



FEN CONSULTING

Reg No. 2019/432634/07
VAT Reg No. TBC
PO Box 751779
Gardenvue
2047
Tel: 011 616 7893
Fax: 086 724 3132
Email: admin@sasenvgroup.co.za
www.sasenvironmental.co.za

FRESHWATER ECOLOGICAL VERIFICATION ASSESSMENT FOR PORTION 18 AND PORTION 55 OF ERF 37119, IN KRAAIFONTEIN, CAPE TOWN, WESTERN CAPE PROVINCE

Prepared for

Bo Mo Property Developers (Pty) Ltd

August 2020

Prepared by:	FEN Consulting (Pty) Ltd
Report author:	C. du Preez (Pr. Sci. Nat)
Report reviewers:	K. Marais (Pr. Sci. Nat)
Report reference:	FEN 21-0043
Date:	August 2020



SAS Environmental Group of Companies

TABLE OF CONTENTS

TABLE OF CONTENTS	ii
LIST OF FIGURES	iii
LIST OF TABLES	iii
GLOSSARY OF TERMS	iv
DOCUMENT GUIDE	v
1. INTRODUCTION	1
1.1. Project Description	1
1.2. Assumptions and Limitations	4
2. ASSESSMENT APPROACH	5
3. RESULTS	6
3.1. Desktop Assessment Findings	6
3.2. Site Verification Results	13
2.2.1 Key observations of the site assessment	13
4. LEGISLATIVE REQUIREMENTS & SENSITIVITY MAPPING.....	16
5. RISK ASSESSMENT.....	17
5.1. Risk Assessment Discussion	17
4.2. Cumulative Impacts	21
6. CONCLUSION	21
7. REFERENCES	22
ANNEXURE A: RISK ASSESSMENT OUTCOME	23
ANNEXURE B: Details, Expertise and Curriculum Vitae of Specialists	25



LIST OF FIGURES

Figure 1:	Digital satellite image depicting the study and investigation areas in relation to the surrounding area.....	2
Figure 2:	Location of the study and investigation areas depicted on a 1:50 000 topographical map, in relation to surrounding area.....	3
Figure 3:	Conceptual layout plan for the proposed permeable paving areas (purple polygons) and pipeline infrastructure below the smoothed 1:100 year floodline (red dashed line) (Graeme McGill Consulting, 2019).	4
Figure 4:	Historical photograph of the approximate locality and extent of the study area (location of the study area indicated in red) (Flight Plan 635 of Job 620). The blue dashed line indicates signatures representative of the unnamed tributary of the Mosselbank River, east of the study area.	6
Figure 5:	Digital satellite imagery (2020) of the study area (red outline) relative to the Maarstricht canal (indicated by yellow line). The downstream reach of the watercourse is unlined (indicated by blue dashed line).....	7
Figure 6:	Natural and artificial watercourses associated with the investigation area as indicated by the NFEPA database (NFEPA, 2011).	10
Figure 7:	Wetlands identified surrounding the study area as per the City of Cape Town Wetlands dataset (2017).....	11
Figure 8:	Biodiversity importance of wetlands identified within the study and investigation areas as per the City of Cape Town Biodiversity Network dataset (2017).	12
Figure 9:	Photographs depicting the Maarstricht canal associated with the study area.	14
Figure 10:	Photographs depicting the vegetation of the area between the canal and the study area boundary indicated by the yellow dashed line (left) and the area below the floodline in the study area up to the boundary fence (yellow dashed line)(right). The Maarstricht canal is located east of the boundary fence (yellow dashed line).	14
Figure 11:	A map presenting the delineated extent of the Maarstricht canal, relative to the proposed development activities and “smoothed” 1:100 floodline of the Maarstricht canal.	15

LIST OF TABLES

Table 1:	Desktop data relating to the characteristics of the study area and surroundings.	9
Table 2:	Articles of Legislation and the relevant zones of regulation applicable to each article. .	16
Table 3:	Summary of the results of the DWS risk assessment applied to the Maarstricht canal which may potentially be impacted by the proposed installation of permeable paving below the 1:100 year floodline.....	18



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 flow 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.
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.
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, 1998 (Act 36 of 1998) a watercourse means: • 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.



DOCUMENT GUIDE

The table below provides the specialist report requirements for the assessment and reporting of impacts on aquatic biodiversity in terms of Government Notice 320 as promulgated in Government Gazette 43110 of 20 March 2020 in line with the Department of Environmental Affairs screening tool requirements, as it relates to the National Environmental Management Act, 1998 (Act No. 107 of 1998).

No.	Requirements	Section in report/Notes
2.1	The Aquatic Biodiversity Compliance Statement, must be prepared by a suitably qualified specialist in the field of aquatic sciences and must verify:	Cover page and Annexure B
2.1.1	That the site is of "low" sensitivity for aquatic biodiversity; and	Section 2.1: Table 1
2.1.2	Whether or not the proposed development will have an impact on the aquatic features.	Section 4.1 and Section 5
3	The Aquatic Biodiversity Compliance Statement, must contain, as a minimum, the following information:	
3.1	Contact details and curriculum vitae of the specialist including SACNASP registration number and field of expertise;	Annexure B
3.2	A signed statement of independence by the specialist;	Annexure B
3.3	Baseline profile description of biodiversity and ecosystems, including the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 3.2.1
3.4	Methodology used to verify the sensitivities of the aquatic biodiversity features on the national web based environmental screening tool;	Section 2
3.5	Methodology used to undertake the Initial Site Sensitivity Verification and preparation of the Compliance Statement, including equipment and modelling used, where relevant;	Section 2
3.6	Where required, proposed impact management outcomes or any monitoring requirements for inclusion in the EMP;.	Section 5
3.7	A description of the assumptions made and any uncertainties or gaps in knowledge or data as well as a statement of the timing and intensity of site inspection observations; and	Section 1.2
3.8	Any conditions to which the statement is subjected.	Section 4 and 5
4.	A signed copy of the full Aquatic Biodiversity Compliance Statement must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.	It is the responsibility of the EAP to ensure that this document is appended to the Basic Assessment Report or Environmental Impact Assessment Report.



1. INTRODUCTION

FEN Consulting (Pty) Ltd was requested to investigate portions 18 and 55 of Erf 37119, Kraaifontein, Western Cape Province (hereafter referred to as the 'study area'), for any watercourses which may be impacted by the proposed installation of a tar driveway, a 110 mm HDPE stormwater pipeline, a 110 mm HDPE slotted subsoil drain, and permeable paving below the 1:100 year floodline of the Maarstricht canal (Figures 1 and 2).

In order to identify all watercourses that may potentially be impacted by the proposed permeable paving activities, a 500 m "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 500 m 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 the South African National Biodiversity Institute (SANBI) Biodiversity Geographic Information Systems (BGIS) website (<http://bgis.sanbi.org>) as well as the National Freshwater Ecosystem Priority Areas (NFEPA) database and the relevant City of Cape Town Wetland Dataset (2017), 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 600 m east of Okavango Road. The Bonnie Brae residential area is located south of the study area and the Kraaifontein Waste Water Treatment Plant (WWTP) is located on its northern boundary. Construction activities for a mixed land use development is already underway within the study area, for which environmental authorisation has been granted (16/3/3/1/A5/40/2028/17) in February 2018.

To ensure sufficient parking bays for the mixed land use development, the proponent wishes to construct a tar driveway and more parking area by means of permeable pavers towards the eastern boundary of the study area. Additionally, a HDPE stormwater pipeline and a 110 mm HDPE slotted subsoil drain will also be installed predominantly within the footprint of the permeable paving parking area. The proposed driveway, permeable paving parking area, stormwater pipeline and slotted subsoil drain is located below the already "smoothed" 1:100 year floodline of the "Maarstricht canal" that is located outside the eastern boundary of the study area (Figure 3). As such, this report presents the outcome of the Department of Water and Sanitation (DWS) Risk Assessment Matrix to guide the application for Water Use Authorisation for the proposed activities below the 1:100 year floodline of the Maarstricht canal in terms of water uses as described in Section 21 (c) and (i) of the National Water Act, 1998 (Act No. 36 of 1998).



