FRESHWATER ASSESSMENT REPORT FOR THE PROPOSED RELOCATION OF THE KOEBERG INSULATION POLLUTION TEST STATION AND CONSTRUCTION OF ASSOCIATED INFRASTRUCTURE

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EXECUTIVE SUMMARY

The Koeberg Insulator Pollution Test Station (KIPTS) is located south of the Koeberg Nuclear Power Station. Environmental changes and the promulgation of new environmental legislation has resulted in the KIPTS needing to be relocated in order that it can be operated safely or expanded cost effectively. ESKOM has identified a new site for the KIPTS which exhibits similar field characteristics as the current site. Aquatic features within the area of the proposed project activities comprise the following:

- *Some dune slack wetland areas are located in the south-western extent of the study area, along the access road to the existing KIPTS site; and*
- *There are no significant aquatic ecosystems within the proposed KIPTS site, only a small dune slack wetland that occurs along the proposed Alternative 1 access road.*

The dune slack wetlands are considered to be largely natural and of a moderate ecological importance and sensitivity. In terms of biodiversity conservation mapping, only the dune slack wetlands near the existing KIPTS are mapped in the City of Cape Town Biodiversity Network wetland mapping. There is no Freshwater Ecosystem Priority Area mapping within the area.

The proposed project is located within a private nature reserve where there is ongoing control of activities as well as the control of invasive alien plants. The existing KIPTS is located within a dune area that is largely surrounded by natural vegetation and dune slack wetlands. The new KIPTS will be located adjacent to the power plant where the area is more disturbed and transformed. Thus once construction, decommissioning and rehabilitation activities associated with the proposed project are complete, a low positive impact can be expected over the longer term.

Construction activities should as far as possible be limited to within the already disturbed areas. The disturbed areas should be rehabilitated after construction is completed by revegetating these areas with suitable indigenous plants if necessary. Monitoring and control of invasive alien plants should be undertaken on an ongoing basis, especially within the disturbed areas.

The potential impact on aquatic habitat would best be mitigated by ensuring that the various elements of the proposed activity avoid these aquatic habitats through the selection of the alternatives that are located away from any aquatic feature. With regards to the various alternatives under consideration:

- *Alternative sites: The preferred KIPTS site is likely to have the least potential impact on the aquatic features in the area as there are no aquatic features identified within this site.*
- *Alternative access roads: Of the proposed access roads, Alternative 3 is likely to have the least (nil) potential impact on the aquatic features, followed by Alternative 2. Alternative 1 has the largest potential impact due to the location of a small wetland area adjacent to the road that could potentially be impacted on by the proposed activities.*
- *Alternative power lines: Alternative 1 entails only a short section of underground line close to the water and sewer lines. There are no freshwater features within this area thus this alternative would not have a potential impact on any aquatic ecosystems. Alternative 2 will*

be located along Alternative 2 Access Road that would also have little to no potential aquatic ecosystem impacts as discussed in the previous bullet.

The risk of the proposed activities degrading the aquatic ecosystems in the area is considered to be low. The water use activities associated with the proposed relocation of the Koeberg Insulator Pollution Test Station are thus such that they can be authorised in terms of the General Authorisations for Section 21(c) and (i) water uses.

Considering that the No-Go Alternative would imply that the existing site that is located near the dune slack wetlands in the site would need to continue to be maintained and operated, posing a greater risk of impacting on these wetland areas than the new proposed site, the proposed relocation of the KIPTS is supported.

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1. BACKGROUND

The Koeberg Insulator Pollution Test Station (KIPTS) is a naturally polluted insulation test station. The test station is located south of the Koeberg Nuclear Power Station which is approximately 30km northwest of Cape Town, on the west coast of South Africa (Figure 1). The purposed of KIPTS is to determine the suitability of composite insulator products for use on the ESKOM system by testing them in field conditions on an ongoing basis. Environmental changes and the promulgation of new environmental legislation has resulted in the KIPTS needing to be relocated in order that it can be operated safely or expanded cost effectively. ESKOM has identified a new site for the KIPTS which exhibits similar field characteristics as the current site. The site is located adjacent to the western edge of the Koeberg power station. There is also an alternative site under consideration to the east of the power station.

Table 1: Key water resources information

Descriptor	Name / Details	Notes
Water Management Area (WMA)	Berg Olifants WMA	
Catchment Area	Sout River	A tributary of the Eerste River
Quaternary Catchment	G21B	
Present Ecological State	E (Serious Modification)	Rapid national assessment for the Sout River (DWS, 2012)
Ecological Importance and Sensitivity	Ecological Importance – Moderate Ecological Sensitivity –High	
Water resource component potentially impacted	Depression wetlands not associated with a stream / river	
Latitude	33°40'19.22"S	Centre of proposed KIPTS site
Longitude	18°25'41.63"E	

2. TERMS OF REFERENCE

The suggested and agreed upon scope of works for this freshwater assessment is as follows:

TASK 1: FRESHWATER IMPACT ASSESSMENT

1.1 Literature survey and initialisation

1.2 Site assessment

1.3 Freshwater ecosystem impact assessment report

1.4 Risk assessment matrix of DWS

1.5 Review and liaison

A water use authorisation application will also be undertaken as part of the scope of works and will include the following:

TASK 2: WATER USE AUTHORISATION APPLICATION FOR SECTION 21 C AND I

2.1 Collate relevant information

2.2 Pre-application consultation meeting with DWS

2.3.1 Part 1 forms

2.3.2 Part 2 forms: Section 21 c and i water use

2.4 Submission of application

2.5 Liaison and review

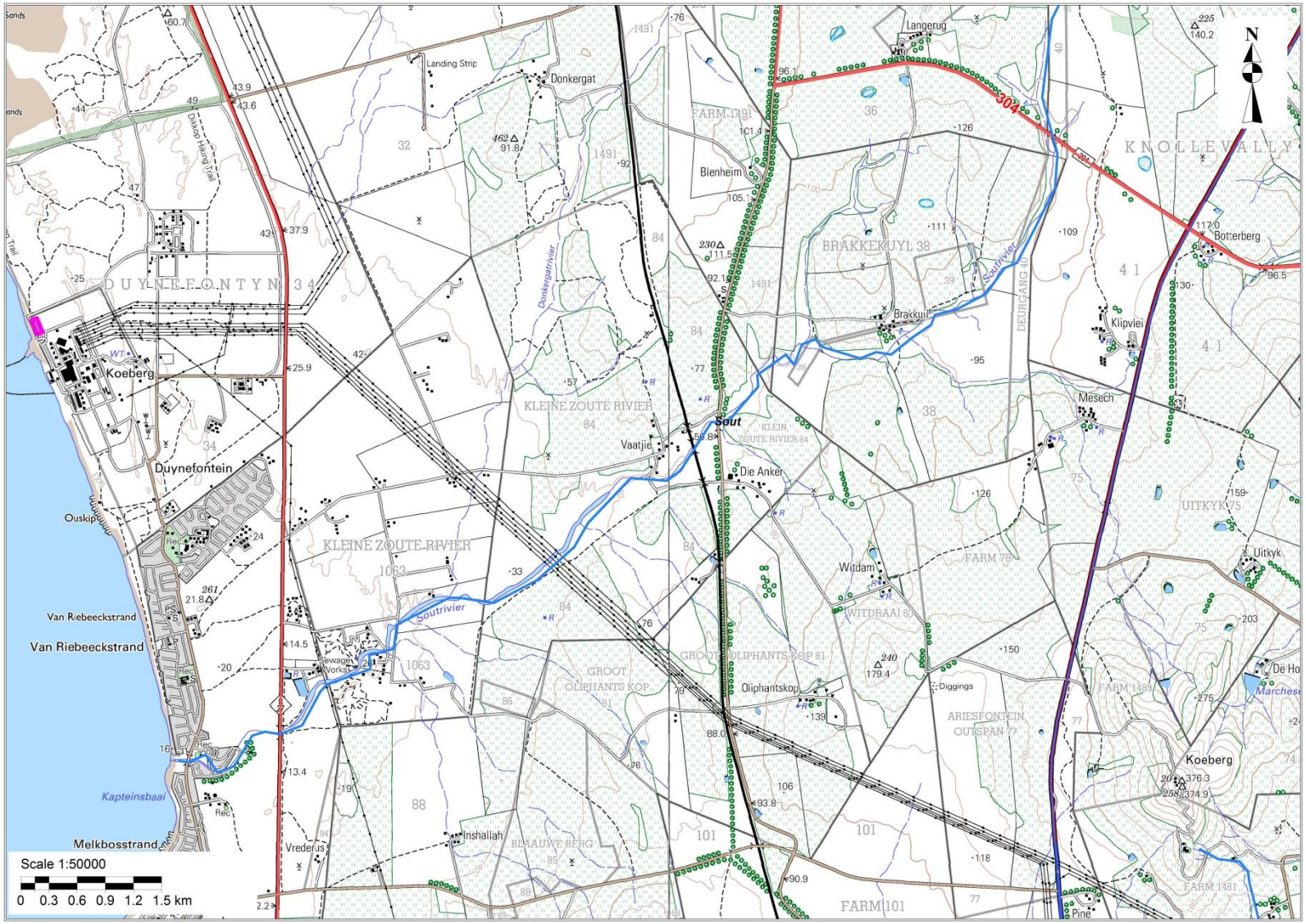


Figure 1. Topographical Map (3318CB&DA) for the proposed KIPTS facility (pink polygon)

3. 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 visit was undertaken at the end of summer, in early February 2017, following two years of below average rainfall in the area. Seasonal wetland features under these conditions are thus difficult to delineate. Therefore, combination of aerial photography and site observations were employed to identify and map wetland features within the study area.

