

**FRESHWATER RESOURCE VERIFICATION FOR THE
PROPOSED JADE HILL DAM, ON THE FARM
STINKFONTEIN 26/383, CERES, WESTERN CAPE**

Prepared for

EnviroAfrica cc

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GLOSSARY OF TERMS

Alien vegetation:	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.
Catchment:	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.
Delineation (of a wetland):	To determine the boundary of a wetland based on soil, vegetation and/or hydrological indicators.
Ecoregion:	An ecoregion is a "recurring pattern of ecosystems associated with characteristic combinations of soil and landform that characterise that region".
Facultative species:	Species usually found in wetlands (76%-99% of occurrences) but occasionally found in non-wetland areas
Gleying:	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.
Groundwater:	Subsurface water in the saturated zone below the water table.
Hydromorphic soil:	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).
Hydrology:	The study of the occurrence, distribution and movement of water over, on and under the land surface.
Hydromorphy:	A process of gleying and mottling resulting from the intermittent or permanent presence of excess water in the soil profile.
Indigenous vegetation:	Vegetation occurring naturally within a defined area.
Mottles:	Soils with variegated colour patterns are described as being mottled, with the "background colour" referred to as the matrix and the spots or blotches of colour referred to as mottles.
Obligate species:	Species almost always found in wetlands (>99% of occurrences).
Seasonal zone of wetness:	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
Temporary zone of wetness:	The outer zone of a wetland characterised by saturation within 50cm of the surface for less than three months of the year.
Watercourse:	In terms of the definition contained within the National Water Act, a watercourse means: <ul style="list-style-type: none"> • A river or spring; • A natural channel which water flows regularly or intermittently; • A wetland, dam or lake into which, or from which, water flows; and • 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.
Wetland:	"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."
Wetland Vegetation (WetVeg) type:	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

In January 2019 Scientific Aquatic Services (SAS) were requested to undertake a watercourse field verification for the proposed Jade Hills Dam, hereafter referred to as the “proposed dam”. The proposed dam is located on the farm Stinkfontein Portion 26/383, which is approximately 4.5 km east of the town Ceres, Western Cape Province. Agricultural activities dominate the area surrounding the proposed dam.

In order to identify all watercourses that may potentially be impacted by the proposed dam development, a 500m “zone of investigation” around the proposed dam, in accordance with Regulation 509 of 2016 as it relates to the National Water Act, 1998 (Act 36 of 1998) (NWA), was used as a guide in which to assess possible sensitivities of the receiving environment. This area – i.e. the 500m zone of investigation around the proposed dam – was assessed utilising desktop methods only and will henceforth be referred to as the “investigation area” (Figure 1 and Figure 2).

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 footprint area of the proposed dam as well as the investigation area. Following this, a field verification assessment was undertaken to ground truth all results.

1.2 Project description

The proposed Jade Hills Dam is located within the north-eastern corner of the Farm Stinkfontein Portion 26/383. The proposed Jade Hills Dam will lead to the flooding of a drainage feature which drains in a northerly direction. The proposed storage capacity of the dam is 67 600m³. A dam wall of 11.1 metres in height will be constructed with a spillway designed to drain water from the dam into the downgradient portion of the drainage feature. The property has an existing water use (for an extent of 8,6ha) for the taking of water from the Rietvallei irrigation scheme, which will be stored in this dam. The proposed dam wall design is provided in Figure 3. Infrastructure (pipeline, pumphouse) associated with the proposed dam is provided in Figure 4.

1.3 Assumptions and Limitations

- The ground-truthing and delineation of watercourse boundaries and the assessment thereof are confined to the footprint area of the proposed Jade Hill dam which was provided to SAS by the proponent in January 2019. All watercourses identified within the investigation area were delineated in fulfilment of Government Notice (GN) 509 of 2016 as it relates to the National Water Act, 1998 (Act No. 36 of 1998) using various desktop methods including the use of topographic maps, historical and current digital satellite imagery and aerial photographs. These resources were not ground-truthed, however, the general surroundings were considered during the desktop assessment. In December 2019, the proponent provided SAS with the layout of the infrastructure within the investigation area, which is proposed to be developed as part of the Jade Hills dam development (see Figure 4), with specific mention of the abstraction pipeline south west of the proposed dam footprint. Any watercourses potentially crossed by the proposed pipeline was therefore not assessed on site (as the field verification was undertaken in January 2019) and the assessment thereof is based on desktop assessment methods, Observations made of the general surrounding area during the initial site visit and assumed to be similar for all watercourses in the area;
- The surrounding area to the proposed dam has been cultivated, which have altered the soil profiles and vegetation composition. At the time of the site assessment, the footprint area of the proposed dam had burnt, with very few vegetation species identifiable, therefore significantly limiting their use as wetland indicators as part of the onsite delineation. Furthermore, the Western Cape region is currently experiencing a drought, which also affects the floral diversity as a whole. Nevertheless, the delineations as presented in this report are



regarded as a best estimate of the boundaries based on the site conditions present, as observed during a single site assessment;

- 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; and
- With ecology being dynamic and complex, and considering the season in which the site assessment was undertaken, certain aspects (some of which may be important) may have been overlooked. Therefore, it is recommended that another assessment be undertaken during late spring (after the raining season) to assess any vegetation which might be present, which could have been overlooked during the previous site assessment.





Figure 1: Digital satellite image depicting the footprint area of the proposed dam in relation to the surrounding areas.