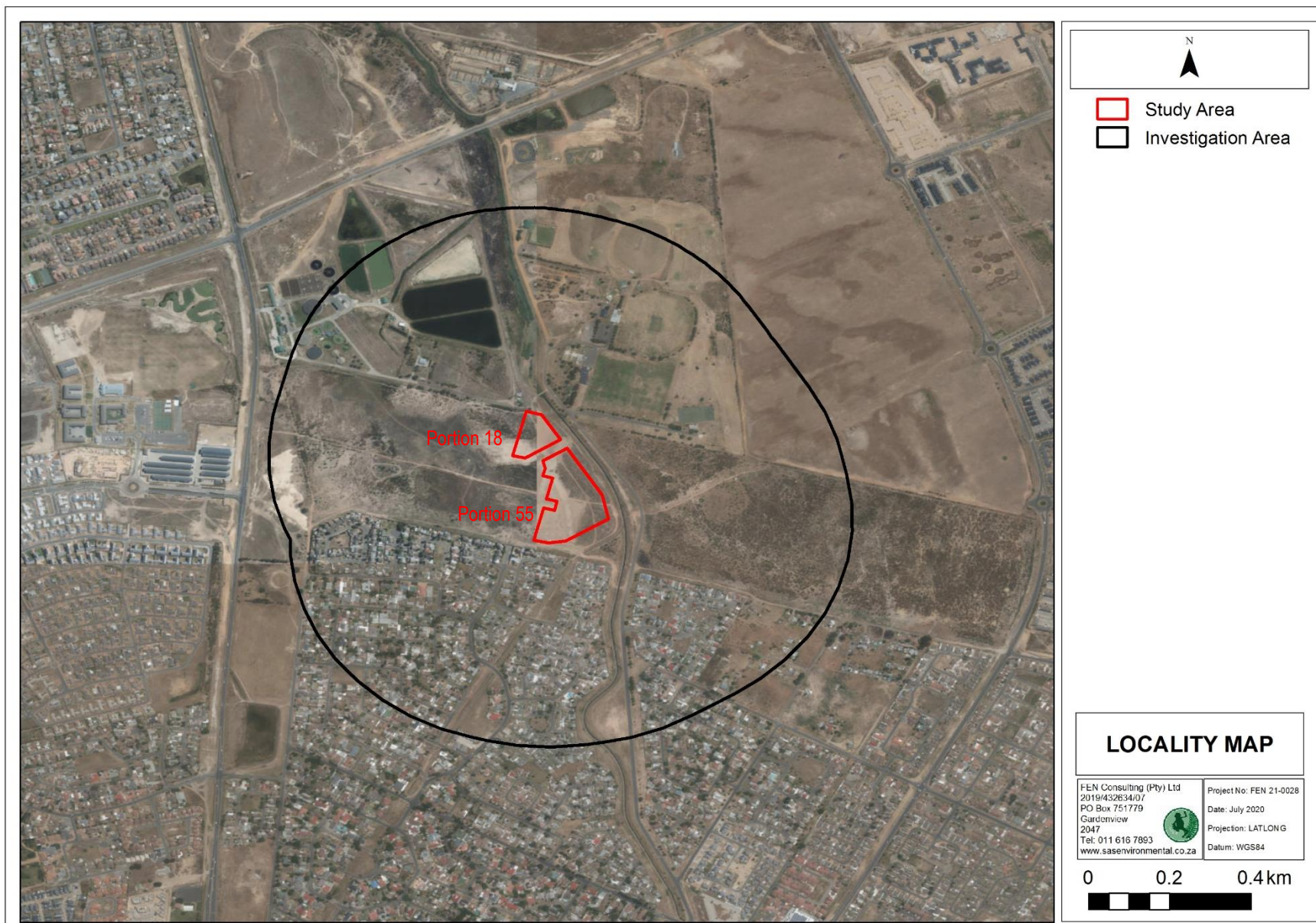


Figure 1: Digital satellite image depicting the study and investigation areas in relation to the surrounding area.



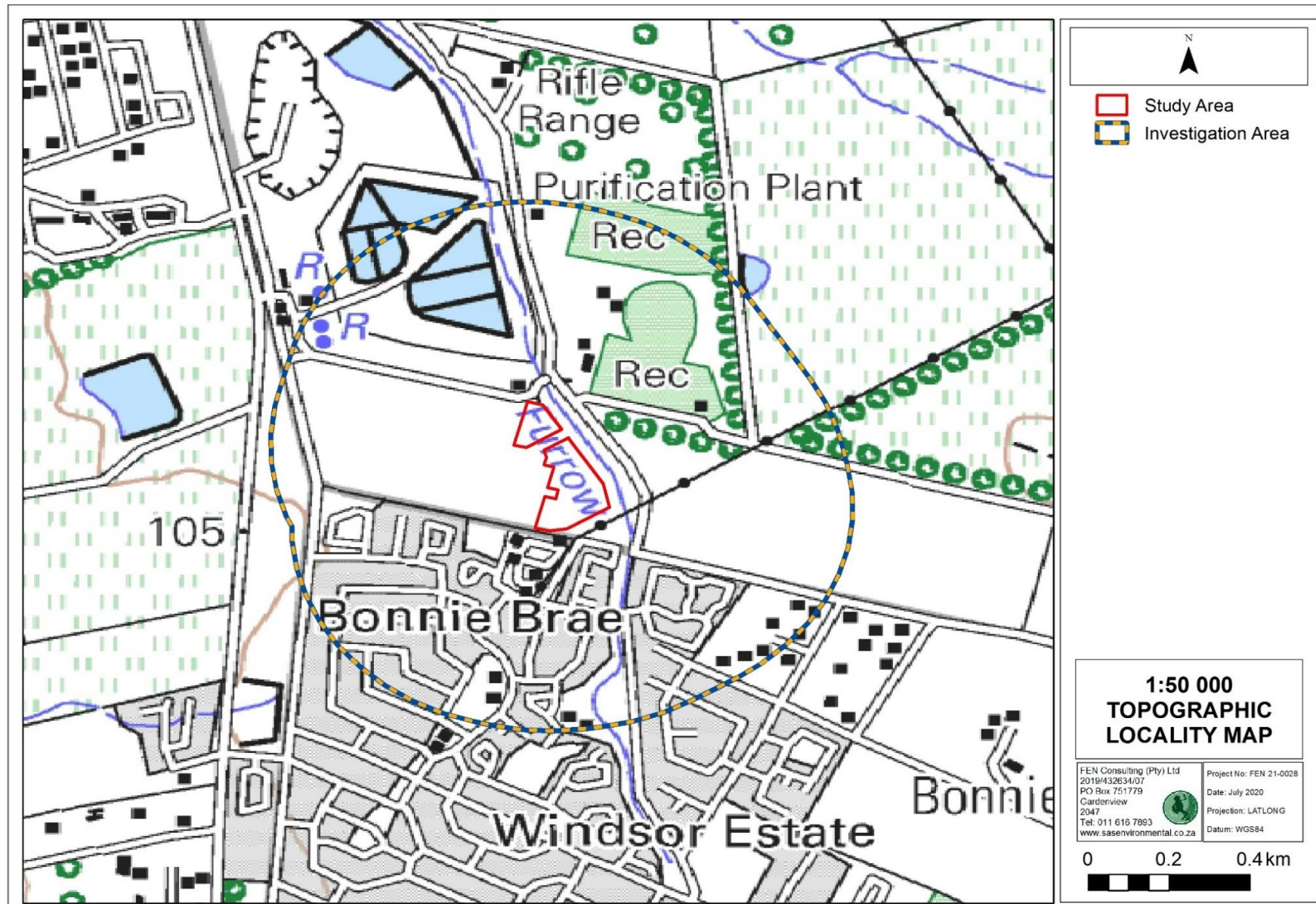


Figure 2: Location of the study and investigation areas depicted on a 1:50 000 topographical map, in relation to surrounding area.



