FRESHWATER ECOLOGICAL IMPACT ASSESSMENT

PROPOSED EXTENTION OF ERICA DRIVE, BELHAR TO OAKDENE OVER THE KUILS RIVER

Prepared for:

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DATE: 22 November 2017

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1. INTRODUCTION AND BACKGROUND

Eco Impact Legal Consulting (Pty) Ltd (Eco Impact) is appointed by the City of Cape Town to assess the impacts of the proposed construction of Erica Drive.

The proposed Erica Drive / Belhar Main Road extension is approximately 3,24km in length. Erica Road will link to the R300 with an interchange which will give access to the north only. The first section of Erica Drive between Belhar Drive and New Nooiensfontein Road will be known as Erica Drive and the section between New Nooiensfontein Road and Highbury Road will be known as Belhar Main Road. The planned road is a dual carriageway with a median that varies in width between 2m and 5m. The planned cross-section comprises of two 3,4m lanes, a 2,4m surfaced shoulder and a 0,3m channel on both the shoulder side and the median side per direction of travel. This is a 9,8m kerb to kerb width per direction. On either side of the dual carriageway will be a 2m sidewalk. The 2,4m surfaced shoulders will be utilized as cycle ways (both sides of the road).

The dual carriageway will be constructed within a road reserve which varies between 32m and 40m. A section of the road reserve adjacent to Kuils River is 50m wide. On the western end of the proposed road it will tie into the existing Erica Drive at the Belhar Drive intersection. On the eastern end it will tie into the existing Highbury Road Intersection. The existing Highbury Road intersection and Belhar Main Road further to east are being designed by another consultant. The first section of the project between Belhar Drive and the R300 (western side) lies within an open field and are owned by council and zoned as road reserve. The section between the R300 road reserve and the Reuter Street intersection is an open field. As part of the neighbouring development most of the road reserve has been determined and zoned as road reserve. There is however areas which needs to be rezoned as road reserve (current zoning = agricultural). The existing Erica Drive / Belhar Road between the Reuter Street Intersection and Highbury Road crosses Kuils River and falls within an existing road reserve. Duo to site distance requirements splay sizes at intersections do require additional road reserve. The additional road reserve influences a number of residential stands as well as property of the Provincial Government of the Western Cape. The R300 off-ramp is 660m in length and will consist of a 4m lane and 2 x 2m pave shoulders which widens to 2 x 3,7m lanes at the Erica Drive Intersection (terminal). The R300 on-ramp is 890m in length and will consist of a single 4m lane and 2 x 2m paved shoulders. The larger part of the ramps falls within the existing R300 road reserve.

The new Erica Drive / Belhar Drive Intersection will be signalized. The Erica Drive / St Vincent Drive Intersection (T-junction) will have STOP-control on St Vincent Drive. Erica Drive will cross the R300 with a bridge passing over the R300. The R300 Bridge will be widened when Erica Drive becomes a dual carriageway Road. Both interchange terminals (T-junctions) will be signalized. The Erica Drive / Reuter Street Intersection will have STOP-control on Reuter Street. The Erica Drive / Isabel Street/Eland Street Intersection will have STOP-control on Isabel Street and Eland Street. The existing Kuils River Bridge will be widened when Erica Road becomes a dual carriageway road. Alterations to the existing Kuils River Bridge will be required for better pedestrian and cycle accommodation. The Erica Drive / Nooiensfontein Road Intersection will be changed into a partial intersection (left-in / left-out) when Erica Drive becomes a dual carriageway road. The Erica Drive / Belhar Main Road / New Nooiensfontein Road Intersection will be changed into a double lane roundabout when Erica Drive / Belhar Main Road becomes a dual carriageway road. The existing school access in Belhar Main Road will be changed to a partial intersection (left-in / left-out) when Belhar Main Road becomes a dual carriageway road.

Construction phasing:

Construction of the road is planned in two phases. The **first phase** is to construct the eastbound carriageway of Erica Drive (9,8m kerb to kerb road width) with 2m sidewalks on

either side between Belhar Drive and Reuter Street. This section of road is approximately 1,75km in length. This phase might include dual carriageway road sections but will be dependent on the budget and design requirements.

The **second phase** will be the construction of the full dual carriageway from Belhar Drive in the west to Highbury Road intersection on the eastern side.

Footprint:
The construction footprint for the full project is estimated to be 125 000 square metres (12.5Ha). The final development footprint is estimated to be 100 000 square metres (10.0Ha) for the full project.

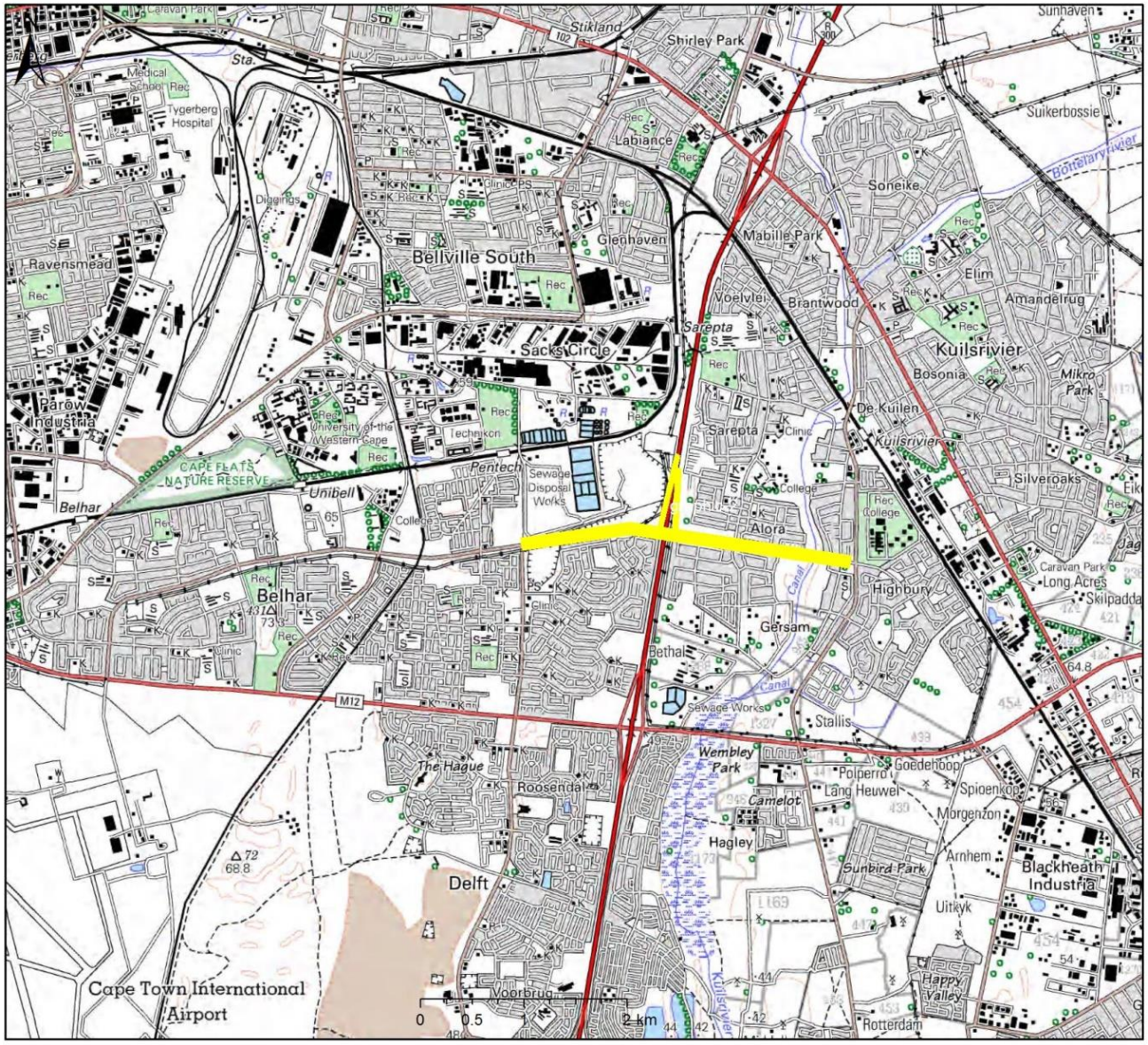


Figure 1: The 1 in 50 000 topographical map for the study area. Study area indicated by yellow line.

