

Appendix 5: Wetland and Vegetation Assessment



**ASSESSMENT OF A STREAM, WETLAND, AND VEGETATION
SURVEY AT THE SITE OF A ROAD CROSSING UPGRADE IN
BHEKULWANDLE, ETHEKWINI MUNICIPALITY, KWAZULU-
NATAL**

June 2018

Prepared by:
JG Afrika (Pty) Ltd

PO Box 794
Hilton
3245
033 3436700
alletsonj@jgafrika.com

Mr Jake Alletson

VERIFICATION PAGE

Rev 13

ASSESSMENT OF A STREAM, WETLAND, AND VEGETATION SURVEY AT THE SITE OF A ROAD CROSSING UPGRADE IN BHEKULWANDLE, ETHEKWINI MUNICIPALITY, KWAZULU-NATAL				
JGI NO. : 4819		DATE : June 2018		REPORT STATUS : Final Report
CARRIED OUT BY :			COMMISSIONED BY :	
JG Afrika (Pty) Ltd P O Box 794 Hilton 3245 Tel: (033) 343 6789 Fax: (033) 343 6788 Email: alletsonj@jgafrika.com			eThekweni Municipality Roads Provision Department 30 Archie Gumede Drive Durban 4000 Tel: (031) 3117941 Email: Selvan.Reddy@durban.gov.za	
AUTHOR : Jake Alletson			CLIENT CONTACT PERSON : Mr Selvan Reddy	
SYNOPSIS : This report documents the findings of study done on the potential impacts on a wetland system and terrestrial biodiversity in relation to a proposed road upgrade in Bhukulwandile in the eThekweni Municipal area. The potential impacts of the project are considered to be small but not negligible. Management recommendations are put forward.				
KEY WORDS : Watercourses, Rivers, Biodiversity, Road crossing, Impact Assessment and Mitigation.				
© COPYRIGHT: Terratest (Pty) Ltd.				
QUALITY VERIFICATION This report has been prepared under the controls established by a quality management system that meets the requirements of ISO9001: 2008 which has been independently certified by DEKRA Certification under certificate number 90906882				
				
Verification	Capacity	Name	Signature	Date
By Author	Specialist Ecologist	DJ Alletson		26 June 2018
Checked by	Specialist Ecologist	M van Rooyen		26 June 2018
Authorised by	Executive Associate	M van Rooyen		26 June 2018

CONTENT OF THIS SPECIALIST REPORT

Appendix 6 of the NEMA: EIA Regulations of 4 December 2014 requires that specialist reports contain at least a number of specified items. The manner in which these items have been addressed in this document is indicated in the table below.

Specified Report Content	Reference
1. (1) A specialist report prepared in terms of these Regulations must contain-	
(a) details of- (i) the specialist who prepared the report; and (ii) the expertise of that specialist to compile a specialist report including a <i>curriculum vitae</i> ;	See Appendix II
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	See Appendix II
(c) an indication of the scope of, and the purpose for which, the report was prepared;	See Sections 1 and 2.
(d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	See Section 6.2.
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process;	See Section 4.
(f) the specific identified sensitivity of the site related to the activity and its associated structures and infrastructure;	See Section 6.1.
(g) an identification of any areas to be avoided, including buffers;	See Section 8.2.
(h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	See Figures 2 and 4.
(l) a description of any assumptions made and any uncertainties or gaps in knowledge;	See Section 5.
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment;	See Sections 6 and 7.
(k) any mitigation measures for inclusion in the EMP; and	See Sections 8 and 9.
(l) any conditions for inclusion in the environmental authorisation;	See Sections 8 and 9.
(m) any monitoring requirements for inclusion in the EMP or environmental authorisation;	See Section 9.
(n) a reasoned opinion- (i) as to whether the proposed activity or portions thereof should be authorised; and (ii) if the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMP, and where applicable, the closure plan;	See Section 10.
(o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	n/a
(p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	n/a
(q) any other information requested by the competent authority.	n/a

Table of Contents

1. BACKGROUND	1
2. PROJECT DESCRIPTION	1
3. STUDY AREA	1
4. STUDY PROCEDURE	2
4.1 Desktop Survey.....	2
4.2 Site Surveys.....	5
4.3 Data Processing.....	6
5. UNCERTAINTIES AND DATA GAPS.....	6
6. STUDY FINDINGS.....	7
6.1 Desktop Study.....	7
6.2 Field Study	8
6.2.1 Vegetation.....	8
6.2.2 Wetlands.....	9
6.2.3 Fauna.....	13
7. CONSIDERATION OF IMPACTS.....	14
7.1 Loss of Indigenous Vegetation	14
7.2 Impacts on Wetlands.....	14
7.3 Loss of Terrestrial Fauna	14
7.6 Alternatives to the Proposed Development.....	14
7.7 Cumulative Impacts.....	15
8. IMPACT ASSESSMENT AND MITIGATION MEASURES.....	15
8.1 Impacts on the Indigenous Vegetation	16
8.2 Impacts on the Wetlands.....	17
8.3 Impacts on the Fauna	21
9. MONITORING PROGRAMME	21
10. DISCUSSION AND CONCLUSION	22
11. REFERENCES	23
APPENDIX I - Definition of the Terms Used	24
APPENDIX II – CV and Declaration of Independence	28

List of Tables

Table 1: List of plant species seen in the study area. Numbers in parentheses indicate the SANBI listed Invader Category.	8
Table 2: List of animal species seen in the study area.	13
Table 3: Assessment of impacts originating from loss of indigenous terrestrial vegetation.	16
Table 4: List of indigenous tree species which could be plant along the road.	17
Table 5: Scores from the Department of Water and Sanitation Risk Assessment Matrix for the impacts arising from the housing upgrade project on wetlands and watercourses.	19
Table 6: Assessment of impacts originating from loss of wetlands.....	20

List of Figures

Figure 1: Locality plan indicating the study area. Source: Map Sheet 2831DD Felixton. 3	
Figure 2: Site plan indicating the road, road crossing, eThekweni database wetlands, and the 500m wide expanded study area.	4
Figure 3: Cross section through a wetland, indicating how the soil wetness and vegetation indicators change (Ollis, et al., 2013).....	6
Figure 4: Wetlands, including correctly delineated systems. Buffers of 32m width are shown for the delineated areas.....	12
Figure 5: Hierarchy of mitigation measures. The most desirable options are those which are higher in the figure. Source: EKZNW, 2010.	16

List of Photographs

Photograph 1: Wetland destruction downstream of the road crossing site.	10
Photograph 2: Excavator working in wetland upstream of the road crossing.....	10
Photograph 3: Soil taken from an auger hole during delineation of a seep area. The mottled transition is indicated.....	11
Photograph 4: Hillslope seep area. The taller vegetation in the channelled valley bottom area is visible along the far side. Beyond that, bare soil may be seen in the pipeline construction area.	11

List of Abbreviations

ECO	Environmental Control Officer
EDTEA	Department of Economic Development, Tourism and Environmental Affairs
EMPR	Environmental Management Plan
HGM	Hydrogeomorphic Unit
KZN	KwaZulu-Natal
NEMA	National Environmental Management Act (Act 107 of 1998)
NFEPA	National Freshwater Ecosystem Priority Areas
PES	Present Ecological State
SANBI	South African National Biodiversity Institute
SASS	South African Scoring System

ASSESSMENT OF A STREAM, WETLAND, AND VEGETATION SURVEY AT THE SITE OF A ROAD CROSSING UPGRADE IN BHEKULWANDLE, ETHEKWINI MUNICIPALITY, KWAZULU-NATAL

1. BACKGROUND

JG Afrika (Pty) Ltd has been appointed to the Environmental Impact Assessment process relating to the upgrade of a road crossing over a stream in the Bhukulwandle area of the eThekweni Municipality. As a part of that assessment, it was necessary to assess the condition of the aquatic system at the site so as to meet the requirements of the environmental impact assessment regulations under the National Environmental Management Act (Act 107 of 1998). It will also be necessary to obtain a Water use Licence in accordance with the National Water Act (Act 36 of 1998) and the survey was undertaken in accordance with the requirements of that Act.

The findings of the study were that the construction of the road upgrade will have very limited potential for impacts since the project is almost entirely within the existing footprint and so the area is already largely transformed. The wetland was until recently in moderately good condition but is being severely damaged by the installation of a bulk water pipeline for Umgeni Water. The damage made it impractical to assess the wetland as would usually be done and so the condition was estimated on the basis of professional experience. Impact assessment was done and construction phase management recommendations are put forward.

2. PROJECT DESCRIPTION

The proponent of the project is the eThekweni Municipality. The project consists upgrading a short road (Trk 83887) which links Reeves Road and Road 510137 in Bhukulwandle. At present the road has a gravel surface but it is to be given a concrete surface so as to provide usability under all weather conditions. At the same time its crossing over a stream is to be improved so as to not block up after heavy rains and so to cause the road to be inundated. The 900mm pipe in the existing crossing is to be replaced with a box culvert since it has insufficient through-flow capacity and water often dams up and flows over the road.