During the field visit, the characterisation and integrity assessments of the freshwater features were undertaken. Mapping of the freshwater features was undertaken using PlanetGIS and Google Earth Professional. The SANBI BiodiversityGIS and CapeFarmMapper websites were 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.

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

- Analysis of the freshwater ecosystems was undertaken at a rapid level and did not involve detailed habitat and biota assessments;
- The guideline document, "A Practical Field Procedure for the Identification and Delineation of Wetlands and Riparian Areas" document, as published by DWAF (2005) was followed for the delineation of the wetland areas;
- The wetlands were classified according to their hydro-geomorphic determinants based on a classification system devised by Kotze *et al* (2004) and SANBI (2009);
- A Present Ecological State (PES) assessment was conducted for each wetland area identified and delineated within the study area. For the purpose of this study, the tool WET-Health as defined in the WET Health Series developed for the Water Research Commission was used to assess the present ecological state of each wetland;
- The functional wetland assessment technique, WET-EcoServices, developed by Kotze *et al* (2009) was used to provide an indication of the ecological benefits and services provided by delineated wetland habitat. This technique consists of assessing a combination of desktop and infield criteria in order to identify the importance and level of functioning of the wetland units within the landscape;
- The ecological importance and sensitivity assessment for the watercourses was conducted according to the guidelines as developed by DWAF (1999);
- Lists of plants, both alien and indigenous are for the purpose of describing the general and dominant habitat conditions and not comprehensive. A comprehensive botanical survey was not conducted as part of this freshwater assessment.

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

4. USE OF THE REPORT

This report reflects the professional judgment of its authors. The full and unedited content of this should be presented to the client. Any summary of these findings should only be produced in consultation with the authors.

5. OVERVIEW OF THE STUDY AREA AND PROJECT PROPOSALS

5.1. OVERVIEW OF STUDY AREA

The site is located immediately west of the Koeberg Nuclear Power Station on the west coast near Melkbosstrand. The area is within 400m of the ocean at an altitude of approximately 5 to 10 m above sea level. The site is flat with a primary foredune between the site and the beach. The vegetation cover in the area comprises of low strandveld. Due to the fact that the power station is contained within the Koeberg Private Nature Reserve and the West Coast Biodiversity Corridor, much of the vegetation cover is largely natural.

5.2. ACTIVITY DESCRIPTION

The proposed activity includes the construction and operation of the relocated KIPTS. The preferred site is immediately north-west of the power station (Figure 2). The alternative site lies south-east of the power station. The proposed associated infrastructure alternatives are all only applicable to the preferred site. Should the alternative KIPTS site be selected – additional associated infrastructure alternative would be required.

Three alternative access roads are proposed to the preferred site: Alternative 1 (the green line in Figure 2) runs through a protected area and would require the construction of a new road. Due to these constraints – this is not the preferred road location alternative. Alternative 2 (the dashed light blue line in Figure 2) is an existing road with is proposed to be used as the access road to the site during the construction phase. The road would need to be widened to a minimum width of 10m and tarred. Alternative 3 (the red line in Figure 2) is proposed as the new access road during the operation phase of the activity. This road would need to be upgraded in the same way as alternative 2. Alternative 2 and 3 are therefore essentially the same alternative – but constitute different routes being used during the different phases.

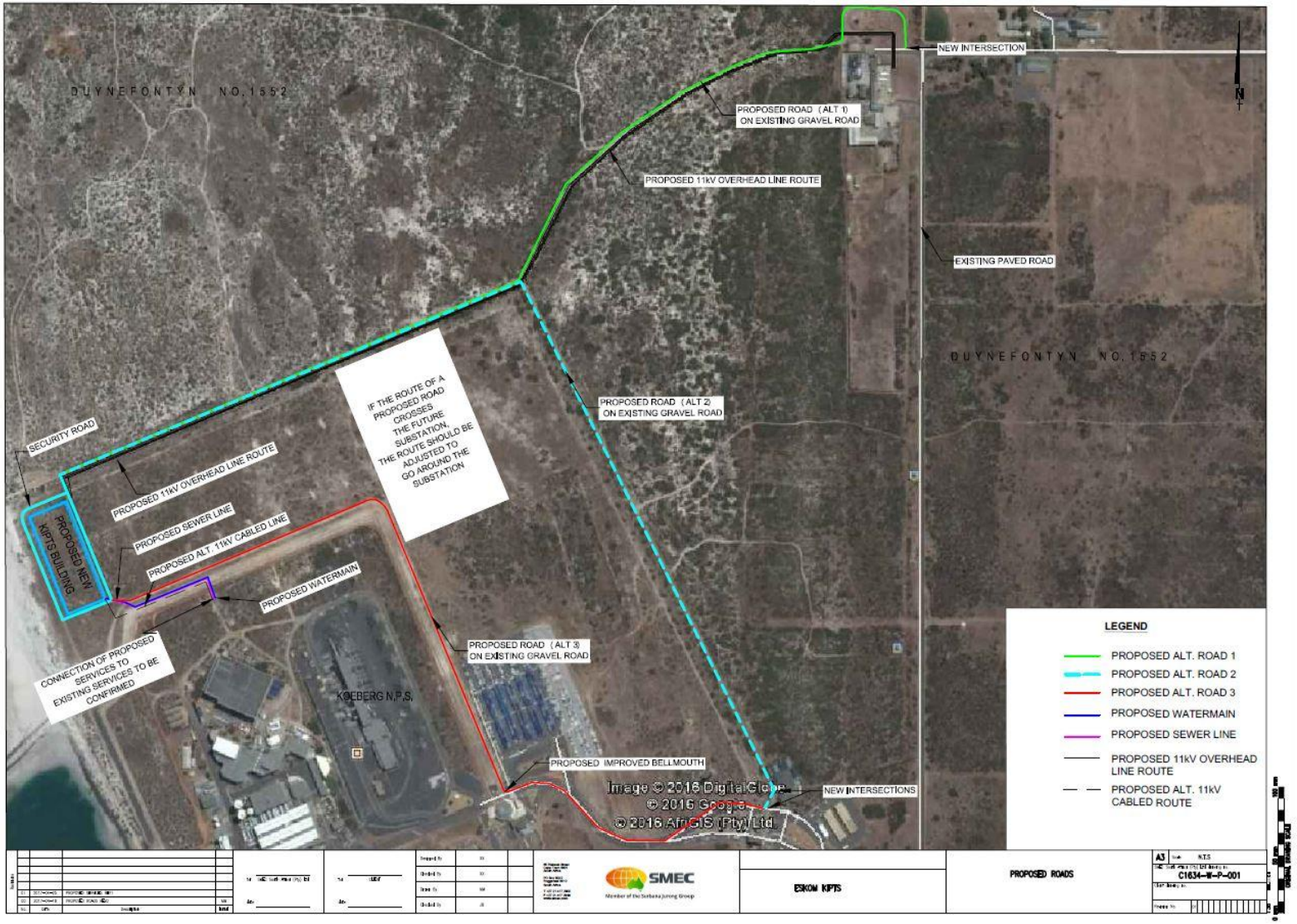


Figure 2. The layout of preferred proposed KIPTS and associated infrastructure

Power supply to the preferred KIPTS site would be via a proposed 11kV line. Alternative 1 (the dashed line in Figure 2) is the preferred alternative and is a short section of underground 11kV line directly to the Koeberg power station. Alternative 2 (the solid black line in Figure 2) would run in a north-eastern direction to connect to power supply approximately 1.5km away. Overhead and underground options are being considered for alternative 2. Typically, underground 11kV lines would be laid in a trench 1m deep and 0.45m wide.

The water supply (the blue line in Figure 2) and sewer line (the pink line in Figure 2) would connect to existing services at the Koeberg power station.

Once the new KIPTS has been construction and is operational, the existing KIPTS will be decommissioned.

6. LEGISLATIVE AND CONSERVATION PLANNING REQUIREMENTS

The proposed activity needs to take cognizance of the legislative requirements, policies, strategies, guidelines and principals of the relevant regulatory documents of the City of Cape Town, such as the Spatial Development Framework (Figure 3) and the Biodiversity Network Plan (Figure 12), as well as the National Water Act (NWA) and the National Environmental Management Act (NEMA).

6.1. CITY OF CAPE TOWN'S POLICIES AND STRATIGIES

FLOODPLAIN AND RIVER CORRIDOR MANAGEMENT POLICY (2009) AND MANAGEMENT OF URBAN STORMWATER IMPACTS POLICY (2009)

Watercourses and wetlands with their adjacent riparian areas and associated fauna and flora are protected from the impacts of adjacent development or activity by ecological buffers. Buffers provide continuous corridors and habitat for flora and fauna, as well as other benefits such as water quality improvement of point or diffuse sources of pollution, stream bank and erosion protection from the hydrological impacts associated with hardened catchments in urban areas, and space for implementation of appropriate water sensitive urban design elements. Determination of ecological buffer widths is based on classification of the watercourse or wetland, its ecological condition and its importance and sensitivity. Buffer widths vary in width between 10 m and 40 m from "top of bank" watercourses, and up to 75 m from outer edge of wetlands.