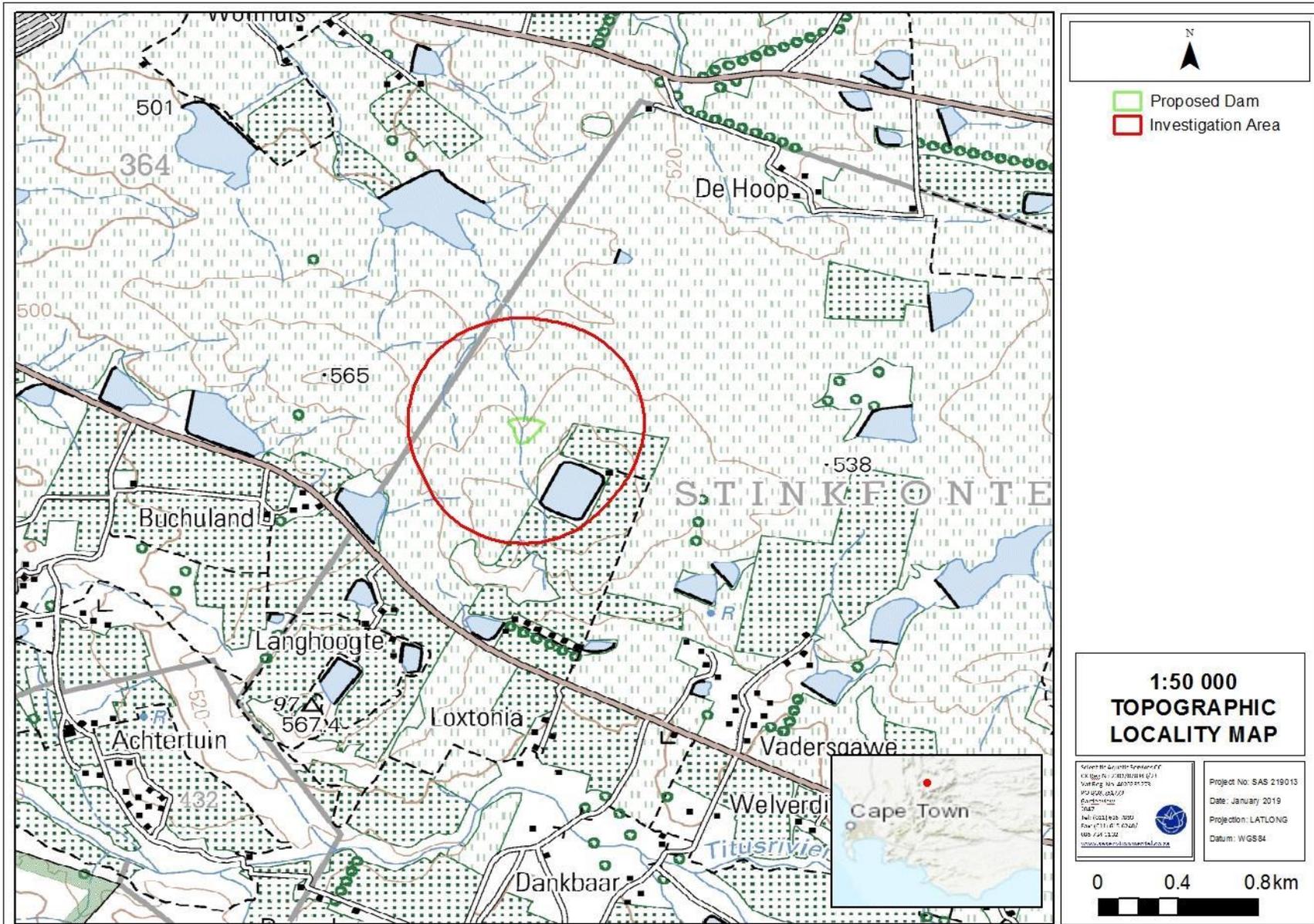


Figure 2: Location of the footprint area of the proposed dam depicted on a 1:50 000 topographical map, in relation to surrounding areas.



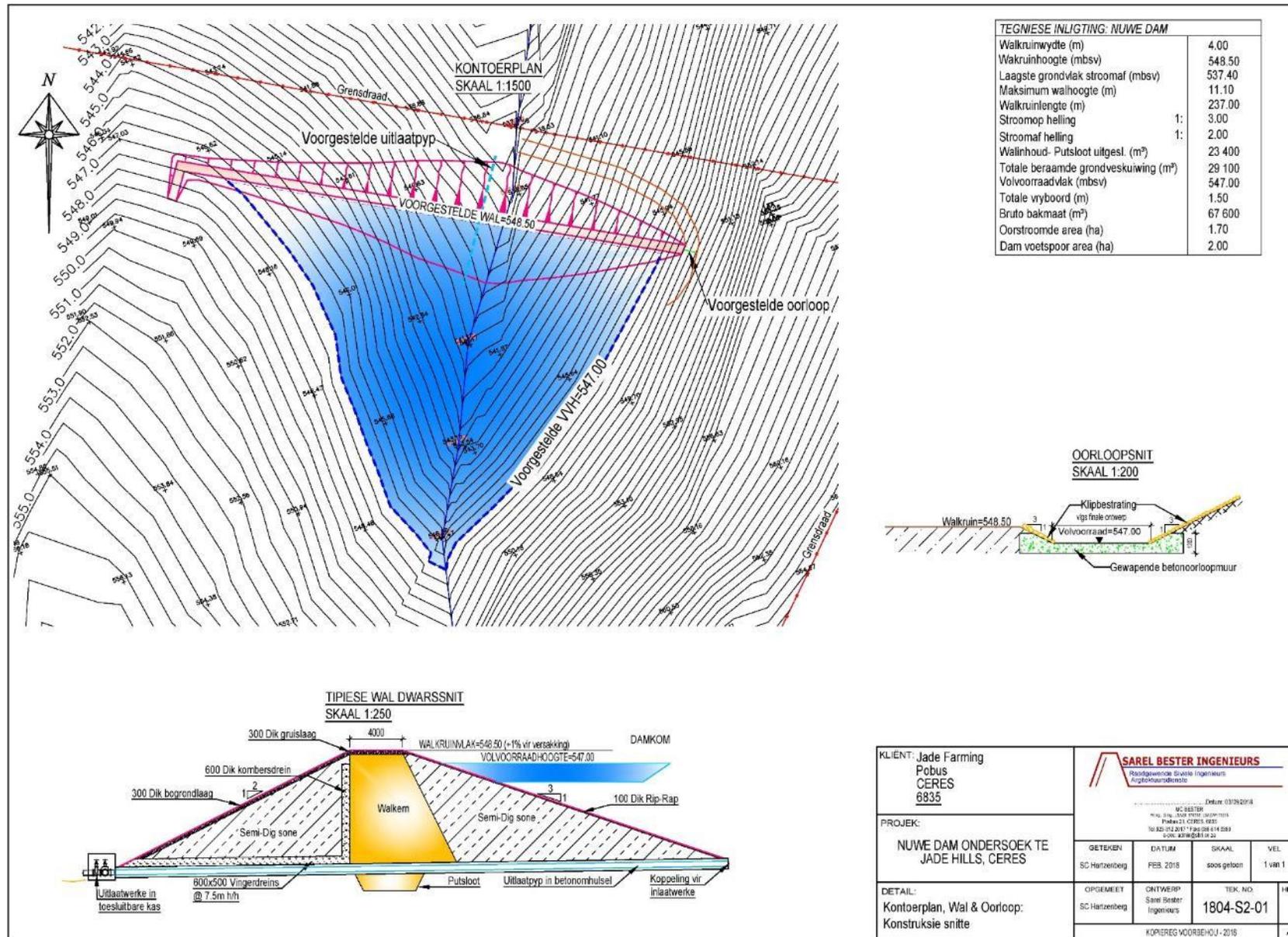


Figure 3: Proposed design drawing of the Jade Hill dam and associated dam wall (Sarel Besters Ingenieurs, 2018).



