FRESHWATER ASSESSMENT FOR THE PROPOSED ESKOM LONGDOWN SUBSTATION AND ASSOCIATED VYEBOOM TURN-IN LINES

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EXECUTIVE SUMMARY

Eskom proposes to construct a new substation in Vyeboom and a 66 kV powerline turn in from Vyeboom-Theewater 66Kv powerline to the new proposed Longdown substation in the Villiersdorp area

The freshwater features within the area proposed for development consist of:

1. *The drainage feature that flows adjacent to Site B and then transects Site A;*
2. *The small wetland area into which the drainage feature discharges that is located to the north of Site A; and*
3. *The wetland features adjacent to Theewaterskloof Dam near the fruit processing facility.*

The freshwater features within the study area vary from being in a largely natural to being in a largely modified ecological condition and have a moderate to low ecological importance and sensitivity. The study area in terms of biodiversity conservation mapping initiatives has only its south-western portion (Site B) located within a terrestrial Critical Biodiversity Area. The study area lies within the Riviersonderend Catchment which is considered as a Fish Support Area. Both of these conservation status categories indicate that the area should not be allowed to become degraded but should rather be rehabilitated.

The proposed activities are to take place within areas that have already to some extent been impacted on by existing land use activities, particularly within the north-western portion of the study area. The likely impacts of the proposed substation and access route would thus be primarily of limited intensity and of a short term nature, mostly taking place during the construction phase provided the footprint of the newly developed areas take place largely within the already degraded areas.

The potential impact on the habitat of the freshwater features could be expected to be greater for Site A than Site B and for the northern access route compared to the southern access route. Proper rehabilitation measures and monitoring and control of any invasive alien plant growth are essential to ensure that longer term impacts do not occur within those areas that are still of conservation value to in the south-east of the study area.

The Gouritz-Breede Water Management Agency should be approached for approval of the water use aspects of the proposed activities, although they are likely to be of such a low significance that they can be generally authorised.

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1. INTRODUCTION

1.1. BACKGROUND

Eskom proposes to construct a new substation in Vyeboom and a 66 kV powerline turn in from Vyeboom-Theewater 66Kv powerline to the new proposed Longdown substation in the Villiersdorp area. The proposed site lies just south of Theewaterskloof Dam in the Riviersonderend Catchment.

The 11kV networks supplied from Vyeboom and Theewater Substations have run out of capacity, with no flexibility to shift loads during the seasonal peak months. Upgrading the 11kV networks is not practically feasible. A centrally located step-down substation will provide and facilitate additional load growth and reliable networks for the area. Longdown substation will be located closer to the large customers on Vyeboom F2 and Theewater F2 thereby improving the supply to those customers.

An Environmental Authorisation process in the form of a Basic Assessment process, as per the NEMA and the EIA Regulations as well as a Water Use License Application in terms of the National Water Act (Act 36 of 1998) and its Regulations and specialist studies which is anticipated to include a Heritage, Aquatic, Botanical and Avifaunal Assessment have been conducted.