A new development must also take cognisance of the City's Storm water Management Planning and Design Guidelines for New Developments (2009). In order to reduce impacts of urban storm water systems on receiving waters, all storm water management systems within the City's area are required to be planned and designed in accordance with best practice criteria and guidelines laid down by the City, to support Water Sensitive Urban Design principles and the following specific sustainable urban drainage system objectives: Improve quality of storm water runoff; control quantity and rate of storm water runoff; and·encourage natural groundwater recharge.

CITY OF CAPE TOWN SPATIAL DEVELOPMENT PLAN (SDP) AND ENVIRONMENTAL MANAGEMENT FRAMEWORK (EMF)

A district SDP and EMF have been developed for the (Figure 3) as a framework of policies and plans that will guide the physical development of the Blaauwberg District. The area surrounding Koeberg Nuclear Power Station is mapped as a Core 1 conservation priority area that forms part of the Koeberg north-south ecological corridor (Core 2 area). The site also falls within the Koeberg Nuclear Power Station safety zone. Spatial development guidelines associated with the area are:

1. Activities in these areas should focus on conservation use with conservation management activities (e.g. alien clearing, research) encouraged.
2. In general, low impact activities such as passive recreation (e.g. walkways and trails), environmental education and tourism may be appropriate, but should be subject to stringent controls. (e.g. limits to development footprint, management plans).
3. Where possible, all new utility infrastructure, services and structures should be located outside of these areas.
4. Formalised reserves and sites should be regarded as 'no-go' areas and no further development of any kind should be allowed in these areas without a detailed assessment of the impacts and reference to the Reserve Zonation Plan (2010).
5. Further subdivision of these areas should generally be discouraged and consolidation encouraged.
6. Where ecological corridors are located within proposed urban areas the extent of the ecological corridor is indicative and precise configuration should be determined through relevant land use and statutory processes including, but not limited to a local development framework as part of future land use applications.
7. Reference should be made to the EMF's conservation and biodiversity priority zone and specific environmental attribute detail for further guidance around the desirability of specific activities in these areas.

A management plan for the Koeberg Nature Reserve has also been compiled by Eskom that provides a strategic and operational management framework as well as monitoring and reporting for the reserve.

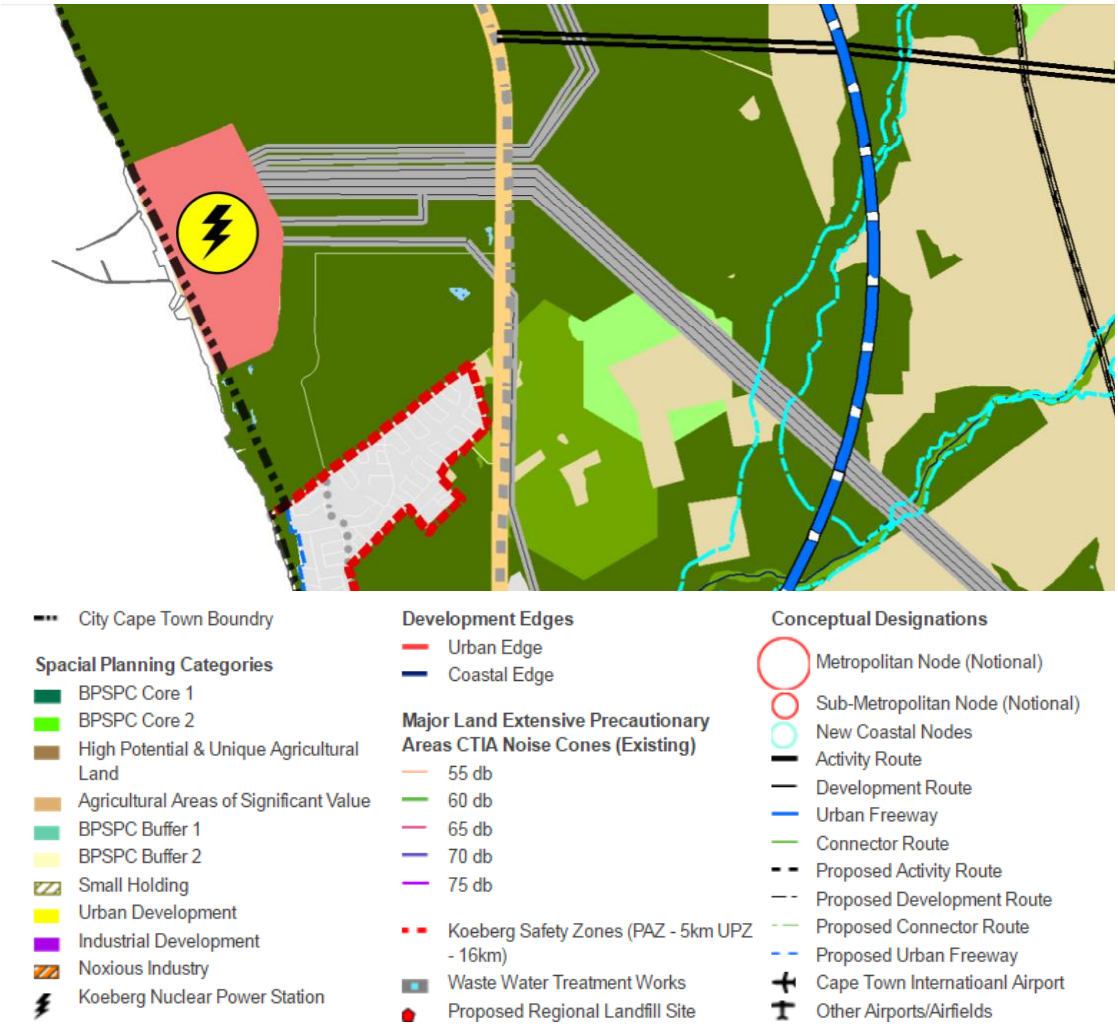


Figure 3. City of Cape Town's Spatial Development Framework for the area (CCT, 2017)

6.2. NEMA AND ENVIRONMENTAL IMPACT ASSESSMENT REGULATIONS

NEMA is the overarching piece of legislation for environmental management in South Africa and includes provisions that must be considered in order to give effect to the general objectives of integrated environmental management. These provisions are contained in Section 24 (4)(a)(b) of the Act, and will be considered during the EIA process. Activities listed in terms of Chapter 5 of NEMA in Government Notice No. R. 983, 984 and 985, dated 4 December 2014, as amended on 7 April 2017, trigger a mandatory Basic Assessment, or even a full scoping EIA process, prior to development.

6.3. NATIONAL WATER ACT, 1998 (ACT NO. 36 OF 1998)

The purpose of the National Water Act, 1998 (NWA) is to provide a framework for the equitable allocation and sustainable management of water resources. Both surface and groundwater sources are redefined by the Act as national resources which cannot be owned by any individual, and rights

to which are not automatically coupled to land rights, but for which prospective users must apply for authorisation and register as users. The NWA also provides for measures to prevent, control and remedy the pollution of surface and groundwater sources.

The Act aims to regulate the use of water and activities (as defined in Part 4, Section 21 of the NWA), which may impact on water resources through the categorisation of 'listed water uses' encompassing water abstraction and flow attenuation within catchments as well as the potential contamination of water resources, where the DWS is the administering body in this regard. Defined water use activities require the approval of DWS in the form of a General Authorisation or Water Use Licence authorisation. There are restrictions on the extent and scale of listed activities for which General Authorisations apply.

Section 22(3) of the National Water Act allows for a responsible authority (DWS) to dispense with the requirement for a Water Use Licence if it is satisfied that the purpose of the Act will be met by the grant of a licence, permit or authorisation under any other law.

GENERAL AUTHORISATION IN TERMS OF SECTION. 39 OF THE NWA

According to the preamble to Part 6 of the NWA, "*This Part established a procedure to enable a responsible authority, after public consultation, to permit the use of water by publishing general authorisations in the Gazette…*" *"The use of water under a general authorisation does not require a licence until the general authorisation is revoked, in which case licensing will be necessary…"*

The General Authorisations for Section 21 (c) and (i) water uses (impeding or diverting flow or changing the bed, banks or characteristics of a watercourse) as defined under the NWA have recently been revised (Government Notice R509 of 2016). The proposed works within or adjacent to the wetland areas and river channels are likely to change the characteristics of the associated freshwater ecosystems and may therefore require authorization. Determining if a water use licence is required for these water uses is now associated with the risk of degrading the ecological status of a watercourse. A low risk of impact could be authorised in terms of a General Authorisations (GA). A risk assessment for the proposed project will be included in this report.

REGULATIONS REQUIRING THAT A WATER USER BE REGISTERED, GN R.1352 (1999)

Regulations requiring the registration of water users were promulgated by the Minister of DWA in terms of provision made in section 26(1)(c), read together with section 69 of the National Water Act, 1998. Section 26(1)(c) of the Act allows for registration of all water uses including existing lawful water use in terms of section 34(2). Section 29(1)(b)(vi) also states that in the case of a general authorisation, the responsible authority may attach a condition requiring the registration of such water use. The Regulations (Art. 3) oblige any water user as defined under section 21 of the Act to register such use with the responsible authority and effectively to apply for a Registration Certificate as contemplated under Art.7(1) of the Regulations.

7. PHYSICAL CHARACTERISTICS OF THE STUDY SITE

7.1. VISUAL CHARACTERISTICS

The site is located within the flat, low-lying area directly behind the foredunes. The area is located within the Koeberg Nature Reserve thus the surrounding land cover is dominated by low strandveld vegetation and white coastal sands (Figure 4). The only development in the area is the Koeberg Nuclear Power Station. Urban development and the Sout River are more than 2.5km to the south.