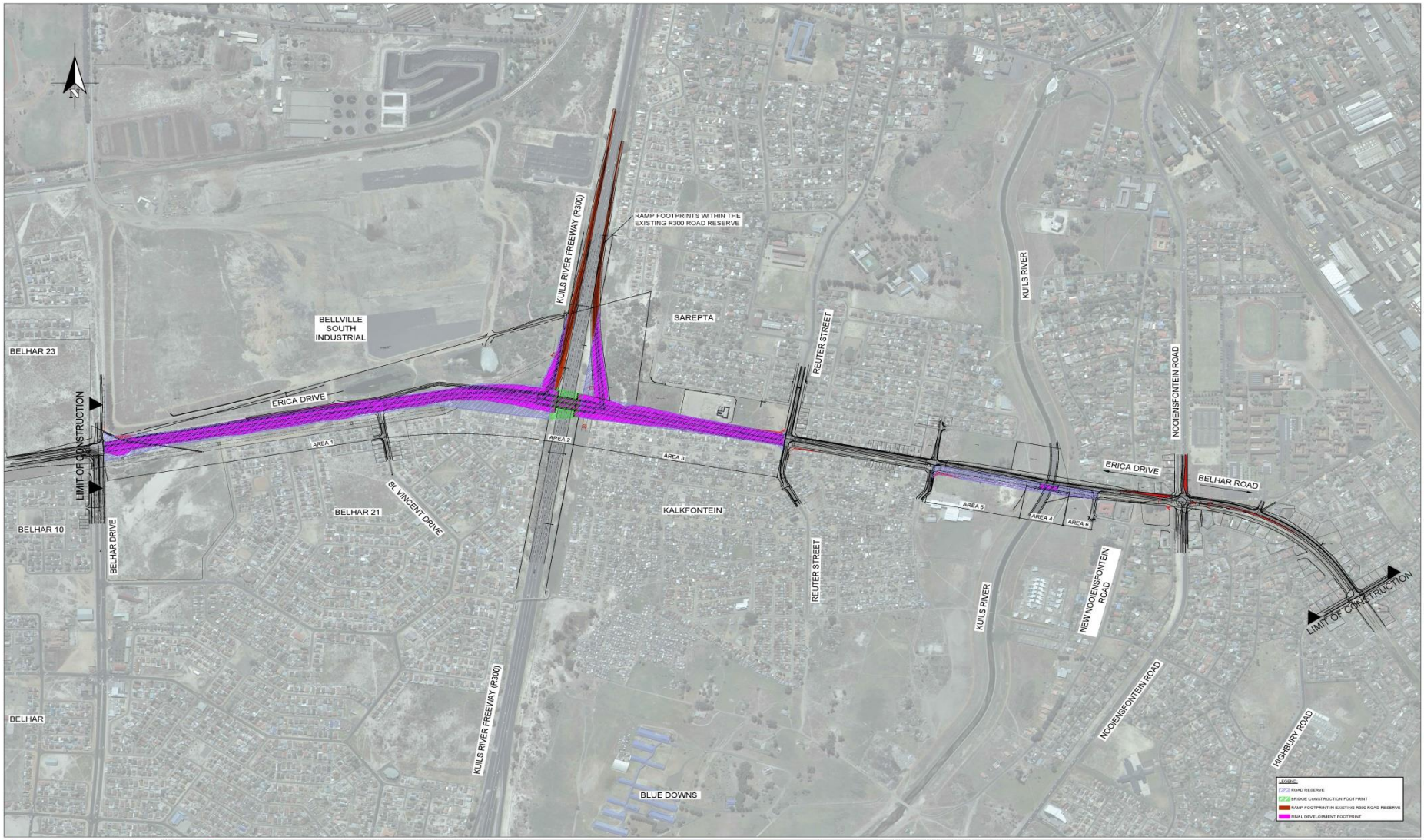


Figure 2: Site Development Plan.

2. METHODOLOGY, ASSUMPTIONS AND LIMITATIONS OF THE STUDY

Input into this report was informed by a combination of desktop assessments of existing freshwater ecosystem information for the study area and catchment, as well as by a more detailed assessment of the freshwater features at the site.

The site was visited in September and November 2017. During the field visit, the characterisation and integrity assessments of the ecological features were undertaken. Mapping of the features was undertaken using Google Maps with GPS tracker. The features were mapped while doing the field survey. The SANBI Biodiversity GIS website was also consulted to identify any constraints in terms of fine-scale biodiversity conservation mapping as well as possible freshwater features mapped in the Freshwater Ecosystem Priority Areas maps. This information/data was used to inform the resource protection related recommendations.

The basic terms of reference (TOR) for this study were the Cape Nature recommended TOR for biodiversity specialists, and are as follows:

- Produce a baseline analysis of the botanical attributes of the study area as a whole.
- This report should clearly indicate any constraints that would need to be taken into account in considering the development proposals further.
- The baseline report must include a map of the identified sensitive areas as well as indications of important constraints on the property. It must also:
- Describe the broad ecological characteristics of the site and its surrounds in terms of any mapped spatial components of ecological processes and/or patchiness, patch size, relative isolation of patches, connectivity, corridors, disturbance regimes, ecotones, buffering viability etc.

In terms of biodiversity pattern, identify or describe:

Community and ecosystem level
- The main vegetation type, its aerial extent and interaction with neighbouring types, soil or topography;
- The types of plant communities that occur in the vicinity of the site
- Threatened or vulnerable ecosystems (*cf. SA vegetation map/National Spatial Biodiversity Assessment, etc.*)

Species level
- Red Data Book species of conservation concern (RDBSCC) - (provide location)
- The viability of and estimated population size of the RDBSCC that are present (include degree of confidence in prediction based on availability of information and specialist knowledge, i.e. High = 70-100% confident, Medium 40-70% confident, Low 0-40% confident)
- The likelihood of other RDBSCC species occurring within the vicinity (include degree of confidence)

Other pattern issues
Any significant landscape features or rare or important vegetation associations such as seasonal wetlands, alluvium, seeps, quartz patches or salt marshes in the vicinity.
- The extent of alien plant cover of the site, and whether the infestation is the result of prior soil disturbance such as ploughing or quarrying
- The condition of the site in terms of current or previous land uses

In terms of biodiversity process, identify or describe:
- The key ecological “drivers” of ecosystems on the site and in the vicinity, such as fire.

- Any mapped spatial component of an ecological process that may occur at the site or in the vicinity i.e. watercourses, biome boundaries, migration routes etc.
- Any possible changes in key processes e.g. increase fire frequency or drainage/artificial recharge of aquatic systems.

- Describe what is the significance of the potential impact of the proposed project – with and without mitigation – on biodiversity pattern and process at the site, landscape, and regional scales.

- Recommend actions that should be taken to prevent or mitigate impacts. Indicated how these should be scheduled to ensure long-term protection, management and restoration of affected ecosystems and biodiversity.

- Indicate limitations and assumptions, particularly in relation to seasonality.

Limitations and uncertainties often exist within the various techniques adopted to assess the condition of ecosystems. The following techniques and methodologies were utilized to undertake this study:

- The ecological importance and sensitivity assessment was conducted according to the guidelines as developed by DWAF (1999).
- Recommendations are made with respect to the adoption of buffer zones within the development site, based on the wetlands functioning and site characteristics.

The level of aquatic assessment undertaken was considered to be adequate for this study.

3. DESCRIPTION OF THE ECOLOGICAL FEATURES AND THE WIDER STUDY AREA

The site is located within the G22E quaternary catchment. The primary aquatic features on the site and surrounds is the Kuils River tributary and several wetlands throughout.

The study area lies within the Kuils-Eerste River sub-catchment of the Berg Water Management Area and within the City of Cape Town boundaries in the Western Cape Province. The affected properties are located within the urban area of Kuils River, adjacent to Belhar and Oakdene. The Kuils River, which originates in the hills of the Durbanville area, flows in a southerly direction to the urban area of Kuils River where it is joined by the Bottelary River. This river system continues in a southerly direction until its confluence with the Eerste River. The upper to middle reaches of the Kuils River are completely canalised through the Kuils River urban area and are, in general, in a poor condition within the urbanised and industrial areas of the town. At the proposed Erica Drive crossing, the river is completely canalised with all indigenous riparian vegetation removed, and is deemed to be in a severely modified ecological state.

The wetlands vegetation consists largely of *Phragmites australis* reeds, *Zantedeschia aethiopica* and Kikuyu *Pennisetum clandestinum* grass west of the R300 road and *Typha capensis* east of the road, with some other wetland species scattered over the area (see vegetation description). The wetland area is home to both birds and amphibians. The overall state of the wetland was observed to be in a moderately to largely modified state with some evidence of illegal waste dumping.

Table 1: Key water resource information for the study area.

DESCRIPTOR	NAME/ DETAILS	NOTES
Water Management Area (WMA)	Berg-Olifants WMA	
Sub Catchment Area	Kuils-Eerste River sub-catchment	

Quaternary Catchment	G22E	
Present Ecological State	F (Critically Modified)	
Ecological Importance and Sensitivity	Ecological Importance – Low Ecological Sensitivity – Low	
Water resource potentially impacted	Kuils River	
Latitude	33°56'33.00"S	Proposed dualling of road over Kuils River.
Longitude	18°40'23.56"E	
Site visit	Mr Nicolaas Hanekom	8 September 2017

3.1. SITE CHARACTERISATION

In order to assess the condition and ecological importance and sensitivity of the study area, it is necessary to understand how the river might have appeared under unimpacted conditions. This is achieved through classifying the river according to its ecological characteristics, in order that it can be compared to ecologically similar rivers. River typing or classification involves the hierarchical grouping of rivers into ecologically similar units so that inter- and intra-river variation in factors that influence water chemistry, channel type, substratum composition and hydrology are best accounted for. Any comparative assessment of river condition should only be done between rivers that share similar physical and biological characteristics under natural conditions. Thus, the classification of rivers provides the basis for assessing river condition to allow comparison between similar river types. The primary classification of rivers is a division into Ecoregions. Rivers within an ecoregion are further divided into sub-regions.

Ecoregions: groups of rivers within South Africa, which share similar physiography, climate, geology, soils and potential natural vegetation. For the purposes of this study, the ecoregional classification presented in DWAF (1999), which divides the country's rivers into ecoregions, was used. The Kuils River at the site falls within the Southern Coastal Belt Ecoregion (Table 2).

