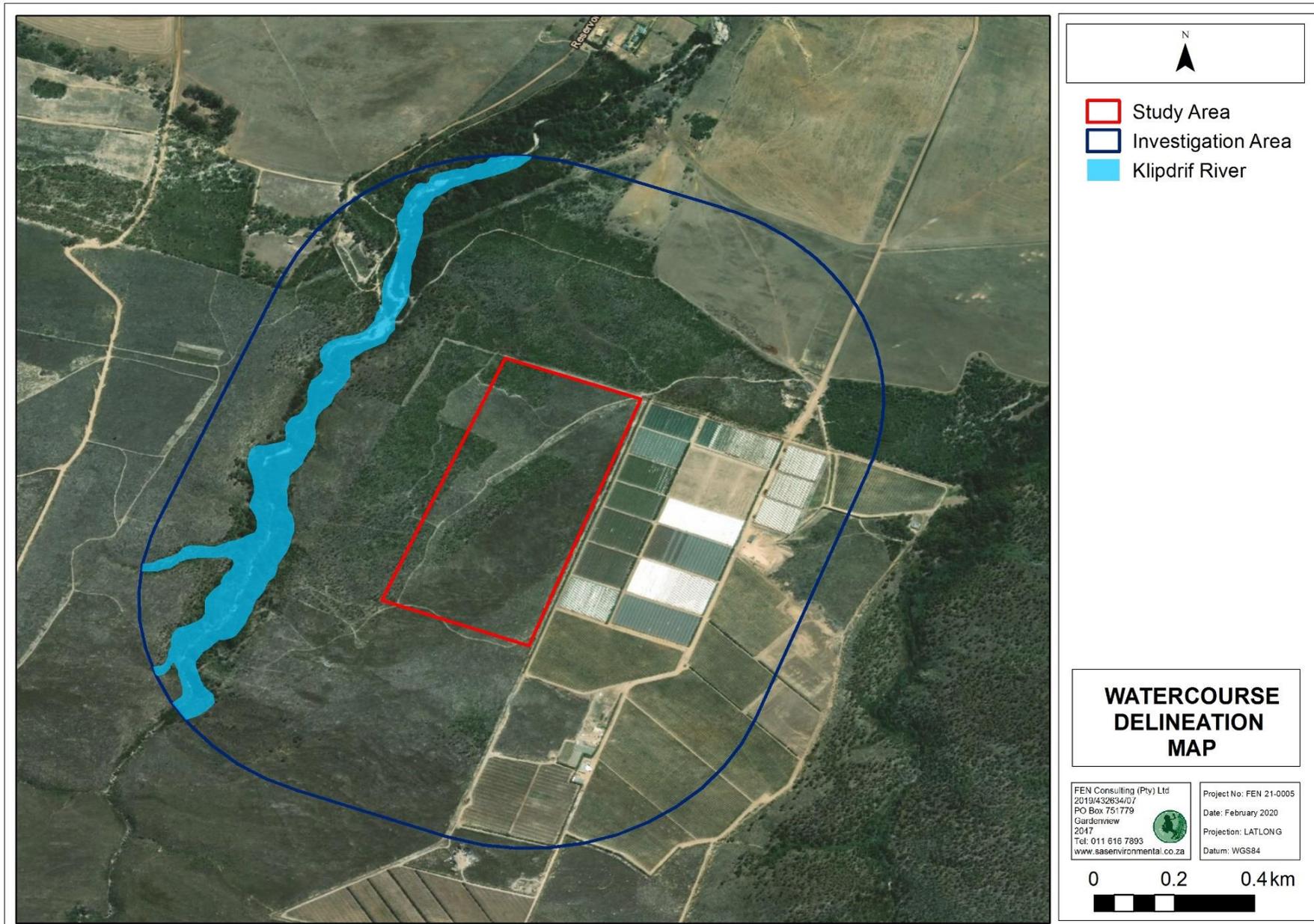


Figure 11: Delineation map for the Klipdrif River relative to the study and investigation areas.



## 4. LEGISLATIVE REQUIREMENTS

The following legislative requirements were considered during the assessment.

- The Constitution of the Republic of South Africa, 1996<sup>2</sup>;
- The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA);
- The National Water Act, 1998 (Act No. 36 of 1998) (NWA);
- Government Notice 509 as published in the Government Gazette 40229 of 2016 as it relates to the National Water Act, 1998 (Act No. 36 of 1998).