3. STUDY AREA

The site for the proposed project is situated in Bhukulwandle and the stream crossing is at 30° 3'5.52"S, 30°50'5.31"E. See Figure 1. The relevant 1:50 000 map sheet is 3030BB Umkomaas. The stream is a tributary of the Manzimtoti River. In addition to the road and its

immediate surrounds, a study zone around them of 500m in width was also included. See Figure 2. The reason for this inclusion is in terms of the National Water Act (Act 36 of 1998).

The “*General Authorisation in terms of Section 39 of the National Water Act, 1998 (Act No. 36 of 1998) for Water Uses as defined in Section 21(c) and (i)*”, Notice 509 of 2016, specifies that the “regulated area of a watercourse” is to mean:

- (a) The outer edge of the 1 in 100 year flood line and / or delineated riparian habitat, whichever is the greatest distance, measured from the middle of the watercourse of a river, spring, natural channel, lake or dam;
- (b) In the absence of a determined 1 in 100 year flood line or riparian area, the area within 100m from the edge of a watercourse where the edge of the watercourse is the first identifiable annual bank fill flood bench; or
- (c) A 500m radius from the delineated boundary (extent) of any wetland or pan.**

The outer edge of the area was therefore defined by a 500m wide buffer strip around the wetland crossing site.

4. STUDY PROCEDURE

This study was undertaken in three phases which were a desktop survey, site visits, and data processing and reporting. However, it was recognised at the outset that the biodiversity component of the study would be limited as a result of the existing urban development in the area.

4.1 Desktop Survey

The desktop survey consisted primarily of searching for any information which might suggest the presence of biodiversity priorities or wetlands in the study area. Reference was made to the SANBI Threatened Ecosystems Database, the Ezemvelo KZN Wildlife Minset Database, DMOSS, the KZN wetland database, and to the National Freshwater Ecosystem Priority Areas (NFEPA) database to see if any wetland-related features are recorded for the study area.

Google Earth was used to gain an initial impression of the study area and the images from several years were closely examined for any wetland or watercourse features. A list of these was prepared, with their geographic coordinates, and was used as an initial guide in the field survey which followed.

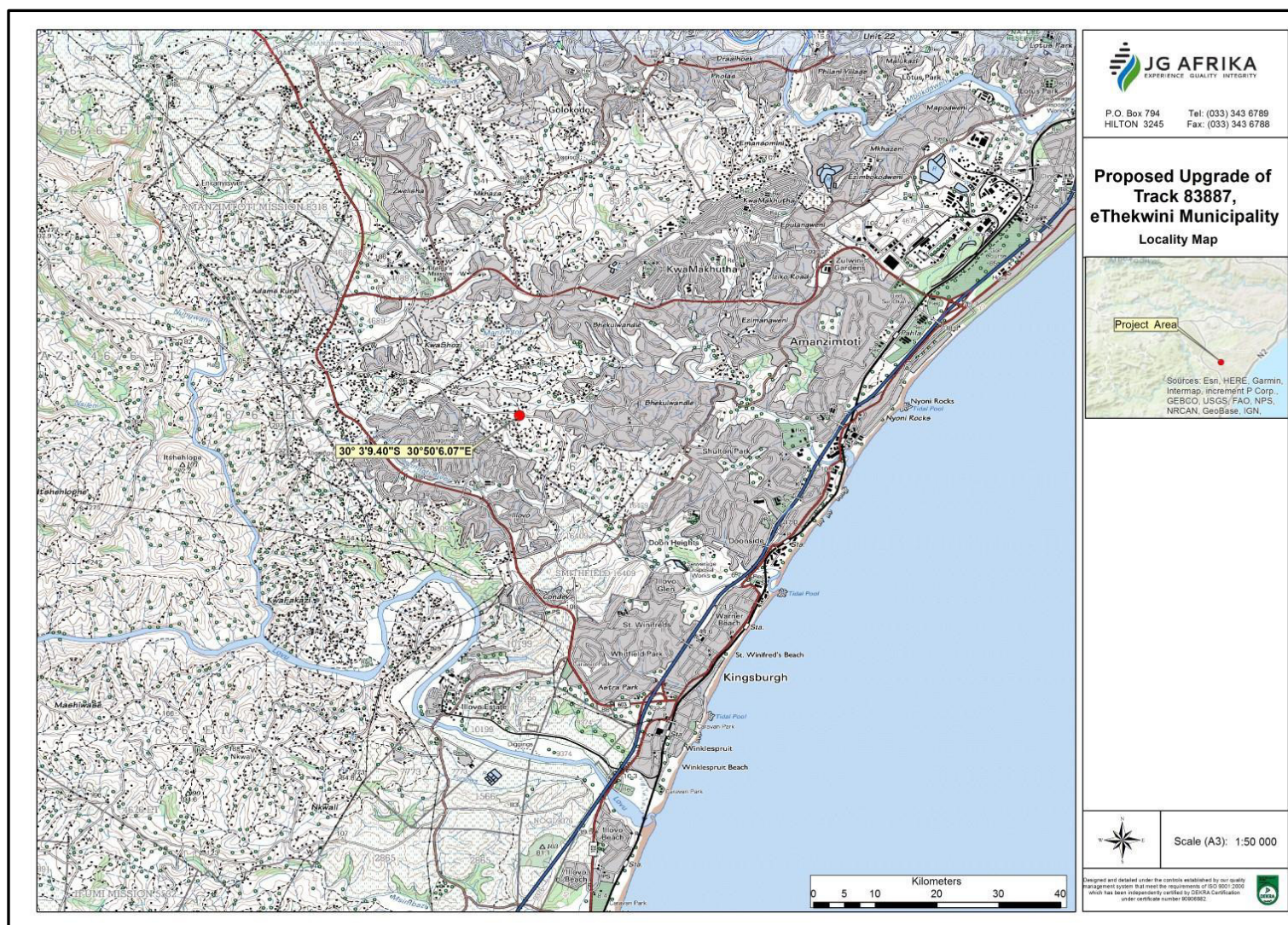


Figure 1: Locality plan indicating the study area. Source: Map Sheet 2831DD Felixton.

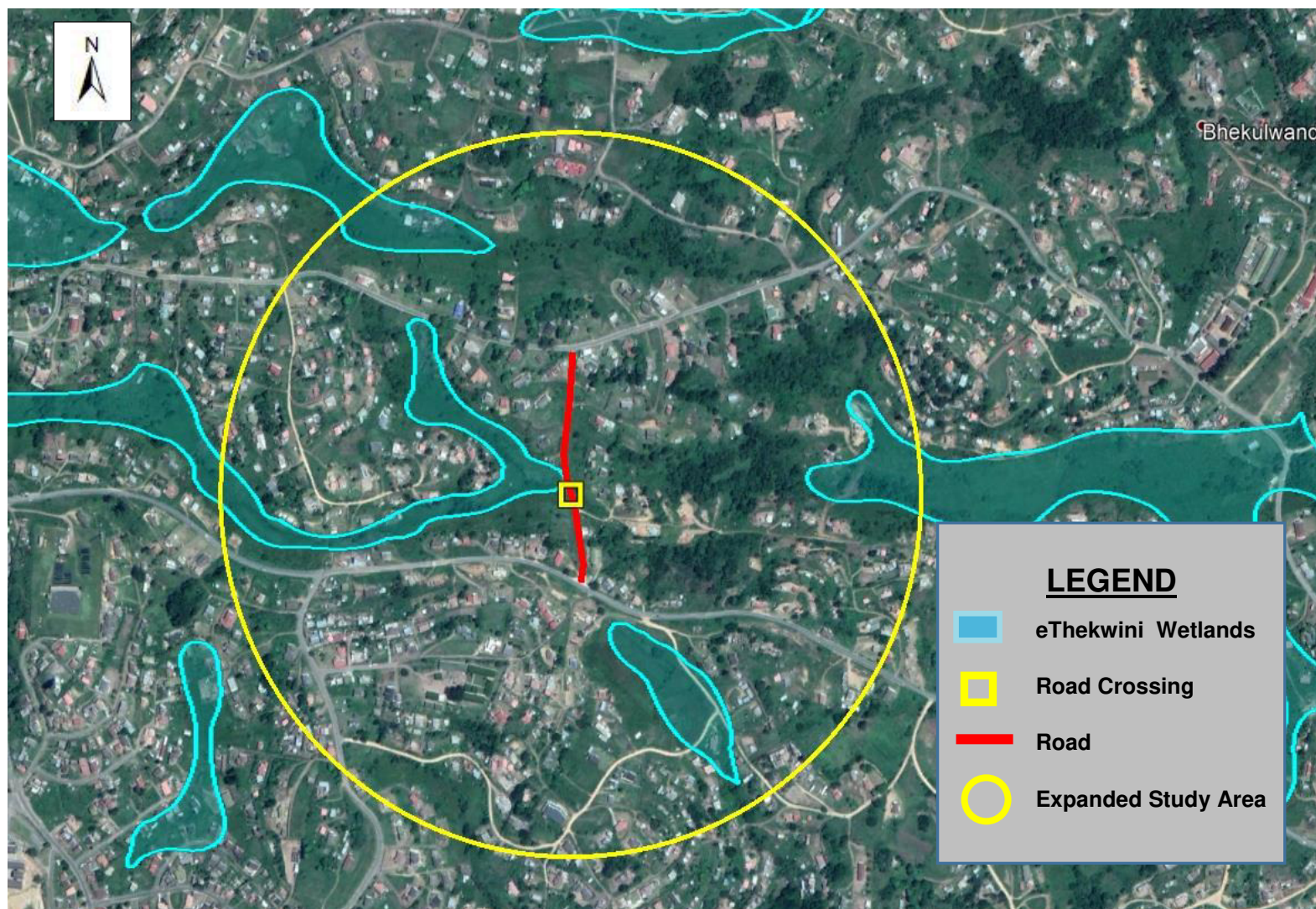


Figure 2: Site plan indicating the road, road crossing, eThekweni database wetlands, and the 500m wide expanded study area.