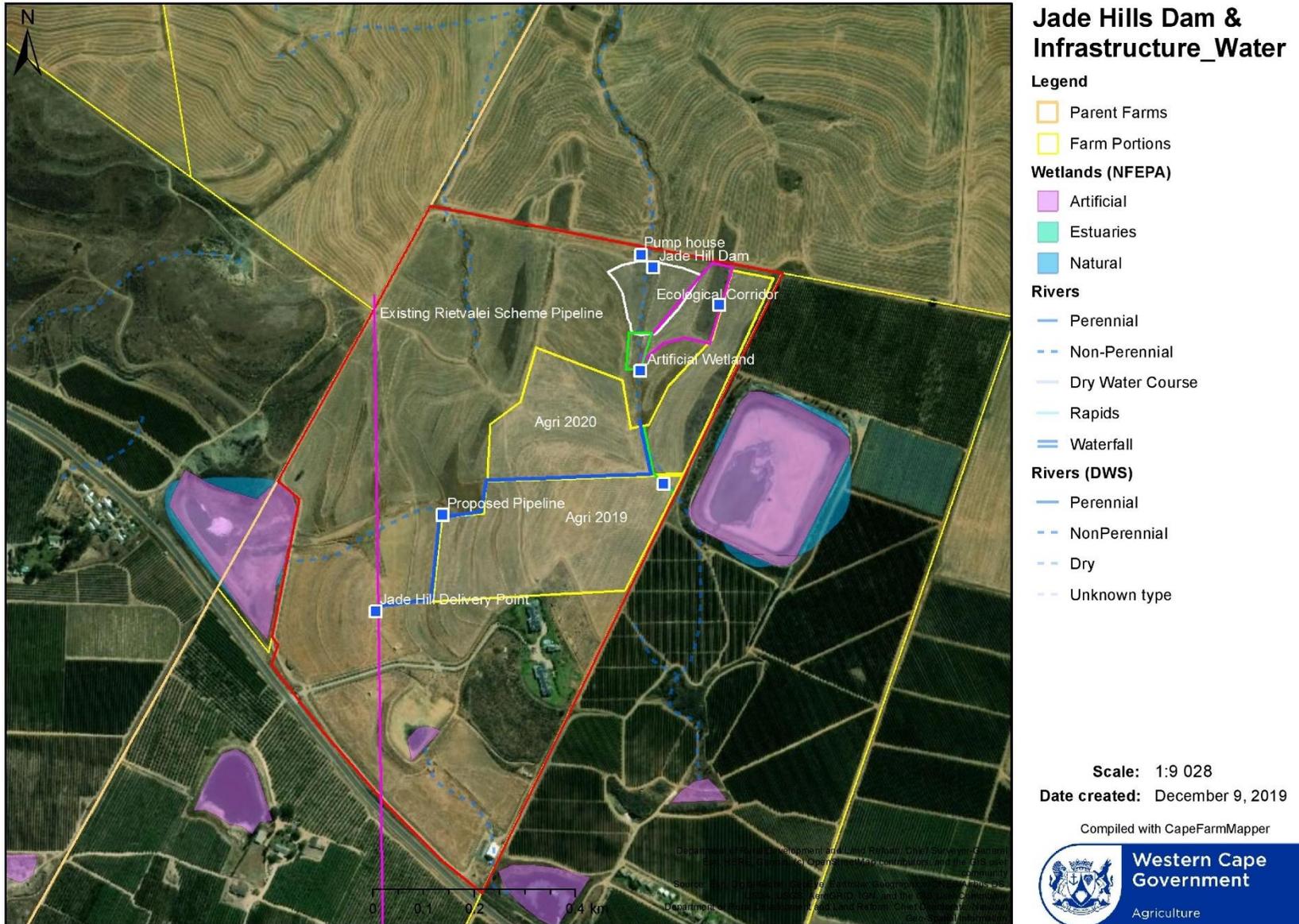


Figure 4: Infrastructure proposed as part of the Jade Hill dam development (white outline). The blue line depicts the proposed abstraction pipeline connecting to the Rietvallei irrigation scheme pipeline (the existing pipeline is indicated by the pink line) (EnviroAfrica, 2019).



2. RESULTS

2.1. Desktop Findings

Use was made of aerial photography, digital satellite imagery, and available provincial and national wetland databases to identify points of interest prior to the field survey. Watercourses often display a diversity of digital signatures that can be used to assist the field verification.

On review of the location of the proposed dam, the surrounding area has primarily been transformed by agricultural activities, including the construction of other dams within the drainage features of the region as a whole. This can be seen in the historical imagery dating back to 1942 when compared to the most recent digital satellite imagery (2017) (Figure 5). The transformation of the surrounding areas to cultivated fields has also significantly modified the movement of surface water through the landscape (Figure 4).

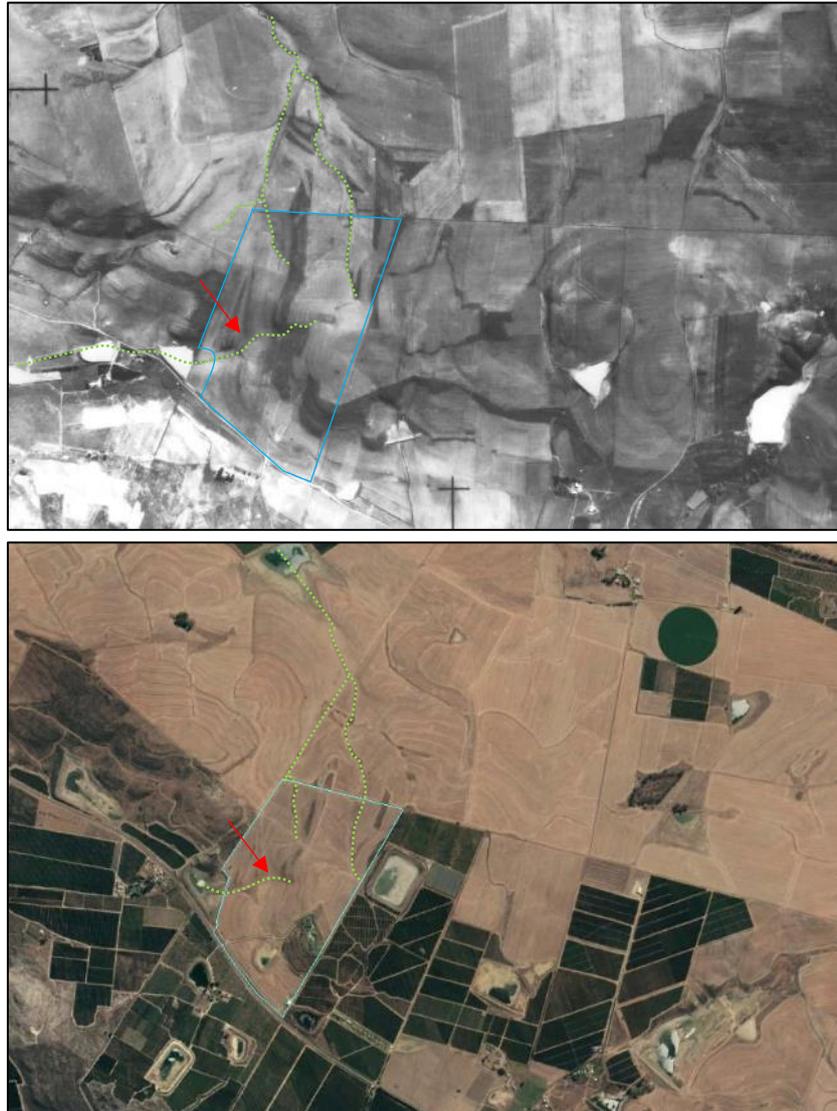


Figure 5: (Top) Historical imagery (circa 1942) of the farm on which the proposed Jade Hills dam would be developed, compared to the most recent satellite imagery (circa 2017). The blue outline indicates the boundary of the farm and the green dashed line indicates the surface flow paths. Take note that the surface flow path in the south western portion of the farm (as indicated by the red arrow) has been altered by surrounding agricultural activities.