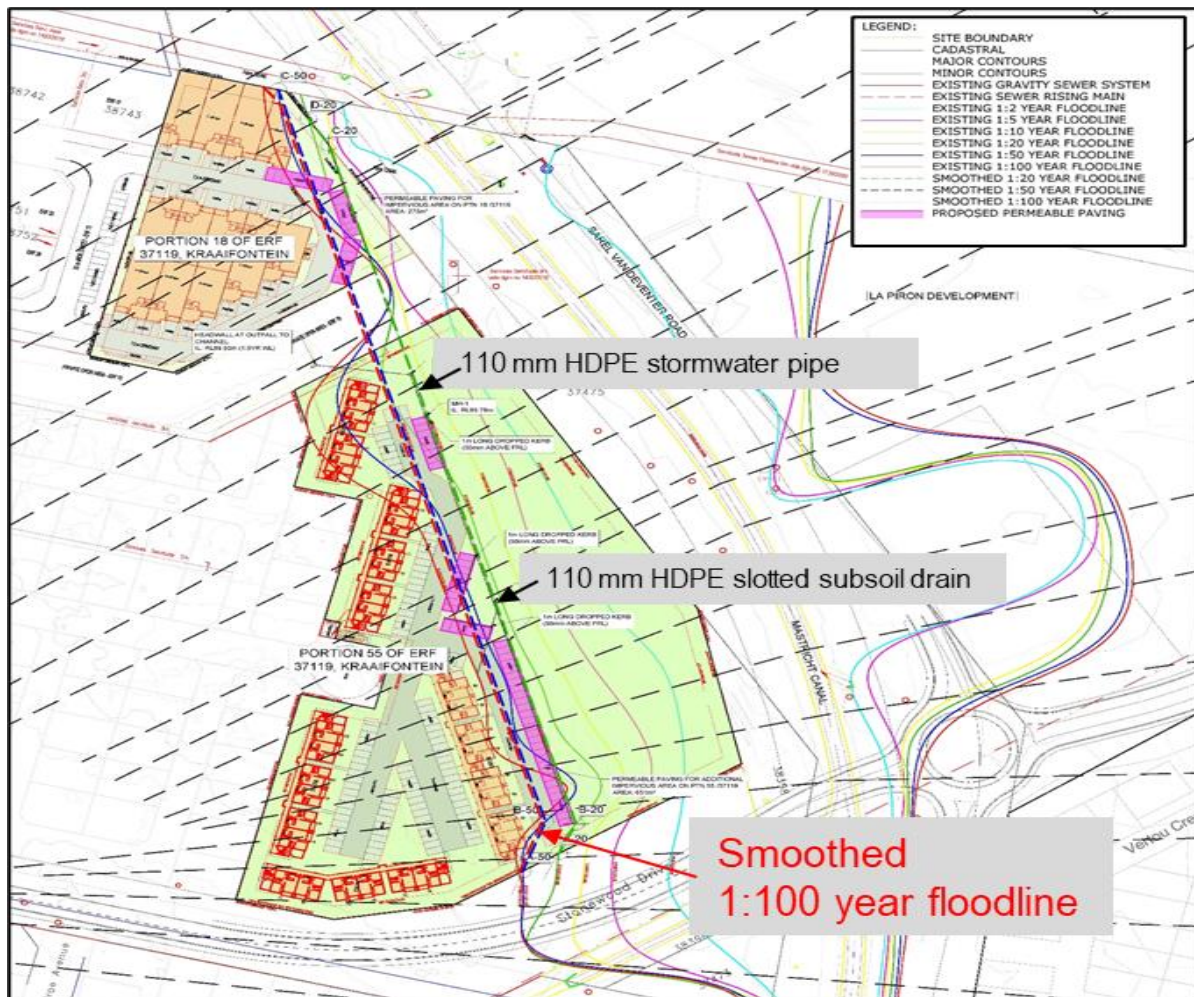


Figure 3: Conceptual layout plan for the proposed permeable paving areas (purple polygons) and pipeline infrastructure below the smoothed 1:100 year floodline (red dashed line) (Graeme McGill Consulting, 2019).

1.2 Assumptions and Limitations

- The determination of the watercourse boundaries is confined to the watercourses associated with the study area and based on a single site visit undertaken on the 6th of August 2020. All watercourses identified within the investigation area were delineated in fulfilment of GN509 as it relates to 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 any watercourses were undertaken as part of the scope of work;
- The outcome of the DWS Risk Assessment only considers the potential impact of the proposed 110 mm HDPE stormwater pipeline, a 110 mm HDPE slotted subsoil drain, and permeable paving activities below the 1:100 year floodline of the Maarstricht canal. It is assumed that all other activities within the study area has been suitably assessed and authorised by the relevant authorities;
- 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 (DWAF) ¹ (2008) 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. ASSESSMENT APPROACH

- A detailed desktop study was undertaken to highlight the EIS and PES based on databases such as the National Freshwater Ecosystem Priority Areas [NFEPA] (2011) database; the DWS Resource Quality Information System (RQIS) PES/ EIS (2014) database and the City of Cape Town wetlands dataset (2017));
- The national web based Environmental Screening Tool (DEA, 2020) was undertaken to screen the study area for any environmental sensitivity, with specific focus on aquatic sensitivities;
- The delineation of the watercourses associated with the study area according to (DWAF) (2008)²: A practical Guideline Procedure for the Identification and Delineation of Wetlands and Riparian Zones". Aspects such as soil morphological characteristics, vegetation types and wetness will be used to delineate the temporary zone of the various watercourses according to the guidelines;
- Delineation of all watercourses (using desktop methods) within 500 m of the study area in accordance with Government Notice 509 as published in the Government Gazette 40229 of 2016 as it relates to activities as stipulated in Section 21(c) and (i) of the National Water Act, 1998 (Act No. 36 of 1998) was undertaken using desktop methods, with limited field verification. However, the portion of the Maarstricht canal located adjacent to the study area was ground truthed;
- Application of applicable buffer zones and/or zones of regulation according to relevant legislation or provincial guidelines were delineated around the watercourses; and
- The Department of Water and Sanitation (DWS) Risk Assessment Matrix as promulgated in 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) was applied to determine the significance of the impacts associated with the proposed development activities and mitigatory measures were identified which aim to minimise the potential impacts.

¹ The Department of Water Affairs and Forestry (DWAF) 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.

² Although an updated manual is available since 2008 (Updated Manual for the Identification and Delineation of Wetlands and Riparian Areas). This is still considered a draft document currently under review.



3. RESULTS

3.1. 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. Signatures used to identify watercourses on digital satellite imagery or historical photographs include:

- 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 aerial photograph dating back to 1968 (Figure 4), a distinct watercourse, the unnamed tributary of the Mosselbank River can be identified along the eastern boundary of the study area. As can be seen in the historical photograph, the study area and surrounding areas were cultivated as far back as the 1960s (at minimum).

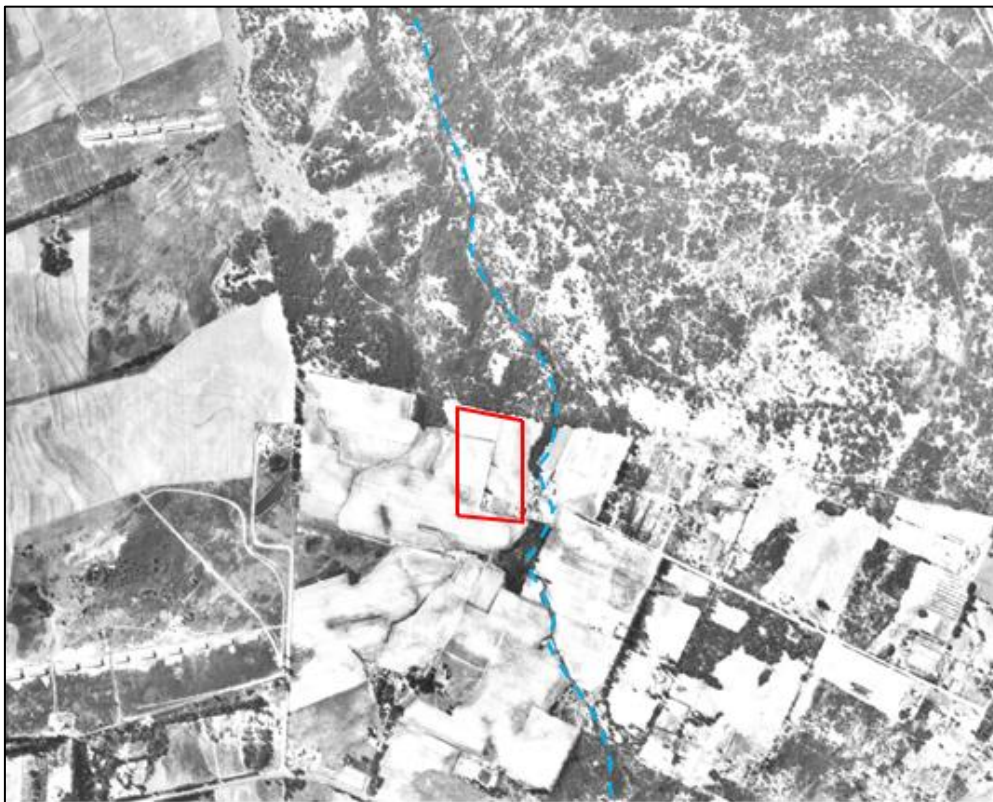


Figure 4: Historical photograph of the approximate locality and extent of the study area (location of the study area indicated in red) (Flight Plan 635 of Job 620). The blue dashed line indicates signatures representative of the unnamed tributary of the Mosselbank River, east of the study area.



On review of the latest digital satellite imagery circa 2020 (Figure 5), it is evident that the surrounding land uses have significantly transformed from the historical agricultural practices to peri-urban, with specific mention of current construction activities within the western portion of the study area. The area to the east of the study area remains predominantly agricultural. The upstream reach of the watercourse associated with the study area as per the historical imagery has also been straightened and formalised into a concrete lined channel, referred to as the Maarstricht canal (Figure 5). The downstream reach thereof, adjacent to the Kraaifontein Waste Water Treatment Works is still unlined.



Figure 5: Digital satellite imagery (2020) of the study area (red outline) relative to the Maarstricht canal (indicated by yellow line). The downstream reach of the watercourse is unlined (indicated by blue dashed line).



The following table contains data accessed as part of the desktop assessment and presented as a “dashboard-style” report below (Table 1). The dashboard report aims to present concise summaries of the data on as few pages as possible in order to allow for integration of results by the reader to take place. Where required, further discussion and interpretation are provided.

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 development site 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, and is important in legislative contextualisation of risk and impact, 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 study area and surroundings.