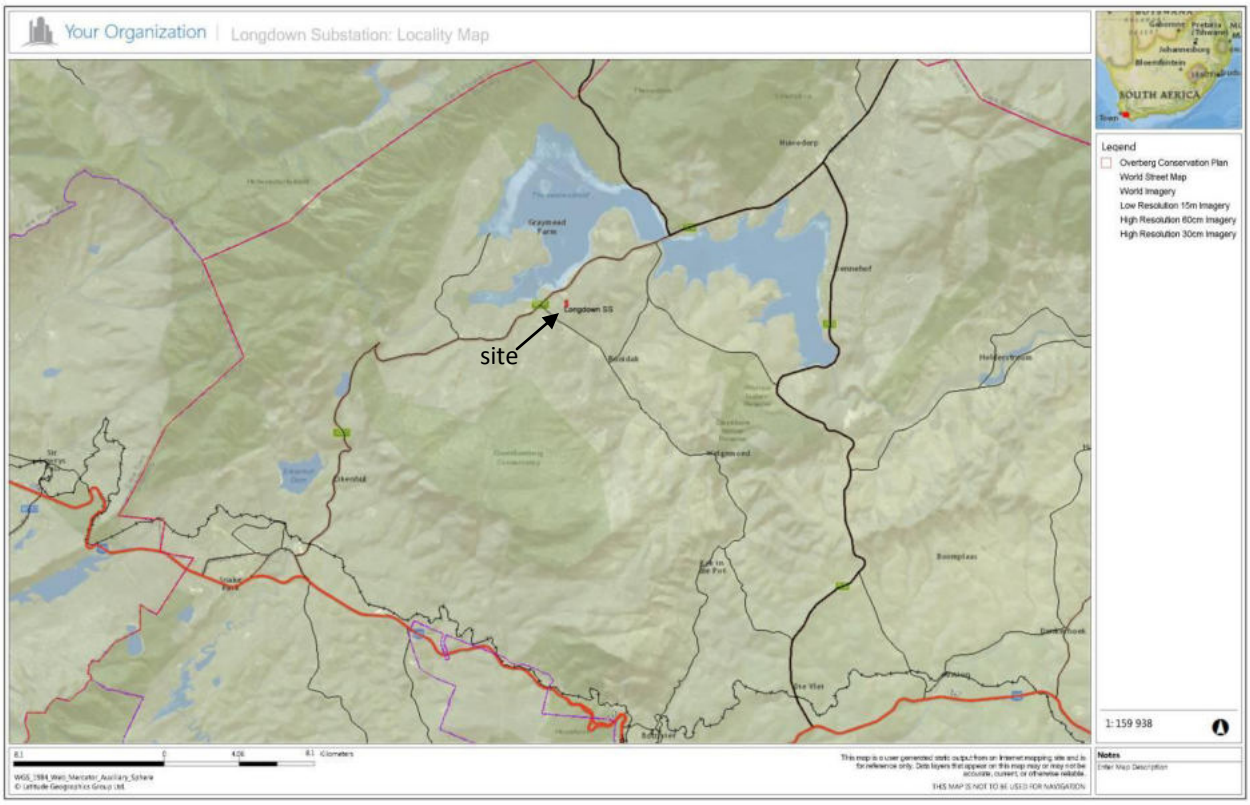


Figure 1. Locality map for the proposed substation

1.2. TERMS OF REFERENCE

This freshwater assessment was compiled in order to help decision-making in the context of the proposed activities related to the proposed Eskom Longdown Substation and associated Vyeboom Turn-in Lines. The agreed upon work programme was divided into the following tasks:

Freshwater assessment

1. *Literature survey and initialisation;*
2. *Field assessment to determine the impact on freshwater resources;*
3. *Compile freshwater assessment report; and*
4. *Review of report and liaison with client.*

1.3. LIMITATIONS AND ASSUMPTIONS OF THE STUDY

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:

- Analysis of the freshwater ecosystems was undertaken according to nationally developed rapid methodologies as defined the Department of Water Affairs. This level is considered to be sufficient for the project.

- Recommendations are made based on professional opinion due to the lack of a formal methodology for buffer zone determination within South Africa.

1.4. USE OF THIS 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.

2. OVERVIEW OF THE LARGER STUDY AREA

2.1. VISUAL CHARACTERISTICS

The study area of the proposed development is within the jurisdiction of the Theewaterskloof Local Municipality just south of Theewaterskloof Dam and the road between Grabouw and Villiersdorp. The proposed sites are located on a small hill adjacent to the dam, with drainage flowing in a north to north west direction, towards the dam. Much of the surrounding land consists of disturbed natural areas and orchards. The study area lies within the catchment of the Riviersonderend River in the Gouritz-Breede Water Management Area.



Figure 2. View of the surrounding topography to the study site

2.2. CLIMATE AND HYDROLOGY

The study site, as with most of the South-Western Cape falls within the Mediterranean climate, where 80% of the mean annual precipitation for this area (about 990mm) is received in winter, in months April/May to September (Figure 3, left). It receives the lowest rainfall (12mm) in January and the highest (94mm) in July. Coastal fog and upper elevation orographic clouds brought in on the South-easterly winds during the summer months plays a considerable role in contributing towards the total precipitation. Snowfalls are uncommon. The average daily maximum temperatures range from 15°C in July to 24.8°C in February. The region is the coldest during July when the mercury drops to 6.4°C on average during the night (Figure 3, right). The prevailing winter wind is the north-west wind, whereas

summer winds are predominately from the south-east. The force and direction is modified to some extent by the alignment of the mountains.

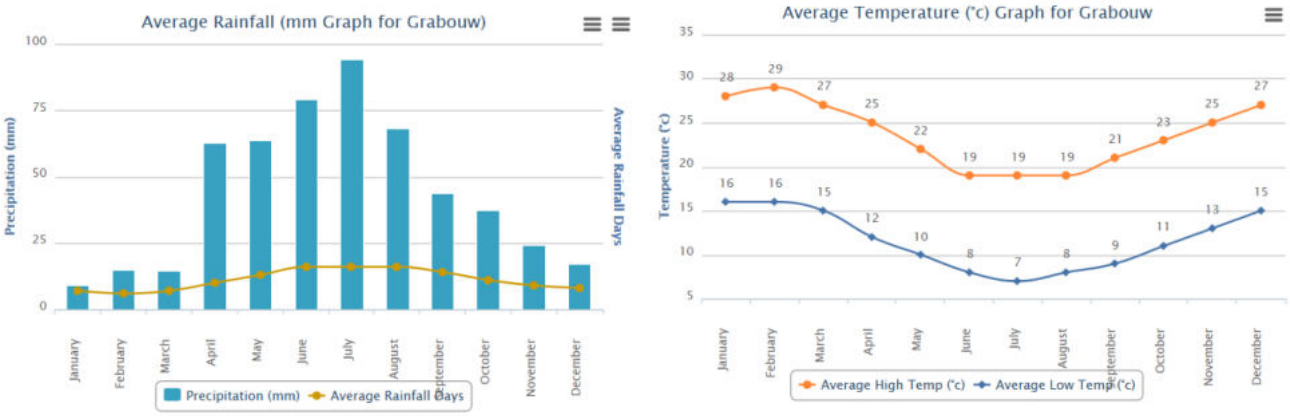


Figure 3. Average rainfall (left) and temperature (right) graphs for the area (Worldweatheronline, 2014)

2.3 GEOLOGY AND SOIL

The Hottentots Holland Mountains, situated at the meeting point of two axes of the Cape Fold Belt, surround the Theewaterskloof Dam. Most of the area is represented geologically by the Cape Supergroup; a group of alternating sandstone and shale sedimentary strata laid down between 450 and 300 million years ago. Dominating the landscape are the sandstones of the Table Mountain Group.