Furthermore, on comparison of the digital satellite imagery available between 2013 and 2017; imagery from 2013 (just after the wet season) (Figure 6) indicates a pronounced wetness digital signature of the drainage line within the footprint area of the proposed dam (hereafter referred to as 'drainage line 1') and a drainage line located south west of the footprint area (hereafter referred to as 'drainage line 2'), correlating to a surface flow paths identified in the historical imagery (Figure 5). After a period of drought in the Western Cape, and imagery of the dry season (December 2017), an area distinctly different to that of the surrounding area, is visible (Figure 6).



Figure 6: Digital satellite imagery from 2013 (Top – wet season) and 2017 (Bottom – dry season), shows an area with a different digital signature than that of the surrounding area (indicated by yellow arrows). These areas correspond to the drainage lines as identified within the historical imagery (Figure 5).

An elevation profile (Figure 7) generated for the footprint area of the proposed dam using Google Earth, shows that the proposed dam would be located within a footslope position (in a south to north direction), but located in a valley area between sloped areas, west and east of the proposed dam area. Based on this, the topographic setting of drainage line 1 (as indicated in Figure 7) within the landscape, indicates that water would drain into this area of lowest relief and drain further in a northerly direction. The drainage line is further identifiable on the 1:50 000 topographical map provided in Figure 2.



Figure 7: The elevation profile of the proposed Jade Hills dam, indicating the position of the dam (blue lines) and the locality of the drainage line (yellow arrow) relative to the elevation of the surrounding area.

The following table contains data accessed as part of the desktop assessment and 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 footprint area of the proposed dam’s actual site characteristics at the scale required to inform the environmental authorisation and/or water use authorisation processes, however, this information is considered to be useful as background information to the study. This data was therefore used as a guideline to inform the assessment and to focus on areas and aspects of increased conservation importance during the site-specific field verification survey.

Table 1: Desktop data relating to the characteristics of the footprint area of the proposed dam.

Aquatic ecoregion and sub-regions in which the proposed dam is located.		Detail of the proposed dam in terms of the National Freshwater Ecosystem Priority Area (NFEPA) (2011) database.	
Ecoregion	Western Folded Mountains	FEPACODE	The proposed dam is located within a sub-quaternary catchment considered to be important as a Fish Support Area (FEPA CODE = 2)
Catchment	Breede		
Quaternary Catchment (Figure 7)	H10B	NFEPA Wetlands (Figure 8 & 9)	According to the NFEPA Database no wetland features are located within the proposed dam footprint, however, a wetland flat is identified within the investigation area, approximately 170m south-east of the proposed dam. A portion of this wetland is considered to be natural, albeit largely modified (WETCON Z2), however a large extent thereof is considered to be artificial.
WMA	Breede		
subWMA	Upper Breede		
Dominant characteristics of the Western Folded Mountains Ecoregion Level II (23.01) (Kleynhans et al., 2007).		Wetland Vegetation Type	The proposed dam is situated within the Western Fynbos-Renosterveld Shale (Critically Endangered) Wetland Vegetation Type. The threat status is provided by Mbona <i>et al</i> (2014).
Level II Code	23.01		
Dominant primary terrain morphology	Closed Hills; Mountains; Moderate and High Relief.	NFEPA Rivers (Figure 8)	No rivers are located within the proposed dam nor the investigation area. The NFEPA Database did identify the Titus River to be located approximately 1.7km south of the proposed dam.
Dominant primary vegetation types	Mountain Fynbos; Central Mountain Renosterveld; West Coast Renosterveld (very limited) and Little Succulent Karoo.		
Importance of the proposed dam according to the Western Cape Biodiversity Spatial Plan (2017) (Figure 10)			
According to the Western Cape Biodiversity Spatial Plan (2017), the proposed dam is located within an Other Ecological Support Areas Buffer. The objective of this areas is to maintain ecological processes provided by the Ecological Support Areas (ESAs).			
Altitude (m a.m.s.l)	300-1700		
MAP (mm)	100 to 1500		
The coefficient of Variation (% of MAP)	<20 to 40		
Rainfall concentration index	30 to >65		
Rainfall seasonality	Winter		
Mean annual temp. (°C)	10 to 20		
Winter temperature (July)	10 – 18		
Summer temperature (Feb)	18 – 32		
Median annual simulated runoff (mm)	5 to >250		

CBA = Critical Biodiversity Areas; DWS = Department of Water and Sanitation; EI = Ecological Importance; ES = Ecological Sensitivity; ESA = Ecological Support Area; m.a.m.s.l = Meters Above Mean Sea Level; MAP = Mean Annual Precipitation; NFEPA = National Freshwater Ecosystem Priority Areas; PES = Present Ecological State; WMA = Water Management Area