Aquatic ecoregion and sub-regions in which the study area is located		Detail of the study area in terms of the National Freshwater Ecosystem Priority Area (NFEPA) (2011) database	
Ecoregion	South Western Coastal Belt	FEPACODE	The study area is located within a sub-quaternary catchment of no freshwater ecological importance (FEPA CODE = 0).
Catchment	Berg/Bot/Potberg		
Quaternary Catchment	G21E	NFEPA Wetlands (Figure 6)	According to the NFEPA Database, no wetlands are located within the study area. Artificial unchanneled valley bottom wetlands are identified by the NFEPA database to be located in the northern portion of the investigation area. Based on digital satellite imagery, these features can best be described as dams associated with the wastewater treatment works (WWTW).
WMA	Berg		
subWMA	Lower Berg		
Dominant characteristics of the South Western Coastal Belt Ecoregion Level II (24.05) (Kleynhans <i>et al.</i> , 2007)		Wetland Vegetation Type	The study area is situated within the Southwest Sand Fynbos (Critically Endangered) Wetland Vegetation Type. The threat status is provided by Mbona <i>et al.</i> (2015).
Level II Code	24.05		
Dominant primary terrain morphology	Moderately Undulating Plains, Hills	NFEPA Rivers	As per the NFEPA database, the Mosselbank River is located approximately 4 km north east of the study area. According to the NFEPA Database, the Mosselbank River is considered largely modified (RIVCON = D).
Dominant primary vegetation types	West Coast Renosterveld, Mountain Fynbos, Sand Plain Fynbos, Central Mountain Renosterveld.		
		Importance of the study area according to the City of Cape Town Dataset (2017) (Figure 7)	
Altitude (m a.m.s.l)	100 to 500	According to the City of Cape Town Dataset (2017), no wetlands are located within the study area. Several artificial depression wetlands (classified as WWTW ponds) are located within the northern portion of the investigation area.	
MAP (mm)	400 to 500		
The coefficient of Variation (% of MAP)	25 to 35		
Rainfall concentration index	30 to 55		
Rainfall seasonality	Winter		
Mean annual temp. (°C)	16 to 18		
Winter temperature (July)	6 to 20		
Summer temperature (Feb)	14 to 30	Importance of the study area according to the City of Cape Town Biodiversity Network (2017) (Figure 8)	
Median annual simulated runoff (mm)	60 to 250	The study area is classified as Critical Biodiversity Area (CBA) 2. CBA 2 sites hosts critically endangered vegetation of restorable condition. These sites are needed for biodiversity targets but not for management consolidation, connectivity or viability of priority Biodiversity Network sites.	
National web based environmental screening tool (2020)			
The study area is located in an area considered of low aquatic sensitivity.			

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



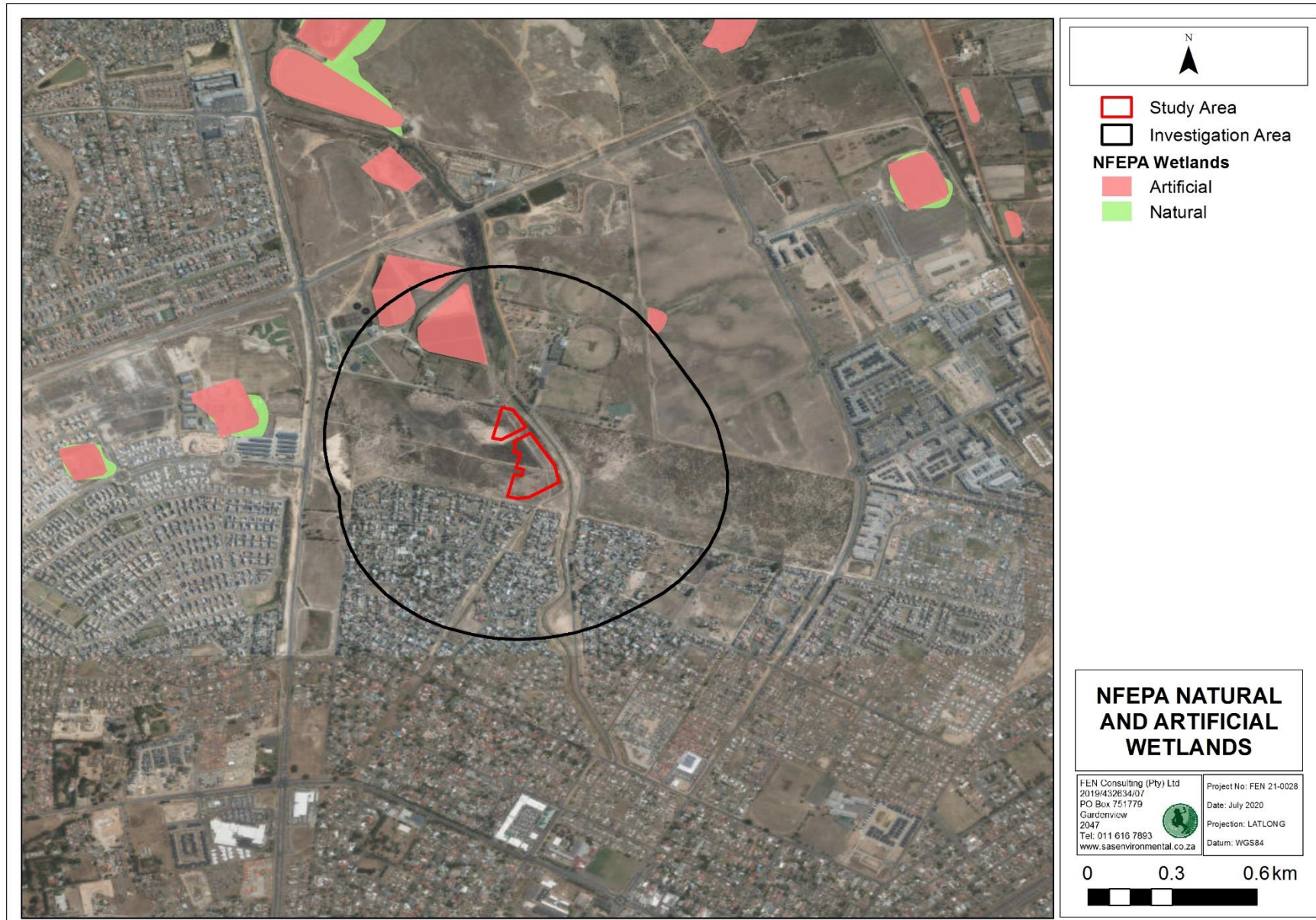


Figure 6: Natural and artificial watercourses associated with the investigation area as indicated by the NFEPA database (NFEPA, 2011).



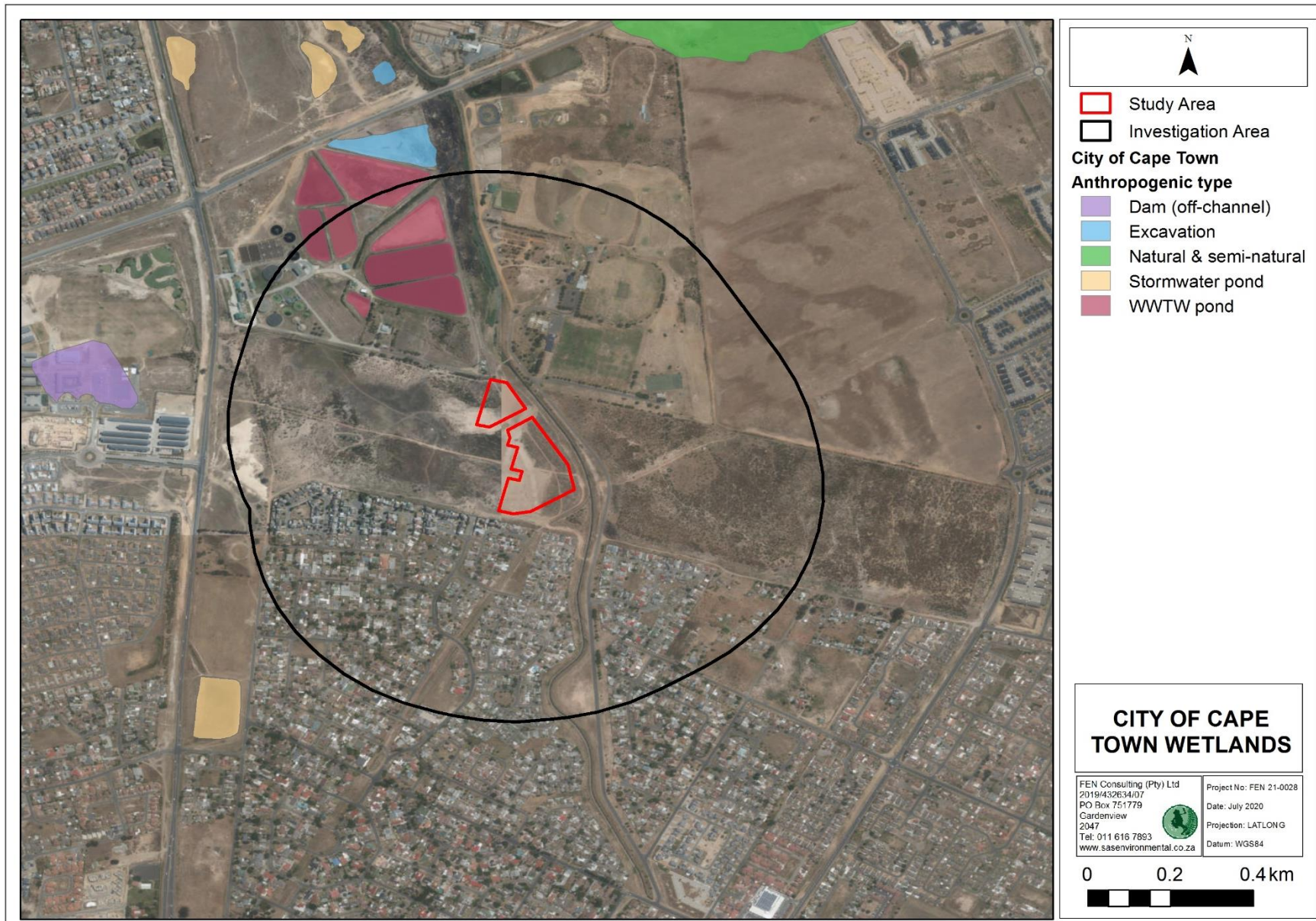


Figure 7: Wetlands identified surrounding the study area as per the City of Cape Town Wetlands dataset (2017).