Table 2: Characteristics of the Great Karoo Ecoregion (**Dominant Types In Bold**)

Main Attributes	Characteristics
Terrain Morphology	Plains; Low Relief; **Plains Moderate Relief;** Closed Hills; Mountains; Moderate and High Relief;
Vegetation types	**Sand Plain Fynbos**; Mountain Fynbos; West Coast Renosterveld; Dune Thicket; Strandveld Succulent Karoo
Altitude (m a.m.s.l)	0-300
MAP (mm)	0 to 1500
Coefficient of Variation (% of annual precipitation)	30 to >40
Rainfall seasonality	Winter
Mean annual temp. (°C)	10-20
Median annual simulated runoff (mm) for quaternary catchment	5->250 (mm) for quaternary catchment

Sub-regions: sub-regions (or geomorphological zones) are groups of rivers or segments of rivers, within an ecoregion, which share similar geomorphological features, of which gradient is the most important. The use of geomorphological features is based on the assumption that these are a major factor in the determination of the distribution of the biota. The geomorphological and other physical characteristics associated with the watercourses within the study sites are given in Table 3.

Table 3: General Geomorphological and Physical features of the Watercourses

Geomorphological Zone	Lower Foothill Zone
Lateral mobility	Non-confined
Channel form	Simple (no macro channel) (Concrete channel)
Channel pattern	Concrete channel
Channel type	Concrete channel
Channel modification	Concrete channel
Hydrological type	Perennial
Ecoregion	South Western Coastal Belt
Vegetation type	Cape Flats Sand Fynbos
Rainfall region	Winter

3.2. DESCRIPTION OF THE RIVER AT THE STUDY AREA

The district is characterised by flat plains typical of the Cape Flats, which cover most of the Tygerberg district. The most significant topographical feature in the district is the Tygerberg Mountain, which runs in a north-south direction. The highest point of the Tygerberg is 398m above sea level, just east of Plattekloof. A few of the foothills of the Durbanville hills penetrate into the north-eastern extreme of the district. The affected properties lie within the urban area of Kuils River and are surrounded by flat residential and commercial / industrial built up areas.

The Kuils River and its tributaries receive most of its rainfall during winter with a Mediterranean climate. This catchment is drier than that of the Eerste River and the mean annual precipitation ranges from 800mm in the eastern hills to about 500mm near the coast. About 80 % of the rain falls in a series of winter downpours, which bring the river down in spate. The monthly distribution of average daily maximum temperatures shows that the average midday temperatures range from 19°C in July to 29°C in February. The region is the coldest during July when the mercury drops to 7°C on average during the night.

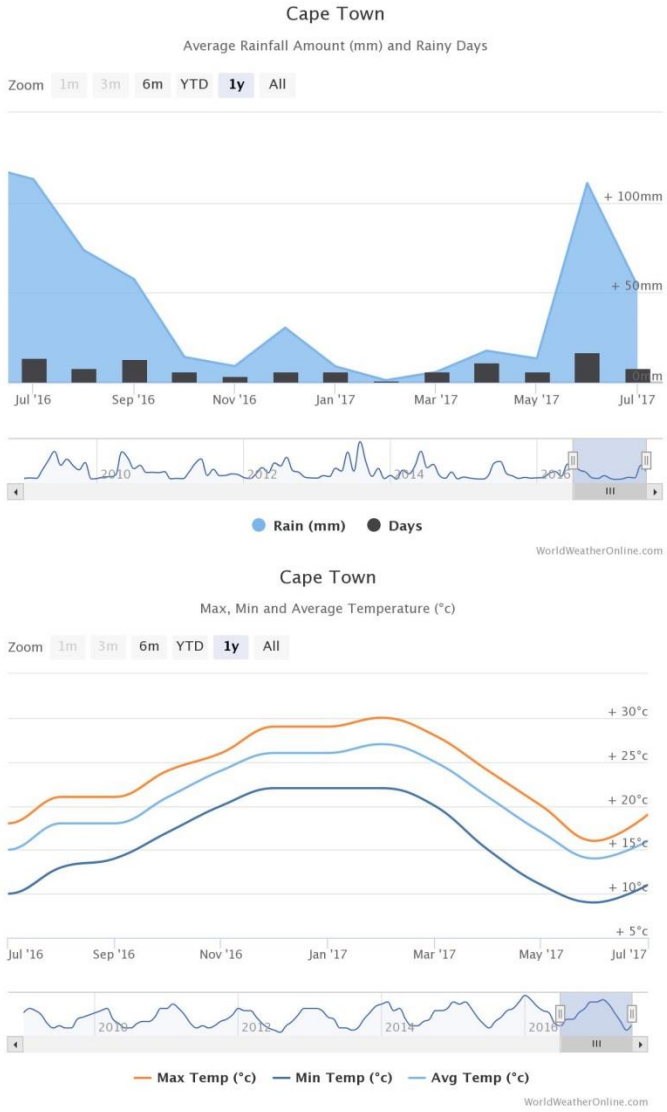


Figure 2: Climate graphs for the area (Worldweatheronline, 2017)

The underlying rock formations of an area comprise the foundation of its physical environment. The geology of an area is shaped by hydrological and weathering processes, which create the topography of the area. The underlying geology also gives rise to various soil types, which influence the indigenous fauna and flora of an area, as well as human agricultural practices. The geology of the site is characterised by the **Sandveld Group Sands**, characteristic of the Cape Flats area, which cover the remainder of the Tygerberg district.

The **Sandveld Group** is mainly represented by the Springfontyn Formation, which was developed through the deposition of windblown sand (an aeolian deposit), consisting of reddish to grey, unconsolidated quartzite aeolian sand and is most common in the northern and central portion of the Tygerberg district, from Milnerton to Langa and Bellville (UCT Department of Geological Sciences). The south-eastern portion of the Tygerberg district, including Cape Town International Airport and Delft, is overlain with semi-consolidated aeolian sands of the Witzand Formation.

Soils underlying the site can be categorized as imperfectly drained sandy soils which consist largely of soils with a sandy texture, leached and with subsurface accumulation of organic matter and aluminium, with or without iron oxides, either deep or on hard or weathering rock.

The natural vegetation surrounding in the study area would have under unmodified circumstances been Cape Flats Sand, which is hardly protected. It is characterised by typical fynbos families such as proteas, ericas, restios (reeds), buchu and geophytes (bulbs). The vegetation comprises dense, moderately tall shrubland, interspersed with restios. Cape Flats Sand Fynbos is exceptionally high in species diversity and has a high number of Vulnerable, Endangered and Critically Endangered species. Five of its plant species have become extinct. Cape Flats Sand Fynbos is listed as Critically Endangered and more than 85% of this vegetation type within the City has been transformed. Many of the remaining patches are small pockets surrounded by urban areas. The vegetation surrounding this area is however in a seriously modified state, with none of these species found on site.

In order to assess the condition, ecological importance and sensitivity of the river segment being assessed, it is necessary to understand how the river habitat characteristics and stream flow was under natural conditions (prior to direct and induced human modifications). This is achieved through classifying rivers according to what its ecological characteristics are in situ and extrapolating these characteristics in comparison with data derived reference conditions, or via professional judgment using catchments of similar physical and biological characteristics. Thus, by deducing ecological reference conditions, impacts on the site can be measured and classed to channel condition, riparian zone integrity, stream quality, as well as factors impacting with reference to the catchment as a whole.

River typing or classification involves the hierarchical grouping of rivers into ecologically similar units so that inter- and intra-river variation in factors that influence water chemistry, channel type, substratum composition and hydrology are best accounted for. This tool provides a framework for reference conditions of streams under study by comparing these conditions to streams that are similar. Thus, the classification of rivers provides the basis for assessing river condition to allow comparison between similar rivers (as a reference) and the rivers under study. The primary classification of rivers is a division into Ecoregions. Rivers within an ecoregion are further divided into sub-regions.

The middle reaches (upstream of the impacted area) of the Kuils River flow through Stikland Industrial Area and into the urban area of Kuils River and consist of sections that have already been largely modified for flood alleviation purposes. The river channel has been largely modified, where sections have been straightened and much of the river bank is incised and has been altered through infilling and the dumping of rubble to form levees.

The riparian vegetation is largely *Typha capensis* bulrushes, *Phragmites australis* and *Cyperus textilis* reeds. Alien trees and shrubs such as Port Jackson willow *(Acacia saligna*), gum trees (*eucalyptus sp.*), castor oil (*Ricinus communis*) and cocklebur (*Xanthium strumarium*) have invaded the riparian zone and block the channel in places. The Kuils River at the impacted area is totally transformed and flows in a concrete channel with no remaining instream and riparian vegetation and habitat left.

Photo 1: State of the Kuils River at the existing bridge where the widening of the road is proposed.

3.3. HABITAT INTEGRITY OF THE KUILS RIVER

Assessment of habitat integrity of a river can be seen as a precursor of the assessment of biotic integrity and is a measure of the degree to which a river has been modified from its natural state. Habitat and biotic integrity together constitute ecological integrity (Kleynhans, 1996). A site-based approach was carried out at all sites, where it is based on ground level observations at each monitoring site, but also makes use of other sources of information (maps, local knowledge etc.). The objectives of the Index of Habitat Integrity (IHI) assessment are to put into perspective the significance of various factors in the degradation of the habitat integrity of a specific river (Kleynhans, 1996).

The methodology (Kleynhans, 1996) involves an assessment of the number and severity of anthropogenic impacts on a river and the damage they potentially inflict upon the system. These disturbances include both abiotic and biotic factors, which are regarded as the primary causes of degradation of a river. The severity of each impact is ranked using a six-point scale with 0 (no impact), 1 to 5 (small impact), 6 to 10 (moderate impact), 11 to 15 (large impact), 16 to 20 (serious impact) and 21 to 25 (critical impact).

The evaluation of Habitat Integrity (HI) provides a measure of the degree to which a river has been modified from its natural state. The methodology (DWAF, 1999) involves a qualitative assessment of the number and severity of anthropogenic perturbations on a river and the damage they potentially inflict upon the system. These disturbances include both abiotic and biotic factors, which are regarded as the primary causes of degradation of a river. The severity of each impact is ranked from 0 (no impact) to 25 (critical impact). The Habitat Integrity Assessment is based on assessment of the impacts of two components of the river, the riparian zone and the instream habitat (Table 4). Assessments are made separately for

both components, but data for the riparian zone are interpreted primarily in terms of the potential impact on the instream component.