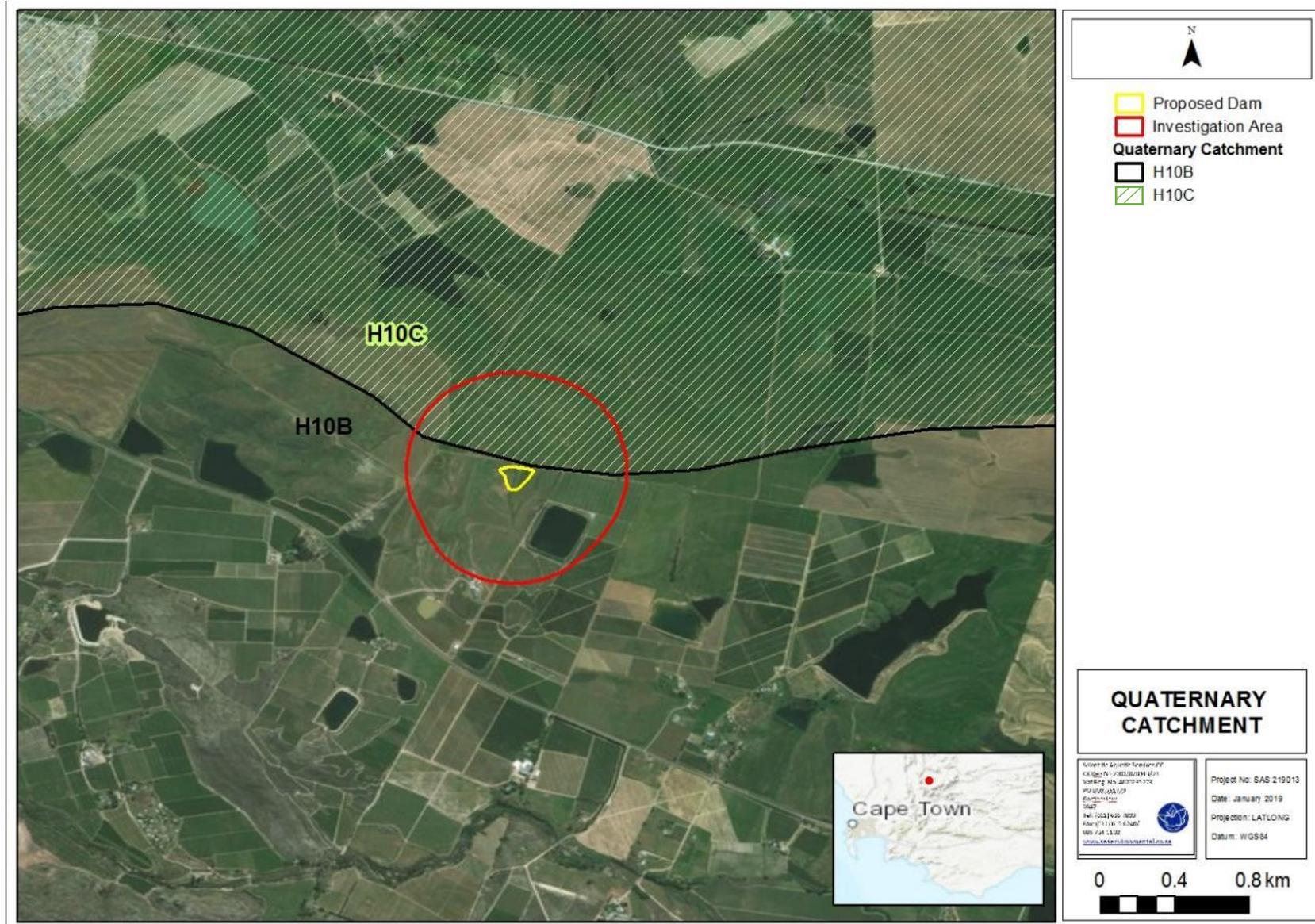


Figure 8: The footprint area of the proposed dam is located on the boundary of the H10B Quaternary Catchment, within the larger Breede Catchment.



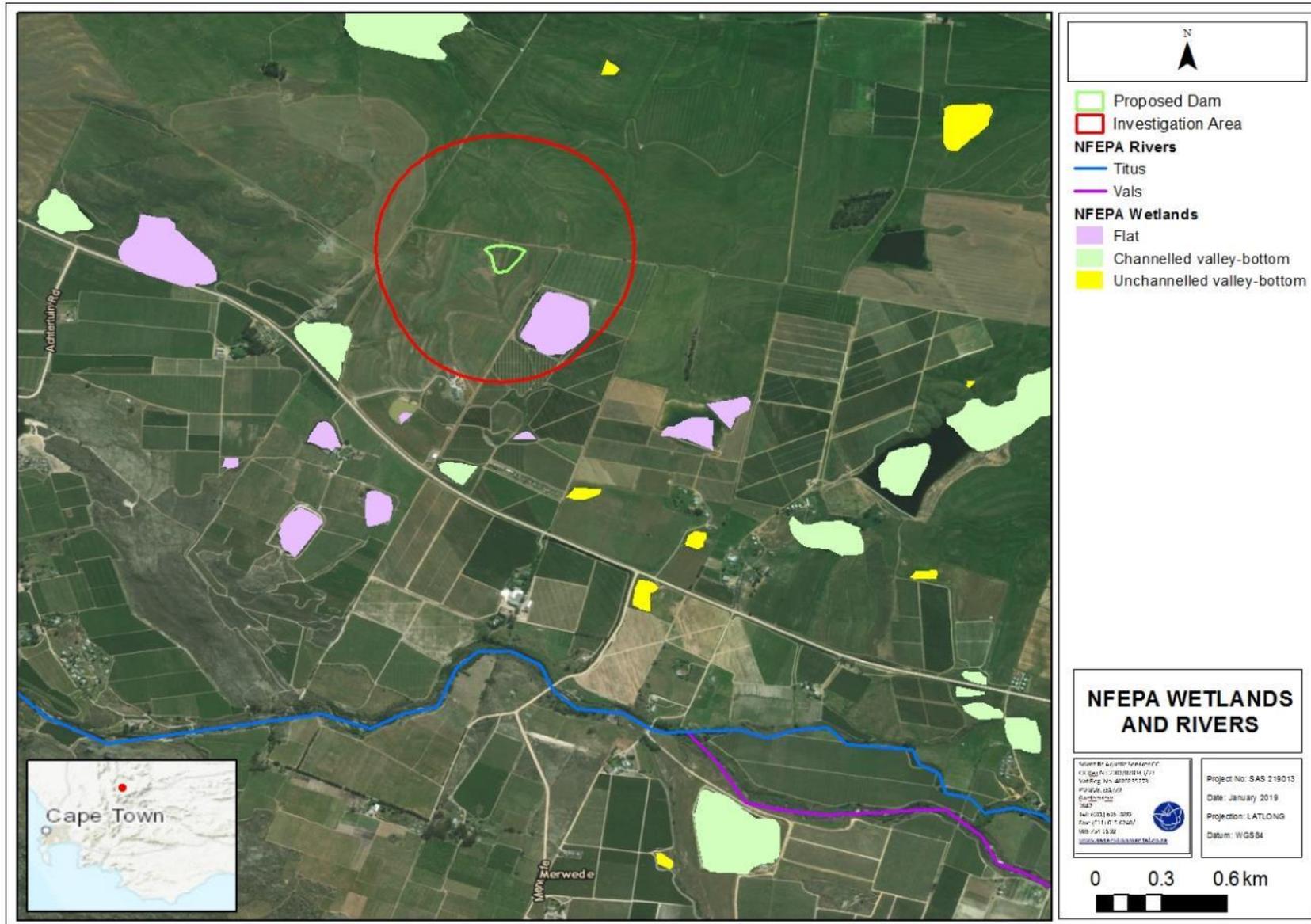


Figure 9: The HGM units and Rivers identified by the NFEPA Database (2011) within the investigation area and the surrounding area.