4.2 Site Surveys

The entire study area was visited during a site survey on 4th June 2018 and, using the list of sites from the desktop study as a guide, wetland and watercourse features which lay within it were visited and assessed. Although not in full plant growth season, it was still quite possible to gain an understanding of the vegetation since the site is in a warm area near the coast. It was found that some of the features seen on Google Earth were not wetland-related, but other additional features which had not been identified in the desktop study were observed in the field.

At every feature as relevant, the following actions were undertaken:

- Watercourses with either flowing water or channels where water obviously flows at times were visited and key features, including the vegetation in the riparian zone were noted.
- Wetlands. Where wetlands were encountered in the study area, the potential of the project to impact on them was to be assessed. If there was likely to be an impact they were to be delineated and note was made of their type. Use would then be made of a soil auger and the guidelines of the Department of Water Affairs and Forestry (DWAF, 2005) were to be followed. The indicators used were to include the following:
 - ✓ The Terrain Unit Indicator. This indicator helps identify those parts of the landscape where wetlands are likely to occur.
 - ✓ The Soil Form Indicator. This indicator consists of soil forms which are associated with prolonged and frequent water saturation. However, since the study was done during the dry season, it was only possible to auger test holes at a few sites.
 - ✓ The Soil Wetness Indicator. This indicator is based on soil characteristics which develop as a result of prolonged and frequent water saturation.
 - ✓ The Vegetation Indicator. This indicator is based on vegetation which consists either entirely or largely of plant species which are associated with frequently or permanently saturated soils. Such species and vegetation are described as being “hydrophilic”.

The associations between wetland vegetation and soils is illustrated in Figure 3. The locations of all observations were recorded by means of a hand-held GPS unit with a stated accuracy tolerance of three metres.

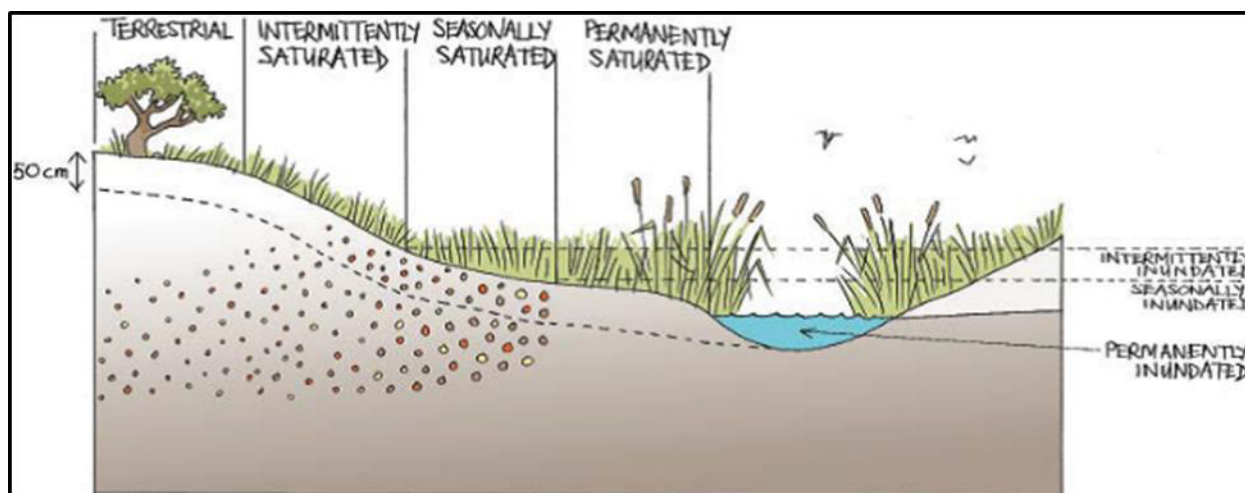


Figure 3: Cross section through a wetland, indicating how the soil wetness and vegetation indicators change (Ollis, et al., 2013)

However, for wetlands within 500 m of the development, but which would not be impacted upon, the outline used was that of the Ezemvelo KZN Wildlife, NFEPA, or eThekweni wetland database. If none of those were available, a line was drawn from Google Earth. When considering what impacts the project may or may not create, consideration was given to not only hydrological factors but also to possible impacts on mobile species such as birds, frogs, and mammals if present. In the field, because of the level of development in the area, the biodiversity was focused largely on the vegetation.

4.3 Data Processing

Wetlands which had been delineated, and which might be impacted upon, were to be assessed by means of the WET-Health model (Macfarlane et al, 2008) and the WET-EcoServices Model (Kotze, et al, 2008). These models produce a value for the Present Ecological State (PES) of a wetland and an assessment of the ecosystem services delivered by the wetlands. However, it was found that the wetlands at the site are being very extensively damaged as result of the installation of a bulk water pipeline for Umgeni Water. Because of this damage, including destruction of the marginal ecotope, it was not realistic to do conventional delineation and modelling. Therefore, an estimate of the PES was done on the basis of professional experience.

5. UNCERTAINTIES AND DATA GAPS

The damage being done to the wetland system by the pipeline construction process resulted in assessment of the wetlands having to be done on the basis of professional experience and opinion. While this situation is not ideal, it could not be avoided. However, since the project

simply entails an upgrade of existing facilities, and does not entail new impacts, the uncertainty may be accepted.

6. STUDY FINDINGS

6.1 Desktop Study

The findings of the desktop study were as follows:

- **Vegetation Type.** The original vegetation in the study area is KwaZulu-Natal Coastal Belt Grassland (CB 3) after Mucina and Rutherford (2006) and is classified as “Endangered”. The landscape which supports this type usually consists of highly dissected undulating coastal plains which presumably used to be covered to a great extent with various types of subtropical coastal forest (the remnants of one of which are described as Northern Coastal Forest). Some primary grassland dominated by *Themeda triandra* still occurs in hilly, high-rainfall areas where pressure from natural fire and grazing regimes prevailed. At present the KwaZulu – Natal Coastal Belt is affected by an intricate mosaic of very extensive sugarcane fields, timber plantations and coastal holiday resorts, with interspersed secondary *Aristida* grasslands, thickets and patches of coastal thornveld.
- **Conservation priorities.** The Ezemvelo KZN Wildlife Minset database and the KwaZulu-Natal Biodiversity Sector Plan were interrogated to search for any conservation priorities. However, the area is not listed as having any sort of priority and neither indicates any features of concern other than for the vegetation type.
- **DMOSS.** The DMOSS database shows no features in the study area.
- **Threatened Ecosystems.** The study area is listed as being in a Terrestrial Threatened Ecosystem. The listing is related to the vegetation type.
- **Game Reserves, Nature Reserves, and Wildlife Conservancies.** There are no formal conservation area or stewardship sites within 5km of the study area.
- **Important Bird Areas.** Important Birds Areas have been designated at sites where the avifauna is of particular value, either in regard to bird diversity, or as habitat for migratory or rare bird species. There are none within or close to the study area.
- **Wetlands.** Neither the Ezemvelo KZN Wildlife and the NFEPA wetland databases indicate wetland systems within the study area. However, the eThekweni wetland database does show wetlands in the area including one at the study site. See Figure 2. These wetlands were noted for further investigation during the course of the site visit.

The Google Earth images of the area also indicated that areas of wetland might be present downstream of the road crossing site and this too was to be investigated further in case alternatives or other mitigatory measures might be required.

6.2 Field Study

The study area was visited on 15th June 2018. Weather conditions at the time were ideal, and access to most areas was easy.

Care was taken to visit all the sites where features of possible concern had been identified by the desktop study and also to look for any others that may have been missed by that study. While at the sites, observations were made on the riparian vegetation and on the vegetation in the general area.

The findings of the field survey were as follows:

6.2.1 Vegetation

The natural vegetation has been largely displaced by the residential development that has already taken place. A considerable part of the land surface is now built over with houses, roads and tracks, and other landuses including crop fields where vegetables are grown. It is clear that extensive tree felling has taken place. However, even in the areas that are not built over, the natural vegetation has been partially displaced by alien species. Table 4 lists the terrestrial plant species seen.

Table 1. List of plant species seen in the study area. Numbers in parentheses indicate the SANBI listed Invader Category.