Higher lying areas consist largely of soils produced from the sandstones are typically white and have an acidic topsoil of little humus overlying a deeper coarse grained sand or rock (tan areas in Figure 4). These soils tend to be structure-less with excessive drainage and a high potential for erosion. To the east (dark brown areas in Figure 4) in the lower lying areas, the soils have marked clay accumulation. These soils tend to be structured with a high natural fertility, slow water infiltration and a restricted soil depth that provides conditions conducive for the formation of wetland areas as can be seen within the valley bottom to the east of the study area.



Figure 4. A soil type map for the site and its surrounding area (SANBI Biodiversity GIS, 2014)

2.4 VEGETATION

Kogelberg Sandstone Fynbos (FFs11, darker pink area in Figure 5) occurs to the north of the site, while the site itself primarily lies within what would naturally have been Elgin Shale Fynbos (FFh6, lighter pink area in Figure 5). Much of the natural vegetation within the immediate area has however been transformed as a result of the dam as well as the surrounding agricultural activities (Figure 6).

The natural vegetation that does occur in the higher lying areas is low, closed shrubland with scattered emergent tall shrubs. Proteoid, ericaeous and restinoid fynbos dominate, while asteraceous fynbos is rare. Seeps and wetland areas are common to the area and support restioid and ericaceous fynbos.

Kogelberg Sandstone Fynbos is classified as least threatened as, although it contains 100 Red Data Species, much of this vegetation type lies within protected areas. The vegetation is well conserved with more than the national target of 30% already being conserved. Elgin Shale Fynbos is however considered to be a Critically Endangered vegetation type as much of it has been lost to agriculture.



Figure 5. Vegetation map of the study site and surroundings (SANBI Biodiversity GIS, 2014)



Figure 6. Transformed areas map for the area (SANBI Biodiversity GIS, 2014)

2.5. AQUATIC FEATURES

The freshwater features within the study area consist of a minor tributary or drainage features of the Riviersonderend River that discharge into a channeled valley bottom wetland area to the east of the study site (Figure 7).

The drainage features at the proposed substation sites appear to consist largely of seepage water that occurs in winter. They have a poorly defined channel (Figure 8, left) and do not contain any noticeable wetland or riparian vegetation. The drainage passes south of Site B and flows towards the gravel road, then crosses over the road near the reservoir and traverses Site A. Past attempts to prevent erosion from occurring as a result of the drainage are evident in the tires that have been placed within Site A. Pools of water now form against the row of tires placed within the site (Figure 8, right). A drainage ditch has also been dug along the northern border of the Site A.



Figure 7. Delineated wetland areas (green polygons) and drainage lines (green lines) within the study area

Wetland areas also occur to the north and east of the proposed sites, within the valley floor and adjacent to the Theewaterskloof Dam. The wetland areas within the valley to the north-east of the site consist of low sedges and are still in a largely natural condition, while those immediately north of the fruit processing facility appear to be largely associated with the small dam in this area and are in a moderately to highly disturbed condition with roads also being constructed through these wetland areas.



Figure 8. Drainage feature (left) and pooled water (right) on Site A

2.6. LAND USE

The land use practice to the north of the site consists of natural areas (light green areas in Figure 9), while cultivated and degraded areas occur at the site and to the south-west (pale yellow and brown areas). There is a storage dam immediately to the west of the site. Theewaterskloof Dam, the largest bulk water supply dam in the Western Cape, occurs to the north of the site. A small community development lies immediately to the east of the site. The closest urban areas are Grabouw, approximately 17km to the south-west, and Villiersdorp, approximately 13km to the north-east.

From the transformed areas map (Figure 6), produced as part of the mapping of critical biodiversity areas mapping for the Overberg District, much of the Site A is mapped as being urban (red in Figure 6) while Site B is mapped as natural but degraded (pale green area in Figure 6).



Figure 9. Land cover map for the area (SANBI Biodiversity GIS, 2014)

2.7. BIODIVERSITY CONSERVATION VALUE

A. CRITICAL BIODIVERSITY AREAS

The Overberg District Conservation Plan (2010) is the most relevant biodiversity conservation plan for Theewaterskloof Municipality, with its information intended to be used for land use decision support. The Critical Biodiversity Areas (CBA) 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. CBAs incorporate: (i) areas that need to be safeguarded in order to meet national biodiversity thresholds (ii) areas required to ensure the continued existence and functioning of species and ecosystems, including the delivery of ecosystem services; and/or (iii) important locations for biodiversity features or rare species. Ecological Support Areas (ESAs) are supporting zones required to prevent the degradation of Critical Biodiversity Areas and Protected Areas. An ESA may be an ecological process area that connects and therefore sustains Critical Biodiversity Areas or a terrestrial feature, e.g. the riparian habitat surrounding and supporting aquatic Critical Biodiversity Areas.



Figure 10. Critical Biodiversity Areas map for the area (SANBI Biodiversity GIS, 2014)

From Figure 10, Site A is not considered conservation worthy, while Site B lies mostly within a CBA where the management action is to maintain the natural land, rehabilitate where necessary and allow for no further degradation of the ecological condition. This is an area with potential threatened terrestrial vegetation species or contains habitat that supports terrestrial threatened species. The study area lies adjacent to a designated protected area, the Theewaterskloof Nature Reserve.

B. FRESHWATER ECOSYSTEM PRIORITY AREAS (FEPA)

Freshwater Ecosystem Priority Areas (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 proposed development site is located in the catchment of the Riviersonderend River which has been identified as a Fish Support Area (Figure 11).