Figure 4. A view of the area around the Koeberg Power Station

7.2 CLIMATE

The study area experiences a Mediterranean climate. Winters (June – August) are typically colder and experience higher rainfall than summers (December – February) (Figure 5). Surface and groundwater levels are therefore higher during winter. Fog is also an important source of moisture on the west coast that compensates for the low rainfall, particularly in summer.

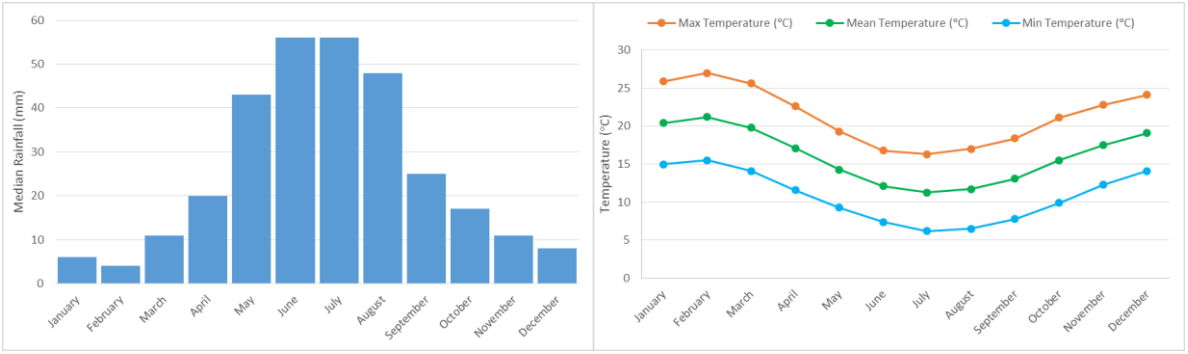


Figure 5. Average monthly rainfall (left) and temperatures (right) for Koeberg (Schulze, 2009)

7.3 GEOLOGY AND SOIL

The underlying geology of the area is dominated by Quaternary calcareous coastal dune sand of the Witzand Formation as well as Quaternary limestone and calcrete of the Langebaan Formation. The soils are dominated by grey regic sands (Figure 6).

Figure 6. The broad soil classification map for the site (red polygon) and its surrounds (CapeFarmMapper, 2017)

7.4. FLORA

The naturally occurring vegetation within the site is indicted to be Cape Flats Dune Strandveld (Figure 7). This vegetation type occurs across the Cape Flats and coastal strip of the West Coast. It occurs on calcareous sand of marine origin, mostly on undulating dune fields. It is a "tall, evergreen, hard – leaved shrubland with abundant grasses and annual herbs in gaps." (Mucina & Rutherford, 2006). Due to ongoing disturbance and development of the area, the vegetation type is considered to be Endangered. Atlantic Sand Fynbos occurs further inland and is also considered an Endangered. These vegetation types are also considered of high sensitivity due to the mobility of the sand.

Habitat and plant communities within the larger Koeberg site vary based on the topography (dunes , dune slack areas and coastal plains) and underlying geology (sand, calcrete and limestone). Some dune slack wetland vegetation occurs where groundwater skylights in the wetter winter months. The seasonal wetlands in the area contain sedges and rushes such as *Farina noose* while the more permanently wet areas comprise of common reed *Phragmites australis* with patches of bulrush *Typha capensis*.

Figure 7. Vegetation map, updated from Mucina and Rutherford (2006), for the vicinity of the study site (Red polygon) (CapeFarmMapper, 2017)

7.5. AQUATIC FEATURES

The site is located within the G21B quaternary catchment within the Berg Olifants Water Management Area. The primary river draining the catchment is the Sout River that is located approximately 5km south of the site. The National Freshwater Ecosystem Priority Areas (FEPA) initiative has not indicated any wetlands of conservation significance occurring on the site (Figure 8). The City of Cape Town's Biodiversity Network wetland mapping did however identify a number of natural or semi-natural depression wetlands in the vicinity of the site – particularly close to the existing KIPTS in the south (Figure 9). This is further discussed in Section 7.7.

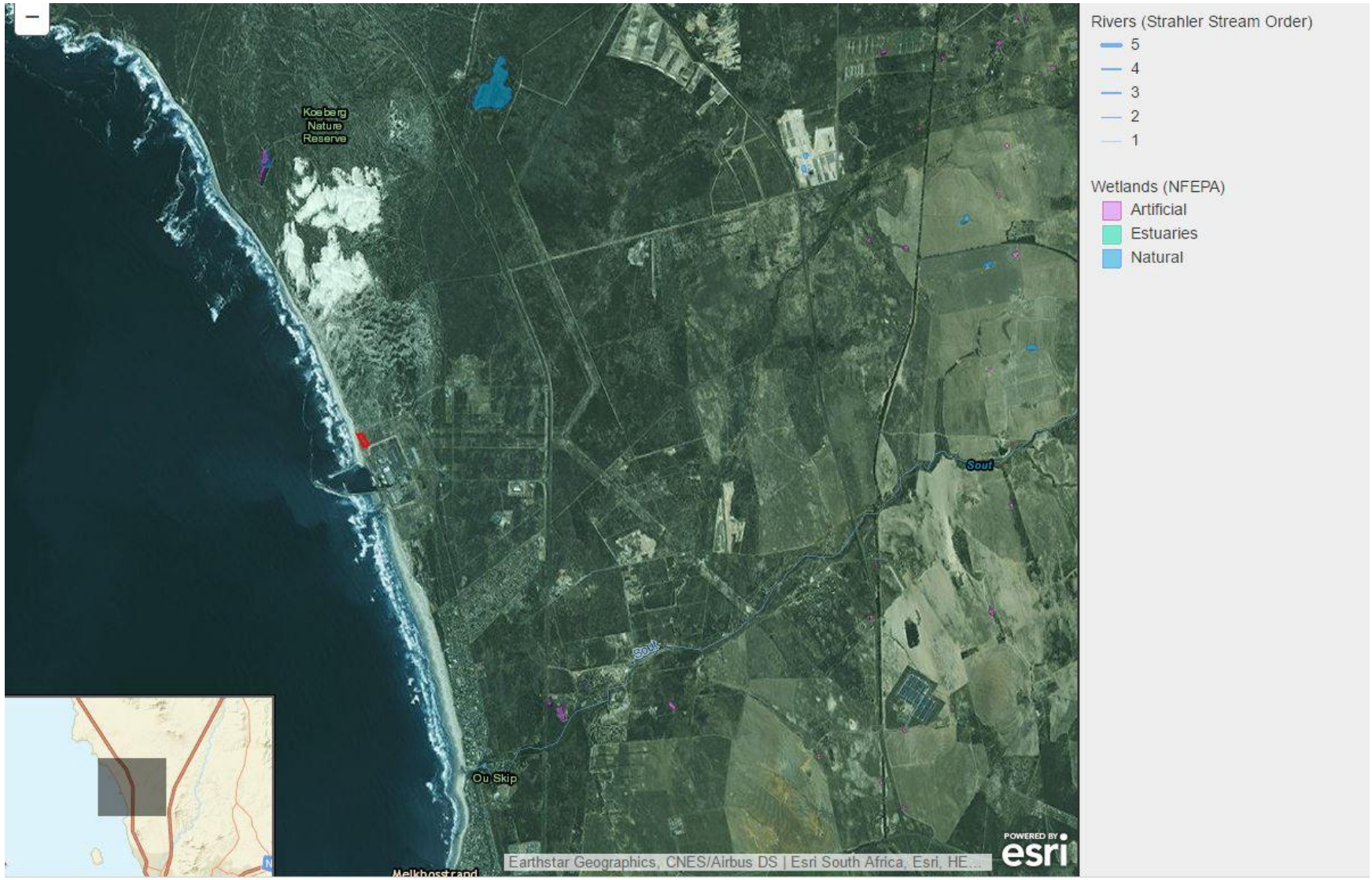


Figure 8. FEPA wetlands and rivers at the study site which is indicated by the red polygon (CapeFarmMapper, 2017)

Figure 9. A map of the City of Cape Town wetlands mapped near the site

7.6 LAND USE

National land cover mapping conducted in 2014 has mapped the area where the new KIPTS is proposed (red polygon in Figure 10) as natural shrubland and fynbos. The Koeberg power plant is mapped as industrial. The site is located within the Koeberg secure area, which lies within the Koeberg Nature Reserve. Road alternative 1 and power supply alternatives 2 would extend the footprint of the proposed activity into the reserve.