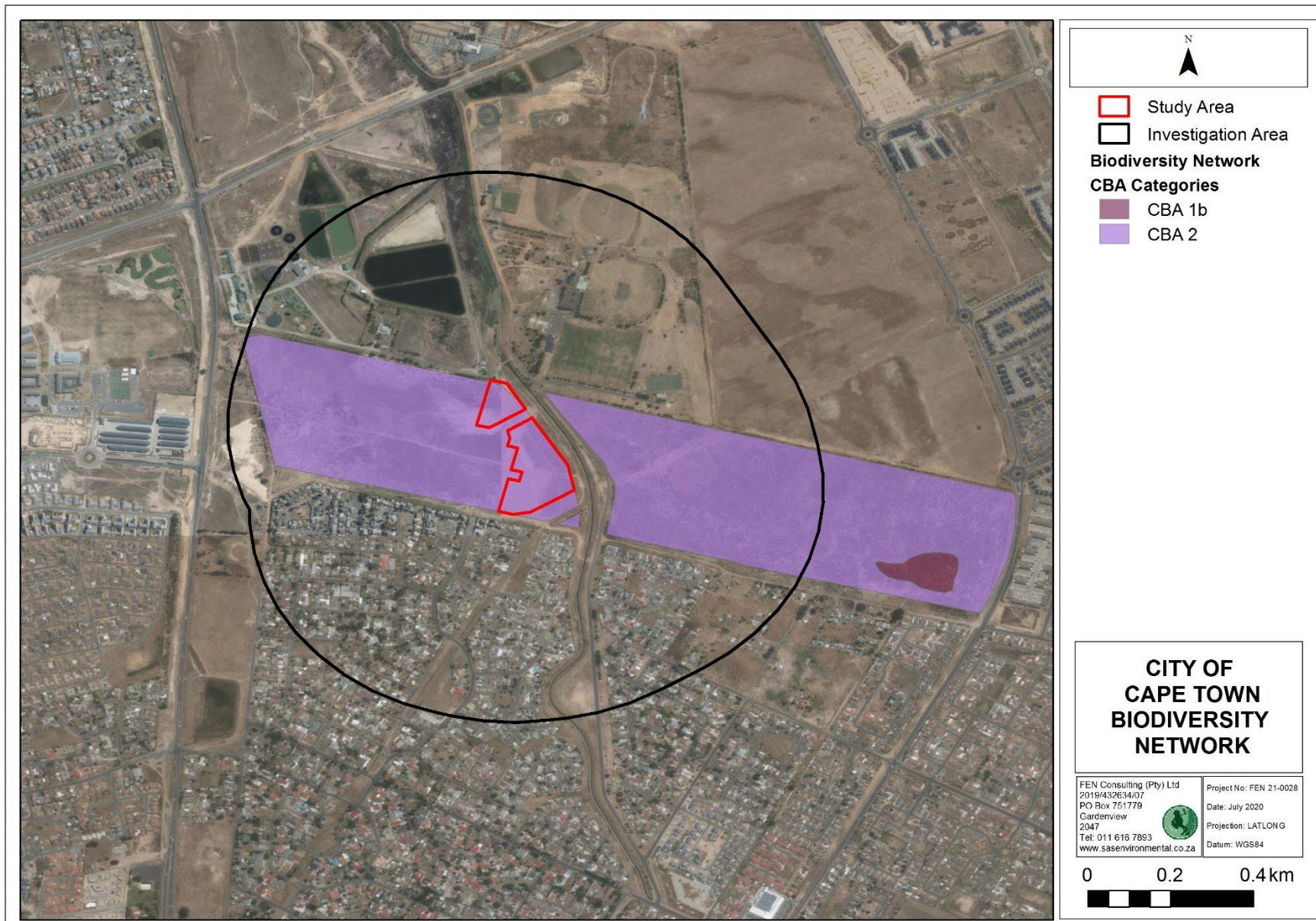


Figure 8: Biodiversity importance of wetlands identified within the study and investigation areas as per the City of Cape Town Biodiversity Network dataset (2017).



3.2. Site Verification Results

A site visit was undertaken on the 6th of August 2020 (Western Cape winter period³), 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.”

2.2.1 Key observations of the site assessment

Upon the site investigation of the study area on the 6th of August 2020, the following observations were made:

1. A canalised watercourse is located on the eastern boundary of the study area, known as the Maarstricht canal (Figure 9). Based on the historical imagery (Figure 4) this canal was previously an unnamed headwater tributary of the Mosselbank River. Canalisation of watercourses in Cape Town was introduced to reduce erosion of watercourses when large scale land use transformation occurred as part of the expansion of urban areas. The Maarstricht canal is a broad concrete lined channel. It is acknowledged that the canal functions as a stormwater channel, conveying surface water runoff from the local urbanised catchment.
2. It is the opinion of the ecologist that the Maarstricht canal, from an ecological perspective, does not conform to the ecological definition of a watercourse which supports aquatic ecosystems with an associated riparian zone. However, it does enjoy protection in terms of the definition of a watercourse as defined by the National Water Act, 1998 (Act No. 36 of 1998) (NWA), as the channel conveys water into the downstream larger Mosselbank River and have a floodline associated with it.

³ Site surveys are recommended to take place during a seasonal period where the probability of detecting an identifiable life history stage of vegetation species (such as facultative vegetation species) is highest and in the raining period to ensure optimised conditions for the identification of seasonal watercourses, which may otherwise be overlooked. Thus, the site conditions at the time of the field assessment is considered optimal as rainfall has occurred in the local area prior to the site assessment undertaken in August 2020.





Figure 9: Photographs depicting the Maarstricht canal associated with the study area.

3. No obligate or facultative wetland or riparian vegetation was noted within the Maarstricht canal or the open space area between the edge of the canal and the boundary fence of the study area, only graminoid species such as *Pennisetum clandestinum* (kikuyu grass) and *Acacia saligna* saplings (Figure 10) were observed. This vegetated strip between the canal and boundary fence is approximately 22 m in width. The area below the 1:100 year floodline within the study area is also well vegetated with a variety of terrestrial vegetation species (Figure 10). Although the Maarstricht canal is considered a watercourse from a legal perspective, the canal does not provide any significant ecological service other than hydrological connectivity and recharge to the downstream Mosselbank River (i.e. streamflow regulation), and flood attenuation.



Figure 10: Photographs depicting the vegetation of the area between the canal and the study area boundary indicated by the yellow dashed line (left) and the area below the floodline in the study area up to the boundary fence (yellow dashed line)(right). The Maarstricht canal is located east of the boundary fence (yellow dashed line).

4. The delineated extent of the Maarstricht canal relative to the study area and the proposed locality of the permeable paving parking area below the “smoothed” 1:100 year floodline is provided in Figure 11 below. As per Figure 11, the closest permeable paving parking area will be located approximately 30m east of the Maarstricht canal.