Figure 11. FEPA map with the location of the study area indicated (SANBI Biodiversity GIS, 2014)

3. FRESHWATER FEATURES ASSESSMENT

3.1 FRESHWATER ASSESSMENT

The freshwater assessment is based on a site visit undertaken in June 2014. Three aquatic features (Figure 12) were assessed and are described in this section in terms of their ecological condition, importance and sensitivity, that is:

1. The drainage feature that flows adjacent to Site B and then transects Site A;
2. The small wetland area into which the drainage feature discharges that is located to the north of Site A; and
3. The wetland features adjacent to Theewaterskloof Dam near the fruit processing facility.



Figure 12. Freshwater features assessed in this section

A. ECOLOGICAL CLASSIFICATION

In order assess the condition and ecological importance and sensitivity of the tributary of the Riviersonderend River at the study site, it is necessary to understand how the stream might have appeared under unimpacted conditions. This is achieved through classifying freshwater features according to their ecological characteristics, in order that it can be compared to ecologically similar aquatic features.

River typing or classification involves the hierarchical grouping of rivers or streams 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/stream condition should only be done between rivers/streams that share similar physical and biological characteristics under natural conditions. Thus, the classification of rivers/streams provides the basis for assessing river/stream condition to allow comparison between similar river/stream types.

The primary classification of rivers/streams is a division into Ecoregions. Rivers/streams within an ecoregion are further divided into sub-regions.

Ecoregions: Groups of aquatic features 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.

Table 1. Characteristics of the Southern Folded Mountains Ecoregion:

Main Attributes (dominant types in bold)	Southern Folded Mountains Characteristics
Terrain Morphology:	Plains; Low Relief (limited); Plains Moderate Relief (limited); Lowlands; Hills and Mountains; Moderate and High Relief; Open Hills; Lowlands; Mountains; Moderate to High Relief; **Closed Hills; Mountains; Moderate and High Relief**
Vegetation types	Patches Afromontane Forest; Spekboom Succulent Thicket; **Grassy Fynbos; Mountain Fynbos;** South and South West Coast Renosterveld; Central Mountain Renosterveld; Eastern Mixed Nama Karoo; Central Nama Karoo; Great Nama Karoo; **Little Succulent Karoo**
Altitude (m a.m.s.l)	0-300 limited; 300-1900
MAP (mm) (modify)	200 to 1500
Rainfall seasonality	Very late summer to winter to all year
Mean annual temp. (°C)	10 to 20
Median annual simulated runoff (mm) for quaternary catchment	<5 to >250

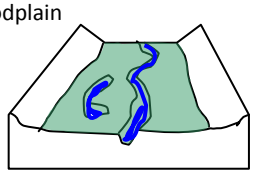
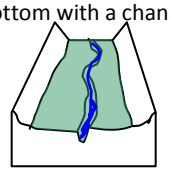
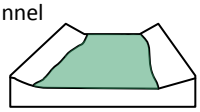
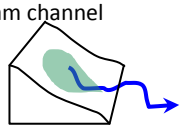
Sub-regions (or geomorphological zones): Groups of rivers/streams or segments thereof, within an ecoregion, which share similar geomorphological features, of which gradient is the most important. The use of geomorphological features is based on the assumption that these are a major factor in the determination of the distribution of the biota.

Table 2. Classification of the minor tributary/drainage feature of the Riviersonderend River at the study area

River	Ecoregion	Subregion
Minor tributary of the Riviersonderend River	Southern Folded Mountains	Foothill stream or drainage feature

Wetland classification: The classification of the wetlands in the study area into different wetland types 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 3).

Table 3. Wetland hydro-geomorphic types typically supporting inland wetlands in South Africa

Hydro-geomorphic types	Description	Source of water maintaining the wetland[1]	
		Surface	Sub-surface
Floodplain 	Valley bottom areas with a well-defined stream channel, gently sloped & characterized by floodplain features such as oxbow depressions and natural levees and the alluvial (by water) transport and deposition of sediment, usually leading to a net accumulation of sediment. Water inputs from main channel (when channel banks overspill) 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 (when channel banks overspill) 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 also from adjacent slopes.	***	*/ ***
Hillslope seepage linked to a stream channel 	Slopes on hillsides, which are characterized by the colluvial (transported by gravity) 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 Table 3 the wetland features within the study area can be classified as follows:

Table 4: Classification of wetland areas within study area

Name	Wetland area on drainage feature through site A that occurs downstream of the site	Wetland areas adjacent to Theewaterskloof Dam, at processing facility
System	Inland	
Ecoregion	Southern Folded Mountains	
Landscape setting	Valley bottom with a channel	Seep
Longitudinal zonation	Lower foothill	Not applicable
Drainage	Primarily groundwater contribution with some surface water	
Seasonality	Perennial	
Anthropogenic influence	Largely natural to moderately modified	Largely modified
Geology	Table Mountain Sandstone	
Vegetation	Elgin Shale Fynbos	Kogelberg Sandstone Fynbos
Substrate	Sand	
Salinity	Fresh	

B. PRESENT ECOLOGICAL STATUS ASSESSMENT

The ecological status for the aquatic features at the site was determined using the rapid Present Ecological Status (PES) Assessment. The rapid estimate for the Present Ecological Status of aquatic ecosystems according to the Resource Directed Measures methodologies (DWAF, 1999) consists of a scoring and rating system for the following attributes: flow, inundation, water quality, bed condition, introduced stream biota and riparian or wetland vegetation condition. Each attribute at each site is given a score between 0 (critically modified) and 5 (natural, unmodified) and the mean of the scores for all attributes provides a rating of PES category between A (Natural/unmodified) and F (Unacceptably modified). This provides a very broad description of the present ecological condition of the aquatic feature.