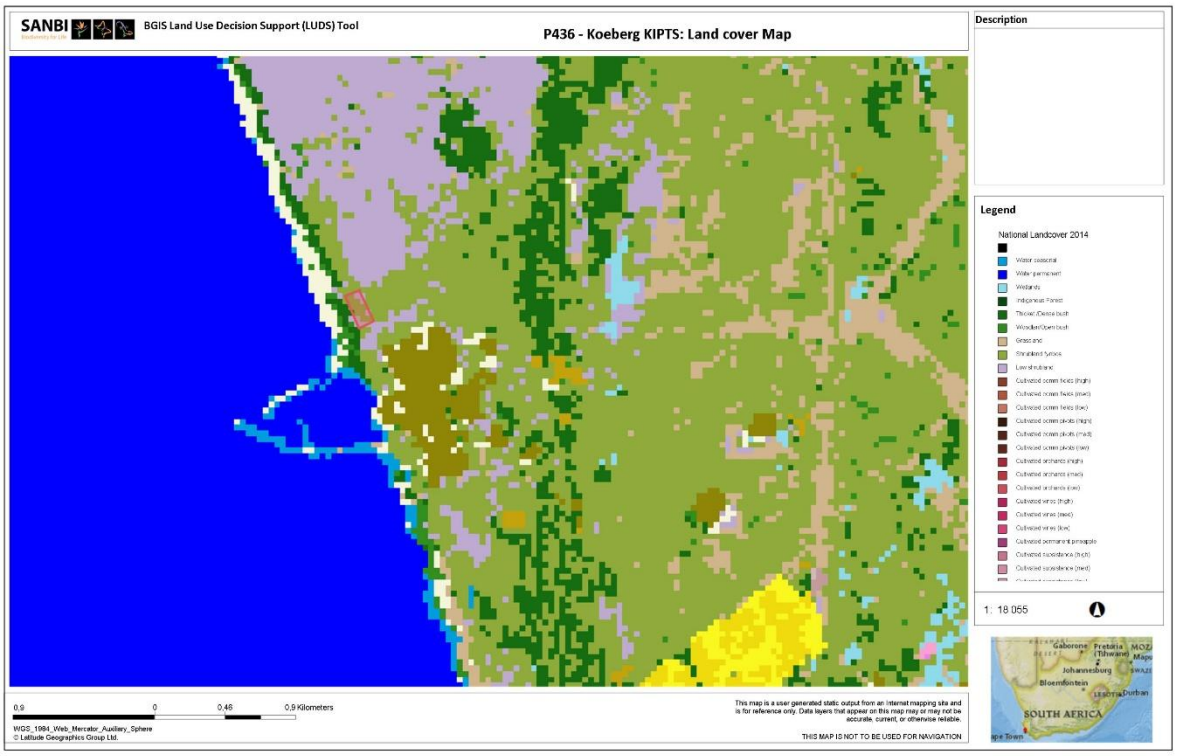


Figure 10. National Landcover (2014) for the study area (SANBI BiodiversityGIS, 2017)

7.7 BIODIVERSITY CONSERVATION VALUE

There are two freshwater biodiversity conservation mapping initiatives of relevance to the study area, the national FEPA mapping and the City of Cape Town Biodiversity Network mapping. FEPAs are intended to provide strategic spatial priorities for conserving South Africa's freshwater ecosystems and supporting sustainable use of water resources. FEPAs 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. The G21B catchment is not mapped as a river FEPA (Figure 11). As mentioned previously, there are not FEPA wetlands mapped within the nearby surrounding area.

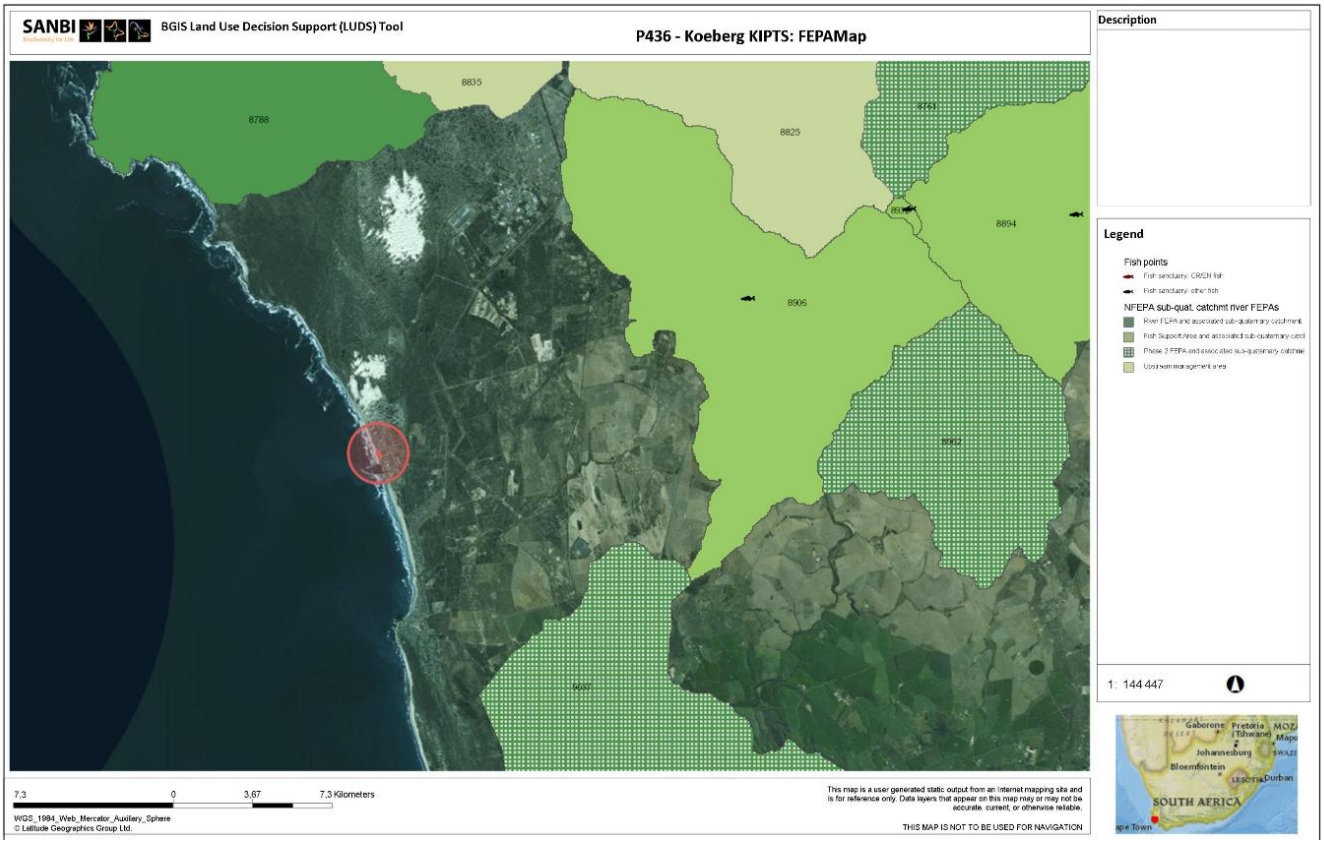


Figure 11. FEPA sub-catchments in the vicinity of the study area (red circle) (SANBI BiodiversityGIS, 2017)

The Biodiversity Network or Critical Biodiversity Areas (CBA) map for the City of Cape Town Metropolitan Municipality aims to guide sustainable development by providing a synthesis of biodiversity information to decision makers. The map indicates areas of land as well as aquatic features which must be safeguarded in their natural state if biodiversity is to persist and ecosystems are to continue functioning. The wetland mapping contains a number of mapped natural or semi-natural areas close to the site of the existing KIPTS (light blue in Figure 12). These wetlands have been mapped as CBAs. Care should be taken in the decommissioning of the site to avoid impacts on these wetlands. No wetlands have been mapped in the footprint of the proposed activities.

In terms of terrestrial areas of conservation concern, the site is surrounded by a protected area – the Koeberg Nature Reserve (Figure 13). Although the footprint of the two proposed KIPTS sites is outside the protected area, road alternative 1 and power supply alternatives 2 would extend the footprint of the proposed activity into the reserve. The existing KIPTS lies within an area mapped as containing natural vegetation.

Figure 12. A Google Earth image showing the City of Cape Town's Biodiversity Network wetland mapping in the vicinity of the site

Figure 13. A Google Earth Image showing the City of Cape Town's Biodiversity Network terrestrial CBA and protected areas mapping in the vicinity of the site

8. ASSESSMENT OF FRESHWATER FEATURES AND THEIR SIGNIFICANCE

8.1. HISTORICAL MODIFICATION OF THE FRESHWATER FEATURES WITHIN THE SITE

Aerial photography from the earliest aerial imagery available, taken in 1938, indicates the site comprised of a combination of natural vegetation and dunefields (Figure 14) nearly 80 years ago. A much larger dune field area occurred at the site with little vegetation cover at the coast. Any dune slack wetlands occurring at that time were inland of the proposed KIPTS sites. Only the proposed road alternatives occur in an area where dune slack wetlands were likely to occur. Due to the mobility of the dunes, the topography has changed somewhat from that in 1938 however, with the exception of the construction of the Koeberg Power Station and its associated infrastructure, the topography and cover vegetation is still largely natural.