Scientific Name	Common Name	Status
<i>Acacia ataxacantha</i>	Flame Thorn	Indigenous
<i>Acacia sieberiana</i>	PaperbarkThorn	Indigenous
<i>Ageratum conyzoides</i>	Ageratum	Alien (1b)
<i>Albizia adianthifolia</i>	Flatcrown	Indigenous
<i>Arundo donax</i>	Giant Reed	Alien (1b)
<i>Berkheya</i> sp.	Berkheya	Indigenous
<i>Bridelia macrantha</i>	Mitzeeri	Indigenous
<i>Catharanthus roseus</i>	Periwinkle	Alien (1b)
<i>Centella asiatica</i>	Marsh Pennywort	Alien (Not listed)
<i>Chromolaena odorata</i>	Chromolaena	Alien (1b)
<i>Coix lacryma-jobi</i>	Job's Tears Grass	Alien (Not listed)
<i>Commelina benghalensis</i>	Commelina	Indigenous
<i>Cynodon dactylon</i>	Kweek Grass	Indigenous
<i>Cyperus</i> spp.	Sedges	Indigenous

<i>Echinochloa pyramidalis</i>	Antelope Grass	Indigenous
<i>Erythrina caffra</i>	Coastal Coral tree	Indigenous
<i>Ficus sur</i>	Broom-cluster Fig	Indigenous
<i>Gomphocarpus physocarpus</i>	Milkweed	Indigenous
<i>Imperata cylindrica</i>	Cottonwool Grass	Indigenous
<i>Ipomoea purpurea</i>	Morning Glory	Alien (1b)
<i>Lantana camara</i>	Lantana	Alien (1b)
<i>Maesa lanceolata</i>	False-assegai	Indigenous
<i>Melia azedarach</i>	Syringa	Alien (1b)
<i>Phoenix reclinata</i>	Wild Date-palm	Indigenous
<i>Phragmites australis</i>	Common reed	Indigenous
<i>Psidium guajava</i>	Guava	Alien (3)
<i>Ricinus communis</i>	Caster-oil Weed	Alien (1b)
<i>Schinus terebinthifolius</i>	Brazilian Pepper	Alien (1b)
<i>Scleria</i> sp.	Scleria	Indigenous
<i>Senna didymobotria</i>	Peanut-butter Senna	Alien (1b)
<i>Solanum mauritianum</i>	Bugweed	Alien (1b)
<i>Stenotaphrum secundatum</i>	Buffalo Grass	Indigenous
<i>Strelitzia nicolai</i>	Wild Banana	Indigenous
<i>Syzygium cordatum</i>	Mdoni	Indigenous
<i>Trema orientalis</i>	Pigeon-wood	Indigenous
<i>Typha capensis</i>	Bullrush	Indigenous
<i>Voacanga thouarsii</i>	Wild Frangipani	Indigenous

No red data listed or protected species were seen.

6.2.2 Wetlands

The wetland areas seen at the road crossing site both in Google Earth and in the eThekweni database were visited. It was found that the site indicated in Figure 2 does exist but that it is much larger than indicated in that it extends at least a kilometre upstream from the site as well as a short distance downstream. In addition, it is wider and with more lateral branches than are shown. Unfortunately, a great deal of this wetland is presently the site of a water pipeline upgrade which is being undertaken on behalf of Umgeni Water. In places the contractors have excavated right into the wetland and sections are totally destroyed. See Photographs 1 and 2.



Photograph 1: *Wetland destruction downstream of the road crossing site.*



Photograph 2: *Excavator working in wetland upstream of the road crossing.*

Because of the damage being done to the wetland it was not feasible to do delineation it as would normally be done. In order to address this situation, delineation was done where intact margins remained, and within 100m upstream of the crossing site. Elsewhere, a rough outline was taken from Google Earth images dating from several years which covered both wet and dry climatic conditions. See Photograph 3 and Figure 4.



Photograph 3: Soil taken from an auger hole during delineation of a seep area. The mottled transition is indicated.



Photograph 4: Hillslope seep area. The taller vegetation in the channelled valley bottom area is visible along the far side. Beyond that, bare soil may be seen in the pipeline construction area.

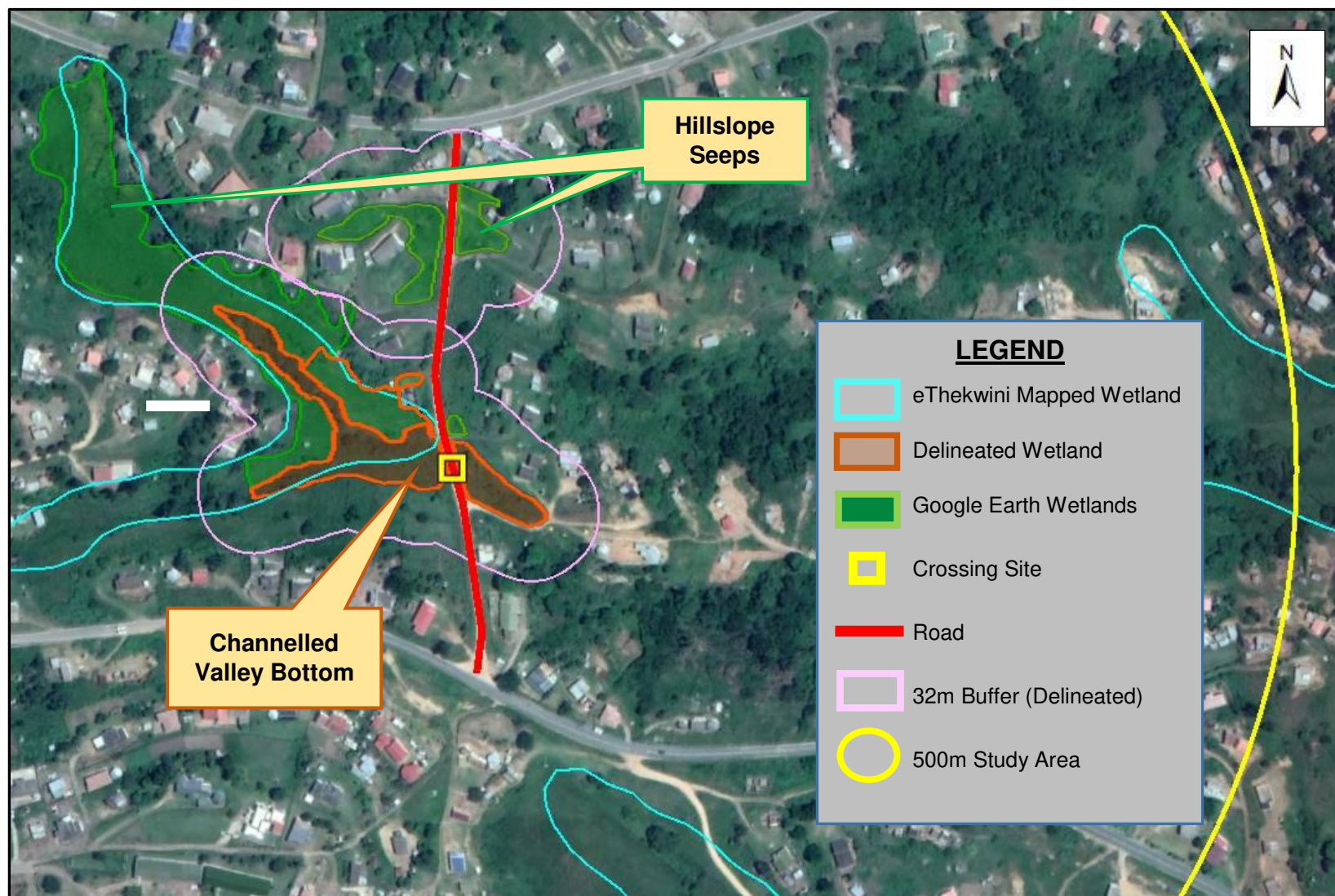


Figure 4: Wetlands, including correctly delineated systems. Buffers of 32m width are shown for the delineated areas.

Because of the damage done to the wetland which passes through the road crossing site, and the subsequent inability to delineate it properly, it was considered that it could not be properly assessed with the wetland models. On the basis of expert opinion, the extant areas which have not been excavated are considered to be in Category C or “Moderately Modified”. The reason for this assessment is that there are still areas of semi-natural wetland vegetation which include both forested and reed/sedge sections along channelled valley bottoms, and short grass/sedge areas in hillslope seeps.

In the areas where the pipeline installation is being done, the wetland is rated as being a Category D (Largely Modified) or Category E (Seriously Modified) system. In places it could even be rated as Category F (Critically Modified).

Elsewhere in the general area, hillslope seeps are very common and while some exist in the study area where the road passes through one, in other places they may be in an untouched condition, or may have been subject to drainage for cultivation or building purposes.

6.2.3 Fauna

The fauna in the study area was not deliberately surveyed but note was made of species which were seen or heard during the course of the site survey. The species noted are listed in Table 2. All are common and widespread.

Table 2: List of animal species seen in the study area.