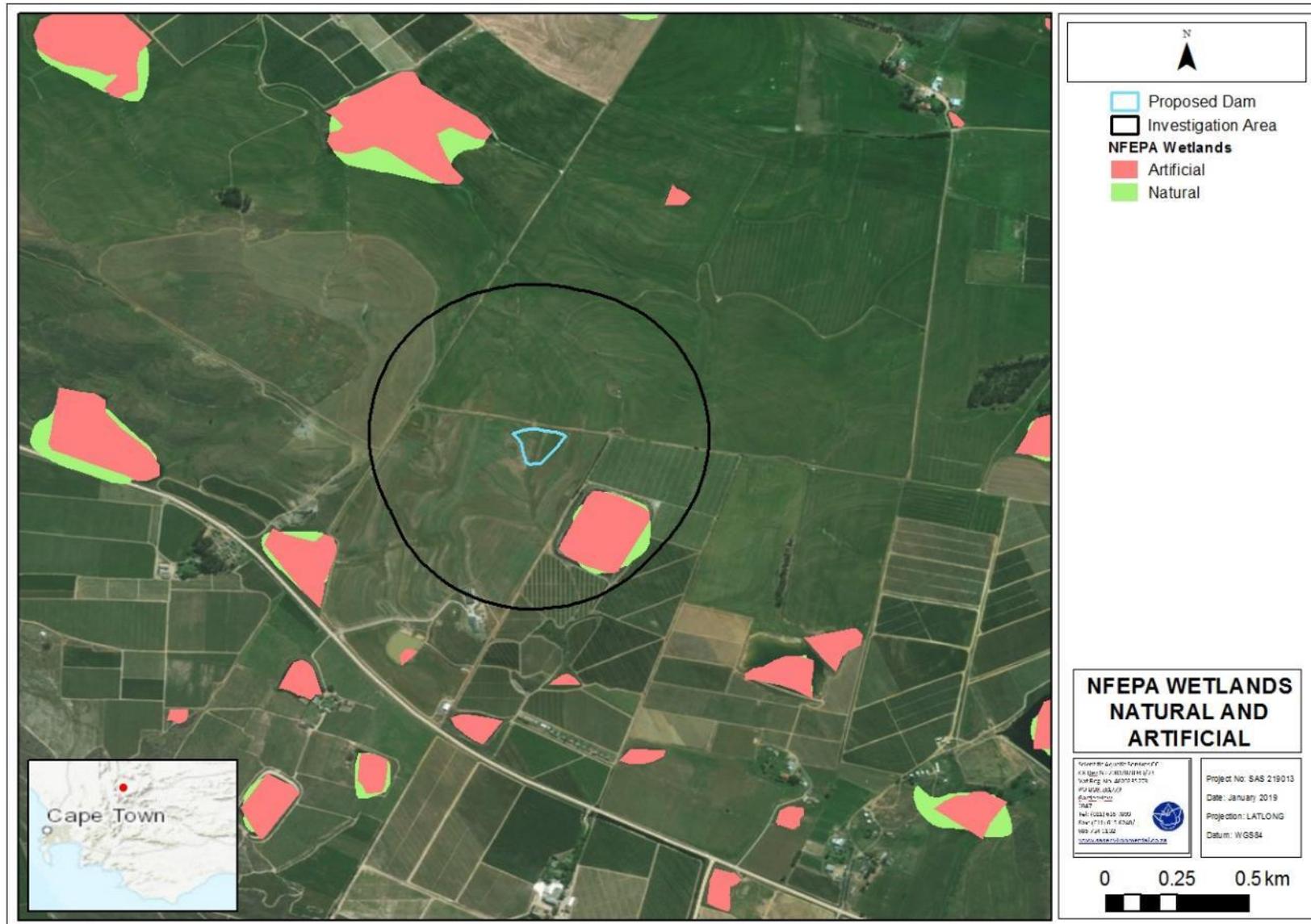


Figure 10: Artificial and Natural Wetland features associated with the footprint of the proposed dam and investigation zone according to the NFEPA database (2011).



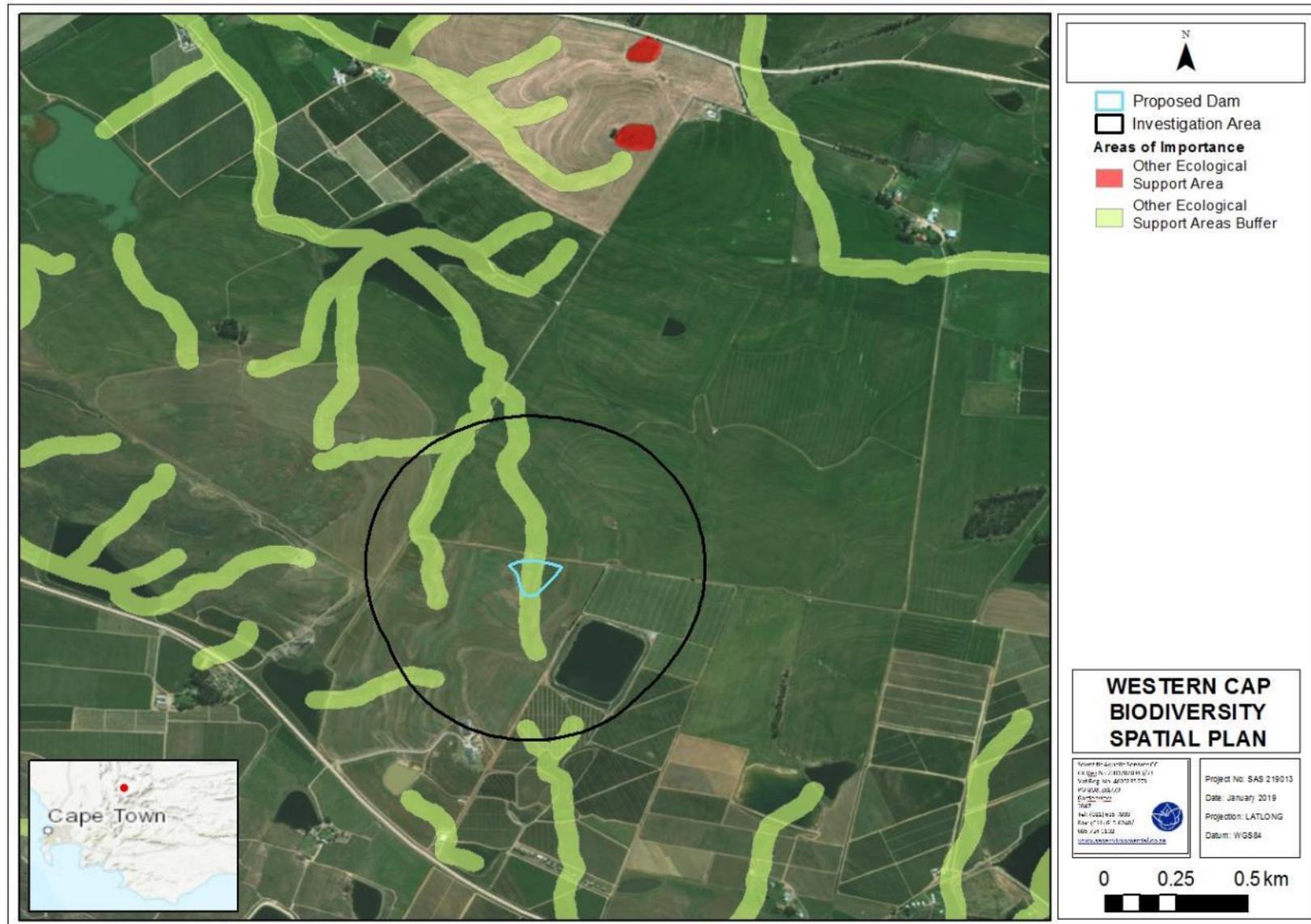


Figure 11: Areas of importance associated with the footprint area of the dam and its investigation area, as identified by the Western Cape Biodiversity Spatial Plan (2017).