Table 5. The PES assessment for the aquatic features assessed at the site

Attribute	Drainage feature	Wetland associated with drainage feature	Wetlands adjacent to Theewaterskloof Dam
Flow	3.0	3.0	2.0
Inundation	2.0	4.0	2.0
Water Quality	3.0	3.0	3.0
Stream Bed Condition	2.5	3.5	2.0
Introduced stream biota	4.5	4.5	3.0
Riparian/wetland condition	3.0	3.5	2.0
Mean score	3.0	3.6	2.3
PES Category	**Largely natural to moderately modified**	**Largely natural**	**Moderately to largely modified**

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 >1 and ≤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 <1; 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.

C. ECOLOGICAL IMPORTANCE AND SENSITIVITY

The Ecological Importance and Sensitivity (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. The median of the resultant score is calculated to derive the EIS category.

Table 7. Definition of the four-point scale used to assess biotic and habitat determinants presumed to indicate 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 (i.e. SA Red Data Books)

Table 8. 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 9. Results of the EIS assessment

Biotic Determinants	Drainage feature	Wetland associated with drainage feature	Wetlands adjacent to Theewaterskloof Dam
Rare and endangered biota	0.5	1	0.5
Unique biota	1	2	1
Intolerant biota	1	2	1
Species/taxon richness	1	1	0.5
Aquatic Habitat Determinants			
Diversity of aquatic habitat types or features	0.5	1	1
Refuge value of habitat type	0.5	2	1
Sensitivity of habitat to flow changes	1	2	1
Sensitivity of flow related water quality changes	1.5	3	1
Migration route/corridor for instream & riparian biota	1	2	1
National parks, wilderness areas, Nature Reserves, Natural Heritage sites, Natural areas, PNEs	2	2	2
RATINGS	1.0	1.8	1.0
EIS CATEGORY	**Low**	**Moderate**	**Low**

4. DESCRIPTION OF PROPOSED ACTIVITY

Eskom is proposing to construct a centrally located step-down substation and a 66 kV powerline turn in from Vyeboom-Theewater 66Kv powerline to the new proposed Longdown substation to provide and facilitate additional load growth and reliable networks for the area. Two sites are being considered for the proposed substation (Figure 13). There will be a road upgrade needed for site A and a new road to be constructed for site B. Clearing of vegetation will be needed as site B consists of natural veld



Figure 13. Google Earth image indicating the two alternative sites for the substation as well as the proposed access routes

5. LEGAL REQUIREMENTS

The following Acts are applicable to the proposed activity:

5.1 THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT (ACT NO. 107 OF 1998)

Chapter Seven of the NEMA states that:

"Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment".

The Act also clearly states that the landowner, or the person using or controlling the land, is responsible for taking measures to control and rectify any degradation. These may include measures to:

"(a) investigate, assess and evaluate the impact on the environment;

(b) inform and educate employees about the environmental risks of their work and the manner in which their tasks must be performed in order to avoid causing significant pollution or degradation of the environment:

(c) cease, modify or control any act, activity or process causing the pollution or degradation:

(d) contain or prevent the movement of pollutants or degradation: or

(e) eliminate any source of pollution or degradation: or

(f) remedy the effects of the pollution or degradation."

NEMA BASIC ASSESSMENT REGULATIONS, GN R543 OF 2010

Activities listed in terms of Chapter 5 of NEMA in Government Notice No. R. 544, 5 and 6 trigger a mandatory Basic Assessment, or even a full scoping EIA process, prior to development.

The National Environmental Management Second Amendment Act (Act No.8 of 2004) provided for formal procedures for offenders in terms of Section 24G to apply for rectification of the unlawful commencement of listed activities.

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

The purpose of the National Water Act (Act 36 of 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 NWA 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.

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 the Department of Water Affairs (DWA) in terms of provision made in section 26(1)(c), read together with Section 69 of the NWA. Section 26(1)(c) of the NWA 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.

GENERAL AUTHORISATION IN TERMS OF S. 39 OF THE NATIONAL WATER ACT, GN R 1199 OF 2009

Government Notice R1199 was issued as a revision of the General Authorisations (No. 1191 of 1999) for Section 21 (c) and (i) water uses as defined under the NWA (Act 36 of 1998). The revision was published and came into effect on 2009/12/18. According to the preamble to Part 6 of the National Water Act, "This Part establishes 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*…"

Section 22(3) of the National Water Act allows for a responsible authority (DWA) 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.

6. POTENTIAL IMPACTS OF PROPOSED ACTIVITIES ON FRESHWATER FEATURES

6.1. CONSTRAINTS MAPPING FOR THE PROPOSED ACTIVITY

Figure 14 provides a constraints map indicating the more sensitive areas from a freshwater point of view. These areas are numbered and comments are provided in Table 10.