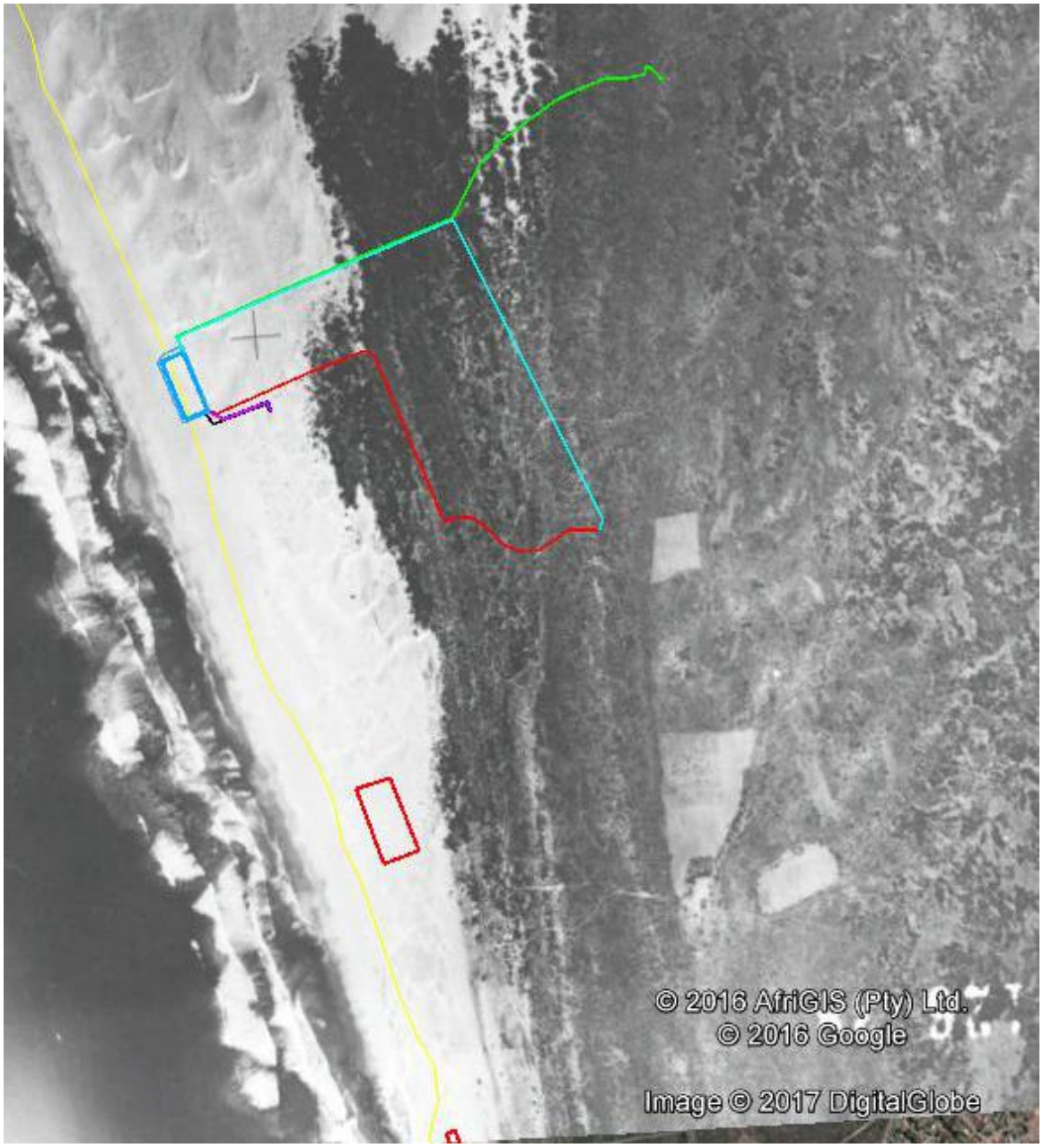


Figure 14. A 1938 aerial photograph of the study site (red polygon)

8.2. DESCRIPTION OF FRESHWATER FEATURES

Some wetland areas are located in the south-western extent of the study area, along the access road to the existing KIPTS site. These tend to be narrow depression that are orientated north-south between the dunes and are dominated by common reeds *Phragmites australis where* the depressions are more permanently inundated with groundwater in winter (Figure 15). Drier depression areas contain patches of the glasswort *Sarcocornia pillansii* and seagrass *Cladoraphis cyperoides.*

Figure 15. The *Phragmities* dominated wetland areas (indicated by the red ovals) near the existing KIPTS site

Figure 16. The drier dune slack depressions near the existing KIPTS

There are no significant aquatic ecosystems within the proposed development area. The proposed alternative site for the KIPTS occurs within a wide depression that contains some hydrophilic plants that are associated with an increased precipitation as a result of settling of dew in the depression behind the frontal dune. These areas comprise largely of bare areas with a mix of Hottentots fig *Carpobrotus acinaciformis* and *C. edulis* together with grasses (Figure 17). This area does not have any significant wetland characteristic.

A small dune slack wetland also occurs along the existing gravel road to the north of the power station that has been identified as Alternative 1 for the access to the proposed KIPTS site.

Figure 17. Low lying area behind the frontal dune at the alternative KIPTS site

8.3. 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.

8.3.1 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). The wetland areas within the site comprise of the following:

- Depression wetlands: The impacts as well as the typical characteristics are very similar. A single assessment was conducted for these wetlands.

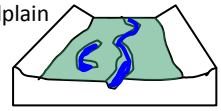
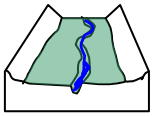
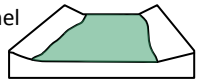
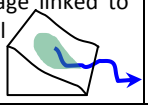
Only the more significant dune slack wetlands (yellow ovals in Figure 11) were assessed in further detail as wetland areas.

Figure 18. Indication of wetland areas within the study area (yellow ovals)

8.3.2. WETLAND CLASSIFICATION

The classification of the channelled valley-bottom wetland in the study area was based on the WET-EcoServices technique (Kotze *et al*, 2005). The WET-EcoServices technique identifies seven main types of wetland based on hydro-geomorphic characteristics (Table 2).

Table 2. 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 an important

Water source: * Contribution usually small
*** Contribution usually large
*/ *** Contribution may be small or important depending on the local circumstances

 Wetland

According to hydro-geomorphic characteristics, the wetland feature within the study area can be classified as follows:

Table 3. Classification of wetland areas within study area

Name	Dune slack wetland areas within the Koeberg Nature Reserve
System	Inland
Ecoregion	South Western Coastal Belt
Landscape setting	Coastal plain dune slack areas
Hydrogeomorphic Type	Depression
Longitudinal zonation	Not applicable
Drainage	Inundation by groundwater table in winter
Seasonality	Seasonal
Anthropogenic influence	Largely natural
Vegetation	Cape Flats Dune Strandveld
Substrate	Deep sands
Salinity	Brackish

8.3.3. WETLAND INTEGRITY

The Present Ecological Status (PES) Method (DWAF 2005) was used to establish the integrity of the wetlands and was based on the modified Habitat Integrity approach developed by Kleynhans (DWAF, 1999; Dickens *et al*, 2003). Table 4 and Table 5 show 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 4. Habitat integrity assessment criteria for palustrine wetlands (Dickens *et al*, 2003)

Criteria	Relevance
Hydrologic	
Flow Modification	Consequence of abstraction, regulation by impoundments or increased runoff from settlements or agricultural land. Changes in flow that affect inundation of wetland habitats resulting in floralistic changes or incorrect cues to biota. Abstraction of groundwater flows to the wetland.
Perm. Inundation	Consequence of impoundment. Result in natural wetland habitat loss and alter wetland biota cues.
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	Desiccation or change wetland inundation pattern and 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 in inundation patterns.
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 Encroachment	Affects habitat characteristics through changes in community 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 5. Wetland habitat integrity assessment (score of 0=critically modified to 5=unmodified)

Criteria & Attributes	Dune slack wetlands
Hydrologic	
Flow Modification	3.5
Permanent Inundation	3.7
Water Quality	
Water Quality Modification	3.3
Sediment Load Modification	3.6
Hydraulic/Geomorphic	
Canalisation	3.2
Topographic Alteration	3.5
Biota	
Terrestrial Encroachment	3.8
Indigenous Vegetation Removal	4.1
Invasive Plant Encroachment	4.2
Alien Fauna	4.2
Over utilisation of Biota	4.1
Total Mean	**3.7**
Category	**B – Largely natural**

Table 6. 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. Large loss of natural habitat & ecosystem functions has occurred.
	OUTSIDE GENERALLY ACCEPTABLE RANGE
Seriously modified - rating=1.	CATEGORY E >0 and <2; seriously modified. Loss of natural habitat & 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 then used to determine that overall Present Ecological Status (PES) for the wetlands. PES scores were determined for geomorphology, hydrology, water quality and vegetation to generate the overall score and ecological category (Table 7).

Table 7. WET-Health assessment of wetland areas in the study area

Components	Method used for assessment	Dune slack wetlands	
		PES% Score	Ecological Category
Hydrology PES	WET-Health Hydro Module	95 %	**A**
Geomorphology PES	WET-Health Geomorph Module	78 %	**B/C**
Water quality PES	Landuse-WQ Model	77 %	**C**
Vegetation PES	WET-Health Veg Module	77 %	**C**
Overall Wetland PES	WET-Health default weightings	85 %	**B**

The wetland areas are in a largely natural ecological condition with most of the impacts arising from flow and water quality impacts within the catchment and the direct impacts of infrastructure adjacent to the wetland areas.

8.3.4. ECOSYSTEM SERVICES SUPPLIED BY THE WETLANDS

The assessment of the ecosystem services supplied by the wetland areas was conducted according to the guidelines as described by Kotze *et* al (2005). An assessment was undertaken that examines and rates the services listed in Table 8. The characteristics were scored according to the general levels of services provided.

Table 8. Goods and services assessment results for the wetland in the study site (high=4; low=0)

Goods and services	Dune slack wetlands	Goods and services	Dune slack wetlands
Flood attenuation	2.0	Maintenance of biodiversity	2.0
Stream flow regulation	0.0	Water supply for human use	0.5
Sediment trapping	1.0	Natural resources	0.5
Phosphate trapping	0.5	Cultivated foods	0
Nitrate removal	1.5	Cultural significance	0
Toxicant removal	0.5	Tourism and recreation	2.0
Erosion control	0.5	Education and research	1.5
Carbon storage	1.5		

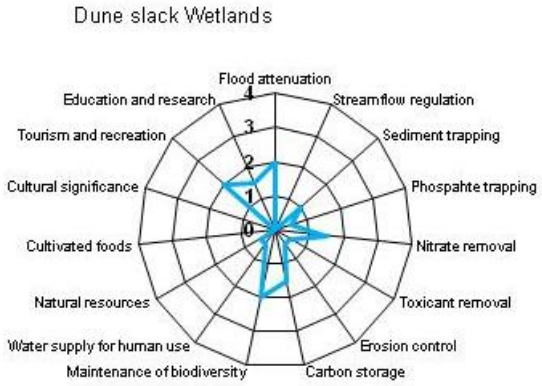


Figure 19. Ecosystem services provided by the wetland areas

The dune slack wetland areas provide limited goods and services that are largely associated with habitat for biodiversity and tourism and recreation value.