2.2. Site Verification Results

A site visit was undertaken on the 15th of January 2019, during which the presence of any areas representing with freshwater characteristics as defined by the DWAF (2008) or watercourses as defined by the National Water Act, 1998 (Act No. 36 of 1998) was identified. The following indicators assist in determining the presence of a watercourse within the study area:

- Terrain units are used to determine in which parts of the landscape a watercourse is most likely to occur (Figure 7);
- Surface water and/or saturated soils/alluvial soils can be used to determine if there is a permanent zone and to define the outer boundaries (temporary zone) of a watercourse;
- Soil form indicators are used to determine the presence of soils that are associated with prolonged and frequent saturation and a fluctuating water table within 50 cm of the land surface; and
- Obligate and facultative 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 determine the boundary of a watercourse. Due to the onsite conditions (burning of the larger area and removal of natural vegetation as part of cultivation activities), this indicator could not be relied upon for the delineation of any watercourses.

It should be noted that for an area to be identified as a watercourse, at least two (2) of the above indicators should be present (*Pers Comm Prof. F. Ellery*).

3. KEY OBSERVATIONS

1. The footprint area of the proposed dam is located within the footslope position in the landscape, changing into the valley bottom position just north of the proposed dam area (Figure 12). The proposed dam area has been burnt and cultivated.



Figure 12: The blue line indicates the approximate extent of the footprint area of the proposed dam. The landscape position changes from a footslope (right) into a valley bottom position (left), draining in a south to north direction (green arrow).

2. An episodic^[1] drainage line was identified to be located in the footprint area of the proposed dam (Figure 12). This drainage line is referred to as drainage line 1. This feature is considered to be degraded as it has no natural riparian vegetation remaining and very few vegetation species were present (vegetation had not recovered after the area was burnt). An erosion gully was present within the drainage line, of which the depth thereof was more incised in the downstream reaches. The natural compaction and rocky nature of the soil (strong soil structure)

^[1] "Highly flashy systems that flow or flood only in response to extreme rainfall events, usually high in their catchments. May not flow in a five-year period, or may flow only once in several years." (Uys and O'Keeffe, 1997, in Rossouw *et. al*, 2006).



prevents exacerbation of erosion, but due to the removal of the vegetation in the surrounding area and the degradation thereof in the drainage line, the depth of the erosion gully is deeper in the downstream reaches of the drainage line in the investigation area. This drainage line enters a dam located approximately 930m north of the proposed dam area. No other wetlands were found to be located within the footprint area of the dam nor the investigation area. The wetland flat identified by the NFEPA Database (Figure 10) to be located within the investigation area was identified as a dam located south-east of the proposed dam area. The locality of the drainage line in relation to the footprint area of the proposed dam and its investigation area is presented in Figure 14.



Figure 13: Photographs of the drainage line located within the footprint area of the proposed dam. The drainage line has an eroded gully, which varies in depth between its upstream and downstream reaches. This drainage line and the general surrounding area is rocky, and it is evident that some of the rocks removed from the surrounding cultivated areas have been placed within the drainage line. (*The green arrow indicates the direction of drainage).

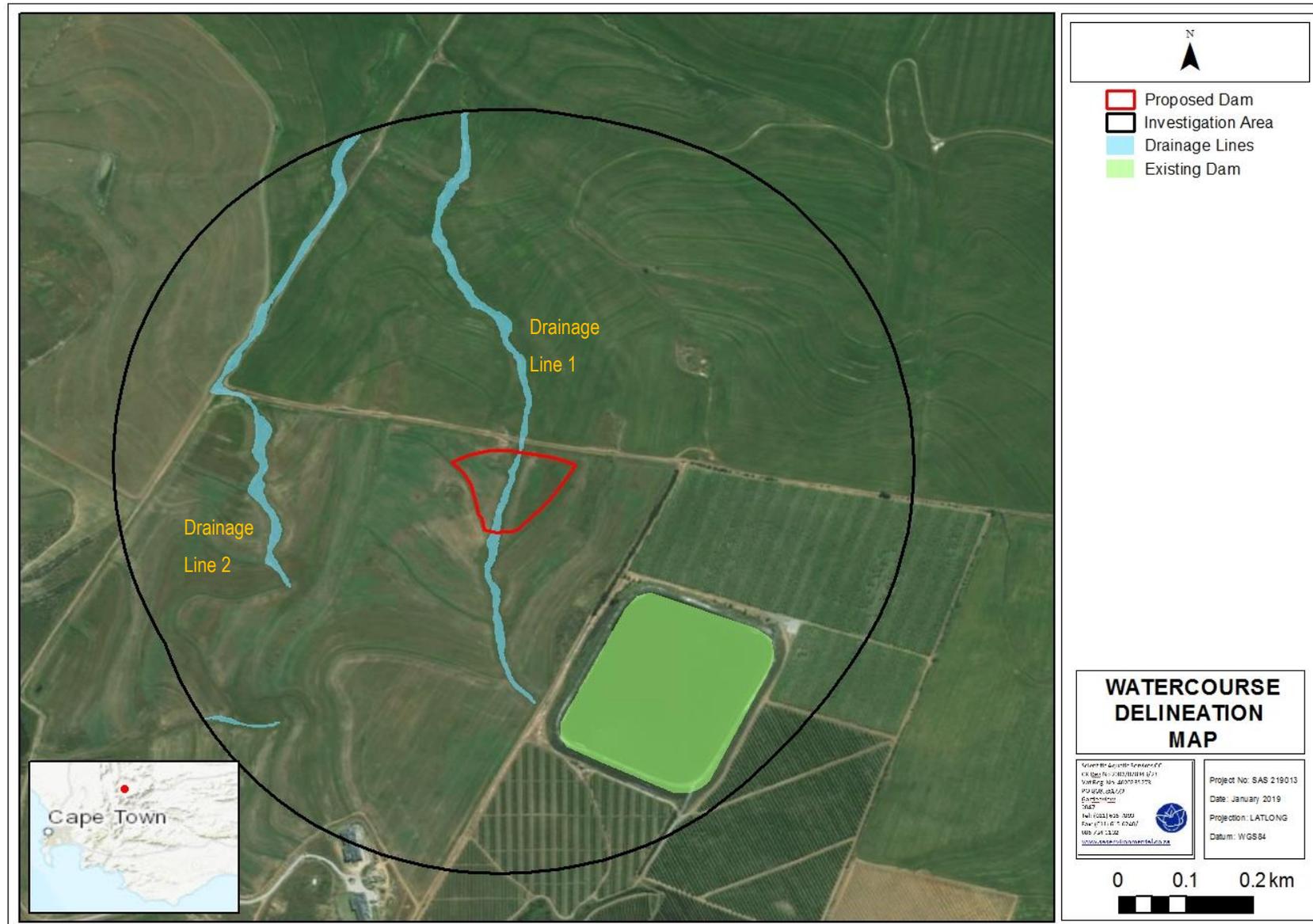


Figure 14: The delineation of the drainage line located within the footprint area of the proposed dam, in relation to its investigation area.



3. This episodic drainage line does not receive and retain sufficient water to support a wetland response or sustain riparian characteristics, such as:

- a. Facultative or obligate wetland vegetation species:

Despite the vegetation component of the drainage line being significantly disturbed (mainly due to the surrounding cultivation activities), no remnants of sedges or any other type of indicator watercourse vegetation could be identified. The drainage line is mostly dominated by grass species, specifically *Avena fatua* (wild oats), a common weed species occurring in areas of disturbance (Figure 14).