Figure 14. Freshwater constraints map for the proposed alternative substation sites (Site A=1 and Site B=2) and access routes (purple line=3 and orange line =4), mapped in Google Earth

Table 10. Project Constraints related to alternative sites for the substations and the access roads (numbers relate to Figure 14)

No.	Comment
1	**Substation Site A:** The small drainage feature crosses the site. The feature is deemed to be in a moderately modified state as a result of the physical modification to the topography of the site that has historically taken place. The feature is of a low ecological significance and does not in itself support any visible aquatic ecosystem. It does however serve to feed the downstream wetland area that is still in a largely natural ecological condition and of a moderate ecological importance. It is thus importance that, should this site be developed that the flow and water quality of the drainage feature feeding the wetland not be altered.
2	**Substation Site B:** The small drainage feature passes along the north-eastern boundary of the site. As for Site A, the possible diversion of this feature is not deemed to have a significant impact, provided that the flow and water quality of the drainage feature feeding the wetland not be altered.
3	**Southern Access Route:** There are no freshwater features in the immediate vicinity of this proposed access route and it follows an existing road. It may however need to cross the dug drainage line. This crossing would be of a very low significance in terms of its potential impact provided the crossing is properly constructed and any potential impacts of the crossing mitigated.
4	**Northern Access Route:** This route also follows an existing road to the small community which passes through some wetland areas that are already moderately to largely modified and are of a low ecological significance. Should this road need to be upgraded, the increase in footprint of the road should preferably no take place to the east of the existing road. As for the southern access route, the crossing over the dug drainage channel, with mitigation, would be of a very low significance.

6.2. ASSESSMENT OF IMPACTS OF PROPOSED ACTIVITIES

The proposed activities are to take place within areas that have already to some extent been impacted on by existing land use activities, particularly within the north-western portion of the study area. The likely impacts of the proposed substation and access route would thus be primarily of limited intensity and of a short term nature, mostly taking place during the construction phase provided the footprint of the newly developed areas take place largely within the already degraded areas. Proper rehabilitation measures and monitoring and control of any invasive alien plant growth are essential to ensure that longer term impacts do not occur within those areas that are still of conservation value to in the south-east of the study area.

This section provides a combined assessment of the potential impacts to freshwater ecosystems that are likely to be associated with the proposed activities.

NATURE OF IMPACT: LOSS OF FRESHWATER RELATED HABITAT AND ASSOCIATED BIOTA

A direct ***loss of freshwater habitat and associated biota*** could be expected as a result of the increased footprint of developed areas within the delineated freshwater features. Should this take place within those freshwater features that are already in a modified state and of a low ecological importance (drainage feature and wetland area associated with the dams), the potential impact is considered to be of a low to very low significance.

The potential impact on the habitat of the freshwater features could be expected to be greater for Site A than Site B and for the northern access route compared to the southern access route.

Significance of impacts without mitigation: A localized impact of medium intensity that is expected to have a low overall significance in terms of its overall impact on the riparian and wetland areas in the study area.

Proposed mitigation: The increase in footprint and the area of disturbance should be limited as far as possible to those areas already disturbed. Disturbed areas should be rehabilitated after construction works are complete and monitored afterwards to ensure that there is no growth of invasive alien plants in these areas.

Significance of impacts after mitigation: The significance of the impact on the aquatic ecosystems with mitigation is expected to be very low significance.

NATURE OF IMPACT: MODIFICATION OF THE FLOW

Construction of the proposed substation and access route may have the potential to alter some of the surface and subsurface flow characteristics, particularly that feeding the wetland areas to the east of the site.

Significance of impacts without mitigation: The proposed activities would be expected to divert and not impede flow feeding the wetland areas and would thus be considered to be of a low significance.

Proposed mitigation: Any flow through the proposed substation sites should be diverted around the sites in such a manner that it still continues to feed the downstream wetland area both during the construction and operation. Care should also be taken not to concentrate flows around the site in such a manner so as to cause erosion.

In terms of the access roads, the increase in footprint of the road should preferably no take place to the east of the existing road and the road should make adequate allowance for the movement of surface water flow with culvert structures, that the flow is not impeded by the road.

Significance of impacts after mitigation: A localised impact of low intensity that is expected to have a very low overall significance to being insignificant.

NATURE OF IMPACT: IMPAIRMENT OF THE SURFACE WATER QUALITY

This impact could potentially occur during the construction phase.

Significance of impacts without mitigation: A very low risk of a localized impact of 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 may occur. Provided the drainage channel is diverted around the construction and development site, this impact should be negligible.

Proposed mitigation: All materials on the construction site should be properly stored and contained. Disposal of waste from the site should also be properly managed. Construction workers should be given ablution facilities at the construction site that should be located away at least 30m any wetland area and regularly serviced. These measures should be addressed, implemented and monitored in terms of the Environmental Management Programme (EMP) for the construction phase.

Significance of impacts after mitigation: Provided that the mitigation measures are effectively implemented the water quality impacts of the proposed works should be insignificant.

6.3. SUMMARY OF ASSESSMENT OF POTENTIAL IMPACTS OF THE PROPOSED ACTIVITIES

Construction Phase:

Potential impact on freshwater features	Proposed substation and access route during the construction phase
Nature of impact:	***Loss of freshwater habitat and associated biota*** as a result of construction activities
Extent and duration of impact:	Localised short and longer term impact
Intensity of Impact	Medium to low depending on alternative selected
Probability of occurrence:	Probable depending on alternative selected
Degree to which impact can be reversed:	Irreversible
Irreplaceability of resources:	Low
Cumulative impact prior to mitigation:	Low
Significance of impact pre-mitigation	Low
Degree of mitigation possible:	Medium to High
Proposed mitigation:	• The increase in footprint and the area of disturbance should be limited as far as possible to those areas already disturbed.