According to Macfarlane *et al.* (2015) the definition of a buffer zone is variable, depending on the purpose of the buffer zone, however in summary, it is considered to be “a strip of land with a use, function or zoning specifically designed to protect one area of land against impacts from another”. Buffer zones are considered important to provide protection of basic ecosystem processes (in this case, the protection of aquatic and wetland ecological services), reduce impacts on watercourses arising from upstream activities (e.g. by removing or filtering sediment and pollutants), provision of habitat for aquatic and wetland species as well as for certain terrestrial species, and a range of ancillary societal benefits (Macfarlane *et al.*, 2015). It should be noted, however that buffer zones are not considered to be effective mitigation against impacts such as hydrological changes arising from stream flow reduction, impoundments or abstraction, nor are they considered to be effective in the management of point-source discharges or contamination of groundwater, both of which require site-specific mitigation measures (Macfarlane *et al.*, 2015).

The definition and motivation for a regulated zone of activity for the protection of the Klipdrif River can be summarised as follows:

**Table 2: Articles of Legislation and the relevant zones of regulation applicable to each article.**

Regulatory authorisation required	Zone of applicability
Water Use License Application for water uses as stipulated in Section 21(c) and (i) of the National Water Act, 1998 (Act No. 36 of 1998).	<p><b>Government Notice 509 as published in the Government Gazette 40229 of 2016 as it relates to the National Water Act, 1998 (Act No. 36 of 1998)</b></p> <p>In accordance with GN509 of 2016 as it relates to the National Water Act, 1998 (Act 36 of 1998), a regulated area of a watercourse in terms of water uses as listed in Section 21c and 21i is defined as:</p> <ul style="list-style-type: none"> <li>• the outer edge of the 1 in 100 year flood line and/or delineated riparian habitat, whichever is the greatest distance, measured from the middle of the watercourse of a river, spring, natural channel, lake or dam;</li> <li>• <b>in the absence of a determined 1 in 100 year flood line or riparian area the area within 100 m from the edge of a watercourse</b> where the edge of the watercourse is the first identifiable annual bank fill flood bench; or</li> <li>• a 500m radius from the delineated boundary (extent) of any wetland or pan in terms of this regulation.</li> </ul>
Listed activities in terms of the National Environmental	<p><b>Activity 12</b> of Listing Notice 1 (GN 327) of the National Environmental Management Act, 1998 (Act No.107 of 1998) EIA regulations, 2014 (as amended) states that:</p> <p><i>The development of:</i></p>

<sup>2</sup> Since 1996, the Constitution has been amended by seventeen amendments acts. The Constitution is formally entitled the ‘Constitution of the Republic of South Africa, 1996’. It was previously also numbered as if it were an Act of Parliament – Act No. 108 of 1996 – but since the passage of the Citation of Constitutional Laws Act, neither it nor the acts amending it are allocated act numbers.



Regulatory authorisation required	Zone of applicability
Management Act, 1998 (Act No. 107 of 1998) EIA Regulations (2014), as amended.	<p><i>(xii) Infrastructure or structures with a physical footprint of <u>100 square meters</u> or more; Where such development occurs outside the urban edge—</i></p> <p><i>a) Within a watercourse;</i></p> <p><i>b) In front of a development setback; or</i></p> <p><i>c) If no development setback has been adopted, within <b>32 meters of a watercourse</b>, measured from the edge of a watercourse.</i></p> <p><u>Excluding-</u></p> <p><i>(aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;</i></p> <p><i>(bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies;</i></p> <p><i>(cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies;</i></p> <p><i>(dd) where such development occurs within an urban area;</i></p> <p><i>(ee) where such development occurs within existing roads, road reserves or railway line reserves; or</i></p> <p><i>(ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared.</i></p>

In accordance with the above, a 32m (NEMA) and 100m (NWA) Zone of Regulation (ZoR) for riparian watercourses (in the absence of a formal 1 in 100 year floodline) were implemented (Figure 12). These ZoRs are not necessarily an ecological buffer, as future development may occur within these zones provided the relevant authorisations have been obtained. However, considering that the proposed agricultural development is located 230m east of the delineated edge of the Klipdrif River, it is not expected that Activity 12 or 19 of GN327 will be triggered nor will a water use authorisation in terms of the National Water Act, 1998 (Act No. 36 of 1998) (NWA) be required. Nevertheless, the findings of this report must be verified by the relative legislative authorities.