Figure 15: The grass species *Avena fatua* was found to be the dominant vegetation species during the time of assessment, with no other natural riparian vegetation identified.

- b. Have a change in structure and composition of bankside vegetation due to hydromorphological drivers:

Although there is a change from the vegetation species located within the drainage line to that of its surrounding area, it is only due to the surrounding area being cultivated (all natural vegetation has been removed) and only some grass species persist in the drainage line. Thus, there are no distinct changes in structure from the vegetation within the drainage line to that of the surrounding area. However, historically, before any cultivation activities vegetation growth within this drainage line could have been more prominent (Figure 5) due to mountain fynbos and renosterveld vegetation propagating more densely in the drainage line, mainly due to microclimatic conditions, protection from fires etc. that these ravine areas provide, especially in gullies that provide protection from adverse weather conditions and reduce evaporation potential as a result of canopy cover. Also, during a period of higher rainfall, as seen in Figure 6, a distinct presence of vegetation in the drainage line is notable, however, from the digital satellite imagery, it is difficult to ascertain if it indicates an increase in vegetation density or a difference in vegetation structure to that of its surrounding vegetation.

- c. Have soils with prolonged and frequent saturation:

The soil profile associated with the drainage line was investigated using a hand auger (Figure 16). Due to the rocky nature of the area, it was only possible to auger to a depth of 20cm. This auger sample was uniform in colour (orange/brown) and did not show any redoximorphic features such as mottling or gleying (which is caused by prolonged saturated conditions in the soil and the subsequent development of anaerobic conditions). Upon investigation of the soil profile of the erosion gully, no variation in soil characteristics were evident (Figure 16), only indicating that the drainage line is composed of shallow compacted, strong structured soils on a hard bedrock (to which the gully has eroded to). Nevertheless, during the event of rainfall, surface runoff would enter the drainage line, in which water would then be conveyed into the larger downstream area which enters a dam approximately 930m north of the proposed dam area.



Figure 16: (Left) A hand auger sample, indicating uniform soil colour and strong structured soil. (Right) The soil profile of the erosion gully is rocky did not show any variation in colour or structure.

4. This drainage line is expected to have surface water present only during and immediately after rainfall events, in which water would be present for a few days (if not shorter) and conveyed to the downstream dam. During the site visit, it was evident that the most upstream point of this drainage line is directly below an existing dam (upstream and south-east of the proposed dam area) (Figure 17). No evidence of an outlet from the dam or visible seepage into the drainage line was evident, but it is possible that if the dam reaches full capacity, spill over water would be conveyed within the drainage line.



Figure 17: (Left) Digital satellite imagery indicating the most upstream point of the drainage line (yellow arrow) relative to the dam. (Right) It is clear that the drainage line is located just downstream of the dam, however, no evidence of seepage from the dam was evident.

5. It can be derived from the description of the drainage line as presented above, that it does lack the characteristics that define true watercourses, wetlands and riparian resources. For the purposes of this investigation, the definitions of a watercourse, wetland and riparian habitat were taken as per that in the National Water Act, 1998 (Act 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.

Wetland habitat is “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.”

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.

6. Although the drainage line cannot be classified as a riparian resource (to which the drainage line mostly relates to, as per the definitions above) in the traditional sense thereof due to the lack of saturated soils and wetland/riparian vegetation, it does function as a waterway, through episodic conveying of water, and therefore potentially enjoys protection in terms of the National Water Act, 1998 (Act 36 of 1998), if a 1:100 floodline is present.
7. Based on the description of drainage line 1 associated with the proposed Jade Hills dam development above and its digital satellite signatures (Figure 6), the drainage lines in the investigation area (west of the proposed dam, as presented in Figure 14) could be considered to have similar on-site characteristics as the drainage line associated with the proposed Jade Hills dam footprint. These drainage lines were not assessed on site (only considered as part of the desktop assessment as they are within the 500m investigation area), but since the drainage line south west of the proposed dam (drainage line 2) may potentially be crossed by the proposed abstraction pipeline (Figure 4), it must be considered as part of this watercourse verification report.
 - a. Based on the most recent digital satellite imagery of drainage line 2 (Figure 5 and 6), it presents with similar digital characteristics as that of the drainage line within the dam footprint, except that drainage line 2 is narrower and its catchment seemingly smaller.
 - b. From digital satellite imagery (Figure 6) it can be seen that the local catchment of drainage line 2 has been transformed by cultivation and there are also no distinct changes in structure from the vegetation in drainage line 2 to that of the surrounding area. Based on this, the functioning and ecological condition of drainage line 2 is expected to be similar to that of the drainage line 1. As such, drainage line 2 may function as a waterway, through episodic conveying of water, and therefore potentially enjoys protection in terms of the National Water Act, 1998 (Act No. 36 of 1998), if a 1:100 floodline is present. To accurately determine the ecological condition and functionality of drainage line 2, it is recommended that it be verified during an on-site verification assessment.

4. CONCLUSION

Based on the findings of the study, the following is recommended:

1. The area in which the proposed dam is located is deemed to be significantly transformed due to extensive cultivation activities within the catchment. This has altered the movement of water in the landscape and impacted the biodiversity thereof.
2. Given the findings of this investigation, it is concluded that there are no true wetlands or riparian resources within the footprint area of the proposed dam. The footprint area is located within an area where an episodic drainage line is present. Other drainage lines, within similar digital signatures (such as drainage line 2), were also identified in the investigation area. This feature is considered to be ecologically degraded.
3. This episodic drainage line could historically have been more pronounced and hosted a larger diversity of species, but due to the transformation of its surrounding ecological corridor and the impact of the dam (located south-east of the proposed dam area) on the hydrological functioning



of the drainage line, it is not expected that it would provide habitat to a large variety of faunal species during the wet season.

4. Given the current site findings and the aspects of the drainage lines as presented above, it is the opinion of the ecologist that the drainage lines do not receive or retain sufficient natural flow to support a wetland response or sustain riparian characteristics. Although the drainage lines cannot be classified as a watercourse from an ecological perspective due to the lack of saturated soils and wetland/riparian vegetation, they do function as a waterway, through episodic conveyance of water from the limited upgradient catchment area. As such, they are considered important for hydrological purposes and therefore may enjoy protection and therefore may only enjoy in terms of the National Water Act, 1998 (Act 36 of 1998) if a 1 in 100 year floodline as applicable to the system.
5. Based on the above, and due to the lack of saturated soils and wetland/riparian vegetation any activities within these drainage lines it will not trigger a listed activity in terms of the National Environmental Management Act, 1998 (Act 107 of 1998), 2014 EIA regulations (as amended) in terms of listed activities pertaining to watercourses.

We trust we have interpreted your requirements correctly. Please do not hesitate to contact us if there are aspects of this document that you would like to discuss further.

Yours Faithfully,

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Christel du Preez

Reviewed by:

Kim Marais (Pri.Sci.Nat), Stephen van Staden (Pri.Sci.Nat)



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