The estimated impact of each criterion is calculated as follows:

Rating for the criterion/maximum value (25) x weight (percent)

Table 4: Index of Habitat Integrity Assessment results and criteria assessed in the affected watercourse

Instream Criteria	Score	Riparian Zone Criteria	Score
Water Abstraction	12	Water Abstraction	12
Flow Modification	25	Inundation	25
Bed Modification	25	Flow modification	25
Channel Modification	25	Water Quality	10
Water Quality	10	Indigenous vegetation removal	25
Inundation	0	Exotic vegetation encroachment	23
Exotic Macrophytes	0	Bank Erosion	0
Exotic Fauna	4	Channel Modification	25
Solid waste disposal	6		
Integrity Class	F	Integrity Class	F

Table 5: Intermediate Habitat Integrity categories (from Kleynhans, 1996)

Category	Description	Score (% of total)
A	Unmodified, natural.	90-100
B	Largely natural with few modifications. A small change in natural habitats and biota may have taken place but the ecosystem functions are essentially unchanged.	80-90
C	Moderately modified. A loss and change of natural habitat and biota have occurred but the basic ecosystem functions are still predominantly unchanged.	60-79
D	Largely modified. A large loss of natural habitat, biota and basic ecosystem functions has occurred.	40-59
E	The loss of natural habitat, biota and basic ecosystem functions is extensive.	20-39
F	Modifications have reached a critical level and the lotic system has been modified completely with almost complete loss of natural habitat and biota. In worst instances basic ecosystem functions have been destroyed and changes are irreversible.	0-19

3.4. ECOLOGICAL IMPORTANCE AND SENSITIVITY (EIS)

The EIS Assessment considers a number of biotic and habitat determinants surmised to indicate either importance or sensitivity.

Table 6: Definition of the four-point scale used to assess biotic and habitat determinants presumed to indicate either importance or sensitivity

Four point scale	Definition
1	One species/taxon judged as rare or endangered at a local scale.
2	More than one species/taxon judged to be rare or endangered on a local scale.

3	One or more species/taxon judged to be rare or endangered on a Provincial/regional scale.
4	One or more species/taxon judged as rare or endangered on a National scale (i.e. SA Red Data Books)

Table 7: Ecological importance and sensitivity categories (DWAF, 1999)

EISC	General description	Range of median
Very high	Quaternaries/delineations that are considered to be unique on a national and international level based on unique biodiversity (habitat diversity, species diversity, unique species, rare and endangered species). These rivers (in terms of biota and habitat) are usually very sensitive to flow modifications and have no or only a small capacity for use.	>3-4
High	Quaternaries/delineations that are considered to be unique on a national scale based on their biodiversity (habitat diversity, species diversity, unique species, rare and endangered species). These rivers (in terms of biota and habitat) may be sensitive to flow modifications but in some cases may have substantial capacity for use.	>2-≤3
Moderate	Quaternaries/delineations that are considered to be unique on a provincial or local scale due to biodiversity (habitat diversity, species diversity, unique species, rare and endangered species). These rivers (in terms of biota and habitat) are not usually very sensitive to flow modifications and often have substantial capacity for use.	>1-≤2
Low/marginal	Quaternaries/delineations which are not unique on any scale. These rivers (in terms of biota and habitat) are generally not very sensitive to flow modifications and usually have substantial capacity for use.	≤1

Table 8: Results of the EIS assessment for the affected watercourse

Biotic Determinants	Score
Rare and endangered biota	2
Unique biota	1
Intolerant biota	1
Species/taxon richness	0
Aquatic Habitat Determinants	
Diversity of aquatic habitat types of features	0
Refuge value and habitat type	0
Sensitivity of habitat to flow changes	1
Sensitivity of flow related water quality changes	1
Migration route/corridor for instream and riparian biota	1
National parks, wilderness areas, Nature Reserves, Natural Heritage sites, PNEs	0
EIS Category	**Low**

EIS considers a number of biotic and habitat determinants surmised to indicate either importance or sensitivity. The determinants are rated according to a four-point scale. The median of the resultant score is calculated to derive the EIS category.

3.5 WETLAND ASSESSMENT

Wetlands as defined by the National Water Act (Act 36 of 1998) "*are a portion of land that 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 under*

normal circumstances supports or would support vegetation typically adapted to life in saturated soil." Wetland delineation relates to the determination and marking of the boundary of a wetland to the outer edge of the temporary zone of wetness.

The wetland assessment consisted of the following wetland assessment components: Wetland delineation; Wetland classification; Wetland integrity; Wetland ecological importance and sensitivity; and Ecosystem services supplied by the wetland.

3.5.1 WETLAND DELINEATION

The wetland delineation process uses four wetland indicators to provide an estimate of the extent of a wetland. They are: landscape position (must be flat or depressed), vegetation (must be hydrophilic), soil form (must compliment an existing wetland type) and soil wetness (water table must be within 50 cm of profile).