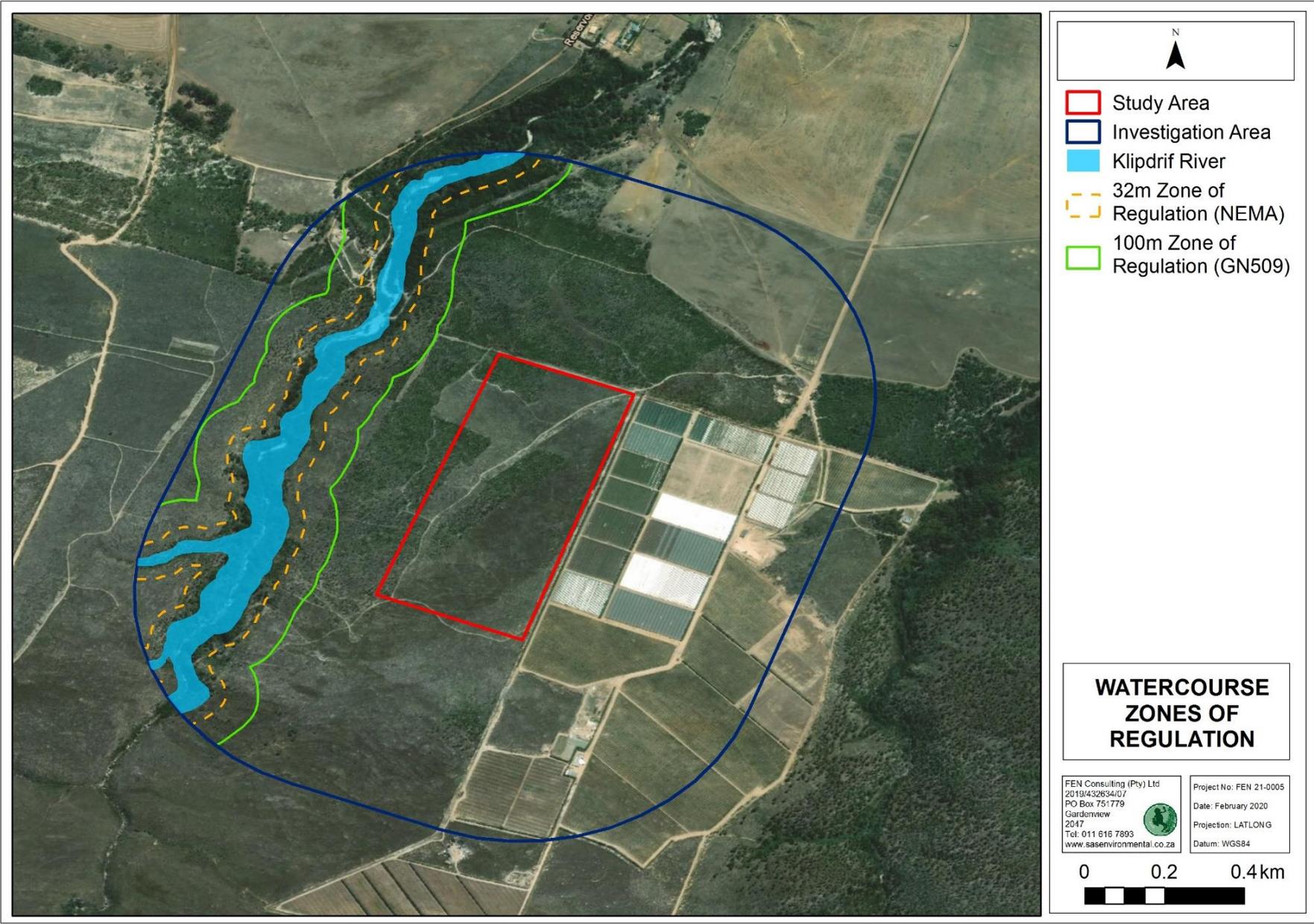


Figure 12: The delineation of the Klipdrif River and its associated NEMA and NWA regulated zones.



## 5. CONCLUSION

Based on the outcome of this study, a riparian watercourse is located in the western portion of the investigation area. No other watercourses were identified in the study or investigation areas. As the proposed development is located approximately 230m east of the identified watercourse (the Klipdrif River) and not within any associated legislative regulated zones, no further authorisation from a freshwater ecological perspective is required for the proposed development.

## 6. REFERENCES

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