Taxon	Scientific Name	Common Name	Status
Mammals	None Seen		
Birds	<i>Acridotheres tristis</i>	Common Myna	Alien
	<i>Bostrychia hagedash</i>	Hadedda Ibis	Indigenous
	<i>Corvus capensis</i>	Cape Crow	Indigenous
	<i>Estrilda astrild</i>	Common Waxbill	Indigenous
	<i>Euplectes orix</i>	Southern Red Bishop	Indigenous
	<i>Ardea melanocephala</i>	Black-headed Heron	Indigenous
	<i>Motacilla capensis</i>	Cape Wagtail	Indigenous
	<i>Passer domesticus</i>	House Sparrow	Alien
	<i>Ploceus cucullatus</i>	Village Weaver	Indigenous
	<i>Ploceus velatus</i>	Southern Masked Weaver	Indigenous
	<i>Spermestes cucullatus</i>	Bronze Mannikin	Indigenous
	<i>Streptopelia semitorquata</i>	Red-eyed Dove	Indigenous
Reptiles	<i>Trachylepis striata</i>	Striped Skink	Indigenous
Amphibians	<i>Cacosternum boettgeri</i>	Common Caco	Indigenous
	<i>Phrynobatrachus natalensis</i>	Snoring Puddle Frog	Indigenous

It was noted that there are numbers of birds in the wetlands. While some could be seen, others were only detected by calls from deep within the reedbeds. The visible species included the weavers and widow birds but the identity of the unseen species could not be determined. It is thought that they were probably gallinules or swampheens. These birds are typically secretive and remain hidden in the thickest wetland vegetation. Thus, even though they may be locally common, they are seldom seen.

7. CONSIDERATION OF IMPACTS

The findings of the survey on the wetlands, watercourses, and biodiversity in the study area suggest that environmental impacts are likely to be small. Those foreseen are listed below.

7.1 *Loss of Indigenous Vegetation*

The upgrading of the road and the stream crossing will have very little new impact on indigenous vegetation. The project will only expand a small amount out of its existing footprint and the vegetation that will be affected consists of grasses and alien weeds.

At the wetland crossing site there will be some loss of sedges and *Scleria* but the affected area is very small.

7.2 *Impacts on Wetlands*

The enlargement of the wetland crossing, with the associated change from a concrete pipe for the water to a 1,5m by 1,5m box culvert will not have a very great impact on the wetland. A small area will be lost but it would be unlikely to have any measurable impact on the system. Given that the wetland downstream of the bridge has been almost totally excavated as a result of the pipeline construction, it is difficult to see that the crossing upgrade could have any new effect.

Uncured concrete from the road and the wetland crossing could be toxic in the wetland system.

7.3 *Loss of Terrestrial Fauna*

The terrestrial fauna in the area is already very severely reduced from the natural state. Since the project will not significantly change the landscape in its footprint, it is not anticipated that there will be any new impacts on the remaining fauna which is, in any event, dominated by birds which are highly mobile and can both move away and return freely.

7.6 *Alternatives to the Proposed Development*

The upgrade of the road and wetland crossing is a development that has no alternatives in terms of its need or desirability.

7.7 Cumulative Impacts

The environment in the project area is already very severely transformed and so there is little scope for any new impacts to be of significance. Therefore, once the construction phase is complete and the rehabilitation has been done, the project will leave no new negative cumulative impacts on the environment.

8. IMPACT ASSESSMENT AND MITIGATION MEASURES

In the course of undertaking the assessment of environmental impacts, attention was given to the Mitigation Hierarchy as set out in EKZNW (2010). See Figure 5. Since the development which is the basis of this report is a municipal project and seeks to provide improved safety and living conditions for the affected community, already largely present, it must be taken that it cannot be avoided or prevented. Therefore, the uppermost level of the hierarchy is bypassed. The second level which calls for minimising of impacts can be considered and the recommendations set out in the sections below seek to do that. Thus, for example, guidelines for the construction phase are provided. The third level of repair and restoration can also be addressed through appropriate construction and rehabilitation efforts. Observation in the general area shows that the environment is quite able to recover if given the proper treatment and handling and if there is appropriate monitoring and follow-up.

The terms used in the assessment of impacts are defined in Appendix I and the impacts on the natural environment are assessed below.

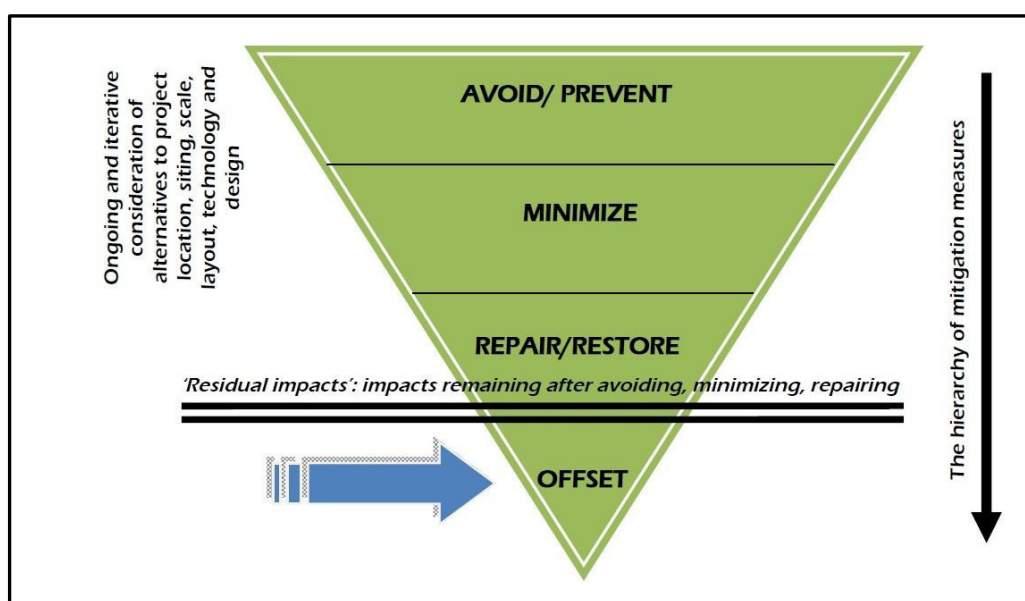


Figure 5: Hierarchy of mitigation measures. The most desirable options are those which are higher in the figure. Source: EKZNW, 2010.

8.1 Impacts on the Indigenous Vegetation

Because the vegetation in virtually the entire project area is already either totally lost, or is at least very largely transformed, no new impacts in this regard are foreseen as a result of the upgrading of the road and wetland crossing. Table 3 considers the potential impacts on the vegetation in the area.

Table 3: Assessment of impacts originating from loss of indigenous terrestrial vegetation.

Assessment Criterion	Rating	Reason(s)
Certainty of Assessment	High	The status of the vegetation in the project area is reasonably well understood.
Probability of Occurrence	Highly Probable	The upgrade of the road will inevitably destroy some vegetation.
Impact (Intensity)	Low to Very High	The upgrade of the road will have a severe effect on indigenous vegetation (grasses) in its footprint but none elsewhere.
Impact (Significance)	Low	There is already so much degradation in the area that the project will probably not make any difference providing that care is taken.
Impact (Spatial Extent)	Site	The impact will be largely limited to the site and its immediate surrounds.
Impact (Duration)	Permanent	Recovery from the development is unlikely to happen in any foreseeable time scale.
Impact (Effect)	Negative	The impact on the environment would be Negative.
Need for Mitigation	High	Mitigation measures are necessary to prevent soil erosion from happening at the site.
Locality of Mitigation	On Site	The mitigation measures are to be undertaken on the site of the potential impacts.

The mitigatory measures put forward include the following actions:

- To the greatest possible extent, the construction work must be done off the existing road.
- At the end of the construction phase the area must be thoroughly cleaned and all waste material must be removed for disposal at an approved site.
- The road verges must be planted with an indigenous grass as soon as possible after construction is complete. It is recommended that Coastal Buffalo Grass (*Stenotaphrum secundatum*) is used.
- A rigorous programme of alien weed control must be implemented and sustained until the vegetation (grass) cover over the working area is well established and complete.

The above measures are intended to quickly cover the soil along the working area and so to prevent erosion. The measures to prevent invasion of weed species, especially Lantana and Chromolaena

must be adhered to. In time it is probable that the alien weeds will colonise the area. While this is unfortunate, at least the soil must be retained until then. If trees are to be planted, the species listed in Table 4 are recommended.

Table 4: List of indigenous tree species which could be plant along the road.

Scientific Name	Common Name
<i>Albizia adianthifolia</i>	Flatcrown
<i>Brachylaena elliptica</i>	Silver-oak
<i>Bridelia macrantha</i>	Mitzeeri
<i>Celtis africana</i>	White Stinkwood
<i>Chrysanthemoides monilifera</i>	Tick-berry
<i>Diospyros lycioides</i>	Bluebush
<i>Ekebergia capensis</i>	Cape-ash
<i>Ficus natalensis</i>	Strangler Fig
<i>Ficus sur</i>	Broom-cluster Fig
<i>Harpephyllum caffrum</i>	Wild plum
<i>Protorhus longifolia</i>	Red-beech
<i>Rauvolfia caffra</i>	Quinine Tree
<i>Syzygium cordatum</i>	Umdoni
<i>Trema orientalis</i>	Pigeonwood
<i>Vangueria infausta</i>	Wild-medlar

This list is not comprehensive and further indigenous species could be added.