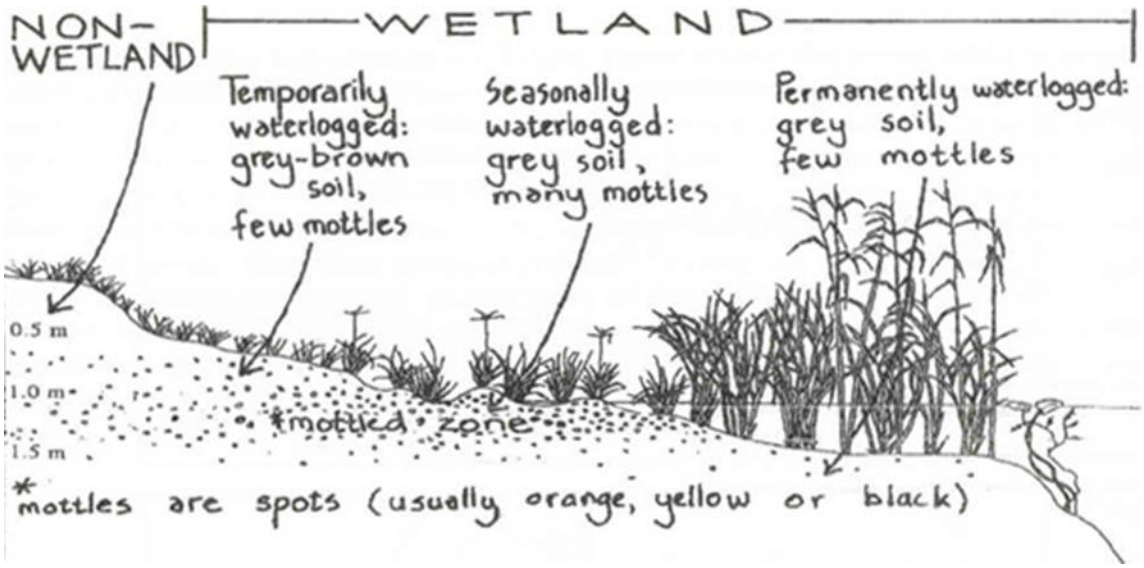


Figure 3: Wetland illustration

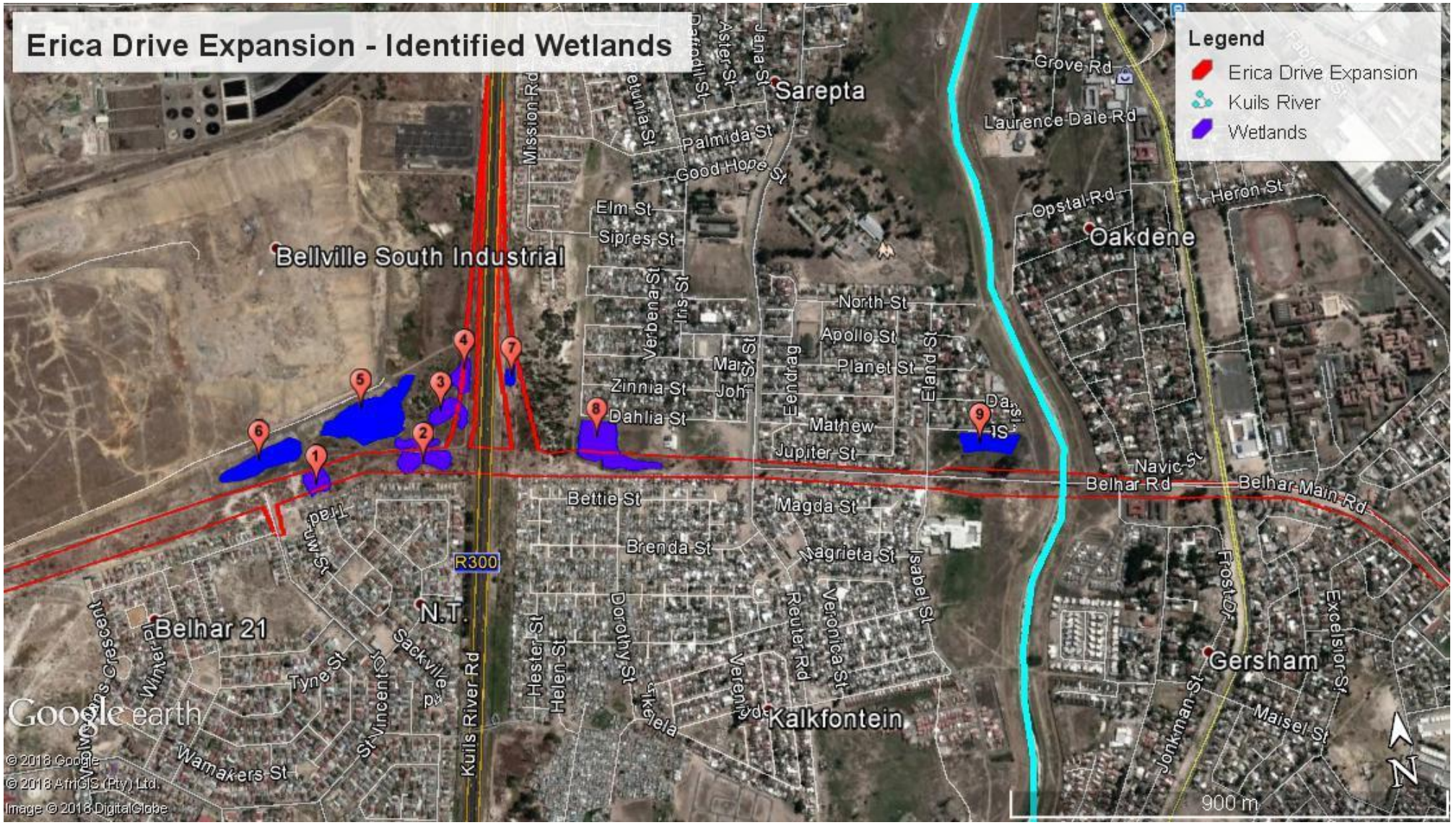


Figure 4: Wetlands identified on the site and surrounds.

Wetlands 1-8 can be considered to be semi-natural wetland depressions and wetland 9 a channelled valley bottom wetland that originally would have been associated with the Kuils River.

3.5.2 WETLAND CLASSIFICATION

The classification of the wetlands in the study area was based on the WET-EcoServices technique (Kotze et al, 2005). The WET-EcoServices technique identifies main types of wetland based on hydro-geomorphic characteristics (Table 11). According to hydro-geomorphic characteristics, the wetland features within the study area and surrounds can be classified as follows:

Table 9: Classification of wetlands 1-8

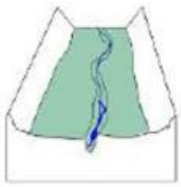
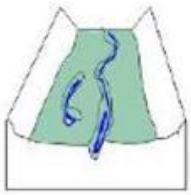
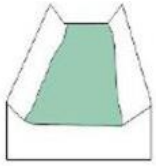
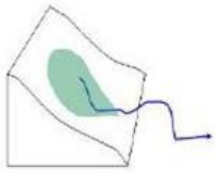
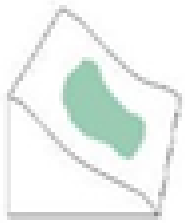
Name	Wetlands 1-8 (Immediately west and east of the R300 road)
Size of wetland area	Wetland 1 – 0.22ha (to be developed) Wetland 2 – 0.46ha (of 0.34ha to be developed) Wetland 3 – 0.29 (0.1ha to be developed) Wetland 4 – 0.22 (0.1ha to be developed) Wetland 5 – 1.33ha (not to be developed) Wetland 6 – 0.64ha (not to be developed) Wetland 7 – 0.1ha (to be developed) Wetland 8 – 0.86ha (0.37ha to be developed)
System	Inland
Ecoregion	South Western Coastal Belt
Landscape setting	Lower Foothills
Hydrogeomorphic Type	Depression
Longitudinal zonation	Lower foothills
Drainage	Surface and low water table.
Seasonality	Permanent to Seasonal
Anthropogenic influence	The edges of the wetlands have become more defined and smaller as a result of previous and ongoing urban developments such as road and services infrastructure, landfill quarry areas, illegal waste and material dumping etc. The wetlands were historically bigger and it is believed that these wetlands were historically all one wetland which were transformed, isolated and fragmented due to developments associated with the ongoing urban developments.
Vegetation	Cape Flats Sand Fynbos
Substrate	Grey, regic sands
Salinity	Fresh

Table 10: Classification of wetland 9

Name	Wetland 9 (immediately west of the Kuils River)
Size of wetland area	0.41ha (not to be developed)
System	Inland
Ecoregion	South Western Coastal Belt
Landscape setting	Lower Foothills
Hydrogeomorphic Type	Channeled valley bottom
Longitudinal zonation	Lower foothills
Drainage	Water is channelled through the wetlands to the Kuils River
Seasonality	Permanent to Seasonal
Anthropogenic influence	The channels of the wetlands have become less defined as a result of the channelization of the Kuils River and surrounding infrastructure development.

Vegetation	Cape Flats Sand Fynbos
Substrate	Grey, regic sands
Salinity	Fresh

Table 11: Wetland hydro-geomorphic types typically supporting inland wetlands in South Africa

Hydro-geomorphic types	**Description**	**Source of water maintaining wetland [1]**	
		Surface	**Sub-surface**
Floodplain 	Valley bottom areas with a well-defined stream channel gently sloped and characterized by floodplain features and the alluvial transport and deposition of sediment, usually leading to a net accumulation of sediment. Water inputs from main channel and from adjacent slopes.	***	*
Valley bottom with a channel 	Valley bottom areas with a well-defined stream channel but lacking characteristic floodplain features. May be gently sloped and characterized by the net accumulation of alluvial deposits or may have steeper slopes and be characterized by the net loss of sediment. Water inputs from main channel and from adjacent slopes.	***	*/ ***
Valley bottom without a channel 	Valley bottom areas with no clearly defined stream channel usually gently sloped and characterized by alluvial sediment deposition, generally leading to a net accumulation of sediment. Water inputs mainly from channel entering the wetland and from adjacent slopes.	***	*/ ***
Hillslope seepage linked to stream channel 	Slopes on hillsides, characterized by the colluvial movement of materials. Water inputs are mainly from sub-surface flow and outflow is usually via a well-defined stream channel connecting the area directly to a stream channel.	*	***
Isolated Hillslope seepage 	Slopes on hillsides, which are characterized by the colluvial (transported by gravity) movement of materials. Water inputs mainly from sub-surface flow and outflow either very limited or through diffuse sub-surface and/or surface flow but with no direct surface water connection to a stream channel.	*	***
Depression (includes Pans)	A basin shaped area with a closed elevation contour that allows for the accumulation of surface water (i.e. it is inward draining). It may also receive sub-surface water. An outlet is usually	*/ ***	*/ ***

	absent, and therefore this type is usually isolated from the stream channel network.		

[1] Precipitation is an important water source and evapotranspiration is important.
Water source: * Contribution usually small
*** Contribution usually large
*/ *** Contribution may be small or important depending on the local circumstances

3.5.3 WETLAND INTEGRITY

The Present Ecological Status (PES) Method (DWAF 2005) was used to establish the integrity of the wetland and was based on the modified Habitat Integrity approach developed by Kleynhans (DWAF, 1999; Dickens *et al*, 2003). Table 14 shows the criteria and results from the assessment of the habitat integrity of the wetland. These criteria were selected based on the assumption that anthropogenic modification of the criteria and attributes listed under each selected criterion can generally be regarded as the primary causes of the ecological integrity of a wetland.

Table 12: Habitat integrity assessment criteria for palustrine wetlands (Dickens *et al*, 2003)

Criteria/Attributes	Relevance
Hydrologic	
Flow Modification	Consequence of abstraction, regulation by impoundments or increased runoff from human settlements or agricultural land. Changes in flow regime (timing, duration, frequency), volumes, velocity which affect inundation of wetland habitats resulting in floralistic changes or incorrect cues to biota. Abstraction of groundwater flows to the wetland.
Permanent Inundation	Consequence of impoundment resulting in destruction of natural wetland habitat and cues for wetland biota.
Water Quality	
Water Quality Modification	From point or diffuse sources. Measure directly by laboratory analysis or assessed indirectly from upstream agricultural activities, human settlements and industrial activities. Aggravated by volumetric decrease in flow delivered to the wetland.
Sediment Load Modification	Reduction due to entrapment by impoundments or increase due to land use practices such as overgrazing. Cause of unnatural rate of erosion, accretion or infilling of wetlands.
Hydraulic/Geomorphic	
Canalisation	Results in desiccation or changes to inundation patterns of wetland and thus changes in habitats. River diversions or drainage.
Topographic Alteration	Consequence of infilling, ploughing, dykes, trampling, bridges, roads, railway lines and other substrate disruptive activities that reduce or change wetland habitat directly.
Biota	
Terrestrial Encroachment	Desiccation of wetland and encroachment of terrestrial plant species due to changes in hydrology or geomorphology. Change from wetland to terrestrial habitat and loss of wetland functions.
Indigenous Veg Removal	Destruction of habitat through farming activities, grazing or firewood collection affecting wildlife habitat and flow attenuation functions, organic matter inputs and increases potential for erosion.
Invasive Plant	Affects habitat characteristics through changes in community

Encroachment	structure and water quality changes (oxygen reduction and shading).
Alien Fauna	Presence of alien fauna affecting faunal community structure.
Over utilisation	Overgrazing, over fishing, etc.

Table 13: Wetland habitat integrity assessment (score of 0=critically modified to 5=unmodified)

Criteria & Attributes	**Wetlands 1-8**
Hydrologic	
Flow Modification	2
Permanent Inundation	2
Water Quality	
Water Quality Modification	2.5
Sediment Load Modification	2
Hydraulic/Geomorphic	
Canalisation	1.5
Topographic Alteration	2.5
Biota	
Terrestrial Encroachment	1
Indigenous Vegetation Removal	3
Invasive Plant Encroachment	3
Alien Fauna	4.5
Over utilisation of Biota	4.5
Total Mean	**2.4**
Category	**D– Largely modified**

Photo 2: Wetland 1. Spade indicates the edge of the wetland.