8.3.5. ECOLOGICAL IMPORTANCE AND SENSITIVITY (EIS)

The EIS assessment 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 (Table 9). The median of the resultant score is calculated to derive the EIS category (Table 10). The results of the EIS assessment are shown in Table 11.

Table 9. Scale used to assess biotic and habitat determinants indicating either importance or sensitivity

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

Table 10. 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 that 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 11. Results of the EIS assessment for the wetland area

Biotic Determinants	Dune slack wetlands
Rare and endangered biota	1.0
Unique biota	1.0
Intolerant biota	1.5
Species/taxon richness	1.0
Aquatic Habitat Determinants	
Diversity of aquatic habitat types or features	1.0
Refuge value of habitat type	1.5
Sensitivity of habitat to flow changes	2.0
Sensitivity of flow related water quality changes	2.0
Migration route/corridor for instream and riparian biota	0
National parks, wilderness areas, Nature Reserves, Natural Heritage sites, Natural areas, PNEs	3.5
EIS CATEGORY	**Moderate**

The dune slack wetland areas are in particular sensitive to flow and water quality changes and are considered to be of moderate ecological importance and sensitivity.

9. FRESHWATER CONSTRAINTS AND IMPACT ASSESSMENT

9.1. FRESHWATER CONSTRAINTS

The proposed development and associated infrastructure is not likely to result in loss of aquatic habitat on the site due to the fact that the proposed activities will occur outside of any wetland areas. The proposed infrastructure is located along existing roads. The dune slack wetland areas within the study area are mostly associated with the access road to the existing KIPTS site. The location of the project activities in relation to the aquatic features within the study area are shown in Figure 18.

9.2. DESCRIPTION OF POTENTIAL IMPACTS AND CONSIDERATION OF ALTERNATIVES

There are two main activities proposed, the construction of a new KIPTS and the decommissioning of the existing KIPTS. Associated with the new KIPTS is a new access road, 11kV power supply, a water main and sewer line and a possible 400kV substation. The largest potential impact of the proposed activities on the aquatic features in the area is some loss of wetland habitat as a result of increased disturbance adjacent to the wetland areas. Associated with the increased disturbance of aquatic habitat is the potential for increased growth of invasive plants such as Port Jackson willows *Acacia saligna* and rooikrans *A. cyclops*. Some flow and water quality impacts could potentially occur during the construction phase if the activities are located adjacent to any of the identified aquatic features. These impacts could however easily be mitigated and would be of a short term nature.

IMPACT OF THE PROPOSED NEW KIPTS FACILITY

CONSTRUCTION PHASE ACTIVITIES

Nature of Impact: Construction activities would include the construction of the KIPTS, as well as an underground or overhead power line, links to the existing sewer and water mains and the potential construction of a substation that does not form part of this assessment. The only wetland area in the vicinity of the preferred KIPTS site is along the access road Alternative 1 which is an existing access road. Activities during the construction phase of the project may result in a ***very limited disturbance of the wetland habitats of the identified freshwater features within the study area***.

Significance of impacts without mitigation: A localized shorter term impact of a low intensity that is expected to have a very low overall significance in terms of its impact on the identified aquatic ecosystems in the area.

Proposed mitigation: Construction activities should as far as possible be limited to within the already disturbed areas. The disturbed areas should be rehabilitated after construction is completed by revegetating these areas with suitable indigenous plants if necessary. Monitoring and control of invasive alien plants should be undertaken on an ongoing basis, especially within the disturbed areas.

The potential impact on aquatic habitat would best be mitigated by ensuring that the various elements of the proposed activity avoid these aquatic habitats through the selection of the alternatives that are located away from any aquatic feature. With regards to the various alternatives under consideration:

- **Alternative sites**: The preferred KIPTS site is likely to have the least potential impact on the aquatic features in the area as there are no aquatic features identified within this site.
- **Alternative access roads**: Of the proposed access roads, Alternative 3 is likely to have the least (nil) potential impact on the aquatic features, followed by Alternative 2. Alternative 1 has the largest potential impact due to the location of a small wetland area adjacent to the road that could potentially be impacted on by the proposed activities.
- **Alternative power lines**: Alternative 1 entails only a short section of underground line close to the water and sewer lines. There are no freshwater features within this area thus this alternative would not have a potential impact on any aquatic ecosystems. Alternative 2 will be located along Alternative 2 Access Road that would also have little to no potential aquatic ecosystem impacts as discussed in the previous bullet.

Significance of impacts after mitigation: A localized, short-term impact is unlikely to occur during the construction phase if the above mitigation measures are implemented and in particular the project activities are located away from any aquatic features within the study area.

OPERATION PHASE ACTIVITIES

Nature of Impact: An impact of very limited to no significance is expected on ***the aquatic habitat of the identified freshwater features*** after the construction phase.

Proposed mitigation: Disturbed areas that have been rehabilitated post construction should be monitored and managed to ensure that they do not become invaded with alien plants. Operation

and maintenance activities associated with the new KIPTS should only take place via the designated access or maintenance routes.

Significance of impacts after mitigation: A localized, long-term impact that is expected to be insignificant.

IMPACT OF THE PROPOSED DECOMMISSIONING OF EXISTING KIPTS FACILITY:

Nature of Impact: Activities that would be associated with the dismantling and the removal or partial removal of the existing KIPTS will include the following:

- It is likely that a new access road to the KIPTS will need to be established for the decommissioning of the existing structure;
- Removal and transport of the existing structure; and
- Rehabilitation of the site.

Activities during the decommissioning phase for the KIPTS could result in some aquatic ***habitat disturbance*** along the newly established access route.

Significance of impacts without mitigation: A longer term impact of a very low significance in terms of its impact on the identified aquatic ecosystems in the area is expected due to the fact that the structure and access road are already in place and are to be decommissioned.

Proposed mitigation:

It is recommended that the newly established access for the decommissioning avoid the wetland areas by following the existing access route as far as possible and limiting the extent of any new disturbed areas. The disturbed areas should be rehabilitated after construction is completed by revegetating these areas with suitable indigenous plants if necessary. Monitoring and control of invasive alien plants should be undertaken on an ongoing basis, especially within the disturbed areas for a period of at least 5 years. An experienced botanist or horticulturalist should assist with this rehabilitation process.

Significance of impacts after mitigation: A localized, short-term impact will occur during the decommission phase; however, the overall significance of the impact on the aquatic ecosystems is expected to be a low positive impact.

CONSIDERATION OF THE NO-GO ALTERNATIVE

The No-Go Alternative implies that no new site would be established for the KIPTS but rather that the existing site would need to be cleared and utilised. As the existing site is located near the dune slack wetlands in the site and thus poses a greater risk of impacting on these wetland areas than the new proposed site. The No-Go Alternative would thus have a higher potential impact on the aquatic features in the area than the proposed KIPTS.

CUMULATIVE IMPACT OF THE ACTIVITIES ON FRESHWATER ECOSYSTEMS:

The proposed project is located within a private nature reserve where there is ongoing control of activities as well as the control of invasive alien plants. The existing KIPTS is located within a dune area that is largely surrounded by natural vegetation and dune slack wetlands. The new KIPTS will be located adjacent to the power plant where the area is more disturbed and transformed. Thus once construction, decommissioning and rehabilitation activities associated with the proposed project are complete, a low positive impact can be expected over the longer term.

9.3. SUMMARY OF ASSESSMENT OF POTENTIAL IMPACTS OF THE PROPOSED ACTIVITIES:

CONSTRUCTION PHASE ACTIVITIES:

Potential impact on freshwater features	Construction of proposed new KIPTS
Nature of impact:	Disturbance of wetland habitat
Extent and duration of impact:	Localised short term impacts
Intensity of Impact	Low
Probability of occurrence:	Possible depending on the extent of construction activities adjacent to wetland areas
Degree to which impact can be reversed:	High
Irreplaceability of resources:	Low
Significance of impact pre-mitigation	Very low
Cumulative impact prior to mitigation:	Very low
Degree of mitigation possible:	Low
Proposed mitigation:	Construction activities should as far as possible be limited to within the already disturbed areas. The disturbed areas should be rehabilitated after construction is completed by revegetating these areas with suitable indigenous plants if necessary. Monitoring and control of invasive alien plants should be undertaken on an ongoing basis, especially within the disturbed areas. The potential impact on aquatic habitat would best be mitigated by ensuring that the various elements of the proposed activity avoid these aquatic habitats through the selection of the alternatives that are located away from any aquatic feature. With regards to the various alternatives under consideration: **Alternative sites**: The preferred KIPTS site is likely to have the least potential impact on the aquatic features in the area as there are no aquatic features identified within this site. **Alternative access roads**: Of the proposed access roads, Alternative 3 is likely to have the least (nil) potential impact on the aquatic features, followed by Alternative 2. Alternative 1 has the largest potential impact due to the location of a small wetland area adjacent to the road that could potentially be impacted on by the proposed activities. **Alternative power lines**: Alternative 1 entails only a short section of underground line close to the water and sewer lines. There are no freshwater features within this area thus this alternative would not have a potential impact on any aquatic ecosystems. Alternative 2 will be located along Alternative 2 Access Road that would also have little to no potential aquatic ecosystem impacts as discussed in the previous bullet.
Significance after mitigation	Very Low/insignificant
Cumulative impact post mitigation:	Very Low/ insignificant