	• Disturbed areas should be rehabilitated after construction works are complete.
Cumulative impact post mitigation:	Very Low
Significance after mitigation	Very Low to insignificant

Potential impact on freshwater features	Proposed substation and access route during the construction phase
Nature of impact:	A *diversion of flow* during construction activities
Extent and duration of impact:	Localised short and longer term impacts
Intensity of Impact	Low to very low depending on alternative selected
Probability of occurrence:	Probable depending on the placement of the substation and access roads
Degree to which impact can be reversed:	Irreversible
Irreplaceability of resources:	Low
Cumulative impact prior to mitigation:	Low
Significance of impact pre-mitigation	Low to very low
Degree of mitigation possible:	Low
Proposed mitigation:	• Any flow through the proposed substation sites should be diverted around the sites in such a manner that it still continues to feed the downstream wetland area both during the construction and operation. • Care should also be taken not to concentrate flows around the site in such a manner so as to cause erosion. • In terms of the access roads, the increase in footprint of the road should preferably no take place to the east of the existing road and the road should make adequate allowance for the movement of surface water flow with culvert structures, that the flow is not impeded by the road.
Cumulative impact post mitigation:	Very Low
Significance after mitigation	Very Low to insignificant

Potential impact on freshwater features	Proposed substation and access route during the construction phase
Nature of impact:	*Water quality impacts* as a result of construction activities
Extent and duration of impact:	Localised short term impacts
Intensity of Impact	Low to very low
Probability of occurrence:	Probable to improbable
Degree to which impact can be reversed:	Fully reversible
Irreplaceability of resources:	Low
Cumulative impact prior to mitigation:	Low
Significance of impact pre-	Very Low

mitigation	
Degree of mitigation possible:	Very low
Proposed mitigation:	• All materials on the construction site should be properly stored and contained. • Disposal of waste from the site should also be properly managed. • Construction workers should be given ablution facilities at the construction site that should be located away at least 30m any wetland area and regularly serviced. • These measures should be addressed, implemented and monitored in terms of the Environmental Management Programme (EMP) for the construction phase.
Cumulative impact post mitigation:	Very Low
Significance after mitigation	Very Low to negligible

Operation Phase

Potential impact on freshwater features	Proposed substation and access route related to operation phase
Nature of impact:	***Loss of freshwater habitat and associated biota*** after construction activities have taken place
Extent and duration of impact:	Localised longer term impacts
Intensity of Impact	Very Low
Probability of occurrence:	Probable to improbable
Degree to which impact can be reversed:	Fully reversible
Irreplaceability of resources:	Low
Cumulative impact prior to mitigation:	Very Low
Significance of impact pre-mitigation	Very Low
Degree of mitigation possible:	Very low
Proposed mitigation:	Disturbed areas should be monitored after construction works are complete to ensure that there is no growth of invasive alien plants in these areas. Care should be taken not to extend the disturbance caused by the maintenance works associated with the proposed substation and access route into the wetland areas, particularly to the north-east of the site.
Cumulative impact post mitigation:	Very Low over the longer term
Significance after mitigation	Very Low to insignificant

7. CONCLUSIONS AND RECOMMENDATIONS

The freshwater features within the area proposed for development consist of:

4. The drainage feature that flows adjacent to Site B and then transects Site A;
5. The small wetland area into which the drainage feature discharges that is located to the north of Site A; and
6. The wetland features adjacent to Theewaterskloof Dam near the fruit processing facility.

The freshwater features within the study area vary from being in a largely natural to being in a largely modified ecological condition and have a moderate to low ecological importance and sensitivity. The study area in terms of biodiversity conservation mapping initiatives has only its south-western portion (Site B) located within a terrestrial Critical Biodiversity Area. The study area lies within the Riviersonderend Catchment which is considered as a Fish Support Area. Both of these conservation status categories indicate that the area should not be allowed to become degraded but should rather be rehabilitated.

The proposed activities are to take place within areas that have already to some extent been impacted on by existing land use activities, particularly within the north-western portion of the study area. The likely impacts of the proposed substation and access route would thus be primarily of limited intensity and of a short term nature, mostly taking place during the construction phase provided the footprint of the newly developed areas take place largely within the already degraded areas.

The potential impact on the habitat of the freshwater features could be expected to be greater for Site A than Site B and for the northern access route compared to the southern access route. Proper rehabilitation measures and monitoring and control of any invasive alien plant growth are essential to ensure that longer term impacts do not occur within those areas that are still of conservation value to in the south-east of the study area.

The Gouritz-Breede Water Management Agency should be approached for approval of the water use aspects of the proposed activities, although they are likely to be of such a low significance that they can be generally authorised.

8. REFERENCES

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

BACKGROUND AND QUALIFICATIONS OF SPECIALIST CONSULTANT

Contact details: 60 Dummer Street, Somerset West, 7130

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 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 specialised assessments of rivers and wetlands in all the major catchments for the Western Cape.

Relevant publications:

Belcher, 2008. Freshwater Assessment: Kronendal Retirement Village – Hout Bay

Belcher, 2009.Water Use Licence Application for the proposed infrastructure development on Portion 112 of Farm 933, Noordhoek

Belcher and Herdien, 2009. Freshwater Assessment and Rehabilitation Plan for the Proposed Development of Erf 307 de Goede Hoop Estate Noordhoek

Belcher and Herdien, 2009. Basic Freshwater Screening Assessment for the Proposed Sub-division and development of Portion 2 of Farm No. 944 Noordhoek

Belcher and Herdien, 2010. Basic Freshwater Screening Assessment for the Proposed Water and Sewer Pipeline Upgrade Developments at Sun Valley Fish Hoek

Belcher, 2010. Freshwater Assessment: Lake Michelle (Phases 4-7) – Noordhoek

Belcher, 2010. Freshwater Assessment for the Proposed Sewer pipeline at Retreat

Belcher and Snyman, 2012. Impact Assessment and Rehabilitation Plan for Construction Activities on Erf 2157 Noordhoek - Freshwater Features

Belcher, 2013. Freshwater Assessment for the Proposed Philippi Industrial Park on Portions of Cape Farms 609, 699 and 701, Philippi

DECLARATION OF INDEPENDENCE BY The independent PERSON WHO COMPILED A SPECIALIST REPORT OR UNDERTOOK A SPECIALIST PROCESS

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 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 favourable 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:

7 July 2014
Date:

APPENDIX B: IMPACT ASSESSMENT METHODOLOGY

Criteria and ratings:

1. Extent

"Extent" defines the physical extent or spatial scale of the impact.