Photo 3: Wetland 1. Vegetation structure inside the wetland. Dominated by *Phragmites australis.*

Photo 4: Wetland 2. Wetland vegetation dominated by *Phragmites australis.*

Photo 5: Wetland 2. Wetland outside the impacted area.

Photo 6: Wetland 2. Wetland to be impacted by western off ramp.

Photo 7: Wetland 2. Wetland to be impacted by western off ramp.

Photo 8: Wetland 8. Wetland vegetation dominated by *Thypha capensis.*

Photo 9: Wetland 8 – Seasonally dry but with low water table.

Table 14: Wetland habitat integrity assessment (score of 0=critically modified to 5=unmodified)

Criteria & Attributes	**Wetland 9 (west of the Kuils River)**
Hydrologic	
Flow Modification	1
Permanent Inundation	1.5
Water Quality	
Water Quality Modification	1.5
Sediment Load Modification	2
Hydraulic/Geomorphic	
Canalisation	1.5
Topographic Alteration	2.5
Biota	
Terrestrial Encroachment	1
Indigenous Vegetation Removal	1
Invasive Plant Encroachment	1.5
Alien Fauna	4.5
Over utilisation of Biota	4.5

Total Mean	**1.90**
Category	**E – The loss of natural habitat, biota and basic ecosystem functions is extensive.**

Photo 10: Wetland 9. Wetland vegetation dominated by *Cyperus congestus.*

Table 15: Relation between scores given and ecological categories Scoring

Guidelines Per Attribute*	**Interpretation of Mean* of Scores for all Attributes: Rating of Present Ecological Status Category (PESC)**
Natural, unmodified - score=5.	Within general acceptable range CATEGORY A >4; Unmodified, or approximates natural condition.
Largely natural - score=4.	CATEGORY B >3 and <4; Largely natural with few modifications, but with some loss of natural habitats.
Moderately modified- score=3.	CATEGORY C >2 and <3; moderately modified, but with some loss of natural habitats.
Largely modified - score=2.	CATEGORY D <2; largely modified. A large loss of natural habitats and basic

	ecosystem functions has occurred.
	OUTSIDE GENERALLY ACCEPTABLE RANGE
Seriously modified - rating=1.	CATEGORY E >0 and <2; seriously modified. The losses of natural habitats and basic ecosystem functions are extensive.
Critically modified - rating=0.	CLASS F 0; critically modified. Modifications have reached a critical level and the system has been modified completely with an almost complete loss of natural habitat.

The WET-Health method was also then used to determine the Present Ecological Status (PES) scores for the hydrology, geomorphology, water quality and vegetation of the wetland and generate an overall PES and ecological category for the wetland (Table 20).

Table 16: WET-Health assessment of the present ecological status of the wetlands

Wetland	**Wetlands 1-8**	
Components	**PES% Score**	**Eco Category**
Hydrology PES	30 %	**E**
Geomorphology PES	71 %	**C**
Water quality PES	-	**-**
Vegetation PES	71 %	**E**
Overall Wetland PES	53 %	**D**

Table 17: WET-Health assessment of the present ecological status of the wetlands

Wetland	**Wetland 4**	
Components	**PES% Score**	**Eco Category**
Hydrology PES	60 %	**E 180**
Geomorphology PES	19 %	**C 38**
Water quality PES	-	**-**
Vegetation PES	33 %	**E 66**
Overall Wetland PES	40 %	**D**

From above assessments/classifications it can be seen that the habitat integrity of all the wetlands are considered to be largely modified. The most significant impacts on the wetland areas are the direct habitat loss, isolation and fragmentation due to surrounding land uses activities and the canalisation of the Kuils River and its tributaries.

3.5.4 ECOSYSTEM SERVICES SUPPLIED BY THE WETLANDS

The assessment of the ecosystem services supplied by the wetland was conducted according to the guidelines as described by Kotze *et* al (2004). An assessment was undertaken that examines and rates the services listed in Table 18. The characteristics were scored according to the general levels of services provided.

The wetland areas offer moderate services in terms of trapping and or removing phosphate, nitrate and toxicants. It also offers moderate services in terms of controlling erosion and attenuating floods. There are no critically important aquatic ecosystems downstream of the site.

Table 18: Goods and services assessment results for the wetland in the study site (high=4; low=0)

Goods and services	**All 6 impacted wetlands**	**Goods and services**	**All 6 impacted wetlands**
Flood attenuation	1.1	Maintenance of biodiversity	1.4
Stream flow	1.1	Water supply for	0

regulation		human use	
Sediment trapping	1.1	Natural resources	0
Phosphate trapping	2.2	Cultivated foods	0
Nitrate removal	1.6	Cultural significance	0
Toxicant removal	2.6	Tourism and recreation	0.4
Erosion control	1.1	Education and research	1.5
Carbon storage	2.3		

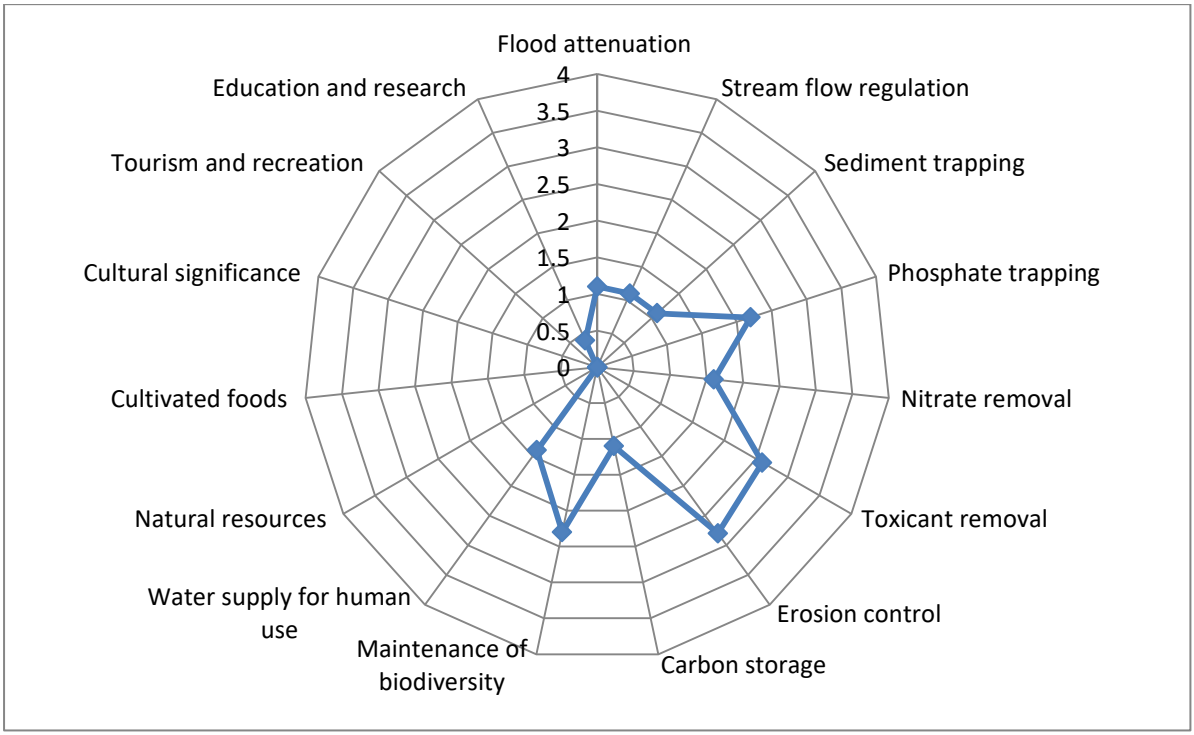


Figure 5: Ecosystem services provided by the wetland area

3.5.5 ECOLOGICAL IMPORTANCE AND SENSITIVITY (EIS)

The EIS Assessment for the wetland area utilises the same methodology as that for rivers and is described in this report. The results from the wetland assessments are provided in Table 19-20 below.

Table 19: Results of the EIS assessment for the wetland area Biotic

Determinants	**Wetlands 1-8**
Rare and endangered biota	0.5
Unique biota	1
Intolerant biota	1
Species/taxon richness	1
Aquatic Habitat Determinants	
Diversity of aquatic habitat types or features	1.5
Refuge value of habitat type	2
Sensitivity of habitat to flow changes	2
Sensitivity of flow related water quality changes	2
Migration route/corridor for instream and riparian biota	3
National parks, wilderness areas, Nature Reserves, Natural Heritage sites, Natural areas, PNEs	0

EIS CATEGORY	**Moderate**

Table 20: Results of the EIS assessment for the wetland area Biotic

Determinants	**Wetland 4**
Rare and endangered biota	0.5
Unique biota	1
Intolerant biota	1
Species/taxon richness	1
Aquatic Habitat Determinants	
Diversity of aquatic habitat types or features	1.5
Refuge value of habitat type	2
Sensitivity of habitat to flow changes	2
Sensitivity of flow related water quality changes	2
Migration route/corridor for instream and riparian biota	3
National parks, wilderness areas, Nature Reserves, Natural Heritage sites, Natural areas, PNEs	0
EIS CATEGORY	**Moderate**

From an ecological perspective, the wetland areas are of a moderate ecological sensitivity and importance. They provide a refuge for some indigenous species and water attenuation functions. Furthermore, as they are the interface between the terrestrial and aquatic environments, they have higher species diversity than the surrounding terrestrial, which has been extensively altered.