8.2 Impacts on the Wetlands

As has been indicated, the wetland crossing already exists and so the upgrade is not a new impact. In addition, the wetland system, over a very large area, has been severely impacted upon by the installation of a new bulk water pipeline on behalf of Umgeni Water. In order to assess the impacts on the wetlands the Department of Water and Sanitation Risk Assessment Matrix was used to determine the level of risk to the wetlands. The output from the matrix is shown in Table 5. The most substantial risks associated with the project relate to construction work in the wetland when building the new culvert structure. These issues are addressed in the mitigatory measures which are provided.

The impacts on wetlands are presented in Table 6. In considering the impacts, the perspective taken was that of ignoring the destruction being done by the nearby pipeline construction process. While this view may not seem realistic, it allows the impacts from the road and crossing upgrade

to be seen on their own. If the pipeline impacts on the wetland are included, then the impacts from the road upgrade project become totally insignificant.

Table 5: Scores from the Department of Water and Sanitation Risk Assessment Matrix for the impacts arising from the housing upgrade project on wetlands and watercourses.

Activity	Aspect	Impact	Severity	Consequence	Likelihood	Significance	Risk Rating	Confidence Level	Control measures
Upgrade of the road and wetland crossing at Bhekulwandle	Acceleration of stormwater flows leading to erosion of the nearby wetlands.	The road and wetland crossing already exist. Much of the site downstream of the crossing has been destroyed by the construction of a pipeline. No new impacts are anticipated.	1.25	3.25	8.0	26.0	Low Risk	90%	Stormwater management must be carefully designed and constructed.
	Deposition of sediment into the wetlands as a result of construction activities.		1.0	3.0	8.0	34.0	Low Risk	85%	Construction must be done with care. Soil must be stockpiled at least 8 m from the watercourse.
	Construction of the new culvert crossing in the wetland.		1.5	4.5	8.0	36.0	Low Risk	90%	<ul style="list-style-type: none"> • Work must be done in the dry season. • Use must be made of coffer dams • Care must be taken when placing uncured cement or concrete.

Table 6: Assessment of impacts originating from loss of wetlands.

Assessment Criterion	Rating	Reason(s)
Certainty of Assessment	Moderate to High	The extent to which the wetlands will be impacted will depend on the care taken during the construction process.
Probability of Occurrence	Probable	It is not definite that the wetlands will be affected but it is probable if care is not taken.
Impact (Intensity)	Low to Moderate	The impact on the wetlands as a result of the development will not be extensive.
Impact (Significance)	Low to Moderate	The significance of the impact will be low to moderate because the wetlands are already partially transformed.
Impact (Spatial Extent)	Site	The impacts from the project are so small that they would be almost entirely restricted to the site.
Impact (Duration)	Construction Phase	The required mitigatory measures must be implemented by the construction contractor.
Impact (Effect)	Negative	The impact on the wetlands would be negative.
Need for Mitigation	Moderate	Given that the wetland has a fairly diverse fauna and flora there is justification to protect it.
Locality of Mitigation	On Site	The mitigation measures are to be undertaken on the site of the potential impacts.

The mitigatory measures put forward for the wetlands include the following actions:

- The stormwater management system on the road must be set in place at an early stage of the construction process. This includes constructing side drains or herringbone drains at regular intervals.
- Stormwater must be prevented from collecting and running down unprotected channels into the wetland.
- All bare areas must be rehabilitated with a grass cover as soon as possible. The grass recommended is Coastal Buffalo Grass (*Stenotaphrum secundatum*).
- The inlet to the culvert must not be lower than the inlet of the existing concrete pipe. The reason for this stipulation is to avoid any draining of the wetland area upstream of the culvert. The area has good biodiversity and must be sustained as a functional wetland.
- The construction work on the culvert must be done in the dry (winter) season.
- The working area within the wetland must be contained within a coffer dam or similar structure.
- Uncured cement or concrete must not be allowed to percolate into the downstream wetland since they are toxic to aquatic life. It must be noted that concrete will be used, not only in the wetland crossing, but also as the road surface.
- The downstream side of the culvert must be well protected by a mattress or by a concrete slab. This structure must be at least five to six metres wide and should slope

gently downwards so that no waterfall is created. The reason for this is to prevent erosion of the wetland floor.

- All rubble and refuse, including the remains of the old crossing, must be removed from the site.

While Figure 4 shows 32m buffers around some of the wetlands, most of the road (approximately 255m) lies within either wetland or wetland buffer. There is no way of avoiding this and so buffering the project area is considered to be pointless. There is, however, a need for care as indicated above.

8.3 Impacts on the Fauna

No new impacts on terrestrial fauna are anticipated but it was noted that there is considerable birdlife within the wetland upstream of the crossing site. If the recommendations relating to the wetland crossing site, especially that of maintaining the water level, are adhered to, then there will be no long term impact on the birds.

9. MONITORING PROGRAMME

Although it is expected that impacts arising from the road and crossing upgrade are likely to be minor, it will still be necessary to undertake a monitoring programme both during the construction phase of the project, and for a limited time after its completion. The programme will include the following actions:

- The Environmental Control Officer (ECO) who oversees the various components of the project must be thoroughly familiar with the recommendations put forward in Section 8 and also with the content of the project Environmental Management Programme. The construction process must then be monitored for compliance with the mandated actions. Monitoring must be done at intervals which are appropriate to the work being done, but on a monthly basis as a minimum.
- The ECO must have sight of the contractors' method statements prior to their implementation and must also have sight of the contractors' time schedules and plans.
- The ECO will be able to discuss with the Resident Engineer issues that could potentially stop works.
- The ECO must take especial care to see that the handling and removal of rubble and other construction wastes are done properly.
- A post-construction monitoring programme must be set in place. It will include examination of at least the following items:

- ✓ **Alien weed invasion.** No alien weed invasion may be tolerated within a year of completion of the project. This point is of particular importance as the area is so prone to alien weed invasion.
- ✓ **Rehabilitation of the road verges.** The road verges must be revegetated with either the recommended grass or with salvaged plants which are demonstrably viable. This is necessary to prevent soil erosion.
- ✓ **Rehabilitation of the working servitude.** The working servitudes at all sites, whether road or wetland crossing, must be returned to their pre-construction condition or better.
- ✓ **Stability of wetland banks.** The banks must be left in a stable condition.
- ✓ **Soil erosion.** No soil erosion anywhere in the working area, including the site camp and laydown areas, may be accepted.

It is suggested that the post construction monitoring visits should be done in September, November, and March in the twelve months following completion of the project. Use should be made of fixed point photos, and each site inspection must be followed up with a written report. These reports will be submitted to the Resident Engineer for distribution.

If any monitoring event, at any time of the project period, does find a fault or problem, then the issue must be investigated further and be reported on. Remedial action as is appropriate must be undertaken within a time frame specified by the ECO.

10. DISCUSSION AND CONCLUSION

The upgrade of Trk 83887 including its wetland crossing poses limited threat to the environment and any impacts during the construction phase may be easily addressed, and are more than compensated for by the amenity and health values of the new facilities. The reasons for this is that the project area is already highly transformed as a result of the existing urban development. The transformation has resulted in either total loss or severe degradation of the vegetation, and in an associated reduction in the fauna.

Although the anticipated further impacts of the development are minimal, and no fatal flaw has been found which would stop the project, it is not implied that the construction of the upgrade may go ahead without appropriate caution. For this reason, a series of management recommendations have been put forward and are backed up by a monitoring programme. Such a programme is outlined, and it is suggested that the management recommendations and the monitoring programme are made available as a part of the construction contract documents which the contractors must agree to and sign.

Finally, it is suggested that the ECO should be appointed prior to the start of construction activities, including site establishment, and that the person should become thoroughly familiar with the project area and should also meet the community representatives in the relevant areas.

11. REFERENCES

- DWAF. 2005. A Practical Field Procedure for Identification and Delineation of Wetlands and Riparian Areas. Department of Water Affairs and Forestry. Private Bag X 313 Pretoria.
- EKZN. 2010. Norms and Standards for Biodiversity Offsets: KwaZulu-Natal Province. Final Draft. Ezemvelo KZN Wildlife. Pietermaritzburg.
- KOTZE, D.C., MARNEWECK, G., BATCHELOR, A., LINDLEY, D. and COLLINS, N. 2008. WET-EcoServices: A technique for rapidly assessing ecosystem services supplied by wetlands. WRC Report TT 339/08. Water Research Commission. Gezina.
- MACFARLANE, D.M., KOTZE, D.C., ELLERY, W.N., WALTERS, D., KOOPMAN, V., GOODMAN, P., and GOGGE, C. 2008. WET-Health: A technique for rapidly assessing wetland health. WRC Report TT 340/08. Water Research Commission. Gezina.
- MUCINA, L. and RUTHERFORD, M. (Eds). 2006. The vegetation of South Africa, Lesotho and Swaziland. Strelitzia 119. South African National Biodiversity Institute, Pretoria.