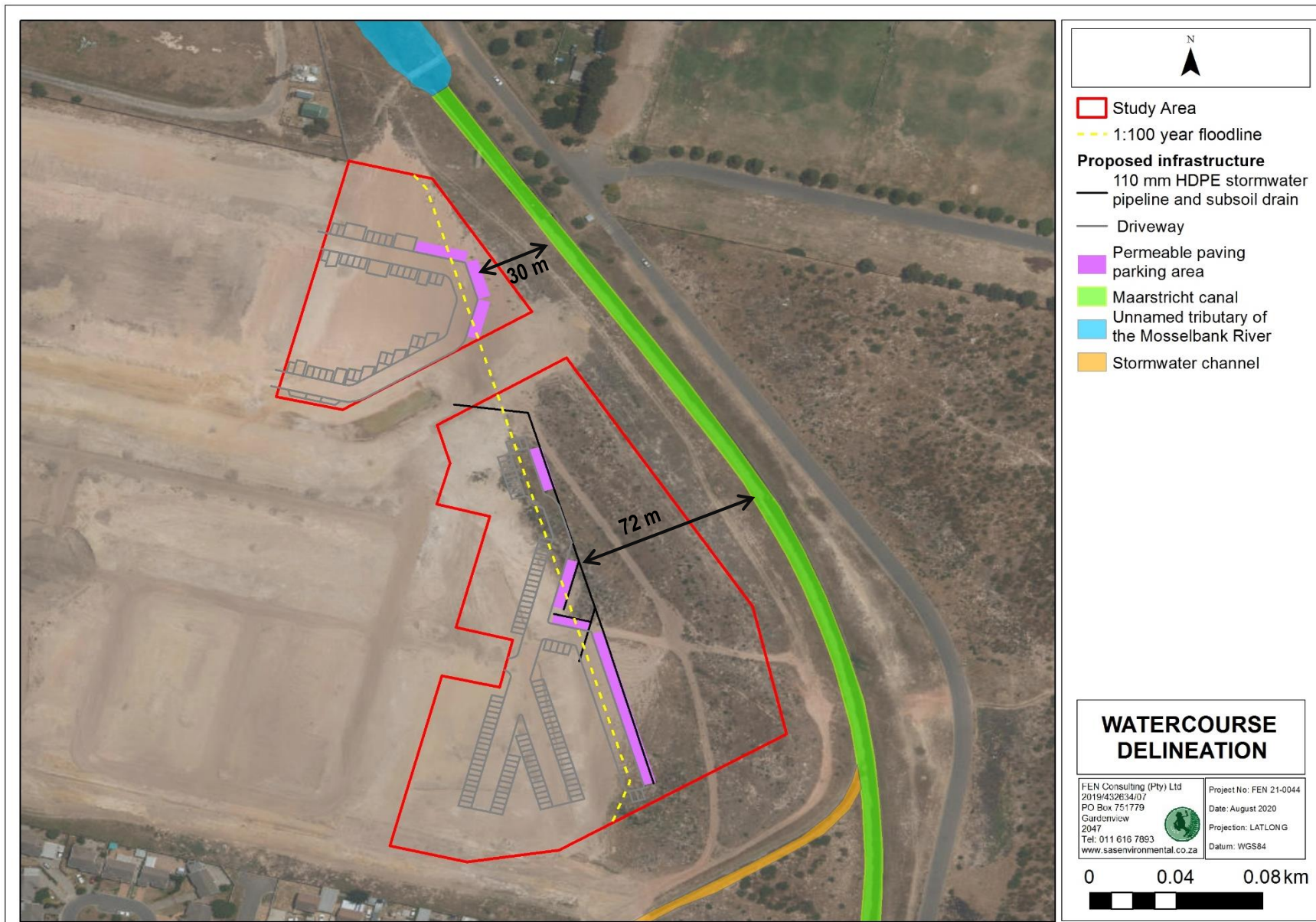


Figure 11: A map presenting the delineated extent of the Maarstricht canal, relative to the proposed development activities and “smoothed” 1:100 floodline of the Maarstricht canal.



4. LEGISLATIVE REQUIREMENTS & SENSITIVITY MAPPING

The following legislative requirements were considered during the assessment. A detailed description of these legislative requirements is presented in **Appendix B** of this report:

- The Constitution of the Republic of South Africa, 1996⁴;
- The National Water Act, 1998 (Act No. 36 of 1998) (NWA); and
- 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).

It is important to note that in terms of the definition of a watercourse as per the National Water Act, 1998 (Act No. 36 of 1998), the Maarstricht canal located outside the eastern boundary of the study area will be regulated by Section 21(c) and (i) of the National Water Act, 1998 (Act No. 36 of 1998), and thus require authorisation from the Department of Water and Sanitation (DWS). This report aids in providing relevant information for this authorisation process should it be deemed relevant by the DWS.

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 Maarstricht canal 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 in terms of the National Water Act, 1998 (Act No. 36 of 1998). Department of Water and Sanitation (DWS)	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) In accordance with GN509 of 2016 as it relates to the National Water Act, 1998 (Act No. 36 of 1998), a regulated area of a watercourse in terms of water uses as listed in Section 21c and 21i is defined as: • 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; • 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 where the edge of the watercourse is the first identifiable annual bank fill flood bench; or • a 500 m radius from the delineated boundary (extent) of any wetland or pan in terms of this regulation.

The 1:100 year floodline as depicted in Figure 11 is therefore considered the GN509 regulated area of the Maarstricht canal. As the proposed development activities is located below the 1:100 year floodline, a Water Use Authorisation in terms of water uses as listed in Section 21 (c) and 21 (i) may need to be applied for based on the risk assessment outcome, as provided in Section 5 below.

⁴ 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.



5. RISK ASSESSMENT

The DWS specified Risk Assessment Matrix (as promulgated in GN509 of 2016 as it relates to the National Water Act, 1998 (Act No. 36 of 1998)) was applied to ascertain the significance of risk associated with the proposed installation of permeable paving parking area below the 1:100 floodline of the Maarstricht canal. The points below summarise the considerations undertaken:

- Although the proposed driveway, a 110 mm HDPE stormwater pipeline, a 110 mm HDPE slotted subsoil drain and permeable paving parking area (hereafter referred to as the proposed development activities) will be located below the 1:100 year floodline of the Maarstricht canal, the activities will be located approximately 30 m from the delineated edge of the Maarstricht canal, inside the study area boundary. As such, no direct impacts to the Maarstricht canal from the installation of the proposed permeable paving activities is expected;
- The DWS risk assessment was applied assuming a high level of mitigation measures are implemented, thus the results of the DWS risk assessment provided in this report presents the perceived impact significance **post-mitigation**;
- In applying the risk assessment, it was assumed that the mitigation hierarchy as advocated by the DEA *et al.* (2013) would be followed, i.e. the impacts would first be avoided, minimised if avoidance is not feasible, rehabilitated as necessary and offset if required;
- The activities and the associated risks they pose are all highly site-specific, not of a significant extent relative to the area of the Maarstricht canal, and therefore have a limited spatial extent (i.e. within the study area);
- Since the proposed development activities will be installed below the 1:100 year floodline and thus within the regulated zone of a watercourse, all legal issues for the installation activities were scored the maximum value of '5';
- While the operation and maintenance of the proposed development activities will be a permanent activity, the construction thereof is envisioned to take no more than a few months. However, the frequency of the construction impacts may be daily during this time;
- Most impacts are considered to be easily detectable; and
- The considered mitigation measures are easily practicable.

5.1. Risk Assessment Discussion

There are four key ecological risks on the Maarstricht canal that were assessed, namely:

- Impacts on the hydrology and sediment balance of the Maarstricht canal;
- Impacts on water quality; and
- Proliferation of alien and invasive plant species surrounding the Maarsticht canal and proliferation into the downstream, unlined reach.

The results of the risk assessment are summarised in Table 3 below, including key mitigation measures for each activity that must be implemented in order to reduce the impacts of the construction and operation of the proposed development activities.



Table 3: Summary of the results of the DWS risk assessment applied to the Maarstricht canal which may potentially be impacted by the proposed installation of permeable paving below the 1:100 year floodline.

	Phases	Activity	Aspect	Impact	Severity	Consequence	Likelihood	Significance	Risk Rating	Control Measures	Reversibility
1	Construction Phase	Site preparation prior to the construction works associated with the proposed development activities (proposed driveway, a 110 mm HDPE stormwater pipeline, a 110 mm HDPE slotted subsoil drain and permeable paving parking area) below the 1:100 year floodline, but at least 30 m from the delineated edge of the Maarstricht canal.	Vehicular movement (transportation of construction materials).	- Transportation of construction materials can result in disturbances to soils, and increased risk of sedimentation/erosion of the Maarstricht canal; and - Soil and stormwater contamination from oils and hydrocarbons originating from construction vehicles.	1	3	12	36	L	- All development footprint areas to remain as small as possible and vegetation clearing to be limited to what is essential; - No vegetation may be removed between the property boundary and the Maarstricht canal; - No vegetation may be removed beyond that of the proposed footprint area of the proposed development activities (proposed driveway, a 110 mm HDPE stormwater pipeline, a 110 mm HDPE slotted subsoil drain and permeable paving parking area) and a 5 m construction buffer surrounding the footprint area as this provides a natural buffer zone around the Maarstricht canal which disperse surface runoff into the Maarstricht canal. This further prevents sedimentation and erosion thereof or the downstream natural watercourses it is connected to; - No long term stockpiling of removed vegetation may be permitted. All vegetation removed as part of the site clearing activities (specifically where large areas need to be cleared) should be transported from the construction site (may not be stockpiled) and disposed of at a registered waste disposal facility; - Contractor laydown areas, and material storage facilities to remain above the a:100 year floodline; - All vehicle re-fuelling is to take place above the 1:100 year floodline.	Fully reversible
2			Removal of vegetation and associated disturbances to soils.	- Earthworks could be potential sources of sediment, which may be transported as runoff into the Maarstricht canal; - Exposure of soils below the 1 in 100 year floodline of the Maarstricht canal, leading to increased runoff, and erosion, and thus increased sedimentation of the Maarstricht canal; and - Proliferation of alien and/or invasive vegetation as a result of disturbances.	1	3	12	36	L		Fully reversible