3.6. BIODIVERSITY CONSERVATION VALUE

There are two conservation mapping initiatives of relevance to the project, the Freshwater Ecosystem Priority Areas (FEPA) map which is available for the entire South Africa and the City of Cape Town Biodiversity Network Map. FEPAs are strategic spatial priorities for conserving freshwater ecosystems and associated biodiversity that were determined through a process of systematic biodiversity planning and were identified using a range of criteria for serving ecosystems and associated biodiversity of rivers, wetlands and estuaries. These rivers should be kept in their current condition, should not be degraded any further than its current moderately modified condition and it should be considered for rehabilitation where reasonable and feasible.

.

The Kuils River at the study area is mapped as a FEPA River that is considered to be largely modified and should not be allowed to be degraded or modified further as per FEPA objectives. However there is an existing bridge structure located on and next to the proposed bridge/road development over the Kuils River tributary. The overall significance of the potential negative impacts on the Kuils River is therefore expected to be of low significance due to the existing transformed state of the affected areas.

There are no FEPA wetlands mapped within the study area. The proposed road alignment will impact on six wetlands. Wetlands 1, 2, 3, 4, 7 and 8 and were mapped as part of three larger wetlands in the City of Cape Town Biodiversity Network (2017). The identified wetlands that will be impacted upon are all classified as natural and semi-natural wetlands, without a channelled outflow and vegetated. The wetlands were all also classified as a CESA in the City of Cape Town Biodiversity Network (2017). The mapping confidence for these wetlands is however indicated as Low Confidence and from the assessment conducted it is therefore clear that the mapping was not groundtruthed. The impacted area of the Kuils River is not classified as a wetland or CESA in the City of Cape Town Biodiversity Network (2017).

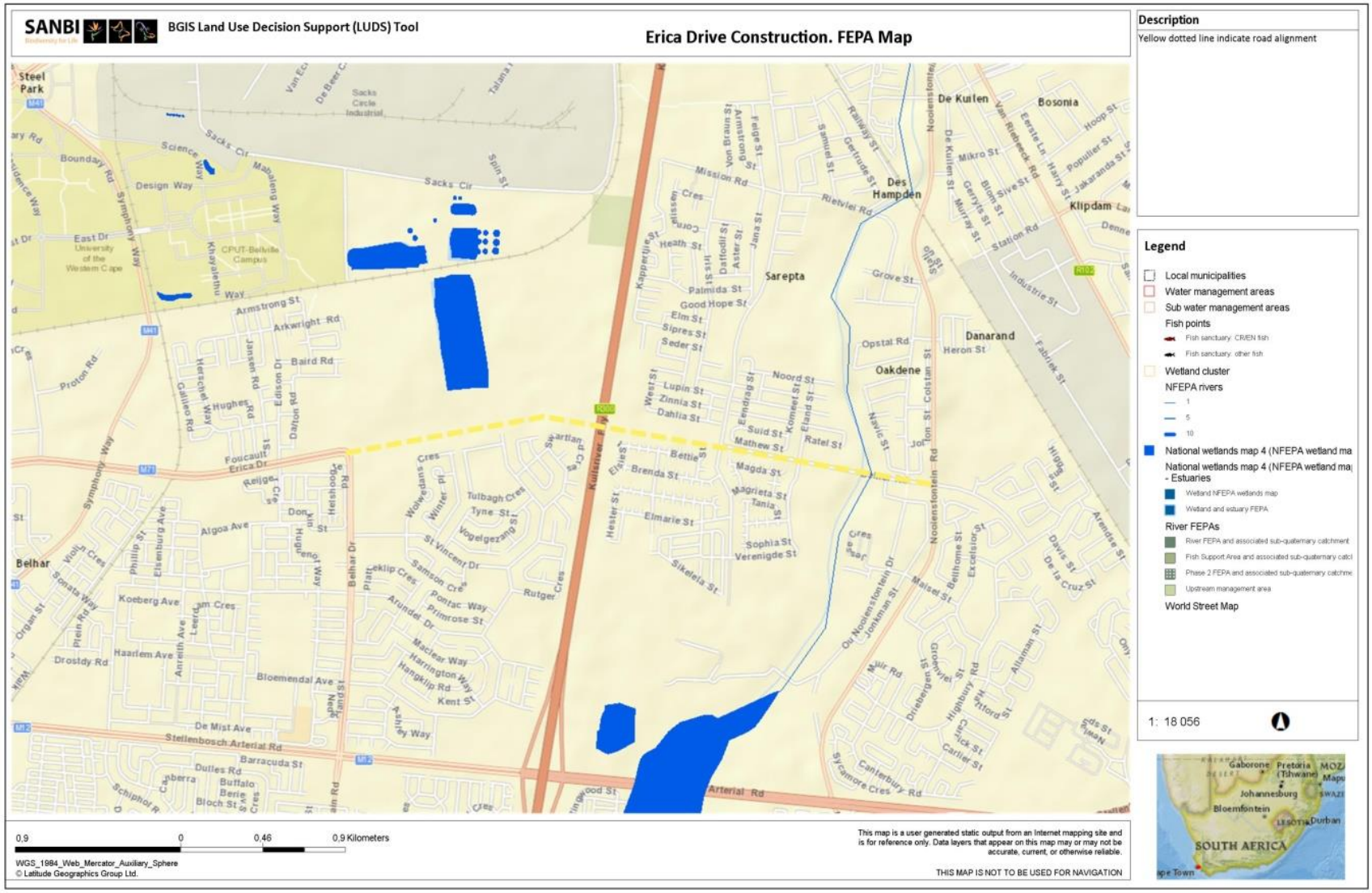


Figure 6: FEPA MAP

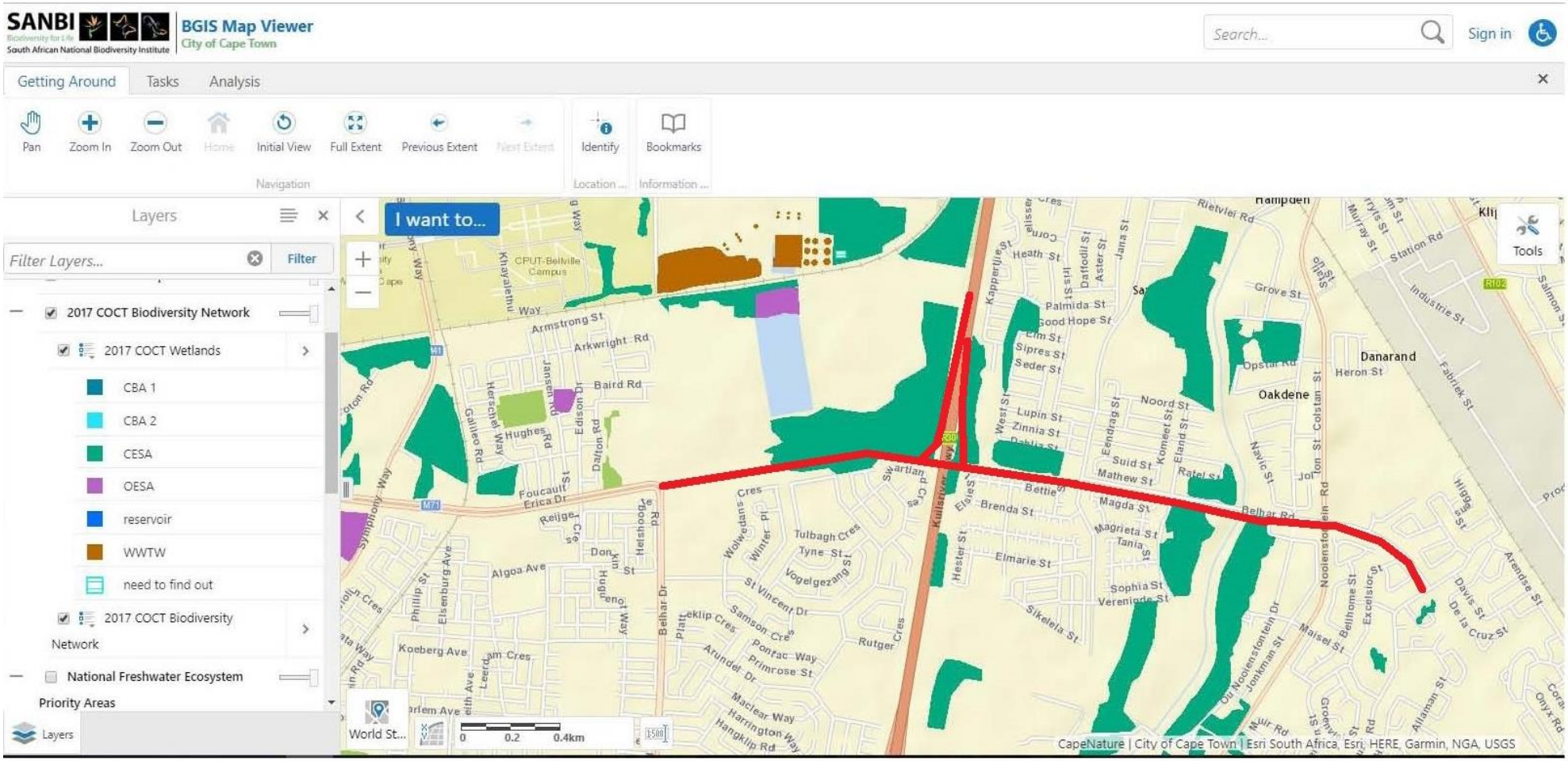


Figure 7: City of Cape Town Biodiversity Network (2017) - CESA wetland areas as mapped for the applicable study area.