Potential impact on freshwater features	Proposed Decommission of Existing KIPTS
Nature of impact:	Disturbance of wetland habitats along the access route to the existing KIPTS
Extent and duration of impact:	Localised short term impacts
Intensity of Impact	Low
Probability of occurrence:	Possible depending on access road to existing KIPTS
Degree to which impact can be reversed:	High
Irreplaceability of resources:	Low
Significance of impact pre-mitigation	Very Low (negative)
Cumulative impact prior to mitigation:	Low to very low
Degree of mitigation possible:	Medium
Proposed mitigation:	It is recommended that the newly established access for the decommissioning avoid the wetland areas by following the existing access route as far as possible and limiting the extent of any new disturbed areas. The disturbed areas should be rehabilitated after construction is completed by revegetating these areas with suitable indigenous plants if necessary. Monitoring and control of invasive alien plants should be undertaken on an ongoing basis, especially within the disturbed areas for a period of at least 5 years. An experienced botanist or horticulturalist should assist with this rehabilitation process.
Significance after mitigation	Low positive
Cumulative impact post mitigation:	Low positive

OPERATION PHASE ACTIVITIES:

Potential impact on freshwater features	Maintenance of proposed new KIPTS
Nature of impact:	Disturbance of the riparian and wetland habitat of the identified freshwater features
Extent and duration of impact:	Localised longer term impacts
Intensity of Impact	Low
Probability of occurrence:	Probable to unlikely
Degree to which impact can be reversed:	High
Irreplaceability of resources:	Medium to High
Significance of impact pre-mitigation	Very low
Cumulative impact prior to mitigation:	Very low
Degree of mitigation possible:	Very low
Proposed mitigation:	Disturbed areas within recommended the buffer zones for the identified freshwater features (that have been rehabilitated post construction) should be monitored and managed to ensure that they do not become invaded with alien plants of impacted on by erosion that may occur as a result of the construction of the power line. Maintenance of the power line should only take place via the designated access routes.
Significance after mitigation	Very Low to insignificant – potential for a low positive impact
Cumulative impact post mitigation:	Low positive impact

10. RISK ASSESSMENT

A preliminary risk assessment (Table 12) has been undertaken to inform the water use authorisation process and is included in this report. Considering the scope of works proposed and its proximity to the aquatic ecosystems in the area, the risk of undertaking the proposed activity is considered to be

Low for the construction and operational phase, provided that the recommended mitigation measures are implemented.

Table 12. A summary of the risk assessment for the proposed new KIPTS site and decommissioning of the existing site

Phases	Activity	Impact	Significance	Risk Rating
Construction	Construction works associated with the new KIPTS and associated infrastructure	Disturbance of wetland habitat	44	L
Decommission	Decommission of existing KIPTS		38.5	L
Operation	Operational activities associated with the KIPTS	Potential for invasion by alien plants	30	L

12. CONCLUSIONS

Aquatic features within the area of the proposed project activities comprise the following:

- Some dune slack wetland areas are located in the south-western extent of the study area, along the access road to the existing KIPTS site; and
- There are no significant aquatic ecosystems within the proposed KIPTS site, only a small dune slack wetland that occurs along the proposed Alternative 1 access road.

The dune slack wetlands are considered to be largely natural and of a moderate ecological importance and sensitivity. In terms of biodiversity conservation mapping, only the dune slack wetlands near the existing KIPTS are mapped in the City wetland mapping. There is no FEPA mapping within the area.

The proposed project is located within a private nature reserve where there is ongoing control of activities as well as the control of invasive alien plants. The existing KIPTS is located within a dune area that is largely surrounded by natural vegetation and dune slack wetlands. The new KIPTS will be located adjacent to the power plant where the area is more disturbed and transformed. Thus once construction, decommissioning and rehabilitation activities associated with the proposed project are complete, a low positive impact can be expected over the longer term.

Construction activities should as far as possible be limited to within the already disturbed areas. The disturbed areas should be rehabilitated after construction is completed by revegetating these areas with suitable indigenous plants if necessary. Monitoring and control of invasive alien plants should be undertaken on an ongoing basis, especially within the disturbed areas.

The potential impact on aquatic habitat would best be mitigated by ensuring that the various elements of the proposed activity avoid these aquatic habitats through the selection of the alternatives that are located away from any aquatic feature. With regards to the various alternatives under consideration:

- **Alternative sites**: The preferred KIPTS site is likely to have the least potential impact on the aquatic features in the area as there are no aquatic features identified within this site.
- **Alternative access roads**: Of the proposed access roads, Alternative 3 is likely to have the least (nil) potential impact on the aquatic features, followed by Alternative 2. Alternative 1

has the largest potential impact due to the location of a small wetland area adjacent to the road that could potentially be impacted on by the proposed activities.

- **Alternative power lines**: Alternative 1 entails only a short section of underground line close to the water and sewer lines. There are no freshwater features within this area thus this alternative would not have a potential impact on any aquatic ecosystems. Alternative 2 will be located along Alternative 2 Access Road that would also have little to no potential aquatic ecosystem impacts as discussed in the previous bullet.

The risk of the proposed activities degrading the aquatic ecosystems in the area is considered to be low. The water use activities associated with the proposed relocation of the Koeberg Insulator Pollution Test Station are thus such that they can be authorised in terms of the General Authorisations for Section 21(c) and (i) water uses.

Considering that the No-Go Alternative would imply that the existing site that is located near the dune slack wetlands in the site would need to continue to be maintained and operated, posing a greater risk of impacting on these wetland areas than the new proposed site, the proposed relocation of the KIPTS is supported.

13. REFERENCES

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APPENDIX A: DECLARATION OF INDEPENDENCE

I, Antonia Belcher, 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, 2010 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, 2010 and any specific environmental management Act;
- am fully aware of and meet the responsibilities in terms of NEMA, the Environmental Impact Assessment Regulations, 2010 (specifically in terms of regulation 17 of GN No. R. 543) 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 favorable to the applicant or not; and
- am aware that a false declaration is an offence in terms of regulation 71 of GN No. R. 543.

Signature of the specialist: 

Date: 10 May 2017

APPENDIX B: BACKGROUND AND QUALIFICATIONS OF SPECIALIST CONSULTANT

Contact details: PO Box 455, Somerset Mall, 7137

Name: Antonia Belcher

Profession: Aquatic Scientist (Pr. Nat. Sc. 400040/10)

Fields of Expertise: Specialist in river and wetland monitoring and reporting

Relevant work experience:

Due to my involvement in the development and implementation of the River Health Programme as well as the Resource Directed Measures directorate of the Department of Water Affairs in the Western Cape, I have been a key part of the team that has undertaken six catchment or area wide 'state-of-river' assessments as well as routine monitoring and specialized assessments of rivers and wetlands in all the major catchments for the Western Cape. In the past eight years, I have undertaken numerous freshwater assessments as input into both the environmental authorization and water use authorization process throughout the Western Cape as well as greater Southern Africa.

Papers and Publications:

More than 300 publications, papers and posters relating mostly to water resource quality and river health assessments in South African rivers and their management.

Recent projects that she has been involved in are:

- Classification of Water Resources in the Olifants-Doorn Water Management Areas, Department of Water Affairs;
- Development and piloting of a National Strategy to Improve Gender Representation in Water Management Institutions, where the focus is on improving the capacity to participate in water related decision making, Department of Water Affairs and Forestry;
- Compilation of a background document as well as a framework management plan towards the development of an integrated water resources management plan for the Sandveld;
- Specialist on the City of Cape Town project: Determination of additional resources to manage pollution in storm water and river systems;
- River Health Programme monitoring for the Free State Region, Department of Water Affairs; and
- Framework for Education and Training in Water (FETWATER), Resource Directed Measures Network partner which has undertaken training initiatives on environmental water requirements in the SADC region.

APPENDIX D: RISK ASSESSMENT

ASPECTS AND IMPACT REGISTER/RISK ASSSESSMENT FOR WATERCOURSES INCLUDING RIVERS, PANS, WETLANDS, SPRINGS, DRAINAGE LINES
Relocation of Koeberg Insulator Pollution Test Station

COMPILED BY: Toni Belcher, BlueScience (SACNASP 400040/10)
DATE: May 2017

				Severity																
Nr.	Phases	Activity	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	Control Measures	Confidence	Type Watercourse; PES and EIS
1	Construction	Construction works associated with the new KIPTS and associated infrastructure	Disturbance of wetland habitat	1	1	1	1	1	1	2	**4**	1	2	5	3	**11**	**44**	L	See Freshwater Report	High	Dune slack wetland areas; PES= Largely natural; EIS=Moderate
	Decommission	Decommission of existing KIPTS		1	1	1	1	1	1	1.5	**3.5**	1	2	5	3	**11**	**38.5**	L	See Freshwater Report	High	
	Operation	Operational activities associated with the KIPTS	Potential for invasion by alien plants	1	1	1	1	1	1	1	**3**	1	1	5	3	**10**	**30**	L	See Freshwater Report	Moderate to High	