3	Construction of the proposed development activities below the 1:100 year floodline of the Maarstricht canal	- Removal of vegetation and topsoil and associated stockpiling; - Ground-breaking and earthworks relating to foundations and trenches; - Mixing and casting of concrete for construction purposes; - Backfilling of excavated and disturbed areas; and - Miscellaneous activities by construction personnel.	- Disturbances of soils leading to increased alien vegetation proliferation within the terrestrial buffer zone surrounding the Maarstricht canal; - Altered runoff patterns within the local catchment of the Maarstricht canal, potentially leading to increased erosion and sedimentation of the downstream watercourses; - Potential impacts on the water quality of surface runoff which may potentially enter the downstream watercourses and contamination of soils due to concrete being cast (if applicable); and - Potential of backfill material entering the Maarstricht canal, increasing the sediment load of the Maarstricht canal.	1	3	12	36	L	With regards to ground-breaking activities: - During excavation activities, the topsoil and vegetation should be stockpiled separately from other material; - Excavated materials should not be contaminated, and it should be ensured that the minimum surface area is taken up. The mixture of the lower and upper layers of the excavated soil should be kept to a minimum, so as for later use as backfill material after construction has commenced; - All exposed soils must be protected for the duration of the construction phase to prevent potential erosion and sedimentation of the Maarstricht canal; - Construction of the proposed permeable paving parking area may result in disturbance to the natural buffer zone surrounding the Maarstricht canal which may result in the reduction of surface roughness. This can be mitigated by ensuring that no concentrated runoff from the construction area enters the Maarstricht canal. This can be achieved by placing haybales down gradient of the construction footprint to ensure no sediment laden or concentrated runoff generates from the construction footprint; - It is highly recommended that an alien vegetation management plan be compiled during the planning phase and implemented concurrently with the commencement of construction; - All alien and invasive vegetation should be removed. All material must be disposed of at a registered garden refuse site and may not be burned or mulched on site. With regards to concrete mixing on site and the use of tar for the driveway: - No mixed concrete/tar may be deposited outside of the designated construction footprint; - Protective equipment should be provided, onto which any mixed concrete can be deposited while it awaits placing; and - Concrete/tar spilt outside of the demarcated area must be promptly removed and taken to a suitably licensed waste disposal site. With regards to backfilling of excavated areas: - Stockpiled material should be used as backfill material (where feasible) or removed from the study area; - All excavated areas should be backfilled to the natural ground level with excavated material; - Soil must be lightly recompacted and all construction material must be removed from the site upon the completion of construction or used in the rehabilitation process. Rehabilitation of the construction footprint areas: - It must be ensured that all the runoff from the driveway and permeable parking area adequately enters the stormwater infrastructure to be conveyed into the stormwater attenuation facility as part of the Stonewood development, and may not flow into the terrestrial area between the study area and Maarstricht canal;	Fully reversible
---	---	--	--	---	---	----	----	---	---	------------------



	Phases	Activity	Aspect	Impact	Severity	Consequence	Likelihood	Significance	Risk Rating	Control Measures	Reversibility
										- All footprint areas outside of the proposed development activities footprint area, which has been compressed should be ripped and revegetated within indigenous vegetation as soon as the construction activities have ceased. This will prevent any soil erosion and the creation of gullies within the surrounding area during the operational phase; - The operational area should be regularly inspected for alien and invasive vegetation species which might have established due to the construction activity related disturbances.	
4	OPERATIONAL PHASE	Operation and maintenance of the development activities below the 1:100 year floodline.	- Potential indiscriminate movement of maintenance vehicles within close proximity to the Maarstricht canal; - Increased risk of sedimentation and/or hydrocarbons entering the Maarstricht canal via stormwater runoff from the driveway/permeable paving parking area.	- Disturbance to soils and ongoing erosion as a result of periodic maintenance activities; and - Altered water quality as a result of increased availability of pollutants	1	3	12	36	L	- No indiscriminate driving beyond the permeable paving parking area may be permitted during standard operational activities or maintenance activities; - Unnecessary disturbances surrounding the perimeter of the permeable paving parking area must be avoided; - Ensure that routine inspections and monitoring of the property boundary fence are undertaken to monitor the establishment of indigenous vegetation and the presence of any alien or invasive plant species; - The driveway and permeable paving parking areas must be inspected to ensure that no concentrated runoff from these areas result in the formation of erosion gullies/preferential flow paths which could potentially flow into the Maarstricht canal. Should this be noted, these gullies/preferential flow paths must be infilled with in situ material and appropriately revegetated; - Monitoring for the establishment for alien and invasive vegetation species must be undertaken, specifically in the area between the permeable paving parking area and the Maarstricht canal (with specific mention of removing <i>Acacia saligna</i>). Should alien and invasive plant species be identified, they must be removed and disposed of as per an alien and invasive species control plan and the area must be revegetated with suitable indigenous vegetation.	Fully reversible



The activities associated with the construction and operational phases of the proposed development activities below the 1:100 year floodline of the Maarstricht canal pose a low risk to the overall integrity of the Maarstricht canal and the impacts are considered fully reversible provided that suitable mitigation and ongoing, proactive monitoring is undertaken. This is predominantly due to no proposed activities being undertaken in the delineated extent of the Maarstricht canal or within at least 30 m from the Maarstricht canal. Most potential impacts are considered indirect, with increased sediment loads potentially entering the Maarstricht canal during the construction phase and potential for stormwater with hydrocarbons entering the canal during the operational phase. Assuming that strict enforcement of cogent, well-developed mitigation measures takes place, the significance of impacts arising from the proposed permeable paving parking area are likely to be reduced during the construction and operational phases to a very low significance.

4.2 Cumulative Impacts

Cumulative impacts are activities and their associated impacts on the past, present and foreseeable future, both spatially and temporally, considered together with the impacts identified in Section 4.1 above. Wetlands and riparian areas within the region are under continued threat due to rapid urbanisation in the surrounding landscape.

Direct and indirect impacts identified within urban watercourses bordering urban development include an increase in alien and invasive species entering the system due to regular disturbance of soils and removal of indigenous vegetation. This results in greater inputs of sediment, and nutrients from runoff that are of higher concentrations in agricultural runoff. The potential impacts on the Maarstrich canal and the downstream unnamed tributary of the Mosselbank River are unlikely to add to the cumulative effect on the loss of freshwater habitat within the region since no development will encroach on this system. All anticipated impacts to the Maarstrich canal are indirect and associated with the potential conveyance of excess sediment loads and contaminated run-off from the construction footprint. With management and mitigation measures implemented during the construction phase and monitoring of potential stormwater runoff into the Maarstricht canal the impacts can further be reduced, thus no significant contribution to the above mentioned impacts is considered likely.

6. CONCLUSION

Based on the site verification undertaken by FEN Consulting (Pty) Ltd and the findings thereof presented in this short memorandum, the Maarstricht canal located along the eastern boundary of the study area, does not conform to the ecological definition of a watercourse, however it does enjoy protection in terms of the definition of a watercourse as defined by the National Water Act, 1998 (Act No. 36 of 1998) (NWA), as the channel conveys water into the downstream larger Mosselbank River and have a floodline associated therewith. Despite the Maarstricht canal being considered a watercourse, from an aquatic biodiversity perspective it can be considered of low ecological sensitivity. This is in line with the outcomes of the national web based environmental screening tool (2020).

As the proposed permeable paving parking area will be constructed below the 1:100 year floodline of the Maarstricht canal, activities as stipulated in Sections 21(c) and (i) of the National Water Act, 1998 (Act No. 36 of 1998) are triggered. As the outcome of the DWS Risk Assessment as promulgated in Government Notice 509 of 2016 as it relates to the National Water Act, 1998 (Act No. 36 of 1998) indicated that the proposed permeable paving parking area will pose a very low risk significance to the Maarstricht canal, a water use authorisation by means of a General Authorisation may be applicable, in consultation with the DWS.



7. REFERENCES

- Department of Water Affairs and Forestry (DWAF).** 2005. Final draft: A practical field procedure for identification and delineation of wetlands and Riparian areas.
- Department of Water Affairs and Forestry (DWAF).** 2008. Updated Manual for the Identification and Delineation of Wetlands and Riparian Areas, prepared by M. Rountree, A. L. Batchelor, J. MacKenzie and D. Hoare. Report no. X. Stream Flow Reduction Activities, Department of Water Affairs and Forestry, Pretoria, South Africa.
- Mbona, N., Job, N., Smith, J., Nel, J., Holness, S., Memani, S., and Dini, J.** 2015. *Supporting better decision making around coal mining in the Mpumalanga Highveld through the development of mapping tools and refinement of spatial data on wetlands*. Pretoria. WRC Report TT614/14.
- Nel, J.L., Driver, A., Strydom W.F., Maherry, A., Petersen, C., Hill, L., Roux, D.J., Nienaber, S., Van Deventer, H., Swartz, E. & Smith-Adao, L.B.** 2011. Atlas of Freshwater Ecosystem Priority Areas in South Africa: Maps to support sustainable development of water resources. Water Research Commission Report No. TT 500/11, Water Research Commission, Pretoria.
- NFEPA: Driver, A., Nel, J.L., Snaddon, K., Murrui, K., Roux, D.J., Hill, L., Swartz, E.R., Manuel, J. and Funke, N.** 2011. Implementation Manual for Freshwater Ecosystem Priority Areas. Water Research Commission. Report No. 1801/1/11. Online available: <http://bgis.sanbi.org/nfepa/project.asp>.