4. IMPACT ASSESSMENT OF THE ACTIVITIES

POTENTIAL IMPACTS ON THE KUILS RIVER

The affected Kuils River area is significantly degraded/transformed and has been channelled. There is also an existing bridge structure located on and next to the proposed bridge/road development over the Kuils River tributary. The overall significant of the potential impacts on the Kuils River is therefore expected to be of low significance due to the existing transformed state of the affected areas.

Proposed Mitigation Measures during Construction. Operational and Decommissioning Phases:

- The construction disturbance zone must be limited to 10m up- and downstream of the end of the new road footprint and this edge must be demarcated on site.
- No work camps or construction phase stockpiling may be located within 50m of the channel of the River or such that construction associated material or waste will flow, blow or leach into the channel.
- Any activities involving cement must be tightly controlled to prevent its passage into the river – uncured cement will increase pH and thus potentially affect ammonia toxicity.
- All refuelling areas must be adequately bunded.

POTENTIAL IMPACTS ON THE WETLANDS

Expansion and dualling of Erica Drive would have the following definite, permanent and irreversible impacts on the identified aquatic ecosystems:

The project layout would result in the complete and portions infilling of Wetlands 1, 2, 3, 4, 7 and 8 as identified and account for permanent encroachment into an total wetland area of approximately 1.23ha of the larger identified wetlands (out of a total wetland area of approximately 4.12ha).

The affected portions of the wetlands would be permanently destroyed. The ecological significance of this loss is considered of **medium negative significance** – a rating that takes account of the existing level of degradation and fragmentation of the system, but also of the rapid rate of degradation of the identified wetlands.

The following impacts are likely to occur within the wetland depressions in the area:

- Degradation as a result of compaction, excavation, passage of vehicles over wetland areas.
- Dumping of construction waste (old tar, paving, rubble) in wetland area.
- Visual degradation associated with litter (e.g. cement bags, litter from workers).
- Permanent destruction of soil function as a result of spillage of oils, fuels other contaminants from refuelling areas.
- Permanent loss of existing wetland habitat due to proposed road developments.

Without mitigation, these measures would be permanent, and would be of medium negative significance, with a medium cumulative significance rating as well, given that they are additional impacts on wetland areas that have already been shrunken as a result of the proposed layout.

Proposed Mitigation Measures during Construction. Operational and Decommissioning Phases:

- Due to the location of the proposed activities being site specific direct mitigation/prevention of impacts is not possible. It is recommended however that on - or off-site wetland offset mitigation should be implemented, to create seasonally inundated wetland depression habitat of at least the area lost or greater, and of a similar or better

quality. The existing wetlands have been completely cut off from all other aquatic ecosystems and are unlikely to play any significant future role in terms of biodiversity conservation. It is therefore recommended that the existing degraded wetland areas that will not be impacted upon be rehabilitated as offset mitigation focus, with allowance made for at least area-for-area wetland replacement and that this be incorporated into the site specific stormwater management structures that must be designed for the proposed development. A wetland ecologist must have input into the final design, extent and landscaping of the recommended wetland offsets and associated stormwater management measures on site.

- The disturbance zone must be kept to a maximum of 10m beyond the edge of the new road – this must be fenced off/demarcated along the full wetland width, using wire fencing and shade cloth and access by personal and machinery beyond the demarcation may not take place, other than for purposes of daily litter collection which must take place on foot.
- Litter must be collected from the abutting wetlands on a daily basis and by foot. All litter must be stored in suitable containers and disposed of at a licensed landfill site on at least a weekly basis.
- No vehicles may be refuelled within 30m of the mapped wetland edges, and any refuelling areas must be appropriately bunded.
- Site camps and areas for the storage of construction equipment and / or waste may not be located within 30m of the edge of any demarcated wetland.
- Construction that requires infilling of a wetland must take place from the terrestrial edge, and not from the wetland edge, to minimise unnecessary damage;
- At the end of construction, allowance must be made for landscaping the area of disturbed wetland abutting the construction area plus a 10m setback area.

5. CUMULATIVE IMPACTS

Cumulatively, the potential impacts of the activities to be undertaken will be of a low to medium negative significance and will be mitigated by providing wetland offset areas and short term rehabilitation of the disturbed areas and longer term monitoring and control of the growth of alien invasive plants.

6. RECOMMENDTIONS AND CONCLUDING REMARKS

The Kuils River flows through the proposed Erica Drive dualling from north to south. The freshwater ecological features on the site have been totally modified and channelled. On the site, surrounding land use, the channelling of the river and the existing constructed bridge has resulted in all of the indigenous riparian vegetation being removed from the river and streams. In terms of the importance and sensitivity of the features, the numerous impacts have greatly reduced their species richness and diversity. In order to maintain what remains of the ecological functioning of the systems on the site, it is recommended that construction methodology be provided by the civil contractor to the freshwater ecologist and approval first be granted before construction commences to ensure that the construction activities are mitigated and to prevent any further degradation of the Kuils River. The construction activities must be monitored by an Environmental Control Officer. The pillars of the expanded bridge must be in line with the existing bridge pillars in order to not affect or impact on the existing hydrology or river flow.

Six of the identified wetlands on site will be impacted upon. The impacted wetlands have largely modified wetland integrity as a large loss of natural habitat, biota and basic ecosystem functions has occurred. The Wetland Health Present Ecological Status of the impacted wetlands was assessed to be largely modified and in a moderate ecological importance state and sensitivity.

It is clear that the route will definitely impact, on a permanent basis, on an extent of depression wetlands. The former impacts are not mitigatable, and this report has

recommended offset mitigation to account for wetland loss. A no-development alternative is not considered a necessary or useful recommendation to avoid these impacts, taking into account the level of degradation and fragmentation of the affected wetlands, as well as the opportunity for offset mitigation to create a better quality of habitat than that lost.

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APPENDIX A: ABBREVIATED CURRICULUM VITAE AND DECLARATION OF INDEPENDENCE OF FRESHWATER SPECIALIST

BACKGROUND AND QUALIFICATIONS OF SPECIALIST CONSULTANT

Full Name: Nicolaas Hanekom
Year of Birth: 1967
Nationality: South African
Profession: Environmental Scientist and Environmental Assessment Practitioner
Years in Profession: Since 1989

This Freshwater Impact Assessment was conducted by Nicolaas Hanekom who has 26 years' experience working as an ecologist in the field of nature conservation. He has extensive field experience, knowledge of freshwater ecology, knows the region in which he is working and exercises sound and unbiased scientific and professional judgment. He has received training on the basics of freshwater ecosystems impact assessment during his career in nature conservation. He is a qualified Environmental Assessment Practitioner who holds a M. Tech, Nature Conservation from the Cape Peninsula University of Technology and a registered Professional Natural Scientist (Ecologist) with the South African Council for Natural Scientific Professions ("SACNASP").

Summary of Experience:

- Assistance Reserve Manage at Gariep Dam Nature Reserve (1993-1998)
- Reserve Manager, Conservation Services Manager for Western Cape Nature Conservation Board (1998-2001)
- Part time external Lecturer at Cape Peninsula University of Technology (2003-2005)
- Director: Environmental Management at Cape Lowlands Environmental Services (2006-2010)
- Environmental Impact Assessment Practitioner at Eco Impact (Pty) Ltd (2010 to date)
- Safety Health & Environmental System consulting

Mr Hanekom meets the legal requirements to act as a specialist on this project in terms of Regulation 13 of the Environmental Impact Assessment Regulations, 2014 that took effect on 8 December 2014, which regulates the general requirements for Environmental Assessment Practitioners ("EAP"s) and specialists. The regulation states that:

An EAP and a specialist, appointed in terms of regulation 12(1) or 12(2), must –

(1)(a) be independent;
(b) have expertise in conducting environmental impact assessments or undertaking specialist work as required, including knowledge of the Act, these Regulations and any guidelines that have relevance to the proposed activity;
(c) ensure compliance with these Regulations;
(d) 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 application;
(e) take into account, to the extent possible, the matters referred to in regulation 18 when preparing the application and any report, plan or document relating to the application; and
(f) disclose to the proponent or applicant, registered interested and affected parties and the competent authority all material information in the possession of the EAP and, where applicable, the specialist, that reasonably has or may have the potential of influencing-

(i) any decision to be taken with respect to the application by the competent authority in terms of these Regulations; or
(ii) the objectivity of any report, plan or document to be prepared by the EAP or specialist, in terms of these Regulations for submission to the competent authority; unless access to that information is protected by law, in which case it must be indicated that such protected information exists and is only provided to the competent authority.

(2) In the event where the EAP or specialist does not comply with sub regulation (1) (a), the proponent or applicant must, prior to conducting public participation as contemplated in chapter 5 of these Regulations, appoint another EAP or specialist to externally review all work undertaken by the EAP or specialist, at the applicant's cost.

THE INDEPENDENT PERSON WHO COMPILED A SPECIALIST REPORT OR UNDERTOOK A SPECIALIST PROCESS

I Nicolaas Willem Hanekom, as the appointed independent specialist hereby declare that I:

- act/ed as the independent specialist in this application;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct, and
- do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- have and will not have no vested interest in the proposed activity proceeding;
- have disclosed, to the applicant, EAP and competent authority, any material information that have or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- am fully aware of and meet the responsibilities in terms of NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act, and that failure to comply with these requirements may constitute and result in disqualification;
- have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;
- have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;
- have ensured that the names of all interested and affected parties that participated in terms of the specialist input/study were recorded in the register of interested and affected parties who participated in the public participation process;
- have provided the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not; and
- am aware that a false declaration is an offence in terms of of NEMA, the Environmental Impact Assessment Regulations, 2014.

Signature of the specialist

Eco Impact Legal Consulting (Pty) Ltd
Name of company

22 November 2017
Date