APPENDIX I - Definition of the Terms Used

The terms used in the Environmental Impact Assessment process are defined below.

Assessment Term	Description
CERTAINTY	This criterion applies to the confidence of the assessor in making the assessment.
	<p>Low. The present degree of confidence in the relevant statement is less than 40%.</p> <p>Moderate. The present degree of confidence in the relevant statement is between 40% and 80%.</p> <p>High. The present degree of confidence in the relevant statement is greater than 80%.</p>
PROBABILITY	This criterion applies to the likelihood of the anticipated impact actually happening. It may also be used in assessing the likelihood of success of a mitigatory action.
	<p>Unlikely. The probability of the anticipated impact happening is low (Less than 20% probable).</p> <p>Probable. The probability of the anticipated impact happening is moderate (20% - 60% probable).</p> <p>Highly Probable. The probability of the anticipated impact happening is great. (60% - 99% probable).</p> <p>Definite. It is definite that the impact will take place.</p>
IMPACT (Intensity)	This criterion refers to the impact in relation to its effect on a (stipulated) feature.
	<p>No Impact. There will be no discernible impact on the feature or issue under consideration.</p> <p>Low. The impact on the feature or issue under consideration will be limited in terms of effect or in time.</p> <p>Moderate. The impact on the feature will be such that there will be some damage done but that the feature will not be totally destroyed and that it will recover if the cause of the impact is removed.</p> <p>High. The impact on the feature is such that the damage done will be considerable and enduring. Recovery from the impact could, at best, be only partial.</p> <p>Very High. The impact on the feature is such that the feature will be totally destroyed and that no recovery is possible.</p> <p>Unknown. The nature of the impact on the feature is not understood or cannot be predicted in any reliable fashion.</p>

IMPACT (Significance)	<p>This criterion refers to the effect of the impact "in the larger scheme of things". EG: If a proposed dam will inundate a particular patch of vegetation then the impact on that patch of vegetation is very high as it will be totally destroyed but, if the vegetation is of a common type which has low conservation priority, then the significance of the impact is reduced.</p>
	<p>No Significance. The impact is so inconsequential that it is of no significance at all.</p> <p>Low. The impact is of low intensity or consequence. It is Local in effect.</p> <p>Moderate. The impact is of sufficient intensity to warrant concern. There will be considerable disturbance to either the natural biota and/or to humans. Ecological processes will be only slightly affected. The impact may be apparent for some time.</p> <p>High. The impact is of considerable intensity. There will be severe degradation of the environment and localised losses of entire plant and animal assemblages may occur. Ecological processes are strongly disrupted. Social impacts may be severe. Recovery will only be possible in the Long Term.</p> <p>Very High. The impact is of potentially devastating intensity to both the natural environment and/or to human residents of the area. There will be total or near-total failure of ecological processes. It is unlikely that mitigation is possible in any reasonable human time scale and hence that full recovery from the impact may not be possible in any reasonable human time scale. Thus the impact must be regarded as being Permanent.</p> <p>Unknown. The consequences of the impact are not understood or cannot be predicted in any reliable fashion. Probably the precautionary principle should be applied.</p>
LEVELS OF SPATIAL EXTENT	<p>This criterion refers to the space within which the impact will be of consequence.</p>
	<p>Site Level. The physical impacts of the development will not extend beyond the immediate development site. If relevant, visual impacts will only be apparent to viewers on or close to, the site.</p> <p>Local Level. The impacts of the development will only be felt or be significant at the site of the development or within a short distance (roughly 500 m) of it. In the case of visual impacts the distance may be increased to about 2 kilometres but is restricted to a narrow viewscape.</p> <p>Regional Level. The impacts of the development may be felt or be significant at a distance which is well removed from the site. In the case of visual impacts the viewscape may be increased to landscape width and breadth.</p> <p>Provincial Level. The impacts of the development are sufficient so as to be significant throughout the province.</p> <p>National Level. The impacts of the development are sufficient so as to be significant throughout the Republic of South Africa.</p> <p>International Level. The impacts of the development are sufficient so as to be significant beyond the borders of the Republic of South Africa.</p>
TIME PERIODS	<p>This criterion refers to the length of time for which the impact may be apparent or in effect.</p>
	<p>Construction phase.</p>

	<p>The time period during which geotechnical surveys and/or construction or other such work is done. Note: This phase will include all the time from the start of any geotechnical work that is done to the end of the construction period and includes any associated rehabilitation work that may be called for.</p> <p>Operational phase. The time period for which the operation or development continues to function. This is of particular relevance for developments which have a very large footprint, such as timber plantations or urban expansion, or opencast mines which keep on expanding as they operate.</p> <p>Short term. A period of time including the Construction Phase and up to two years further. Note: This time period is defined as it is considered that it covers the period in which the footprint of the construction operation will be sustainably revegetated and wildlife will return to the disturbed areas.</p> <p>Medium term. A period of up to five years from the end of the Construction Phase. Note: This time period includes the criteria described for the Short Term but includes the time necessary for woody vegetation, if appropriate, to become established on the development area.</p> <p>Long Term. A period of at least ten years, but possibly more, from the end of the Construction Phase or the Operational Phase. Note: This time period includes the criteria described for the Medium Term but includes the time necessary for trees to reach a "fair" size at which they will largely soften the appearance of the development.</p> <p>Permanent. The change which would be brought about by the development cannot in any way be reversed <i>in situ</i>. The only mitigation options which may be available will be those which are conducted off site.</p>
EFFECT	<p>This criterion refers to the nature of the change brought about by an impact.</p> <p>Positive. The impact will have predominantly beneficial results or connotations.</p> <p>Negative. The impact will have predominantly detrimental results or connotations.</p> <p>Neutral. There will be a change but it cannot be described as being either particularly beneficial or particularly detrimental.</p>
NEED FOR MITIGATION	<p>This criterion refers to the extent to which an anticipated impact will require that mitigatory action is taken.</p> <p>Low. The need for mitigation is slight but the conditions demand that some effort be made.</p> <p>Moderate. The need for mitigation is definite but there is not requirement for major and costly works. Any proposed mitigatory measure must have good potential to reduce the impact.</p> <p>High. The need for mitigation is such that major and costly works are justifiable. Any proposed mitigatory measure must have definite and demonstrable potential for reduction of the impact before the proposed development may be given authorisation to proceed.</p> <p>Obligatory. The nature of the impact is such that, unless mitigation can very largely nullify the consequences, it must be regarded as a potential fatal flaw which will halt the proposed development. If such mitigation cannot be achieved, it will be necessary to modify the development so that the impact will be reduced or even obviated.</p>

LOCALITY OF MITIGATION	This criterion refers to the place at which the stipulated mitigation must take place.
	<p>On Site. The necessary mitigation must be undertaken at the site of the impact.</p> <p>Off Site. The necessary mitigation need not necessarily be at the site of the impact. Compensatory action may be undertaken at another, preferably similar, site on the property. Eg. Loss of a wetland due to construction of a dam may be mitigated by rehabilitation of a similar wetland in the immediate vicinity.</p>

APPENDIX II – CV and Declaration of Independence

ABBREVIATED CURRICULUM VITAE ALLETSON, D.J.

Name : Dacre James Alletson
Date of birth : 10/4/1948
Nationality : South African
Profession : Consulting Ecologist
Specialisation : Aquatic and terrestrial ecology, environmental impact assessment, landscape scale conservation science and planning
Years of experience : 41
Academic qualifications : Bsc (Biological Sciences) University of Natal. 1968.
 BSc Hons (Zoology) Rhodes University. 1972.

APPLICABLE EXPERIENCE

Mr Alletson has long experience in the fields of conservation and management of the natural environment and has specialised in aquatic species and systems and in conservation at the scale of landscape. After graduating he was employed at the Oceanographic Research Institute in Durban where he worked on a number of projects in both the estuarine and marine environments. In 1975 he joined to the Natal Parks Board where he served for 21 years in a number of positions. His activities in this time included research and management of certain fish species, management of a trout hatchery, provision of an extension service relating to wetlands and rivers, and participation in management of game and nature reserves including drafting of management plans. From 1984 onwards he served as the Board's river and wetland specialist ecologist and was involved in wetland-related research and management activities. In the process he instigated the development of the KwaZulu-Natal Environmental Atlas and participated in environmental impact assessments including that of the St Lucia Eastern Shores dune mining where he led the wetland component.

In 1997 he formed Alletson Ecologicals, an environmental consultancy and has undertaken a wide variety of environmental investigation and monitoring programmes. Amongst these are some 100 Environmental Impact Assessments. These range from small-scale developments such as timber planting permits, gravel pits, and irrigation dams, through to coal mines, large state dams, housing schemes, private property developments, and pipelines. Some of these projects were undertaken as a member of a team of specialists while in others all facets of impact assessment were undertaken. In the course of this work he has gained a good understanding of the requirements of the National Environmental Management Act (NEMA) and the Biodiversity Act (NEM:BA). He has developed a standardised procedure for assessing and describing impacts and this has become widely used by others. He also consults for government departments and quasi-government organisations. For DWAF he has worked on

numerous projects including the raising of Hazelmere Dam, Mearns Weir, the Mooi-Mgeni Transfer Scheme (Spring Grove Dam, Receiving Streams, Fish surveys, etc.), the TuVa canals decommissioning, and parts of reserve studies for the Upper Tugela Catchment, Ngagane Catchment, and the Umkomaas Catchment. The Mooi-Mgeni project was given the 2003 excellence award by the SA Institute of Civil Engineers. Similar projects have included water quality studies on the proposed Metolong Dam in Lesotho, a water reticulation scheme in and around Taung (North West Province), fishways on the Komati River, and wetland rehabilitation studies, and aquatic ecosystem monitoring including both fish and SASS surveys.