ANNEXURE A: RISK ASSESSMENT OUTCOME

Table A1: Outcome of the DWS Risk Assessment.

	Phases	Activity	Aspect	Impact	Flow Regime	Physico & Chemical (Water Quality)	Habitat (Geomorph & Vegetation)	Biota	Severity	Spatial scale	Duration	Consequence	Frequency of activity	Frequency of impact	Legal Issues	Detection	Likelihood	Significance	Risk Rating	Reversibility
1	Construction Phase	Site preparation prior to the installation of permeable pavers below the 1:100 year floodline but at least 30 m from the delineated edge of the Maarstricht canal.	Vehicular movement (transportation of construction materials)	*Loss of vegetation, associated habitat and ecosystem services; *Transportation of construction materials can result in disturbances to soils, and increased risk of sedimentation/erosion; and *Soil and stormwater contamination from oils and hydrocarbons originating from construction vehicles.	1	1	1	1	1	1	1	3	5	1	5	1	12	36	L	Fully reversible
2			Removal of vegetation and associated disturbances to soils.	*Earthworks could be potential sources of sediment, which may be transported as runoff into the Maarstricht canal; *Exposure of soils, leading to increased runoff, and erosion, and thus increased sedimentation of the Maarstricht canal; *Increased sedimentation of the Maarstricht canal, leading to smothering of vegetation of the downstream watercourses connected to the Maarstricht canal; and *Proliferation of alien and/or invasive vegetation as a result of disturbances.	1	1	1	1	1	1	1	3	5	1	5	1	12	36	L	Fully reversible



	Phases	Activity	Aspect	Impact	Flow Regime	Physico & Chemical (Water Quality)	Habitat (Geomorph & Vegetation)	Biota	Severity	Spatial scale	Duration	Consequence	Frequency of activity	Frequency of impact	Legal Issues	Detection	Likelihood	Significance	Risk Rating	Reversibility
3		Installation of the permeable paving below the 1:100 year floodline of the Maarstricht canal	*Removal of vegetation and topsoil and associated stockpiling; *Ground-breaking and earthworks relating to foundations and trenches; *Mixing and casting of concrete for construction purposes; *Backfilling of excavated and disturbed areas; - and *Miscellaneous activities by construction personnel.	*Disturbances of soils leading to increased alien vegetation proliferation within the terrestrial buffer zone surrounding the Maarstricht canal; *Altered runoff patterns within the local catchment of the Maarstricht canal, potentially leading to increased erosion and sedimentation of the downstream watercourses it is connected to; *Potential impacts on the water quality of surface runoff which may potentially enter the downstream watercourses and contamination of soils due to concrete being cast (if applicable); and *Potential of backfill material to enter the Maarstricht canal, increasing the sediment load of tMaarstricht canal.	1	1	1	1	1	1	1	3	5	1	5	1	12	36	L	Fully reversible
4	OPERATIONAL PHASE	Operation and maintenance of the permeable parking area below the 1:100 year floodline.	*Potential indiscriminate movement of maintenance vehicles within close proximity to the Maarstricht canal; *Increased risk of sedimentation and/or hydrocarbons entering the Maarstricht canal via stormwater runoff from the permeable paving parking area.	*Disturbance to soils and ongoing erosion as a result of periodic maintenance activities; *Altered water quality as a result of increased availability of pollutants	1	1	1	1	1	1	1	3	5	1	5	1	12	36	L	Fully reversible



ANNEXURE B: Details, Expertise and Curriculum Vitae of Specialists

1. (a) (i) Details of the specialist who prepared the report

Kim Marais BSc (Hons) Zoology (Herpetology) (University of the Witwatersrand)
 Christel du Preez MSc Environmental Sciences (North West University)

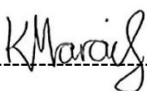
1. (a). (ii) The expertise of that specialist to compile a specialist report including a curriculum vitae

Company of Specialist:	FEN Consulting (Pty) Ltd		
Name / Contact person:	Christel du Preez		
Postal address:	221 Riverside Lofts, Tygerfalls Boulevard, Bellville,		
Postal code:	7539	Cell:	074 580 6823
Telephone:	011 616 7893	Fax:	086 724 3132
E-mail:	christel@sasenvgroup.co.za		
Qualifications	MSC Environmental Science		
Registration / Associations	Registered Professional Scientist at South African Council for Natural Scientific Professions (SACNASP)		

1. (b) a declaration that the specialist is independent in a form as may be specified by the competent authority

I, Kim Marais, declare that -

- I act as the independent specialist in this application;
- I will 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 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 relevant legislation and any guidelines that have relevance to the proposed activity;
- I will comply with the applicable legislation;
- I have not, and will not engage in, conflicting interests in the undertaking of the activity;
- 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;
- All the particulars furnished by me in this form are true and correct

_____ 



1. (b) a declaration that the specialist is independent in a form as may be specified by the competent authority

I, Christel du Preez, declare that -

- I act as the independent specialist in this application;
- I will 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 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 relevant legislation and any guidelines that have relevance to the proposed activity;
- I will comply with the applicable legislation;
- I have not, and will not engage in, conflicting interests in the undertaking of the activity;
- 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;
- All the particulars furnished by me in this form are true and correct

C du Preez





SAS ENVIRONMENTAL GROUP OF COMPANIES – SPECIALIST CONSULTANT INFORMATION

CURRICULUM VITAE OF KIM MARAIS

PERSONAL DETAILS

Position in Company

Senior Scientist
Water Resource Manager
2015

Joined SAS Environmental Group of Companies

MEMBERSHIP IN PROFESSIONAL SOCIETIES

Professional member of the South African Council for Natural Scientific Professions
(SACNASP – Reg No. 117137/17)

Member of the Western Cape Wetland Forum (WCWF)

EDUCATION

Qualifications

BSc (Hons) Zoology (University of the Witwatersrand) 2012

BSc (Zoology and Conservation) (University of the Witwatersrand) 2011

Short Courses

Aquatic and Wetland Plant Identification (Cripsis Environment) 2019

Tools for Wetland Assessment (Rhodes University) 2018

Certificate in Environmental Law for Environmental Managers (CEM) 2014

Certificate for Introduction to Environmental Management (CEM) 2013

AREAS OF WORK EXPERIENCE

South Africa – Gauteng, Mpumalanga, KwaZulu-Natal, Northern Cape, Eastern Cape,

Africa - Uganda

KEY SPECIALIST DISCIPLINES

Biodiversity Assessments

- Biodiversity Action Plans (BAP)
- Alien and Invasive Control Plans (AICP)
- Faunal Eco Scans
- Faunal Impact Assessments

Freshwater Assessments

- Desktop Freshwater Delineation
- Freshwater Verification Assessment
- Freshwater (wetland / riparian) Delineation and Assessment
- Freshwater Eco Service and Status Determination
- Rehabilitation Assessment / Planning
- Watercourse Maintenance and Management Plans
- Freshwater Offset Plans

Aquatic Ecological Assessment and Water Quality Studies

- Riparian Vegetation Integrity (VEGRAI)
- Water quality Monitoring
- Riverine Rehabilitation Plans

Legislative Requirements, Processes and Assessments

- Water Use Applications (Water Use Licence Applications / General Authorisations)
- Water Use Audits
- Freshwater Resource Management and Monitoring as part of EMPR and WUL conditions
- Public Participation processes





SAS ENVIRONMENTAL GROUP OF COMPANIES – SPECIALIST CONSULTANT INFORMATION

CURRICULUM VITAE OF CHRISTEL DU PREEZ

PERSONAL DETAILS

Position in Company

Senior Scientist
Watercourse ecology
2016

Joined SAS Environmental Group of Companies

MEMBERSHIP IN PROFESSIONAL SOCIETIES

Professional member of the South African Council for Natural Scientific Professions (SACNASP – Reg No. 120240)

Member of the Western Cape Wetland Forum (WCF)

Member of the Gauteng Wetland Forum (GWF)

EDUCATION

Qualifications

MSc Environmental Sciences (North West University)	2017
BSc Hons Environmental Sciences (North West University)	2012
BSc Environmental and Biological Sciences (North West University)	2011

Short Courses

Wetland and Aquatic plant Identification presented by Carin van Ginkel	2019
Wetland Management: Introduction and Delineation presented by the Centre of Environmental Management University of the Free State	2018
Tools for Wetland Assessment presented by Prof. F. Ellery and Rhodes University	2017
Basic Principles of ecological rehabilitation and mine closure presented by the Centre for Environmental Management North West University	2015

AREAS OF WORK EXPERIENCE

South Africa – Gauteng, Mpumalanga, Limpopo, Western Cape, Northern Cape, Eastern Cape

Freshwater Assessments

- Desktop Freshwater Delineation
- Freshwater Verification Assessment
- Freshwater (wetland / riparian) Delineation and Assessment
- Freshwater Eco Service and Status Determination
- Rehabilitation Assessment / Planning
- Maintenance and Management Plans
- Plant species and Landscape Plans
- Freshwater Offset Plans