Rating	Description
LOCAL	Extending only as far as the activity, limited to the site and its immediate surroundings. Specialist studies to specify extent.
REGIONAL	Western Cape. Specialist studies to specify extent.
NATIONAL	South Africa
INTERNATIONAL	

2. Duration

"Duration" gives an indication of how long the impact would occur.

Rating	Description
SHORT TERM	0 - 5 years
MEDIUM TERM	5 - 15 years
LONG TERM	Where the impact will cease after the operational life of the activity, either because of natural processes or by human intervention.
PERMANENT	Where mitigation either by natural processes or by human intervention will not occur in such a way or in such time span that the impact can be considered transient.

3. Intensity

"Intensity" establishes whether the impact would be destructive or benign.

Rating	Description
ZERO TO VERY LOW	Where the impact affects the environment in such a way that natural, cultural and social functions and processes are not affected.
LOW	Where the impact affects the environment in such a way that natural, cultural and social functions and processes continue, albeit in a slightly modified way.
MEDIUM	Where the affected environment is altered, but natural, cultural and social functions and processes continue, albeit in a modified way.
HIGH	Where natural, cultural and social functions or processes are altered to the extent that it will temporarily or permanently cease.

4. Loss of resources

"Loss of resource" refers to the degree to which a resource is permanently affected by the activity, i.e. the degree to which a resource is irreplaceable.

Rating	Description
LOW	Where the activity results in a loss of a particular resource but where the natural, cultural and social functions and processes are not affected.
MEDIUM	Where the loss of a resource occurs, but natural, cultural and social functions and processes continue, albeit in a modified way.
HIGH	Where the activity results in an irreplaceable loss of a resource.

5. Status of impact

The status of an impact is used to describe whether the impact would have a negative, positive or zero effect on the affected environment. An impact may therefore be negative, positive (or referred to as a benefit) or neutral.

6. Probability

"Probability" describes the likelihood of the impact occurring.

Rating	Description
IMPROBABLE	Where the possibility of the impact to materialise is very low either because of design or historic experience.
PROBABLE	Where there is a distinct possibility that the impact will occur.
HIGHLY PROBABLE	Where it is most likely that the impact will occur.
DEFINITE	Where the impact will occur regardless of any prevention measures.

7. Degree of confidence

This indicates the degree of confidence in the impact predictions, based on the availability of information and specialist knowledge.

Rating	Description
HIGH	Greater than 70% sure of impact prediction.
MEDIUM	Between 35% and 70% sure of impact prediction.
LOW	Less than 35% sure of impact prediction.

8. Significance

"Significance" attempts to evaluate the importance of a particular impact, and in doing so incorporates the above three scales (i.e. extent, duration and intensity).

Rating	Description
VERY HIGH	Impacts could be EITHER: of high intensity at a regional level and endure in the long term; OR of high intensity at a national level in the medium term; OR of medium intensity at a national level in the long term.
HIGH	Impacts could be EITHER: of high intensity at a regional level and endure in the medium term; OR of high intensity at a national level in the short term; OR of medium intensity at a national level in the medium term; OR of low intensity at a national level in the long term; OR of high intensity at a local level in the long term; OR of medium intensity at a regional level in the long term.
MEDIUM	Impacts could be EITHER: of high intensity at a local level and endure in the medium term; OR of medium intensity at a regional level in the medium term; OR of high intensity at a regional level in the short term; OR of medium intensity at a national level in the short term; OR of medium intensity at a local level in the long term; OR of low intensity at a national level in the medium term; OR of low intensity at a regional level in the long term.
LOW	Impacts could be EITHER of low intensity at a regional level and endure in the medium term; OR of low intensity at a national level in the short term; OR of high intensity at a local level and endure in the short term; OR of medium intensity at a regional level in the short term; OR of low intensity at a local level in the long term; OR of medium intensity at a local level and endure in the medium term.
VERY LOW	Impacts could be EITHER of low intensity at a local level and endure in the medium term; OR of low intensity at a regional level and endure in the short term; OR of low to medium intensity at a local level and endure in the short term.
INSIGNIFICANT	Impacts with: Zero to very low intensity with any combination of extent and duration.
UNKNOWN	In certain cases it may not be possible to determine the significance of an impact.

9. Degree to which impact can be mitigated

This indicates the degree to which an impact can be reduced / enhanced.

Rating	Description
NONE	No change in impact after mitigation.
VERY LOW	Where the significance rating stays the same, but where mitigation will reduce the intensity of the impact.
LOW	Where the significance rating drops by one level, after mitigation.
MEDIUM	Where the significance rating drops by two to three levels, after mitigation.
HIGH	Where the significance rating drops by more than three levels, after mitigation.

10 Reversibility of an impact

This refers to the degree to which an impact can be reversed.

Rating	Description
IRREVERSIBLE	Where the impact is permanent.
PARTIALLY REVERSIBLE	Where the impact can be partially reversed.
FULLY REVERSIBLE	Where the impact can be completely reversed.