He has worked on a number of forestry related studies for the Department of Agriculture and Environment Affairs and has given training to staff in relation to afforestation issues, including both infield site analysis, and facets of impact assessment.

A number of dam, pipeline and wetland studies (past and current) have been done for Umgeni Water and he also took part in regional planning studies for the Town and Regional Planning Commission. Numerous studies have been done on wetland and environmental assessment for various housing and other infrastructure upgrade projects.

Apart from the planning and impact studies, Mr Alletson also acts as Environmental Control Officer for construction projects and carries out routine aquatic monitoring around coal mines which are being rehabilitated as a part of the closure process.

Since 2012 Mr Alletson has worked with Jeffares & Green (Pty) Ltd and has, amongst other activities undertaken a number of wetland delineations, assessments, and also aquatic surveys for river health assessments and Water Use Licence applications. He has also undertaken terrestrial biodiversity surveys as components of impact assessments and planning projects.

PUBLICATIONS AND REPORTS

Has produced approximately 200 reports alone and about 50 more in collaboration with others, since January 1997. A list is available on request.

RECENT WETLAND RELATED EXPERIENCE

Name of Project 1:	Sikoto Dam and Associated Bulk Works Ozwathini Bulk Water Supply Scheme (Two studies)
Years (From - To):	1997 - 2011
Location:	KwaZulu-Natal
Client:	uMgungundlovu District Municipality <i>via</i> Umgeni Water
Main project features:	Environmental Impact Assessments and Environmental Management Plans for the Greater Ozwathini Bulk Water Supply Scheme. Scoping and EIA studies on a regional water supply dam, and on the bulk raw water pipeline.
Positions held:	Assessment Practitioner, Environmental Control Officer
Activities performed:	Environmental Impact Assessment. River and wetland studies.

<u>Name of Project 2:</u>	Mooi – Mgeni Water Transfer Scheme
Years (From - To):	2009-2014
Location:	Mooi River - Ligetton region
Client:	Umgeni Water
Main project features:	Environmental Impact Assessment for the Potable Water Pipeline.
Positions held:	Specialist Ecologist. Impact Assessment.
Activities performed:	River and wetland studies, terrestrial biodiversity studies, Environmental Impact Assessment, Environmental Management Plan.
<u>Name of Project 3:</u>	Delineation of Wetlands (Multiple Projects)
Years (From - To):	2008 - 2017
Location:	Various
Client:	Various
Main project features:	Delineation of wetlands and wetland assessment
Positions held:	Specialist Ecologist
Activities performed:	Delineation of wetlands in relation to a number of proposed development projects. Impact assessments performed in some instances.
<u>Name of Project 4:</u>	Biodiversity Assessment – Proposed New Durban Dig-out Container Port
Years (From - To):	2012 - 2013
Location:	Durban
Client:	Transnet SOC
Main project features:	Assessment of Floral and Faunal Biodiversity, Wetland Studies, Estuary and Marine Studies, Impact Assessment, Management Recommendations. Biodiversity offsets.
Positions held:	Project Team Leader, Wetland Specialist, Bird and Invertebrate Studies, Report Writing and Compilation.
Activities performed:	Team Management, Client Liaison, Wetland and Biodiversity Surveys, Reporting.
<u>Name of Project 5:</u>	Water Use Licence Applications (Multiple Projects)
Years (From - To):	2014 - 2017
Location:	Throughout KwaZulu-Natal

Client:	Municipalities, Sanral, Property Developers, Private Development Projects.
Main project features:	Wetland surveys, Wetland health, Wetland Ecoservices, River studies, Management recommendations.
Positions held:	Specialist Wetland Ecologist
Activities performed:	Wetland assessments. Impact Assessments. Biodiversity, fish and SASS surveys.
<u>Name of Project 6:</u>	Wetlands Search and Delineation Along the Route of a Proposed New Bulk Raw Water Supply Pipeline from Spioenkop Dam to Ladysmith Water Treatment Works
Years (From - To):	2015
Location:	Ladysmith, KwaZulu-Natal
Client:	uThukela District Municipality
Main project features:	Development of a new 35 km bulk potable water pipeline to service the Ladysmith area.
Positions held:	Specialist Wetland Ecologist
Activities performed:	River and wetland studies, terrestrial biodiversity studies, wetland modelling, management guidelines.
<u>Name of Project 7:</u>	Survey of the Biodiversity at the Site of a Proposed New Lodge Development Adjacent to Lake Bhangazi South in the Isimangaliso Wetland Park World Heritage Site
Years (From - To):	2016
Location:	Isimangaliso Wetland Park World Heritage Site
Client:	ERM Southern Africa (PTY) Ltd
Main project features:	Assessment of the biodiversity within the area of a proposed new community lodge in the World Heritage Site.
Positions held:	Wetland ecologist, survey team leader.
Activities performed:	Historic data collection. Wetland delineation and status assessment. Bird and mammal survey, act as project leader for the team of botanists. Report writing and compilation.
<u>Name of Project 8:</u>	Development of a Truffle Farm in the Kamberg area near Nottingham Road, KwaZulu-Natal.
Years (From - To):	2016 - 2017
Location:	Kamberg area, KwaZulu-Natal.
Client:	Private Land Owner
Main project features:	Assessment of aquatic and terrestrial biodiversity and wetland delineation and assessment.

Positions held:	Wetland ecologist, survey team leader.
Activities performed:	Historic data collection. Wetland delineation and status and functionality assessment. Bird and mammal survey, act as project leader for the team of botanists. Report writing and compilation.
<u>Name of Project 9:</u>	
Years (From - To):	2016 - 2017
Location:	Wembezi, KwaZulu-Natal.
Client:	uThukela District Municipality
Main project features:	Assessment of wetlands, watercourses, and a river in relation to a new potable water municipal project.
Positions held:	Wetland specialist and survey team leader.
Activities performed:	Historic data collection. Wetland delineation and status and functionality assessment. Bird and mammal survey, act as project leader for the botanists. Report writing and compilation.
<u>Name of Project 10:</u>	Biodiversity and Wetland Assessments Associated with the proposed expansion of the Sewer Pipeline Reticulation in Klaarwater.
Years (From - To):	2018
Location:	Klaarwater, eThekweni Metropolitan Municipality Kwazulu-Natal
Client:	eThekweni Metropolitan Municipality
Main project features:	Assessment of biodiversity, wetlands, watercourses, and a river in relation to a municipal housing upgrade project.
Positions held:	Biodiversity and wetland specialist
Activities performed:	River and wetland studies, terrestrial biodiversity studies, wetland modelling, management guidelines.



DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

	(For official use only)
File Reference Number:	DC/
NEAS Reference Number:	
Date Received:	

Application for an environmental authorisation in terms of section 24(2) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) or for a waste management licence in terms of section 20(b) of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008).

PROJECT TITLE

ASSESSMENT OF A STREAM, WETLAND, AND VEGETATION SURVEY AT THE SITE OF A ROAD CROSSING UPGRADE IN BHEKULWANDLE, ETHEKWINI MUNICIPALITY, KWAZULU-NATAL

Specialist:	Wetland Specialist		
Contact person:	D.J. Alletson		
Postal address:	PO Box 794, Hilton		
Postal code:	3245	Cell:	083 7871584
Telephone:	033 3436700	Fax:	033 3436701
E-mail:	alletsonj@jqafrika.com		
Professional affiliation(s) (if any)	IAIA SA		

Project Consultant:	JG Afrika (Pty) Ltd		
Contact person:	M. van Rooyen		
Postal address:	P.O. Box 794, Hilton		
Postal code:	3245	Cell:	084 2492365
Telephone:	033 343 6700	Fax:	033 343 6788
E-mail:	vanrooyenm@jqafrika.com		

4.2 The specialist appointed in terms of the Regulations_

I, **D.J. Alletson**, declare that --

General declaration:

- I act as the independent specialist in this application;
- do not have and will not have any vested interest (either business, financial, personal or other) in the undertaking of the proposed activity, other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2014;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I am aware that a person is guilty of an offence in terms of Regulation 48 (1) of the EIA Regulations, 2014, if that person provides incorrect or misleading information. A person who is convicted of an offence in terms of sub-regulation 48(1) (a)-(e) is liable to the penalties as contemplated in section 49B(1) of the National Environmental Management Act, 1998 (Act 107 of 1998).



Signature of the specialist:

Terratest (Pty) Ltd

Name of company (if applicable):

25 June 2018

Date: