APPENDIX D

SPECIALIST REPORTS

D1 – TERMS OF REFERENCE

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D3 – TERMS OF REFERENCE

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APPENDIX D1

TERMS OF REFERENCE FOR AQUATIC ECOLOGICAL ASSESSMENT

Jeffares & Green (Pty) Ltd, acting on behalf of SFC Engineers and the South African National Roads Agency SOC Limited (SANRAL)

SPECIALIST WATER COURSE AND WETLAND ASSESSMENT FOR INPUT INTO THE APPLICATION ENVIRONMENTAL AUTHORISATION FOR THE REHABILITATION OF NATIONAL ROUTE 2 (N2) SECTIONS 19 (KM 92.4 TO 94.8) AND 20 (KM 0.0 TO 39.4) BETWEEN MOUNT FRERE AND THE NGCWELENI RIVER, ALFRED NZO DISTRICT MUNICIPALITY, EASTERN CAPE PROVINCE (PROJECT REF: NRA N002-200-2011/1ENV)

TERMS OF REFERENCE

1. INTRODUCTION

Jeffares & Green (Pty) Ltd, in our capacity as Environmental Consultants for the Environmental Authorisation of the above-mentioned project, hereby invite the submission of a written quotation for the undertaking of a Water Course and Wetland Identification and Delineation Assessment along Sections 19 (km 92.4 – 94.8) and 20 (km 0.0 – 39.4) between Mount Frere and the Ngcweleni River Bridge, located within Alfred Nzo District Municipality, Eastern Cape Province.

2. BACKGROUND

The proposed project comprises the rehabilitation of the entire Section 20 of the N2 (km 0.0 to km 39.4) and a portion of Section 19 (km 92.4 to km 94.8), including capacity upgrades to the interchange between the N2 National Route and the R405 Provincial Route.

The proposed rehabilitation will include:

- General widening of the existing road cross section to allow for the incorporation of climbing lanes, passing lanes and 2.5 m shoulders;
- Vertical and horizontal geometric improvements to increase design speeds from the current 60 km/h to 100 km/h;
- The rehabilitation and general strengthening of the pavement on the existing road alignment, as well as the construction of new pavement on sections of proposed new alignment;
- Stabilisation of both existing and proposed new cut faces;

- Widening of existing bridges, agricultural underpasses and drainage structures; and
- The upgrade and extension of 173 minor culverts.

In total, the route proposed for rehabilitation within Section 19 is 2.4 km in length, whilst in Section 20 it measures 39.4 km, equating to a total of 41.8 km. The existing road reserve within these sections is proposed to be widened to 50 metres, requiring the acquisition of additional land.

The proposed construction activities will require the sourcing of material for use as both fill and road building material. This has necessitated the identification of potential sites for the establishment of new hard rock quarries and borrow pits. The Geotechnical Engineers have identified four potential hard rock quarry sites (2 existing and 2 new) and six borrow pit sites (5 existing and one new). All of these potential sites will need to be assessed for Heritage Impacts to assist in the selection of preferred material sources.

3. THE SITE

3.1 The Road

Sections 19 and 20 of the N2 Freeway are proposed for re-alignment and upgrade. The co-ordinates of the start and end points of these sections are indicated below

SECTION 19	***South Co-ordinate***	***East Co-ordinate***
START POINT	30° 54' 38.23" S	28° 59' 27.56" E
END POINT	30° 53' 24.59" S	28° 59' 48.37" E

SECTION 20	***South Co-ordinate***	***East Co-ordinate***
START POINT	30° 53' 24.59" S	28° 59' 48.37" E
END POINT	30° 48' 31.45" S	29° 19' 17.41" E

Please refer to Annexure 1 for a locality plan.

3.2 Materials Sources

Material will be sourced from a combination of hard rock quarries and borrow pits.

Hard Rock Quarry Sites

Name	***Material***	***Type***	***South Co-ordinate***	***East Co-ordinate***
Quarry A	Dolerite	New	30° 49' 29.9" S	28° 59' 54.7" E
Quarry B1	Dolerite	Existing	30° 49' 39.5" S	29° 09' 25.9" E

Quarry B2	Dolerite	New	30° 49' 37.4" S	29° 09' 14.5" E
Dorning Crushers	Dolerite	Existing	30° 35' 54.7" S	29° 27"' 57.1" E

Borrow Pit Sites

Name	*Material*	*Type*	*South Co-ordinate*	*East Co-ordinate*
Borrow Pit A	Dolerite	Existing	30° 50' 26.2" S	29° 00' 11.4" E
Borrow Pit B	Dolerite	Existing	30° 51' 42.5" S	29° 01' 19.8" E
Borrow Pit C	Dolerite	Existing	30° 50' 55.3" S	29° 02' 47.0" E
Borrow Pit D	Dolerite	Existing	30° 49' 51.3" S	29° 08' 40.9" E
Borrow Pit E	Dolerite	Existing	30° 48' 35.0" S	29° 18' 09.1" E
Borrow Pit F	Dolerite	New	30° 48' 31.6" S	29° 19' 11.2" E

4. SCOPE OF REQUIRED SERVICES

Through a combination of desktop and visual assessment methods, the Screening Assessment of the proposed development identified, 22 potential watercourse crossings along the 41.8 km section of N2 route under investigation.

The proposed widening and upgrade of the road, the various drainage line and watercourse crossings as well as stormwater management infrastructure located along the road route will require excavation, infilling and construction activities within these drainage lines and watercourses. The potential exists too, for material sources to be located in proximity to surface water features, and therefore having an impact on these features.

In terms of the current Environmental Impact Assessment (EIA) Regulations (2014), the project triggers a number of Listed Activities. As part of the application process for Environmental Authorisation, therefore, it is necessary to consider the nature, extent and significance of the impacts on these surface water resources, as well as to identify measures for the avoidance, control, minimisation and mitigation of these impacts.

The Project Team is therefore seeking to appoint an appropriately qualified and experienced specialist to undertake the following scope of work, with the aim of assisting the Environmental Assessment Practitioner in achieving the above-mentioned impact assessment process:

i. Conduct a situation assessment based on existing information for the area and contextualisation of the proposed development.
ii. Conduct a freshwater assessment, which includes mapping and descriptions of the freshwater features in the proposed development footprint (including the length of the

road route to be rehabilitated, the proposed materials source sites and extending to include areas within 100 meters of these proposed activities), assessments of importance, conservation value, sensitivity and current state of the freshwater/wetland features within and related to the development footprint.

A formal delineation of the boundary of surface water features is not required. Rather, an identification of the approximate watercourse boundary, through desktop and visual assessment means, i.e. an indication of extent based on vegetation type and an assessment of historical aerial imagery, will be sufficient.

iii. Evaluate the proposed development activities to:

- Identify any feasible and reasonable alternatives which may comprise a better practicable environmental option for development (if any),
- Identify and assess the potential impacts of the proposed project on the surface water features identified. This should include direct, indirect and cumulative impacts. Impacts must be described in terms of their nature, extent and significance, as well as the level to which they can be mitigated.
- Describe any relevant mitigation measures (including appropriate monitoring, if relevant) that should be implemented during the various phases of the proposed project to avoid, control, minimise or reduce the significance of any negative impacts, or enhance the benefits of any positive impacts. It is intended that these recommendations will be included in the Environmental Management Programme (EMPr) and as conditions of the Environmental Authorisation.

iv. Compile a post-construction Rehabilitation Plan for inclusion into the EMPr aimed at correcting disturbances which have resulted from construction-phase activities.

v. Assist and have input into the undertaking of an appropriate application to the Department of Water and Sanitation (DWS) for the authorisation or licensing of water uses, as identified in Section 21 of the National Water Act, 1998 (Act No. 36 of 1998), taking place on the site. This would include::

a. Assisting Jeffares & Green (Pty) Ltd in the identification of the relevant water uses occurring on the site;
b. Assisting in the determination of the required application process, whether General Authorisation or Water Use Licensing;
c. Provision of comment on the additional information / specialist study requirements (if any) for the completion of the necessary application to the DWS.

5. GENERAL

- It is a requirement of SANRAL that the area of investigation extend to include areas located 100 meters to either side of the edge of the road route and the proposed material source locations, under investigation.
- It is intended that the information contained in the Surface Water Resource Assessment will be made available to DWS at a pre-consultation meeting to determine the way forward in terms of appropriate authorisation / licensing of the activity in terms of the National Water Act.
- In addition, it is intended to include the information generated regarding impact significance and mitigation into the impact assessment section of the Basic Assessment Report for consideration by the Competent Authority in decision-making.
- Please note that Jeffares & Green (Pty) Ltd expects that specialists will be aware of and utilise the following guidelines for involving Specialists in EIA Processes, to more precisely determine methods and approaches to specialist studies:
    - DEA (2002) Integrated Environmental Management Information Series 4: Specialist Studies. Department of Environmental Affairs (DEA), Pretoria; and

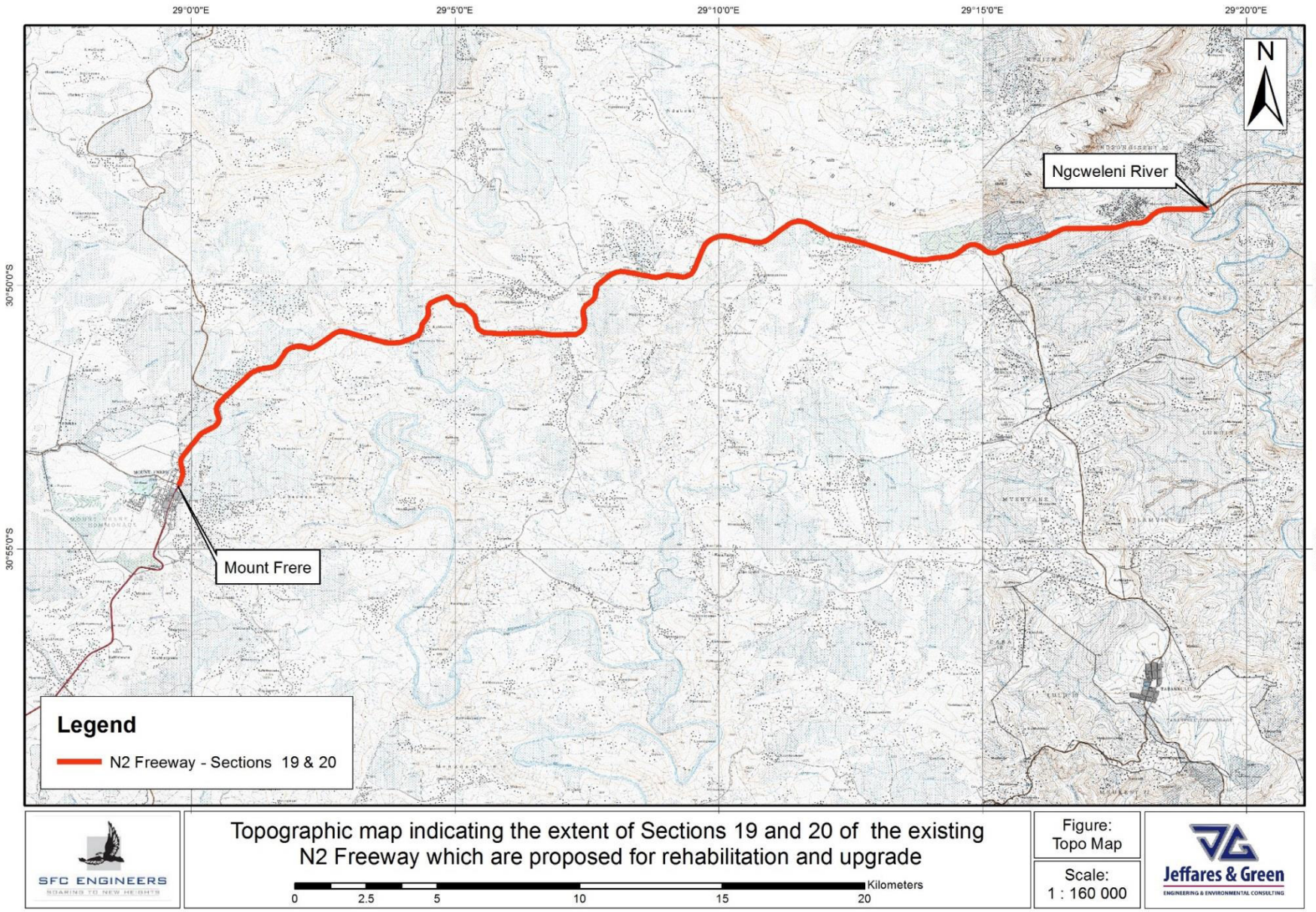
6. DEADLINE FOR SUBMISSION OF PROPOSALS

Proposals are to be submitted by email to Jeffares & Green (Pty) Ltd by 16:30 on 10 March 2015.

Enquires may be directed to:

Sarah Baxter
Tel: 041 363 1900
Email: baxters@jgi.co.za

ANNEXURE 1 – LOCALITY PLAN


29°0'0"E
29°5'0"E
29°10'0"E
29°15'0"E
29°20'0"E
30°50'0"S
30°55'0"S
N
Ngcweleni River
Mount Frere
Legend
N2 Freeway - Sections 19 & 20
SFC ENGINEERS
SOARING TO NEW HEIGHTS
Topographic map indicating the extent of Sections 19 and 20 of the existing N2 Freeway which are proposed for rehabilitation and upgrade
Kilometers
0 2.5 5 10 15 20
Figure: Topo Map
Scale: 1 : 160 000
Jeffares & Green
ENGINEERING & ENVIRONMENTAL CONSULTING

APPENDIX D2

AQUATIC ECOLOGICAL ASSESSMENT REPORT

ENVIRONMENTAL ASSESSMENT FOR THE REHABILITATION OF SECTIONS 19 AND 20 OF THE N2 NEAR MOUNT FRERE

AQUATIC ECOLOGICAL ASSESSMENT

DRAFT REPORT

Prepared for:
Jeffares & Green (Pty) Ltd
PO Box 27308
Greenacres
PORT ELIZABETH
6057

Prepared by:

Scherman Colloty & Associates
1 Rossini Rd
Pari Park
PORT ELIZABETH
6070

Scherman Colloty and Associates cc
Environmental and Aquatic Management Consulting
(CK 2009/112403/23)

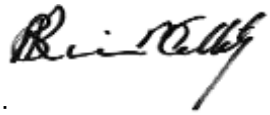
June 2015

SPECIALIST REPORT DETAILS

This report has been prepared as per the requirements of the Environmental Impact Assessment Regulations and the National Environmental Management Act (Act 107 of 1998), any subsequent amendments and any relevant National and / or Provincial Policies related to biodiversity assessments.

Report prepared by: Dr. Brian Colloty Pr.Sci.Nat. (Ecology) / Certified EAP / Member of SAEIES & SASAqS

I, **Dr. Brian Michael Colloty** declare that this report has been prepared independently of any influence or prejudice as may be specified by the National Department of Environmental Affairs (DEA)



Signed: Date: 2 June 2015

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ACRONYMS

CSIR	Council for Scientific and Industrial Research
DWS	National Department of Water and Sanitation
DWAF	National Department of Water Affairs and Forestry (now DWA)
EIA	Environmental Impact Assessment
GIS	Geographic Information System
NFEPA	National Freshwater Ecosystem Priority Areas (Nel *et al*., 2011)
PES	Present Ecological State Score
SANBI	South African National Biodiversity Institute
SC&A	Scherman Colloty & Associates

1 Introduction

Scherman Colloty & Associates cc (SC&A) was appointed by Jeffares & Green (Pty) Ltd as an independent specialist to evaluate the terrestrial ecological aspects of the proposed rehabilitation of sections 19 and 20 of the National Route 2 between Mount Frere and the Ngqeleni River crossing near Mount Ayliff.

This document reports on results obtained in a survey of the regional literature and observations made during a site visit conducted in June 2-15. The main objective of this report is to provide comment on the potential impact of the proposed development areas based on any constraints as a result of the presence of any sensitive aquatic habitats.

Several important national, provincial scale conservation plans were also reviewed, with the results of those studies being included in this report. Most conservation plans are produced at a course scale so it thus important to verify the actual status of the study area during this initial phase, prior to the final development plan being produced.

Certain aspects of the development may also trigger the need for Section 21, Water Use License Applications such as development within 500m of a wetland boundary or river crossings. These applications must be submitted to the relevant Department of Water and Sanitation Office, and information contained in this report must be used in the supporting documentation.

1.1 Terms of reference

- An aquatic biodiversity assessment of the study area. This will cover the study area and a 500m development buffer in relation to available information on the aquatic vegetation and fish.
- Maps depicting demarcated aquatic and wetland vegetation delineated to a scale of 1:10 000, following the methodology described by the Department of Water and sanitation (DWS, previously DWA), together with a classification of delineated wetland areas, according to the methods contained in the Level 1 WET-Health methodology and the latest National Wetland Classification System (2010).
- The determination of the Present Ecological State (PES) and Ecological Importance and Sensitivity (EIS) of any waterbodies, estimating their biodiversity, conservation and ecosystem function importance with regard ecosystem services.
- Recommend buffer zones and No-go areas around any delineated aquatic vegetation areas based on the relevant legislation (e.g. Eastern Cape Biodiversity Conservation Plan guidelines) or best practice. SC&A also has access to geographic information that forms part of the latest National Freshwater Ecosystems Priority Areas (Nel *et al*, 2011) Atlas being completed by the CSIR.
- Provide mitigations regarding project related impacts, including engineering services that could negatively affect demarcated aquatic vegetation units.
- Recommend specific actions that could enhance the aquatic functioning in the areas, allowing the potential for a positive contribution by the project.
- Supply the client with geo-referenced GIS shape files of the waterbodies as per the required specifications supplied.

The above detail could be required for inclusion in the respective water use license application / GA documents submitted to DWS should these be required

1.2 Limitations

In order to obtain a comprehensive understanding of the dynamics of both the flora and fauna of both the terrestrial and aquatic communities within a study site, as well as the status of endemic, rare or threatened species in any area, assessments should always consider investigations at different time scales (across seasons/years) and through replication. Due to time constraints these long-term studies are not always feasible and are mostly based on instantaneous sampling.

It should be emphasised that information, as presented in this document, only has reference to the study area as indicated on the accompanying maps. Therefore, this information cannot be applied to any other area without detailed investigation.

Furthermore, additional information may come to light during a later stage of the process or development. This company, and/or specialist investigators do not accept any responsibility for conclusions, suggestions, limitations and recommendations made in good faith, based on the information presented to them, obtained from the surveys or requests made to them at the time of this report.

2 Project locality

The road sections (19 & 20) are located within the Alfred Nzo District Municipality in the Eastern Cape Province. These portions of the National Route 2 between Mount Frere town and the Nqgeleni River will be rehabilitated (Figure 1).

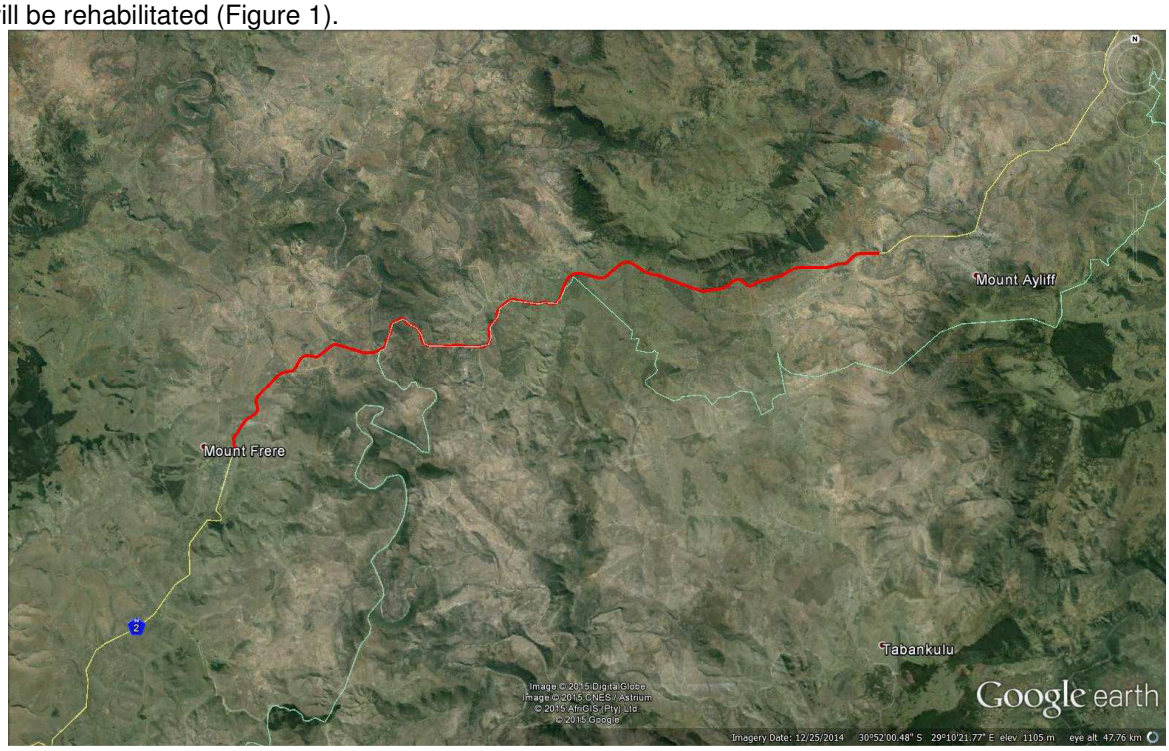

Figure 1: A map showing the sections along the N2 (red) that will be rehabilitated between Mount Frere and the Ngqeleni River, west of Mount Ayliff

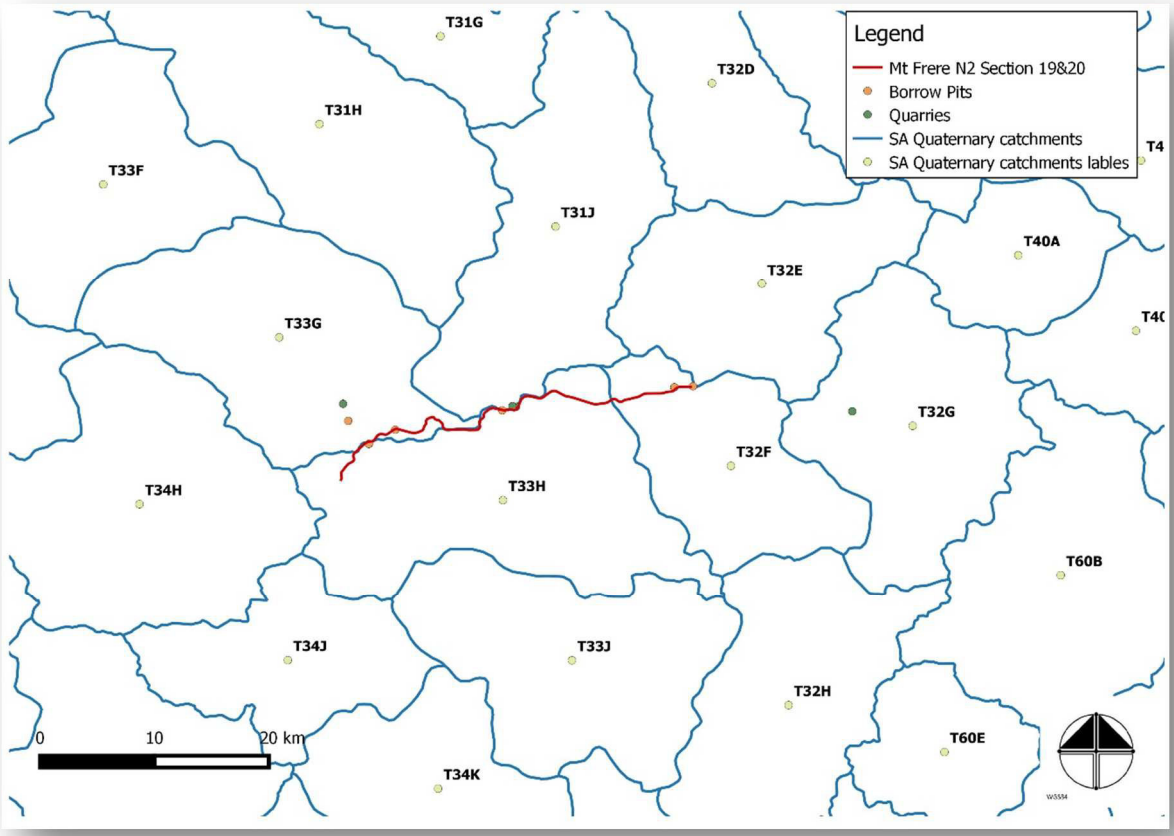

Figure 2: The respective quaternary catchments within the study region indicated by the red line together with the main stem river systems

3 Project description

A detailed project description is contained in the Basic Assessment Report supporting documentation, but the project proposes to rehabilitate the road over a short term period. Present water course crossings will also be upgraded or rehabilitated as required. The proponent has identified 16 major water course crossings, but this does not include additional drainage lines as shown in the 1:50 000 topo-cadastral data.

Plate 1: A photograph taken within Section 19, showing the typical water courses within the region as well as the impacts observed such as erosion and sedimentation

4 Results

4.1 Aquatic environment – Water courses and drainage lines

There were a number of, perennial, non- perennial watercourses and drainage lines (Plate 1) within the study area. These are mostly associated with the upper Mzimvubu, Mnceba and Mzintlava river catchments (Figure 2).

The quaternary catchments include:

- T33H
- T33G
- T31J
- T32F

What is notable is the large proportion of eroded areas within these catchments (Plate 1) that impact on the hydrological regime within the area. This is opposed to the eastern portions of the route, where the catchment are afforested with pine plantations (Plate 2). While most of the dams and have mistakenly been classified as natural wetlands in the National Freshwater Ecosystems Priority Areas (NFEPA) assessment. Sedimentation and erosion was also noted within all the drainage lines, where pipe culverts had little or no erosion / energy dissipation structures.

Plate 2: A view of a catchment containing mostly alien pine plantations

An assessment of all of the systems was conducted in 2012/ 2013 by SC&A and now forms part of the revised Present Ecological State (PES) and Ecological Importance and Ecological Sensitivity Assessment (EI/ES) assessment published by the Department of Water and Sanitation (DWS, 2014). This included all aspects such as water quality, riparian vegetation, invertebrates, fish and hydrology at a subquaternary catchment level.

Based then on the available information and again confirmed during the site visit, the larger systems within the study area, when considering the remainder of the downstream catchments were rated as being Moderately Modified. The exception being the Mzimvubu Catchment (5588) was rated as Largely Natural (PES) = B, while the ES and EI scores where HIGH (DWS, 2014). However the road does not cross any water courses within this latter catchment.

The smaller drainage lines due to upstream erosion, grazing, agriculture, the large number of dams and afforestation, the overall Ecological Importance and Ecological Sensitivity for all the systems were rated as LOW, while the large systems were rated as Moderate. These ratings were based on the fact that the study area still contained valuable intact riparian and instream habitat, which would contain several sensitive fish and invertebrate species (DWS, 2014).

The results for each of the affected Sub-quaternary catchments (Figure 2 & 3) are summarised below:
Where SQ= Subquaternary catchment, PES = Present Ecological State, ES = Ecological Sensitivity and EI = Ecological Importance.

SQ REACH	SQR NAME	PES ASSESSED BY XPERTS? (IF TRUE="Y")	PES CATEGORY MEDIAN	MEAN EI CLASS	MEAN ES CLASS	LENGTH km	STREAM ORDER	DEFAULT EC (BASED ON MEDIAN PES AND HIGHEST OF EI OR ES MEANS)
T31J-05588	Mzimvubu	Y	B	MODERATE	MODERATE	17,8	4,0	C
T32F-05464	Mzintlava	Y	C	HIGH	HIGH	76,1	2,0	B
T33H-05638	Mnceba	Y	C	MODERATE	MODERATE	35,9	1,0	C
T33H-05680	Mzimvubu	Y	C	MODERATE	MODERATE	41,8	4,0	C

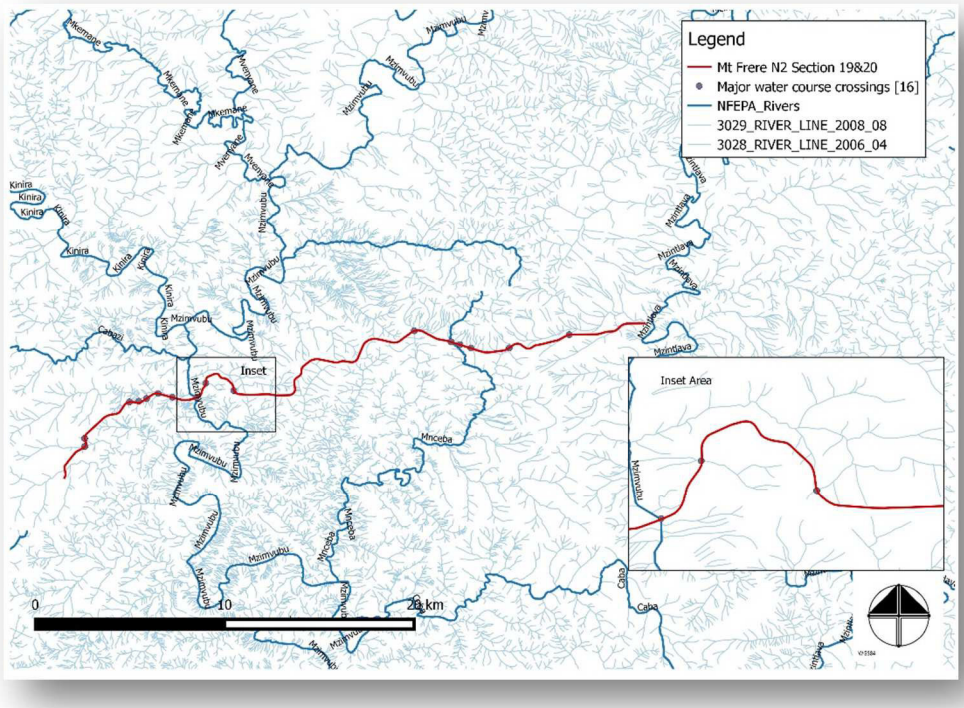

Figure 3: The water courses traversed by the N2 road sections within the study area (NFEPA and 1:50 000 topo-cadastral data)

Similar results were obtained in previous assessments related to the National Freshwater Ecosystem Priority Areas (Nel, *et al*. 2011). The road sections do traverses important Freshwater Ecosystems Priority Areas (FEPAs), Fish Corridors and important upstream catchments as shown in Figure 4. This is again due to the fact the riparian and instream areas are largely intact.

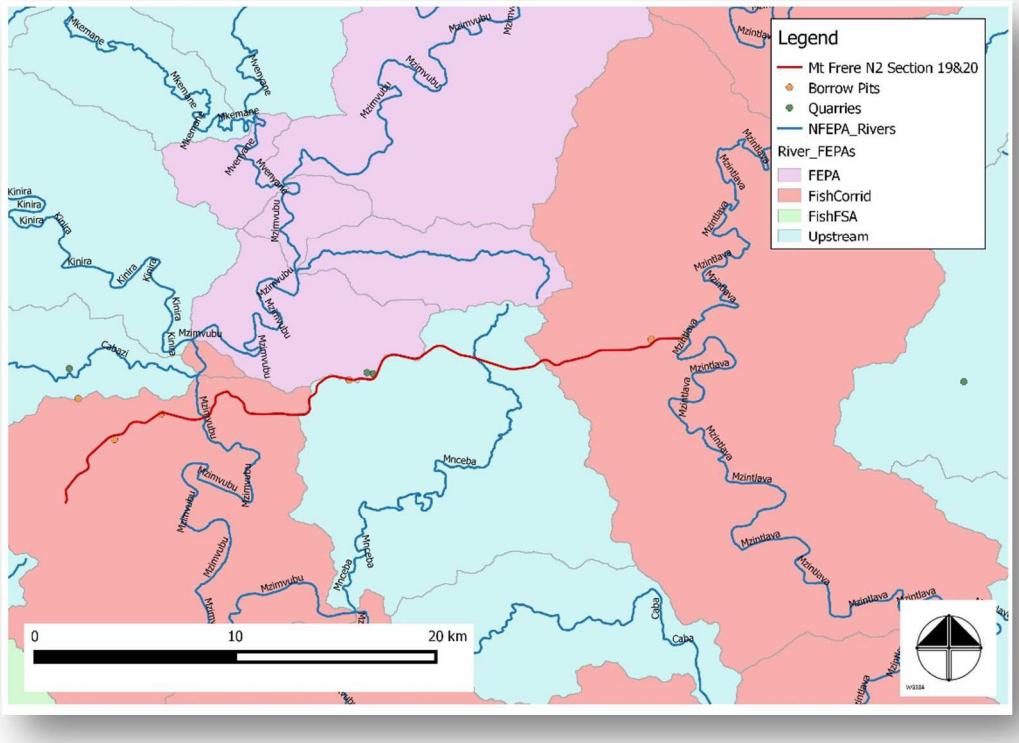

Figure 4: Results of the National Freshwater Ecosystem Priority Assessment for the study area (Nel *et al*., 2011)

4.2 Wetland delineation and Conservation & Importance

The National Wetland Inventory (SANBI), which is contained in the National Freshwater Ecosystem Priority Areas (NFEPA) spatial database, indicated that the study area contains several wetlands (Figure 5).

These were confirmed to be artificial impoundments, mostly farm dams. None of these had any extensive wetland habitat that support larger numbers of species. The only biota included a few weavers using the reeds that had grown due to the sedimentation or amphibians. None of the plant or animal species are of conservation concern.

With regard the Present Ecological State scores (See appendix for the methods), the man-made farm dams were not rated as the N2 will not impact on these artificial systems. Similarly the wetlands created by the road itself were not rated as these will disappear once the road is upgraded. This is however seen as a positive impact as it is more important to reinstate the natural hydrology of the riverine systems and protect these from erosion, sedimentation and additional impoundments.

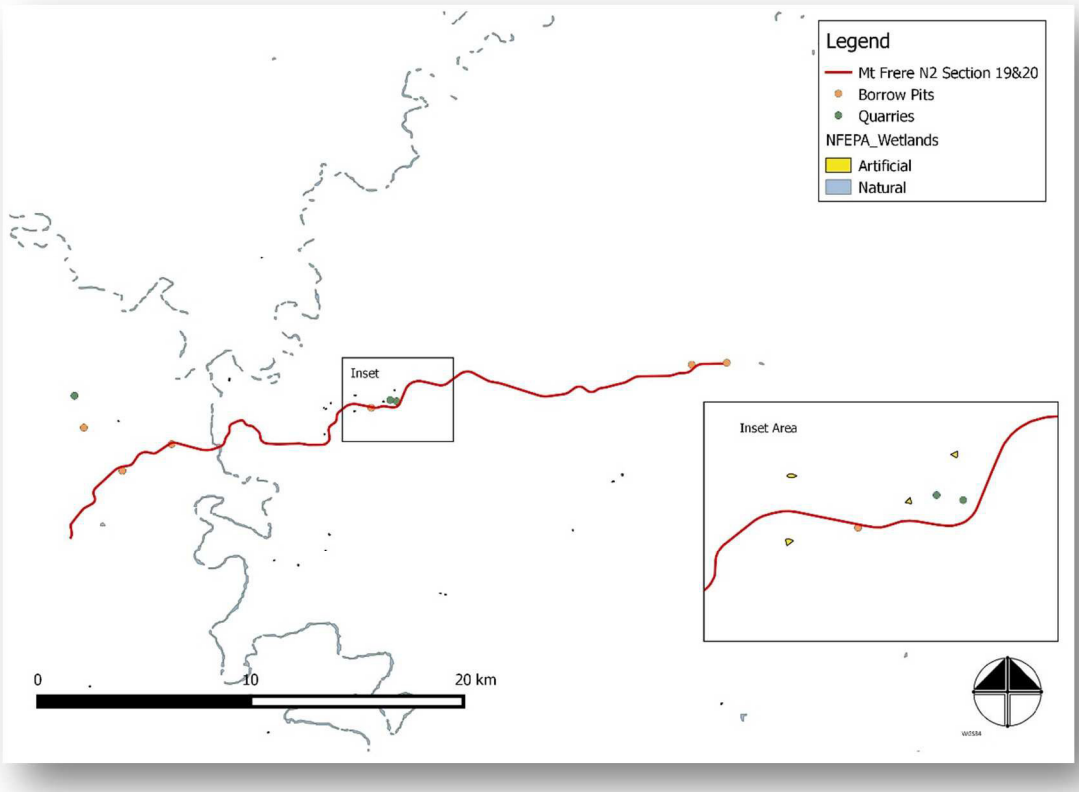

Figure 5: Wetland types and distribution within the study area

5 Ecological sensitivity assessment

Based on the findings of this study, the various habitats (rivers) could be ranked in terms of their sensitivity to development, using the following criteria, listed in order of importance, i.e. the habitat or Present Ecological State score:

- Contained Species of Special Concern (SSC)
- Habitat was protected under a form of legislation
- Exhibited a high degree of biodiversity
- Exhibited a limited degree of degradation
- A unique habitat that is not well represented within the region
- Provided an important ecosystem role or support system, e.g. ecological corridor

However with the exception of the larger water course crossings (Mzimvubu, Mnceba & Mzintlava River - currently bridge crossings), all the systems would have a similar sensitivity (Moderate) due to the potential construction impacts such as sedimentation and erosion.

Wetland were not included in this assessment as these are all artificial impoundments.

6 Assessment of Impacts and Identification of Management Actions

It has been determined that the impacts would largely occur during the construction phase (habitat disturbance) which increases the potential for erosion and sedimentation (bare soils), while the operation phase could present hydrological impacts that could result in downstream erosion and sedimentation. The loss of any wetlands were not assessed as the road upgrade would not impact on of these areas.

6.1 - Impact 5: Changes to the hydrological regime and increased potential for erosion

<table>
<tr><td colspan="2">Environmental Impact:
Loss of vegetation, and upgrading of the various road crossings could result in changes in the hydrology resulting in erosion:</td><td colspan="3">Activity/Aspect & Impact Source:
Due to the nature of the proposed project this would start at the onset of the construction phase, but persist in the long term in the operational phase impact, limited to once the roads, any road crossings, stormwater management features, erosion protection structures have been constructed. These structures would probably interfere with natural run-off patterns, either diverting or increasing the velocity of surface water flows. This then has the potential to increase the potential for erosion.</td><td colspan="2">Proposed Mitigation:
• Stormwater and any runoff generated by the hard surfaces should be discharged into retention swales or detention ponds..
• Additional energy dissipation structures should be placed in a manner that flows are managed prior to being discharged back into the natural water courses, thus not only preventing erosion, but would support the maintenance of natural base flows within these systems, i.e. hydrological regime (water quantity and quality) is maintained.
• Any crossings must be designed in such a manner so as not to impede or divert any baseflows or increase upstream flood inundation. The use portal culverts spanning up to 7m have been suggested for the large crossings and pipe culverts for the smaller crossings. It is however recommended that box culverts be selected over pipe culverts as they are less restrictive in terms of flow and also aid in reducing habitat fragmentation.
Reference to EMP section:
EMP to be completed after review of draft basic assessment report.</td></tr>
<tr><td colspan="6">Impact Significance</td></tr>
<tr><td>Without Mitigation:</td><td>Duration:
Long term</td><td>Frequency:
Occasional</td><td>Extent/Scale:
Site Impact</td><td>Probability:
Probable</td><td>Impact Status:
NEGATIVE</td><td>Significance:
MEDIUM</td></tr>
<tr><td>With Mitigation:</td><td>Duration:
Medium term</td><td>Frequency:
Occasional</td><td>Extent/Scale:
Site Impact</td><td>Probability:
Probable</td><td>Impact Status:
NEGATIVE</td><td>Significance:
LOW</td></tr>
<tr><td colspan="2">IAP Interest:
Undermined, to be completed based on review of draft BAR</td><td colspan="2">Potential to Mitigate:
High potential / easy to mitigate</td><td colspan="3">Assessment Confidence:
Complete</td></tr>
</table>

6.2 - Impact 6: Increased velocity of surface water flows – reduction in permeable surfaces

<table>
<tr><td colspan="2">Environmental Impact:
Loss of vegetation, and upgrading of the various road crossings could result in changes in the hydrology resulting due to changes in permeable surfaces</td><td colspan="2">Activity/Aspect & Impact Source:
Loss of vegetation and the replacement of the areas with hard engineered surfaces</td><td colspan="3">Proposed Mitigation:
• Stormwater and any runoff generated by the hard surfaces should be discharged into retention swales or detention ponds.
• Additional energy dissipation structures should be placed in a manner that flows are managed prior to being discharged back into the natural water courses, thus not only preventing erosion, but would support the maintenance of natural base flows within these systems, i.e. hydrological regime (water quantity and quality) is maintained.
• Any upgraded crossings must be designed in such a manner so as not to impede or divert any baseflows or increase upstream flood inundation. The use portal culverts spanning up to 7m have been suggested for the large crossings and pipe culverts for the smaller crossings. It is however recommended that box culverts be selected over pipe culverts as they are less restrictive in terms of flow and also aid in reducing habitat fragmentation.
Reference to EMP section:
EMP to be completed after review of draft basic assessment report.</td></tr>
<tr><td colspan="7">Impact Significance</td></tr>
<tr><td>Without Mitigation:</td><td>Duration:
Long term</td><td>Frequency:
Occasional</td><td>Extent/Scale:
Site Impact</td><td>Probability:
Probable</td><td>Impact Status:
NEGATIVE</td><td>Significance:
MEDIUM</td></tr>
<tr><td>With Mitigation:</td><td>Duration:
Medium term</td><td>Frequency:
Occasional</td><td>Extent/Scale:
Site Impact</td><td>Probability:
Probable</td><td>Impact Status:
NEGATIVE</td><td>Significance:
LOW</td></tr>
<tr><td colspan="2">IAP Interest:
Undermined, to be completed based on review of draft BAR</td><td colspan="2">Potential to Mitigate:
High potential / easy to mitigate</td><td colspan="3">Assessment Confidence:
Complete</td></tr>
</table>

6.3 - Impact 7: Impact of changes to water quality

<table>
<tr><td colspan="2">Environmental Impact:
Presently little is known about the water quality of the water courses directly in the study area, but it is assumed due to the activities in the study area, that the aquatic systems contain some form of pollutants (e.g. cattle and solid waste) as eutrophication was observed in area near the Little Fish River</td><td colspan="2">Activity/Aspect & Impact Source:
During construction various materials, such as sediments, diesel, oils and cement, could pose a threat to the continued functioning downstream areas, if by chance it is dispersed via surface run-off, or are allowed to permeate into the groundwater. The possible negative changes to water quality during the operational phase would be limited to sedimentation and erosion related issues assessed in Section 6.1. These negative impacts would persist into the medium term.</td><td colspan="3">Proposed Mitigation:
Construction Phase
• Chemicals used for construction must be stored safely on site and surrounded by bunds. Chemical storage containers must be regularly inspected so that any leaks are detected early.
• Littering and contamination of water sources during construction must be prevented by effective construction camp management.
• Emergency plans must be in place in case of spillages onto road surfaces and water courses.
• No stockpiling should take place within a water course.
• All stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds.
• Stockpiles must be located away from river channels.
• Erosion and sedimentation into channels must be minimised through the effective stabilisation (gabions and Reno mattresses) and the re-vegetation of any disturbed riverbanks.
• The construction camp and necessary ablution facilities meant for construction workers must be beyond the 32m buffer described previously.

Reference to EMP section:
EMP to be completed after review of draft basic assessment report.</td></tr>
<tr><td colspan="6">Impact Significance</td></tr>
<tr><td>Without Mitigation:</td><td>Duration:
Long term</td><td>Frequency:
Seldom</td><td>Extent/Scale:
Site Impact</td><td>Probability:
Probable</td><td>Impact Status:
NEGATIVE</td><td>Significance:
MEDIUM</td></tr>
<tr><td>With Mitigation:</td><td>Duration:
Medium term</td><td>Frequency:
Often</td><td>Extent/Scale:
Site Impact</td><td>Probability:
Probable</td><td>Impact Status:
NEGATIVE</td><td>Significance:
LOW</td></tr>
<tr><td colspan="2">IAP Interest:
Undermined, to be completed based on review of draft BAR</td><td colspan="2">Potential to Mitigate:
High potential / easy to mitigate</td><td colspan="3">Assessment Confidence:
Complete</td></tr>
</table>

7 Conclusion and recommendations

Several habitats and water courses of interest were highlighted in this study, which could be impacted upon by the proposed rehabilitation. Based on observations in the field it was found that with mitigation all the impacts would be rated as LOW.

The project has in fact the potential to enhance the functioning of the observed water courses by proposing large culverts where pipe culverts are currently installed and retaining the current bridges.

Further recommendations could be provide once more detail on any road crossings have been developed by the engineering team, any of the proposed mitigations listed in the impact assessment must be adhered to.

With regard the borrow pits and quarries the following summary is presented, in particular if a new area is proposed or the current mining area will be expanded:

	Type	Site Sensitivity	Rationale
Borrow Pit A	Existing	Low	Degraded grasslands
Borrow Pit B	Existing	Low	Degraded grasslands
Borrow Pit C	Existing	Low	Degraded grasslands
Borrow Pit D	Existing	Low	Degraded grasslands
Borrow Pit E	Existing	Low	Degraded grasslands
Borrow Pit F	Proposed	High	Rocky outcrop and in close proximity to large floodplain and watercourses
Quarry A	Proposed	Moderate	Close to water courses and rock outcrops
Quarry B1	Existing	Low	Degraded grassland
Quarry B2	Existing	Low	Degraded grassland
Doring Crushers Quarry	Proposed	Moderate	Located near several water courses, already poorly vegetated with signs of erosion.

8 References

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SANBI (2009). Further Development of a Proposed National Wetland Classification System for South Africa. Primary Project Report. Prepared by the Freshwater Consulting Group (FCG) for the South African National Biodiversity Institute (SANBI).

9 Appendix 2 - Wetland delineation and assessment

During this study and due to the nature of the seasonal wetland and watercourses observed, it was decided that the accepted National Wetlands Classification System (NWCS) be adopted. This classification approach has integrated aspects of the HGM approached used in the WET-Health system as well as the widely accepted eco-classification approach used for rivers.

The NWCS (SANBI, 2009) uses hydrological and geomorphological traits to distinguish the primary wetland units, i.e. direct factors that influence wetland function. Other wetland assessment techniques, such as the DWAF (2005) delineation method, only infer wetland function based on abiotic and biotic descriptors (size, soils & vegetation) stemming from the Cowardin approach (SANBI, 2009). Several transects were sampled perpendicular to the wetlands in which information of the soils (cores) and vegetation were collected.

The NWCS has a six tiered hierarchical structure, with four spatially nested primary levels of classification (Figure 2). The hierarchical system firstly distinguishes between Marine, Estuarine and Inland ecosystems (**Level 1**), based on the degree of connectivity the particular systems has with the open ocean (greater than 10 m in depth). Level 2 then categorises the regional wetland setting using a combination of biophysical attributes at the landscape level, which operate at a broad bioregional scale. This is opposed to specific attributes such as soils and vegetation.

Level 2 has adopted the following systems:

- Inshore bioregions (marine)
- Biogeographic zones (estuaries)
- Ecoregions (Inland)

Level 3 of the NWCS assess the topographical position of inland wetlands as this factor broadly defines certain hydrological characteristics of the inland systems. Four landscape units based on topographical position are used in distinguishing between Inland systems at this level. No subsystems are recognised for Marine systems, but estuaries are grouped according to their periodicity of connection with the marine environment, as this would affect the biotic characteristics of the estuary.

Level 4 classifies the hydrogeomorphic (HGM) units discussed earlier. The HGM units are defined as follows:

- Landform – shape and localised setting of wetland
- Hydrological characteristics – nature of water movement into, through and out of the wetland
- Hydrodynamics – the direction and strength of flow through the wetland

These factors characterise the geomorphological processes within the wetland, such as erosion and deposition, as well as the biogeochemical processes.

Level 5 of the assessment pertains to the classification of the tidal regime within the marine and estuarine environments, while the hydrological and inundation depth classes are determined for the inland wetlands. Classes are based on frequency and depth of inundation, which are used to determine the functional unit of the wetlands and are considered secondary discriminators within the NWCS.

Level 6 uses of six descriptors to characterise the wetland types on the basis of biophysical features. As with Level 5, these are non hierarchal in relation to each other and are applied in any order, dependent on the availability of information. The descriptors include:

(i) Geology;

(ii) Natural vs. Artificial;

(iii) Vegetation cover type;

(iv) Substratum;

(v) Salinity; and

(vi) Acidity or Alkalinity.

It should be noted that where sub-categories exist within the above descriptors, hierarchical systems are employed, thus are nested in relation to each other.

The HGM unit (Level 4) is the **focal point of the NWCS**, with the upper levels (Figure 3 – Inland systems only) providing means to classify the broad bio-geographical context for grouping functional wetland units at the HGM level, while the lower levels provide more descriptive detail on the particular wetland type characteristics of a particular HGM unit. Therefore Level 1 – 5 deals with functional aspects, while Level 6 classifies wetlands on structural aspects.

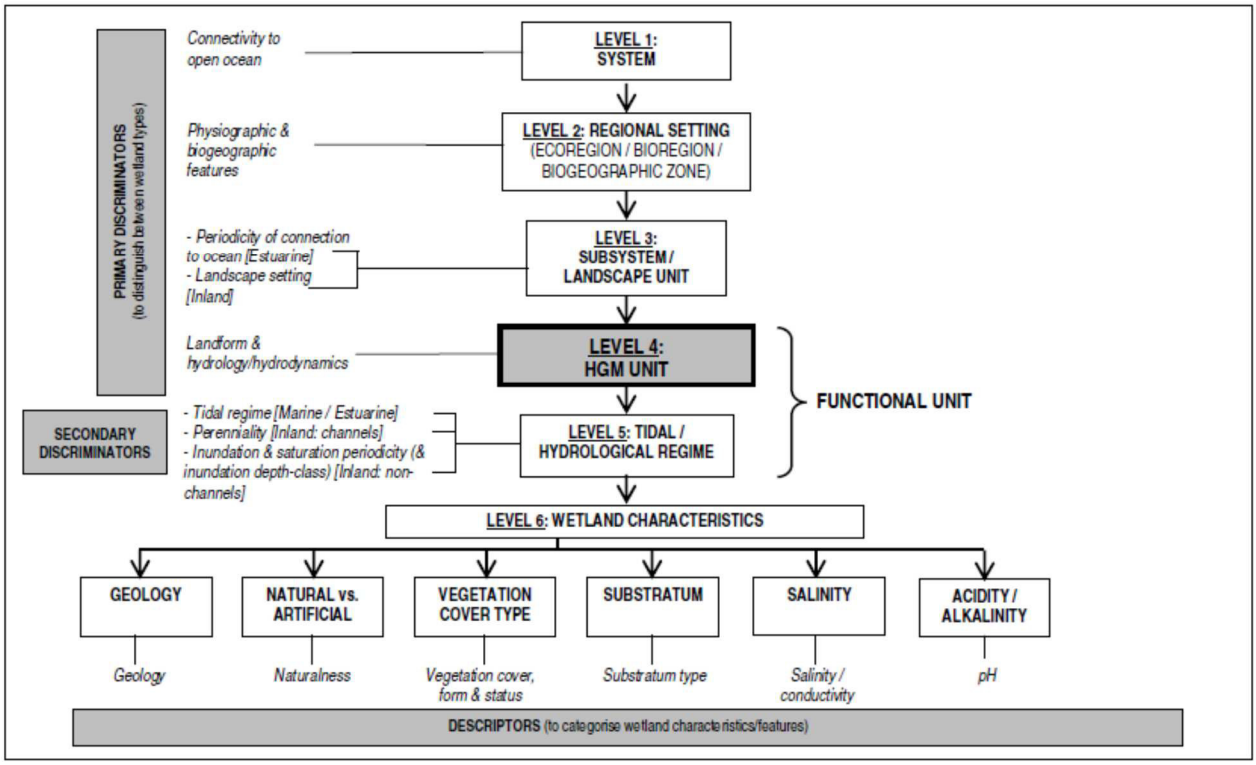


Figure 2: Basic structure of the National Wetland Classification System, showing how 'primary discriminators' are applied up to Level 4 to classify Hydrogeomorphic (HGM) Units, with 'secondary discriminators' applied at Level 5 to classify the tidal/hydrological regime, and 'descriptors' applied at Level 6 to categorise the characteristics of wetlands classified up to Level 5 (From SANBI, 2009).

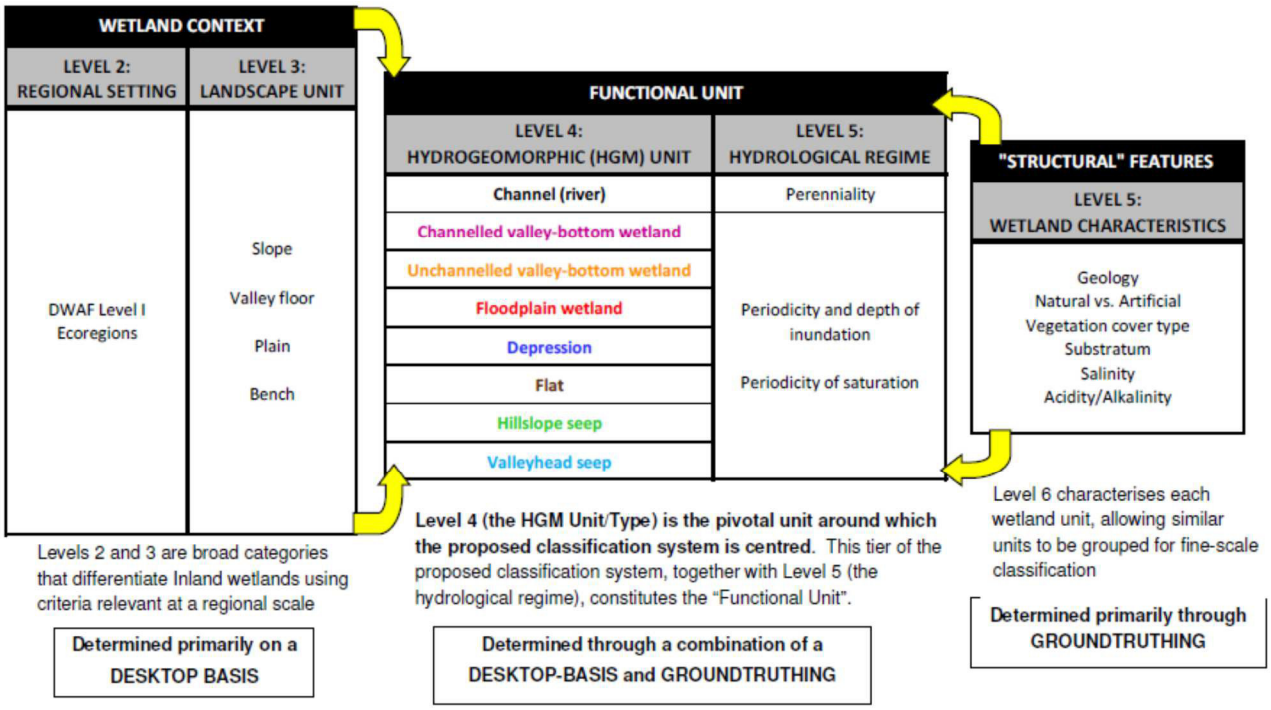


Figure 3: Illustration of the conceptual relationship of HGM Units (at Level 4) with higher and lower levels (relative sizes of the boxes show the increasing spatial resolution and level of detail from the higher to the lower levels) for Inland Systems (from SANBI, 2009).

9.1.1 Wetland condition and conservation importance assessment

To assess the Present Ecological State (PES) or condition of the observed wetlands, a modified Wetland Index of Habitat Integrity (DWAF, 2007) was used. The Wetland Index of Habitat Integrity (WETLAND-IHI) is a tool developed for use in the National Aquatic Ecosystem Health Monitoring Programme (NAEHMP), formerly known as the River Health Programme (RHP). The output scores from the WETLAND-IHI model are presented in the standard DWAF A-F ecological categories (Table 2), and provide a score of the Present Ecological State of the habitat integrity of the wetland system being examined. The author has included additional criteria into the model based system to include additional wetland types. This system is preferred when compared to systems such as WET-Health – wetland management series (WRC 2009), as WET-Health (Level 1) was developed with wetland rehabilitation in mind, and is not always suitable for impact assessments. This coupled to degraded state of the wetlands in the study area, a complex study approach was not warranted, i.e. conduct a Wet-Health Level 2 and WET-Ecosystems Services study required for an impact assessment.

The WETLAND-IHI model is composed of four modules. The "Hydrology", "Geomorphology" and "Water Quality" modules all assess the contemporary ***driving processes*** behind wetland formation and maintenance. The last module, "Vegetation Alteration", provides an indication of the intensity of human landuse activities on the wetland surface itself and how these may have ***modified*** the condition of the wetland. The integration of the scores from these 4 modules provides an overall Present Ecological State (PES) score for the wetland system being examined. The WETLAND-IHI model is an MS Excel-based model, and the data required for the assessment are generated during a rapid site visit.

Additional data may be obtained from remotely sensed imagery (aerial photos; maps and/or satellite imagery) to assist with the assessment. The interface of the WETLAND-IHI has been developed in a format which is similar to DWAF's River EcoStatus models which are currently used for the assessment of PES in riverine environments.

Conservation importance of the individual wetlands was based on the following criteria:

- Habitat uniqueness
- Species of conservation concern
- Habitat fragmentation with regard ecological corridors
- Ecosystem service (social and ecological)

The presence of any or a combination of the above criteria would result in a HIGH conservation rating if the wetland was found in a near natural state (high PES). Should any of the habitats be found modified the conservation importance would rate as MEDIUM, unless a Species of conservation concern was observed (HIGH). Any systems that was highly modified (low PES) or had none of the above criteria, received a LOW conservation importance rating. Wetlands with HIGH and MEDIUM ratings should thus be excluded from development with incorporation into a suitable open space system, with the maximum possible buffer being applied. Wetlands which receive a LOW conservation importance rating could be included into stormwater management features, but should not be developed so as to retain the function of any ecological corridors.

APPENDIX D3

TERMS OF REFERENCE FOR TERRESTRIAL ECOLOGICAL ASSESSMENT

Jeffares & Green (Pty) Ltd, acting on behalf of SFC Engineers and the South African National Roads Agency SOC Limited (SANRAL)

SPECIALIST VEGETATION ASSESSMENT FOR INPUT INTO THE APPLICATION ENVIRONMENTAL AUTHORISATION FOR THE REHABILITATION OF NATIONAL ROUTE 2 (N2) SECTIONS 19 (KM 92.4 TO 94.8) AND 20 (KM 0.0 TO 39.4) BETWEEN MOUNT FRERE AND THE NGCWELENI RIVER, ALFRED NZO DISTRICT MUNICIPALITY, EASTERN CAPE PROVINCE (PROJECT REF: NRA N002-200-2011/1ENV)

TERMS OF REFERENCE

1. INTRODUCTION

Jeffares & Green (Pty) Ltd, in our capacity as Environmental Consultants for the Environmental Authorisation of the above-mentioned project, hereby invite the submission of a written quotation for the undertaking of a Vegetation Assessment along Sections 19 (km 92.4 – 94.8) and 20 (km 0.0 – 39.4) between Mount Frere and the Ngcweleni River Bridge, located within Alfred Nzo District Municipality, Eastern Cape Province.

2. BACKGROUND

The proposed project comprises the rehabilitation of the entire Section 20 of the N2 (km 0.0 to km 39.4) and a portion of Section 19 (km 92.4 to km 94.8), including capacity upgrades to the interchange between the N2 National Route and the R405 Provincial Route.

The proposed rehabilitation will include:

- General widening of the existing road cross section to allow for the incorporation of climbing lanes, passing lanes and 2.5 m shoulders;
- Vertical and horizontal geometric improvements to increase design speeds from the current 60 km/h to 100 km/h;
- The rehabilitation and general strengthening of the pavement on the existing road alignment, as well as the construction of new pavement on sections of proposed new alignment;
- Stabilisation of both existing and proposed new cut faces;
- Widening of existing bridges, agricultural underpasses and drainage structures; and
- The upgrade and extension of 173 minor culverts.

In total, the route proposed for rehabilitation within Section 19 is 2.4 km in length, whilst in Section 20 it measures 39.4 km, equating to a total of 41.8 km. The existing road reserve within these sections is proposed to be widened to 50 metres, requiring the acquisition of additional land.

The proposed construction activities will require the sourcing of material for use as both fill and road building material. This has necessitated the identification of potential sites for the establishment of new hard rock quarries and borrow pits. The Geotechnical Engineers have identified four potential hard rock quarry sites (2 existing and 2 new) and six borrow pit sites (5 existing and one new). All of these potential sites will need to be assessed for Heritage Impacts to assist in the selection of preferred material sources.

3. THE SITE

3.1 The Road

Sections 19 and 20 of the N2 Freeway are proposed for re-alignment and upgrade. The co-ordinates of the start and end points of these sections are indicated below

SECTION 19	***South Co-ordinate***	***East Co-ordinate***
START POINT	30° 54' 38.23" S	28° 59' 27.56" E
END POINT	30° 53' 24.59" S	28° 59' 48.37" E

SECTION 20	***South Co-ordinate***	***East Co-ordinate***
START POINT	30° 53' 24.59" S	28° 59' 48.37" E
END POINT	30° 48' 31.45" S	29° 19' 17.41" E

Please refer to Annexure 1 for a locality plan.

3.2 Materials Sources

Material will be sourced from a combination of hard rock quarries and borrow pits.

Hard Rock Quarry Sites

Name	***Material***	***Type***	***South Co-ordinate***	***East Co-ordinate***
Quarry A	Dolerite	New	30° 49' 29.9" S	28° 59' 54.7" E
Quarry B1	Dolerite	Existing	30° 49' 39.5" S	29° 09' 25.9" E
Quarry B2	Dolerite	New	30° 49' 37.4" S	29° 09' 14.5" E
Dorning Crushers	Dolerite	Existing	30° 35' 54.7" S	29° 27"' 57.1" E

Borrow Pit Sites

Name	*Material*	*Type*	*South Co-ordinate*	*East Co-ordinate*
Borrow Pit A	Dolerite	Existing	30° 50' 26.2" S	29° 00' 11.4" E
Borrow Pit B	Dolerite	Existing	30° 51' 42.5" S	29° 01' 19.8" E
Borrow Pit C	Dolerite	Existing	30° 50' 55.3" S	29° 02' 47.0" E
Borrow Pit D	Dolerite	Existing	30° 49' 51.3" S	29° 08' 40.9" E
Borrow Pit E	Dolerite	Existing	30° 48' 35.0" S	29° 18' 09.1" E
Borrow Pit F	Dolerite	New	30° 48' 31.6" S	29° 19' 11.2" E

4. SCOPE OF REQUIRED SERVICES

The upgrade and widening of the road, as well as the establishment of material sources will require the clearing of vegetation. It is likely that this will result in the triggering of a Listed Activity

As part of the application process for Environmental Authorisation, therefore, it is necessary to consider the nature, extent and significance of the impacts associated with of the clearance of indigenous vegetation, as well as to identify measures for the avoidance, control, minimisation and mitigation of these impacts.

The Project Team is therefore seeking to appoint an appropriately qualified and experienced specialist to undertake the following scope of work, with the aim of assisting the Environmental Assessment Practitioner in achieving the above-mentioned impact assessment process:

i. Describe and map the existing vegetation in those areas potentially affected by the proposed project and its alternatives (if any), based on field work and desktop study.
ii. List any rare or threatened plant species in the study area and indicate their location on a map.
iii. Indicate the importance of the identified vegetation in the potentially affected area relative to the surrounding, national and regional area, as well as in terms of national and provincial legislation and policy (e.g. National Spatial Biodiversity Assessment (2011), Threatened Ecosystems listed in terms of Section 52 of the National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA) and the Eastern Cape Biodiversity Conservation Plan (2007), etc.).
iv. Provide comment on the level of disturbance / transformation occurring within ecosystems and based on this, comment on the value of the local biodiversity for conservation, compared to its listed value in the above-mentioned policies and legislation.

v. Identify and assess the potential impacts of the proposed project on the botanical resources identified. This should include direct, indirect and cumulative impacts. Impacts must be described in terms of their nature, extent and significance, as well as the level to which they can be mitigated.

vi. Describe any relevant mitigation measures that could be implemented during the various phases of the proposed project to avoid, control, minimise or reduce the significance of any negative impacts, or enhance the benefits of any positive impacts.

vii. Make recommendations for the control of alien vegetation along the route, during all phases of the development, for inclusion into the Environmental Management Programme (EMPr).

viii. Compile a post-construction Rehabilitation Plan, which includes recommended species lists for re-vegetation of disturbed areas, also for inclusion into the EMPr.

5. GENERAL

- This assessment is intended to be utilised in the Basic Assessment Report and will assist the Competent Authority in decision-making.
- It is a requirement of SANRAL that the area of investigation extend to include areas located 100 meters to either side of the edge of the road route and the proposed material source locations, under investigation.
- Please note that Jeffares & Green (Pty) Ltd expects that specialists will be aware of and utilise the following guidelines for involving Specialists in EIA Processes, to more precisely determine methods and approaches to specialist studies:
    - DEA (2002) Integrated Environmental Management Information Series 4: Specialist Studies. Department of Environmental Affairs (DEA), Pretoria; and
    - DEA&DP (2005) Guideline for involving biodiversity specialists in EIA processes: Edition 1. Department of Environmental Affairs & Development Planning, (DEA&DP), Cape Town.

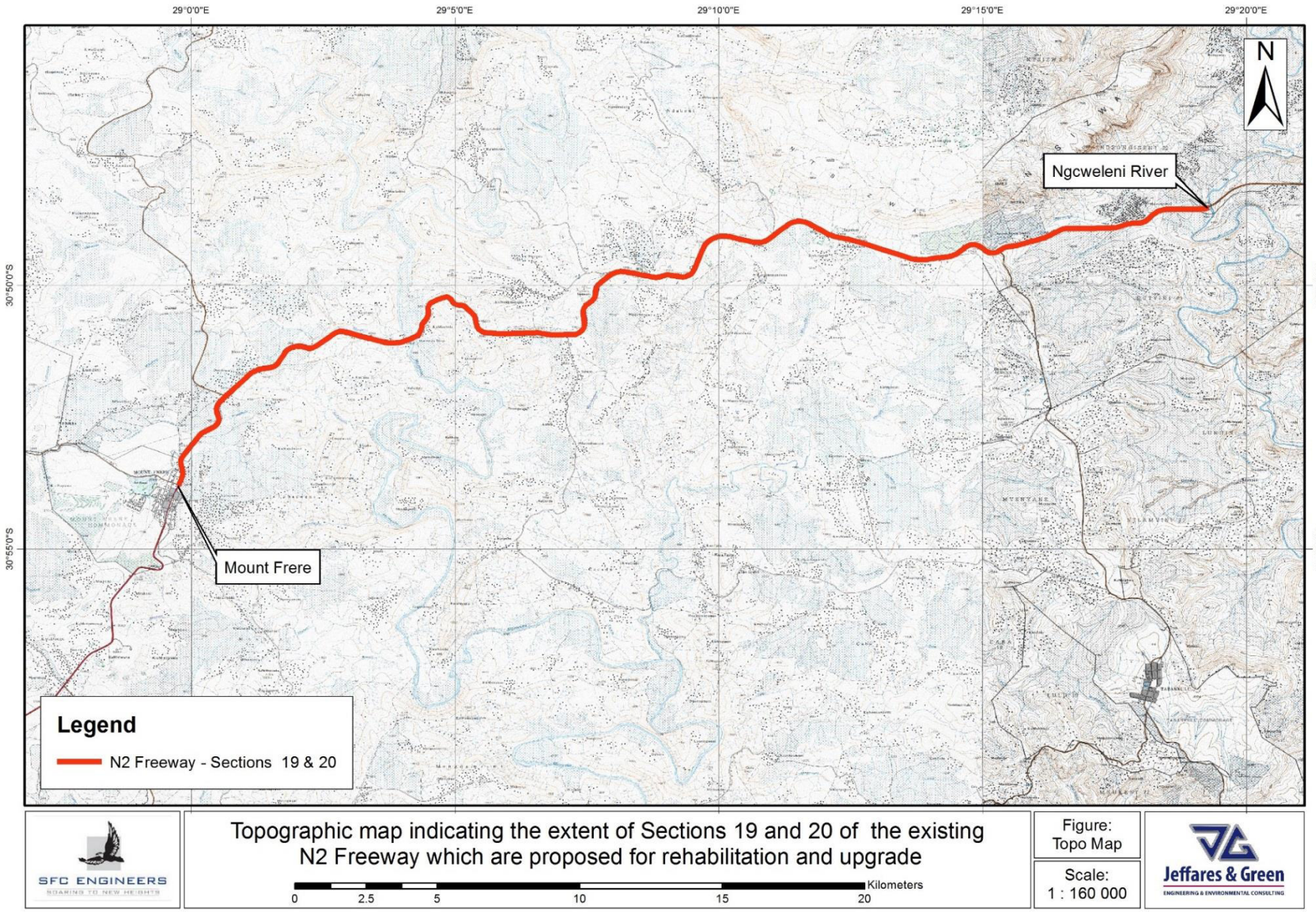
6. DEADLINE FOR SUBMISSION OF PROPOSALS

Proposals are to be submitted by email to Jeffares & Green (Pty) Ltd by 16:30 on 10 March 2015.

Enquires may be directed to:

Sarah Baxter
Tel: 041 363 1900
Email: baxters@jgi.co.za

ANNEXURE 1 – LOCALITY PLAN


29°0'0"E
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29°15'0"E
29°20'0"E
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N
Ngcweleni River
Mount Frere
Legend
N2 Freeway - Sections 19 & 20
SFC ENGINEERS
SOARING TO NEW HEIGHTS
Topographic map indicating the extent of Sections 19 and 20 of the existing N2 Freeway which are proposed for rehabilitation and upgrade
Kilometers
0 2.5 5 10 15 20
Figure: Topo Map
Scale: 1 : 160 000
Jeffares & Green
ENGINEERING & ENVIRONMENTAL CONSULTING

APPENDIX D4

TERRESTRIAL ECOLOGICAL ASSESSMENT REPORT

ENVIRONMENTAL ASSESSMENT FOR THE REHABILITATION OF SECTIONS 19 AND 20 OF THE N2 NEAR MOUNT FRERE

TERRESTRIAL ECOLOGICAL ASSESSMENT

DRAFT REPORT

Prepared for:
Jeffares & Green (Pty) Ltd
PO Box 27308
Greenacres
PORT ELIZABETH
6057

Prepared by:

Scherman Colloty & Associates
1 Rossini Rd
Pari Park
PORT ELIZABETH
6070

Scherman Colloty and Associates cc
Environmental and Aquatic Management Consulting
(CK 2009/112403/23)

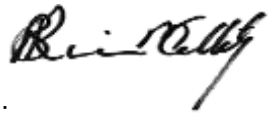
June 2015

SPECIALIST REPORT DETAILS

This report has been prepared as per the requirements of the Environmental Impact Assessment Regulations and the National Environmental Management Act (Act 107 of 1998), any subsequent amendments and any relevant National and / or Provincial Policies related to biodiversity assessments.

Report prepared by: Dr. Brian Colloty Pr.Sci.Nat. (Ecology) / Certified EAP / Member of SAEIES & SASAqS

I, **Dr. Brian Michael Colloty** declare that this report has been prepared independently of any influence or prejudice as may be specified by the National Department of Environmental Affairs (DEA)



Signed: Date: 5 June 2015

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ACRONYMS

CSIR	Council for Scientific and Industrial Research
ECBCP	Eastern Cape Biodiversity Conservation Plan
EIA	Environmental Impact Assessment
GIS	Geographic Information System
NSBA	South African - National Spatial Biodiversity Assessment
PNCO	Provincial Nature Conservation Ordinance
SANBI	South African National Biodiversity Institute
SC&A	Scherman Colloty & Associates
SSC	Species of Special Concern

1 Introduction

Scherman Colloty & Associates cc (SC&A) was appointed by Jeffares & Green (Pty) Ltd as an independent specialist to evaluate the terrestrial ecological aspects of the proposed rehabilitation of sections 19 and 20 of the National Route 2 between Mount Frere and the Ngqeleni River crossing near Mount Ayliff.

This document reports on results obtained in a survey of the regional literature and observations made during a site visit conducted in June 2015. The main objective of this report is to provide comment on the potential impact of the works based on any constraints as a result of the presence of any sensitive terrestrial habitats.

Several important national, provincial scale conservation plans were also reviewed, with the results of those studies being included in this report. Most conservation plans are produced at a course scale so it thus important to verify the actual status of the study area.

1.1 Terms of reference

A desktop and literature review of the area under investigation will be conducted to collate as much information as possible prior to any detailed fieldwork. The purpose of the desktop assessment is to rank relevant areas according to their ecological sensitivity and to identify areas of least ecological risk (to be assessed during the site visit).

Other relevant literature for e.g. South African Biodiversity Information Facility (SABIF, which includes the PRECIS plant distribution database), South African Bird & Herpetological Atlas Projects, relevant Red Data books, provincial ordinances and all systematic bioregional / conservation plans, will also be consulted. Particular attention would be paid to the CBA 1 & 2 areas shown in the Eastern Cape Biodiversity Conservation Plan (ECBCP) and any areas identified as sensitive in the Pondoland Systematic Conservation Assessment (CSIR, 2005). This latter encompasses the Mzintlava River Catchment and affects the last 9km of upgrade near Mount Ayliff, Borrow pits E & F and the Doring Crushers Quarry.

Fieldwork will be limited to visual sightings by means of transect walks and plot-based sampling, while particular attention will also be paid to the occurrence Red Data species or Protected species.

Vegetation units will be sampled by means of the following techniques as per each site:

- Data collection will be plot-based and in the form of vegetation samples within selected reference areas to categorise the various vegetation units.
- Results from the data analysis will provide a description of the dominant and typical species occurring on the site(s), and will include:
    - Threatened, endemic or rare species, with an indication of the relative functionality and conservation importance of the specific community in the area under investigation
    - Invasive or exotic species present in the area
    - The functional and conservation importance of all vegetation communities in the area of investigation

Additional information on faunal communities residing on the area of investigation will be sourced from distributional data/records (both recent and historical), relevant literature, the private sector and other atlas projects.

Habitat areas (based on the species compositions of the vegetation analysis, topography and soil study) will be ranked into high, medium or low classes in terms of their significance based on the Ecological Sensitivity and Conservation Importance. A sensitivity and habitat map (including buffer zones if applicable) will be produced based on the above information, if possible or relevant.

Recommendations and mitigation measures, where required, will also be included in the report with proposed buffers

1.2 Limitations

In order to obtain a comprehensive understanding of the dynamics of both the flora and fauna of both the terrestrial communities within a study site, as well as the status of endemic, rare or threatened species in any area, assessments should always consider investigations at different time scales (across seasons/years) and through replication. Due to time constraints these long-term studies are not always feasible and are mostly based on instantaneous sampling.

It should be emphasised that information, as presented in this document, only has reference to the study area as indicated on the accompanying maps. Therefore, this information cannot be applied to any other area without detailed investigation.

Furthermore, additional information may come to light during a later stage of the process or development. This company, and/or specialist investigators do not accept any responsibility for conclusions, suggestions, limitations and recommendations made in good faith, based on the information presented to them, obtained from the surveys or requests made to them at the time of this report.

2 Project locality

The road sections (19 & 20) are located within the Alfred Nzo District Municipality in the Eastern Cape Province. These portions of the National Route 2 between Mount Frere town and the Nqgeleni River will be rehabilitated (Figure 1).

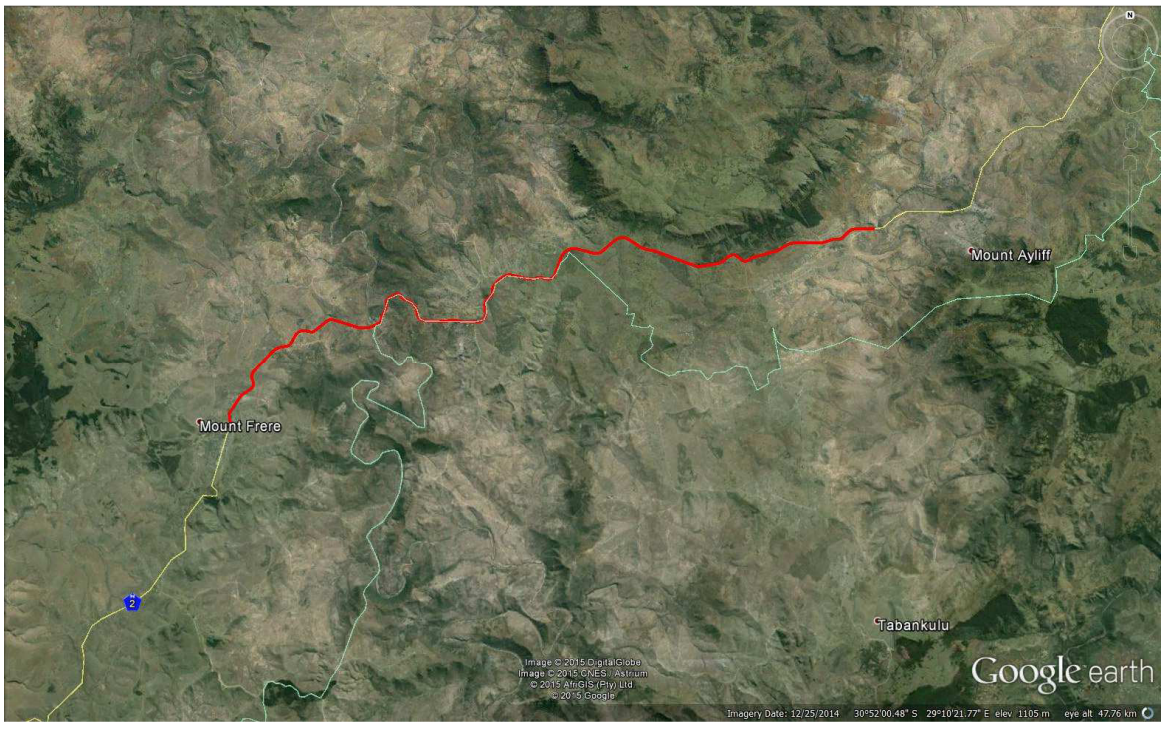

Figure 1: A map showing the sections along the N2 (red) that will be rehabilitated between Mount Frere and the Ngqeleni River, west of Mount Ayliff

3 Project description

A detailed project description is contained in the Basic Assessment Report supporting documentation, but the project proposes to rehabilitate the road over a short term period.

Plate 1: A photograph taken along Section 19 indicating the typical state of the vegetation and land use (dryland crops) within the study area

4 Results

4.1 Generalised vegetation description

The study area is located within a region that contains several of the world's biomes and more particularly the Forest, Grassland and Thicket Biomes as defined by Mucina & Rutherford (2006).

On a broad national scale, the study area is covered by four main vegetation types, defined by Mucina & Rutherford (2006, with maps amended, SANBI, 2009) (Figure 2). These are as follows:

1. Midlands Mistbelt Grassland (Gs9) – Endangered

This vegetation unit falls within the Grassland Biome and occurs in the KwaZulu-Natal midlands and the Eastern Cape Provinces between 760-1400 m above mean sea level. The climate is summer rainfall with heavy and frequent mist providing significant amounts of additional moisture. Frosts are generally moderate, but occasional severe frosts may also occur. The landscape is a hilly and rolling, and mainly associated with a discontinuous east-facing scarp formed by dolerite intrusions (south of the Thukela River southwards to Flagstaff). The vegetation is dominated by forb-rich, tall, sour *Themeda triandra* grasslands transformed by the invasion of indigenous 'Ngongoni grass (*Aristida junciformis* subsp. *junciformis*). Only a few patches of the original species-rich grasslands remain.

Only about 0.5% is statutorily conserved in a number of reserves. It is still heavily underrepresented in conservation plans. More than half has already been transformed for plantations, cultivated land or by urban sprawl. Uncontrolled fires and poorly regulated grazing by livestock add to threats, and some aliens are of concern in places (e.g. *Solanum mauritianum, Rubus spp., Acacia spp., Pinus spp., Eucalyptus spp.*) (Mucina & Rutherford, 2006).

2. Drakensberg Foothill Moist Grassland (Gs10) – Least Threatened

Drakensberg Foothill Moist Grassland falls within the Grassland Biome and extends along the lower foothills of the Drakensberg from the north Eastern Cape to the Free State at altitudes between 880 m to 186 m. The landscape comprises moderately rolling and mountainous terrain, which is incised by river gorges of drier vegetation types and forest (e.g. Valley Thicket). It is dominated by forb-rich grassland and short grasses such as *Themeda triandra* and *Tristachya leucothrix*.

Only two to three percent is statutorily conserved in the uKhahlamba Drakensberg Park and Ntsikeni Wildlife Reserve. It is also conserved in the following nature reserves: Karkloof, Mount Currie, Coleford, Fort Nottingham, Impendle, Ngeli and Umgeni Vlei. Almost 20% is transformed by cultivation, plantations and urbanisation. Woody alien species may become invasive in places, particularly *Rubus spp.*, *Acacia dealbata* and *Solanum mauritianum* (Mucina & Rutherford, 2006).

3. East Griqualand Grassland (Gs 12) – Vulnerable

This vegetation type is located with the southern portions of KwaZulu-Natal and the North Western areas of the Eastern Cape Provinces. As the name implies the majority of the this unit covers most of East Griqualand (with Kokstad and Matatiele as centres) at altitudes of between 920 and 1740 m above sea level. This vegetation type is found mostly on slopes dominated by grassland species, with patches of bush clumps with *Leucosidea sericea* (only wet sites) or *Diospyros lycioides, Varchellia karroo* and *Ziziphus mucronata* in low-lying and very dry sites.

4. Eastern Valley Bushveld (SVs 6) – Least Threatened

This vegetation unit falls within the Savannah Biome and occurs in KwaZulu-Natal and the Eastern Cape Provinces in the lower reaches of deeply incised river valleys. It occurs between 100-1000 m above mean sea level, and very seldom extends to the coast. The climate is summer rainfall with some winter rain. The vegetation is characterized by semi-deciduous savanna woodlands in a mosaic with thickets, often succulent and dominated by *Euphorbia* and *Aloe* species. North-facing slopes receive more insolation and tend to be drier and xerophilous, while south-facing slopes tend to be moister.

Only 0.8% statutorily conserved in the Luchaba Wildlife Reserve with small patches also conserved in the Oribi Gorge Nature Reserve. Some 15% has been transformed mainly by cultivation. Alien invasive plants are also a serious threat, particularly *Chromolaena odorata, Lantana camara* and *Caesalpinia decapetala* (Mucina & Rutherford, 2006).

Plate 2: A view from the road of the Eastern Valley Thicket, within the Mzimvubu River valley

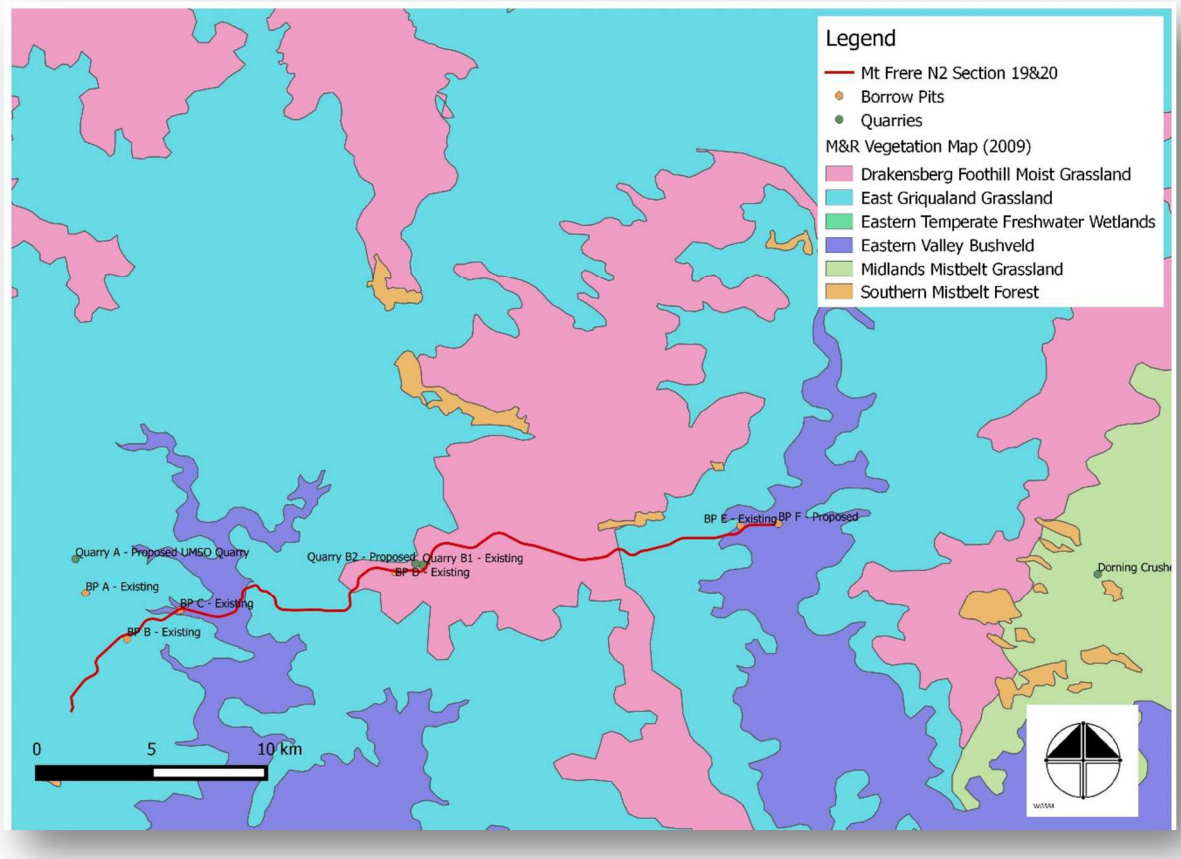

Figure 2: The vegetation units as shown in the Mucina & Rutherford 2006 Vegmap data

The National Environmental Management, Biodiversity Act, promulgated on 9 December 2011 (NEM:BA (Act No 10 of 2004) lists 225 threatened ecosystems based on vegetation type (Vegmap, 2006 as amended). Should a vegetation type or ecosystem be listed, actions in terms of NEM:BA are triggered.

Midlands Mistbelt Grassland (Gs9) (Figure 2) is listed by this Act, thus and development will require a minimum of a Basic Assessment for any development, which would result in a loss of any area greater than 300m^2. It is also required that when determining the significance of impact on biodiversity in an EA process, listed as either a Critically endangered or Endangered ecosystem, the impact of the loss of natural habitat should be ranked as **highly significant.** The Midlands Mistbelt Grassland is however listed as Vulnerable and only applies to the Doring Crushers Quarry within the study area.

4.2 Observed vegetation and plant Species of Special concern

Approximately 269 plant species were confirmed within the study area in this and various other assessments conducted by the author within the region in the past (Appendix 1). Plant Species of Special Concern were actively searched for (Appendix 1) and those observed are listed in Table 1; together with their respective conservation status and distribution in the site. The status of these plants is dependent on their respective listing in the Provincial Nature Conservation Ordinance (PNCO) of 1974, the National Forest Act (Act No. 84 of 1998) or by the International Union for Conservation of Nature (Red data list) or IUCN.

These species of special concern will require permits from the relevant provincial departments, if any individuals are to be removed, translocated or trimmed according to the relevant legislation including the National Forestry Act (Department of Agriculture, Fisheries and Forestry) and the Provincial Nature Conservation Ordinance (Department of Economic Development, Environmental Affairs and Tourism – Permit Administration).

The majority of the species were observed in the thicket vegetation units and isolated specimens within the grassland units. All of the species are easily translocated or can be used on the rehabilitation within the disturbed areas after construction.

Table 1: Protected plant species observed in the study area

Botanical Name	Family	Status	Regional Distribution/ Endemism	Distribution within the site
Aloe striata	Asphodelaceae	PNCO	EC endemic, widespread	Isolated specimens in Section 20 with the Eastern Valley Thicket areas and associated with rocky areas along water courses with most just outside the present servitude fences
Crassula sp	Crassulaceae	PNCO	EC, WC, KZN	Isolated specimens usually associated with rocky cliffs in any of the observed cuttings

4.3 Terrestrial fauna

As per the Terms of Reference, the faunal assessment was largely desktop, based on known distribution records, past assessments and expertise, supported by field observations. Table 2, 3 and 5 lists the relevant faunal groups, their likelihood of occurring within the study area, together with their associated habitat and conservation status. The majority of species listed as well as observed with a conservation status were found in association with rivers, rocky outcrops and the thicket / grassland vegetation types. The majority of these species were listed by the Provincial Nature Conservation Ordinance (PNCO).

The survey occurred during an extended dry winter period with cold conditions. This limited to the siting of any species particularly the reptiles and amphibians. This is opposed to a previous survey conducted in the region during warm conditions, with an abundance of amphibians and snakes being observed in the area. These included Puff adders, Rinkhals and a large variety of amphibians. However due to the disturbance, traffic all of these species were observed adjacent to the road reserve, and mostly within puddles or streams (Table 2 -4)

Table 2: List of amphibian species recorded or likely to occur in the general study area, together with the conservation status.

Family	Genus	Species	Common name	Red list category	Atlas region endemic	Probability of occurring / observed
Arthroleptidae	Arthroleptis	wahlbergi	Bush Squeaker	Least Concern		Unlikely
Arthroleptidae	*Leptopelis*	*xenodactylus*	Longtoed Tree Frog	Endangered	Yes	Unlikely
Brevicepitidae	*Breviceps*	*mossambicus*	Mozambique Rain Frog	Least Concern		Unlikely
Brevicepitidae	*Breviceps*	*verrucosus*	Plaintive Rain Frog	Least Concern		Likely
Bufonidae	*Amietophrynus*	*gutturalis*	Guttural Toad	Least Concern		Likely
Bufonidae	*Amietophrynus*	*rangeri*	Raucous Toad	Least Concern		Observed in previous studies
Bufonidae	*Vandijkophrynus*	*gariepensis*	Karoo Toad (subsp. gariepensis)	Not listed		Likely
Heleophrynidae	*Hadromophryne*	*natalensis*	Natal Ghost Frog	Least Concern		Unlikely
Hyperoliidae	*Afrixalus*	*spinifrons*	Natal Leaf-folding Frog	Vulnerable		Unlikely
Hyperoliidae	*Hyperolius*	*marmoratus*	Painted Reed Frog	Least Concern		Unlikely
Hyperoliidae	*Hyperolius*	*semidiscus*	Yellowstriped Reed Frog	Least Concern		Unlikely
Hyperoliidae	*Kassina*	*senegalensis*	Bubbling Kassina	Least Concern		Observed in previous studies
Hyperoliidae	*Semnodactylus*	*wealii*	Rattling Frog	Least Concern		Observed in previous studies
Phrynobatrachidae	*Phrynobatrachus*	*mababiensis*	Dwarf Puddle Frog	Least Concern		Unlikely
Phrynobatrachidae	*Phrynobatrachus*	*natalensis*	Snoring Puddle Frog	Least Concern		Unlikely
Pipidae	*Xenopus*	*laevis*	Common Platanna	Least Concern		Observed in previous studies
Ptychadenidae	*Ptychadena*	*oxyrhynchus*	Sharpnosed Grass Frog	Least Concern		Unlikely
Ptychadenidae	*Ptychadena*	*porosissima*	Striped Grass Frog	Least Concern		Unlikely
Pyxicephalidae	*Amietia*	*fuscigula*	Cape River Frog	Least Concern		Unlikely
Pyxicephalidae	*Amietia*	*angloensis*	Common River Frog	Least Concern		Likely
Pyxicephalidae	*Amietia*	*quecketti*	Queckett's River Frog	Least Concern	Yes	Unlikely
Pyxicephalidae	*Amietia*	*umbraculata*	Maluti River Frog	Least Concern	Yes	Unlikely
Pyxicephalidae	*Anhydrophryne*	*ngongoniensis*	Mistbelt or Ngongoni Moss Frog	Critically Endangered	Yes	Probable - remnant habitat but requires seep / wetland habitat

Pyxicephalidae	*Cacosternum*	*boettgeri*	Common Caco	Least Concern		Observed in previous studies
Pyxicephalidae	*Cacosternum*	*nanum*	Bronze Caco	Least Concern		Observed in previous studies
Pyxicephalidae	*Cacosternum*	*parvum*	Mountain Caco	Least Concern		Unlikely
Pyxicephalidae	*Cacosternum*	*striatum*	Stiped Caco	Data Deficient	Yes	Unlikely
Pyxicephalidae	*Strongylopus*	*fasciatus*	Striped Stream Frog	Least Concern		Likely
Pyxicephalidae	*Strongylopus*	*grayii*	Clicking Stream Frog	Least Concern		Likely
Pyxicephalidae	*Strongylopus*	*wageri*	Plain Stream Frog	Near Threatened		Unlikely
Pyxicephalidae	*Tomopterna*	*natalensis*	Natal Sand Frog	Least Concern		Likely
Pyxicephalidae	*Tomopterna*	*tandyi*	Tandy's Sand Frog	Least Concern		Unlikely

Table 3: List of Reptilian species recorded or likely to occur in the general study area, together with the conservation status

Family	Genus	Species	Subspecies	Common name	Red list category	Atlas region endemic	Probability of occurring / observed
Agamidae	*Agama*	*atra*		Southern Rock Agama	Least Concern		Likely
Chamaeleonidae	*Bradypodion*	*melanocephalum*		KwaZulu Dwarf Chameleon	Vulnerable	Yes	Unlikely
Chamaeleonidae	*Bradypodion*	*thamnobates*		Natal Midlands Dwarf Chameleon	Vulnerable	Yes	Unlikely
Colubridae	*Amplorhinus*	*multimaculatus*		Many-spotted Snake	Least Concern		Unlikely
Colubridae	*Duberria*	*lutrix*	*lutrix*	South African Slug-eater	Least Concern	Yes	Likely
Colubridae	*Lamprophis*	*guttatus*		Spotted House Snake	Least Concern		Likely
Colubridae	*Lycodonomorphus*	*inornatus*		Olive House Snake	Least Concern	Yes	Likely
Colubridae	*Lycodonomorphus*	*laevissimus*		Dusky-bellied Water Snake	Least Concern	Yes	Likely
Colubridae	*Lycodonomorphus*	*rufulus*		Brown Water Snake	Least Concern		Observed in small river
Colubridae	*Lycophidion*	*capense*	*capense*	Cape Wolf Snake	Least Concern		Likely
Colubridae	*Philothamnus*	*natalensis*	*occidentalis*	Western Natal Green Snake	Least Concern	Yes	Likely
Colubridae	*Psammophis*	*crucifer*		Cross-marked Grass Snake	Least Concern		Observed in previous studies
Colubridae	*Psammophylax*	*rhombeatus*	*rhombeatus*	Spotted Grass Snake	Least Concern		Observed in previous studies
Colubridae	*Pseudaspis*	*cana*		Mole Snake	Least Concern		Likely
Cordylidae	*Chamaesaura*	*aenea*		Coppery Grass Lizard	Near Threatened	Yes	Likely
Cordylidae	*Cordylus*	*cordylus*		Cape Girdled Lizard	Least Concern	Yes	Observed in rocky outcrops
Cordylidae	*Cordylus*	*vittifer*		Common Girdled Lizard	Least Concern		Likely
Cordylidae	*Pseudocordylus*	*melanotus*	*subviridis*	Drakensberg Crag Lizard	Least Concern	Yes	Likely
Elapidae	*Hemachatus*	*haemachatus*		Rinkhals	Least Concern		Likely
Gekkonidae	*Pachydactylus*	*maculatus*		Spotted Gecko	Least Concern		Unlikely
Lacertidae	*Nucras*	*lalandii*		Delalande's Sandveld Lizard	Least Concern	Yes	Likely
Lacertidae	*Pedioplanis*	*burchelli*		Burchell's Sand Lizard	Least Concern	Yes	Likely

Lacertidae	*Tropidosaura*	*cottrelli*		Cottrell's Mountain Lizard	Near Threatened	Yes	Likely
Lacertidae	*Tropidosaura*	*essexi*		Essex's Mountain Lizard	Least Concern	Yes	Unlikely
Scincidae	*Acontias*	*breviceps*		Short-headed Legless Skink	Least Concern	Yes	Likely
Scincidae	*Trachylepis*	*punctatissima*		Speckled Rock Skink	Least Concern		Likely
Scincidae	*Trachylepis*	*varia*		Variable Skink	Least Concern		Likely
Varanidae	*Varanus*	*niloticus*		Water Monitor	Least Concern		Unlikely
Viperidae	*Bitis*	*arietans*	*arietans*	Puff Adder	Least Concern		Observed in previous studies

Table 4: List of mammalian species recorded or likely to occur in the general study area, together with the conservation status

Family	Genus	Species	Common name	Red list category	Atlas region endemic	Probability of occurring / observed
Bovidae	*Philantomba*	*monticola*	Blue Duiker	Vulnerable	Yes	Unlikely
Cercopithecidae	*Papio*	*ursinus*	Chacma Baboon	Least Concern	Yes	Unlikely
Chrysochloridae	*Chrysospalax*	*trevelyani*	Giant Golden Mole	Vulnerable	Yes	Unlikely
Vespertilionidae	*Miniopterus*	*schreibersii*	Schreibers's Long-fingered Bat	Near Threatened	Yes	Unlikely

4.4 Birds

According to the South African Bird Atlas Project (SABAP2), an average of 146 bird species have been recorded from the quarter degree grid cells (QDGC) that overlaps with the study area. (www.sabap2.adu.org.za). Table 5 lists birds that were observed in the study area, with none of these being listed as conservation needy.

Table 5: A list of Bird species that were observed.

Genus and species name	Common name
Ardea melanocephala	Heron, Black-headed
Bubulcus ibis	Egret, Cattle
Threskiornis aethiopicus	Ibis, African Sacred
Bostrychia hagedash	Ibis, Hadeda
Columba guinea	Pigeon, Speckled
Streptopelia capicola	Turtle-dove, Cape
Streptopelia senegalensis	Dove, Laughing
Cuculus solitarius	Cuckoo, Red-chested
Colius striatus	Mousebird, Speckled
Hirundo cucullata	Swallow, Greater Striped
Dicrurus adsimilis	Drongo, Fork-tailed
Corvus albus	Crow, Pied
Saxicola torquatus	Stonechat, African
Cossypha caffra	Robin-chat, Cape
Motacilla capensis	Wagtail, Cape
Macronyx capensis	Longclaw, Cape

Lanius collaris	Fiscal, Common (Southern)
Onychognathus morio	Starling, Red-winged
Passer domesticus	Sparrow, House
Passer melanurus	Sparrow, Cape
Ploceus capensis	Weaver, Cape
Euplectes orix	Bishop, Southern Red
Euplectes progne	Widowbird, Long-tailed
Vidua macroura	Whydah, Pin-tailed
Vidua funerea	Indigobird, Dusky
Crithagra scotops	Canary, Forest
Zosterops virens	White-eye, Cape
Scopus umbretta	Hamerkop, Hamerkop
Plectropterus gambensis	Goose, Spur-winged
Alopochen aegyptiacus	Goose, Egyptian
Anas undulata	Duck, Yellow-billed
Milvus aegyptius	Kite, Yellow-billed
Vanellus armatus	Lapwing, Blacksmith
Upupa africana	Hoopoe, African
Pycnonotus tricolor	Bulbul, Dark-capped

5 Bioregional Conservation Plans

According to the Eastern Cape Biodiversity Conservation Plan (ECBCP) of Berliner & Desmet (2007), the study area sections of road traverses several Critical Biodiversity Areas (CBA), with the remaining areas being considered degraded or transformed (Figure 3).

CBA's affected include the following (See definitions as per Berliner & Desmet, (2007) below):

CBA 1 T1 SA Vegetation
T2 Expert
CBA 2 T2 SA vegetation
T2 Expert
CBA 3 – T3 mdtpvg

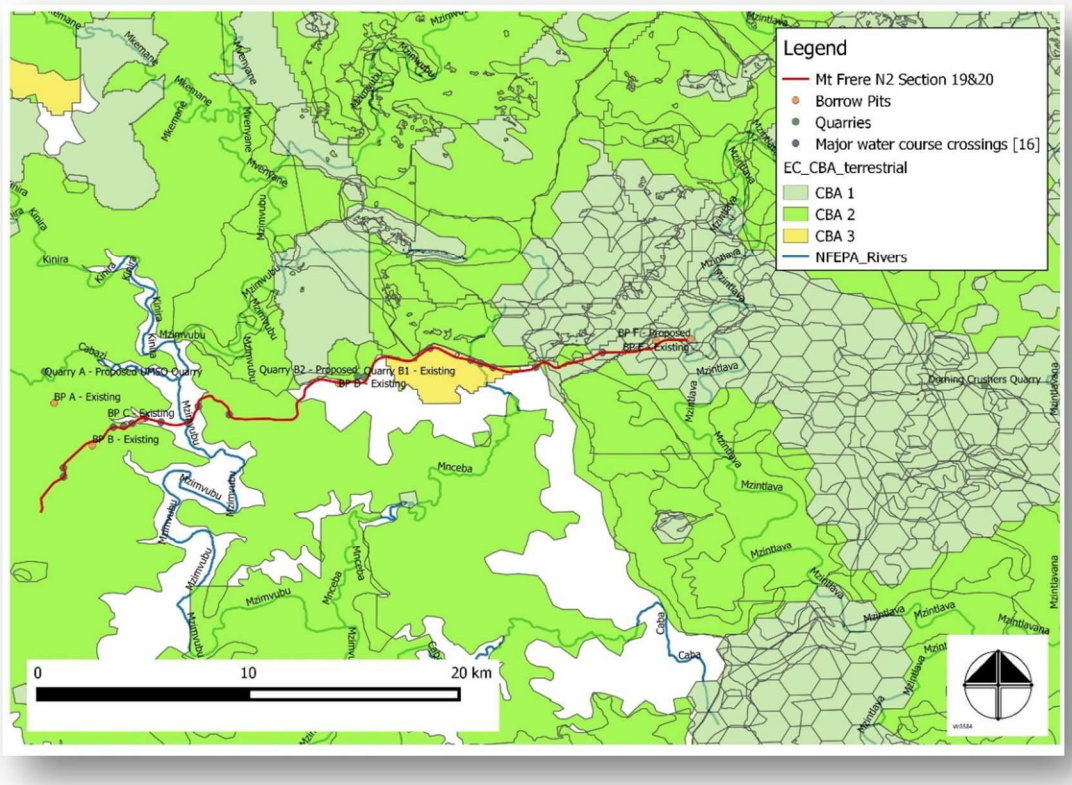

Figure 3: A map illustrating the various CBA's described by Berliner & Desmet (2007), where CBA = Critical Biodiversity Areas

CBA Categories & CBA Field Codes	Features used to define category	Map Layer	CBA Sub-Category Name
Conservation Areas			
Reserve 1	South African National Parks	Protected Areas 1	Statutory protected areas
	Eastern Cape Provincial Nature Reserves	Protected Areas 1	
Reserve 2	Included, but not reliable as no accepted coverage of private nature reserves, conservancies, etc. available	Protected Areas 2	Non-statutory protected areas
Terrestrial Environment			
Terrestrial Critical Biodiversity Area (CBA) Level 1			
T1	National critically endangered vegetation types (ecosystems): The Amount of remaining intact SA vegetation type is less than representation target. NOTE: The ecosystem status classification used is the provincial level classification and includes degradation (see Section 0)	SA vegetation	Critically endangered ecosystems
T1	STEP critically endangered vegetations types	STEP vegetation	Critically endangered ecosystems
T1	National Forest Assessment critically endangered forest patches	Forests patches	Critically endangered ecosystems
T1	80-100% irreplaceable planning units: Areas definitely required to meet representation targets for biodiversity features (SA vegetation types, expert mapped areas)	Planning units	Irreplaceable sites
T1	KZN C-Plan minset R1 & R2 minset display categories	KZN CPlan	Irreplaceable sites
T1	Important forest clusters: Clusters identified in the forestry planning process as critical (All forest clusters with IRR>=10 (50%))	Forest clusters	Irreplaceable forest clusters
Terrestrial CBA Level 2			
T2	50-90% irreplaceable sites. This criterion is not included here. By definition this implies all remaining areas of critical and endangered vegetation types, and most areas of vulnerable vegetation types not included in T1. This criterion is covered by T2-level ecosystem status	*No Layer*	Near irreplaceable sites
T2	Endangered SA vegetation types. The area of intact vegetation remaining of a vegetation type is within 15% of the set representation target	SA vegetation	Endangered ecosystems
T2	Endangered STEP vegetations types	STEP vegetation	Endangered ecosystems
T2	Endangered forest patches	Forest patches	Endangered ecosystems
T2	All expert mapped areas less than 25 000ha in size. Includes expert data from this project, STEP birds, SKEP, Wild Coast, Pondoland and marine studies.	Expert areas	Known important sites for biodiversity
T2	All other Forest Clusters (with 500m buffers)	Forest clusters	Forest clusters
T2	1km coastal buffer (forests are not added to this as these are captured elsewhere)	Coastal buffer	Coastal buffer
Corridor1	Ecological corridors and/or named macro-ecological corridors from existing studies (i.e. from STEP, Wild Coast/Pondoland, SEA, etc.) and expert mapped	Corridors 1	Ecological corridors
Corridor2	Ecological corridors identified in this project using an Integrated corridor design for the whole province that considers all (not only thicket) terrestrial priorities as well as aquatic priorities whilst minimizing conflict with existing production landscapes. Design units are sub-QCs.	Corridors 2	Ecological corridors
Terrestrial CBA Level 3			
T3	Vulnerable SA vegetation types	SA vegetation	Vulnerable ecosystems
T3	Vulnerable STEP vegetation types	STEP vegetation	Vulnerable ecosystems

Figure 4 indicates the relevant Pondoland Systematic conservation plan, used in the ECBCP, which indicated that the Doring Crushers quarry is located within a forest corridor between two priority forest areas. However during this survey it was found that the proposed quarry site is located within a transformed area (grazing and agriculture) surrounded by degrade water courses (erosion) and alien vegetation.

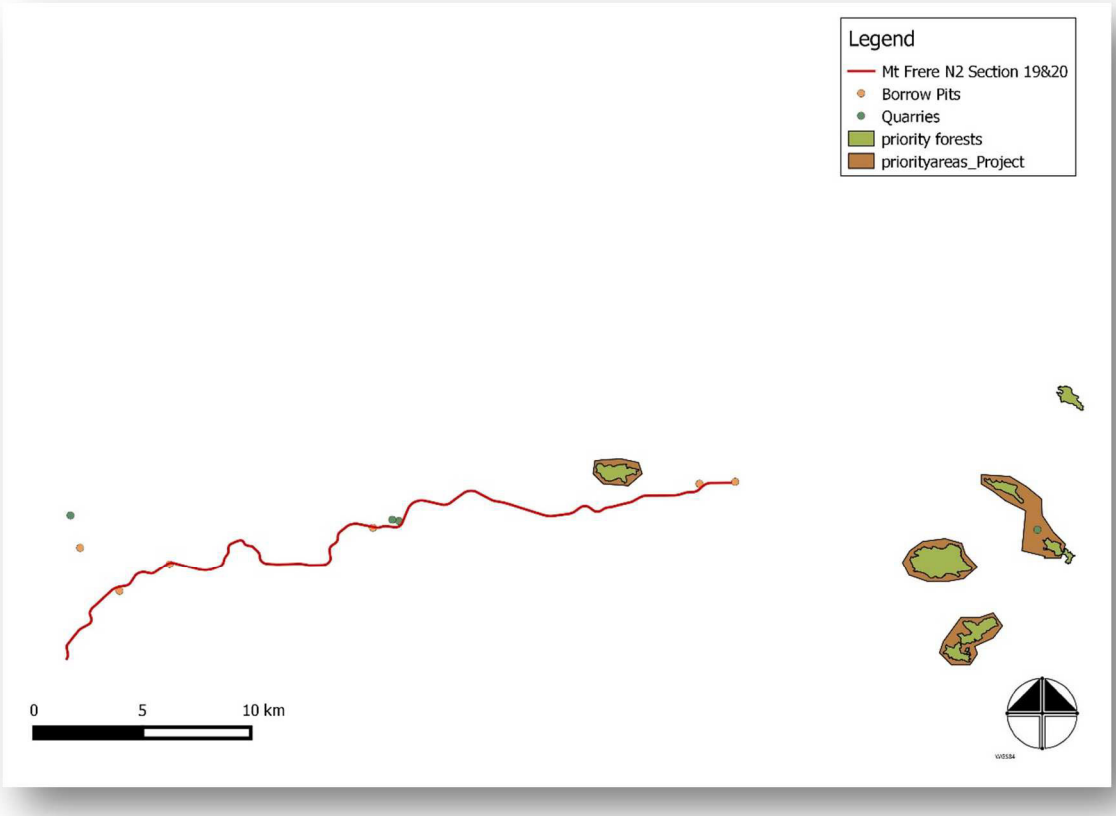

Figure 4: Pondoland Systematic Conservation Plan priority areas noting the position of the eastern most quarry.

6 Ecological sensitivity assessment

The ecological sensitivity of the various habitats (vegetation) is usually ranked in terms of their sensitivity to transformation, using the following criteria, listed in order of importance, i.e. the habitat or vegetation unit:

- Contained Species of Special Concern (SSC)
- Habitat was protected under a form of legislation
- Exhibited a high degree of biodiversity
- Exhibited a limited degree of degradation
- A unique habitat that is not well represented within the region
- Provided an important ecosystem role or support system, e.g. ecological corridor:

- Habitats containing SSC are thus rated as **Very High**
- All intact vegetation units, which contained protected flora or sensitive habitat, are rated **High**
- All unimproved vegetation types are rated as **Moderate**, i.e. these have been impacted upon, but are still able to contribute at the landscape level towards ecosystem function and / or assist in the maintenance of ecological corridors
- All modified, transformed or man-made systems were rated as **Low**. These systems have limited restoration / rehabilitation potential, but still provide a form of habitat.

Figure 5 indicates the various habitats that were considered sensitive, i.e. these are unique habitats rated as either Endangered or Vulnerable (Berliner & Desmet, 2007) and were thus consequently listed as Critical Biodiversity Areas within the ECBCP. The corridor related CBAs were considered Moderate while the remaining areas were rated as LOW / Not Applicable.

However, consideration must be given that the road is already constructed within these areas, and would not have a direct impact, resulting in any loss of these sensitive habitats. This is based on the assumption that all the mitigation and recommendations are upheld and that should any protected species be removed that the requisite permits are in place.

7 Assessment of Impacts and Identification of Management Actions

The impact assessment was conducted based on the supplied methodology and considered the following five potential impacts:

- Impact 1: Loss of vegetation and associated habitat – Biodiversity Loss
- Impact 2: Loss of plant Species of Conservation Concern - Biodiversity Loss
- Impact 3: Spread of alien invasive plant species - Biodiversity Loss
- Impact 4: Loss of fauna - Biodiversity Loss
- Impact 5: Habitat fragmentation and disturbance of Critical Biodiversity Areas corridors

7.1 - Impact 1: Loss of vegetation and associated habitat

<table>
<tr><td>Environmental Impact:
Loss of vegetation, a loss of species abundance although low within the road servitude:</td><td colspan="2">Activity/Aspect & Impact Source:
Due to the nature of the project vegetation will be cleared within the road servitude and the present road rehabilitated, together with supporting infrastructure such as stormwater management system. The construction phase would have the greatest impact on the surrounding vegetation. This will definitely result in the disturbance of the vegetation and soils within the site especially when considering the linear aspects of the project such as the roads. Due to the scale of disturbance in the long-term on the surrounding vegetation when compared to its current state (low species abundance but with isolate areas with sensitive habitat and or protected plant species.
The operational phase of the project would have limited impact on the surrounding vegetation once the plants are allowed to re-establish themselves in any remaining areas; as the species assemblages have already altered from natural</td><td colspan="4">Proposed Mitigation:
• Clearing of vegetation should be kept to a minimum, keeping to the width and length of the earth works to a minimum and only as required considering the duration of the construction period.
• Construction activities should not exceed the proposed construction boundaries by more than 5m to avoid the secondary impact of construction and increasing the areas that would require clearing and rehabilitation
• A search and rescue operation for both plants and fauna (particularly reptiles) must be initiated prior to the commencement of any construction once the required permits are in place per section road being upgraded. Applications must be submitted to the Department of Agricultural, Fisheries and Forestry (DAFF) and the Provincial Department of Economic Development, Environmental Affairs and Tourism (DEDEAT). Rescued plants could be used in the re-vegetation / rehabilitation process, while any animals could be released on the adjacent farms.
• Re-vegetation as part of a rehabilitation plan is always advocated, however due the nature of the vegetation, this may not be practical. It is suggested that the shallow topsoil layer be stockpiled separately from the subsoil layers, should the excavation exceed 0.5 m. When the construction has been completed, then the topsoil layers, which contain seed and vegetative material, should be reinstated last thus allowing plants to rapidly re-colonise the bare soil areas.
• Alien plant regrowth should also be monitored, and any such species should be removed during the construction phase.
Reference to EMP section:
EMP to be completed after review of draft basic assessment report.</td></tr>
<tr><td colspan="7">Impact Significance</td></tr>
<tr><td>Without Mitigation:</td><td>Duration:
Long term</td><td>Frequency:
Often</td><td>Extent/Scale:
Site Impact</td><td>Probability:
Probable</td><td>Impact Status:
NEGATIVE</td><td>Significance:
MEDIUM</td></tr>
<tr><td>With Mitigation:</td><td>Duration:
Medium term</td><td>Frequency:
Often</td><td>Extent/Scale:
Site Impact</td><td>Probability:
Probable</td><td>Impact Status:
NEGATIVE</td><td>Significance:
LOW</td></tr>
<tr><td colspan="2">IAP Interest:
Undermined, to be completed based on review of draft BAR</td><td colspan="2">Potential to Mitigate:
High potential / easy to mitigate</td><td colspan="3">Assessment Confidence:
Complete</td></tr>
</table>

7.2 - Impact 2: Loss of habitat containing protected species or Species of Special Concern

<table>
<tr>
<td>Environmental Impact:
Loss of vegetation, a loss of species of special concern. Isolated area occur within the road reserve mostly associated with rocky areas as listed in Table 1 in this report:</td>
<td>Activity/Aspect & Impact Source:
Due to the nature of the project vegetation will be cleared within the road servitude and the present road rehabilitated, together with supporting infrastructure such as stormwater management system. The construction phase would have the greatest impact on the surrounding vegetation. This will definitely result in the disturbance of the vegetation and soils within the site especially when considering the linear aspects of the project such as the roads. Due to the scale of disturbance in the long-term on the surrounding vegetation when compared to its current state (low species abundance but with isolate areas with sensitive habitat and or protected plant species.
The operational phase of the project would have limited impact on the surrounding vegetation once the plants are allowed to re-establish themselves in any remaining areas; as the species assemblages have already altered from natural</td>
<td colspan="4">Proposed Mitigation:
• Clearing of vegetation should be kept to a minimum, keeping to the width and length of the earth works to a minimum and only as required considering the duration of the construction period.
• Construction activities should not exceed the proposed construction boundaries by more than 5m to avoid the secondary impact of construction and increasing the areas that would require clearing and rehabilitation
• A search and rescue operation for both plants and fauna (particularly reptiles) must be initiated prior to the commencement of any construction once the required permits are in place per section road being upgraded. Applications must be submitted to the Department of Agricultural, Fisheries and Forestry (DAFF) and the Provincial Department of Economic Development, Environmental Affairs and Tourism (DEDEAT). Rescued plants could be used in the re-vegetation / rehabilitation process, while any animals could be released on the adjacent farms.
• Re-vegetation as part of a rehabilitation plan is always advocated, however due the nature of the vegetation, this may not be practical. It is suggested that the shallow topsoil layer be stockpiled separately from the subsoil layers, should the excavation exceed 0.5 m. When the construction has been completed, then the topsoil layers, which contain seed and vegetative material, should be reinstated last thus allowing plants to rapidly re-colonise the bare soil areas.
• Alien plant regrowth should also be monitored, and any such species should be removed during the construction phase.
Reference to EMP section:
EMP to be completed after review of draft basic assessment report.</td>
</tr>
<tr>
<td colspan="6">Impact Significance</td>
</tr>
<tr>
<td>Without Mitigation:</td>
<td>Duration:
Long term</td>
<td>Frequency:
Often</td>
<td>Extent/Scale:
Site Impact</td>
<td>Probability:
Probable</td>
<td>Impact Status:
NEGATIVE</td>
<td>Significance:
MEDIUM</td>
</tr>
<tr>
<td>With Mitigation:</td>
<td>Duration:
Medium term</td>
<td>Frequency:
Often</td>
<td>Extent/Scale:
Site Impact</td>
<td>Probability:
Probable</td>
<td>Impact Status:
NEGATIVE</td>
<td>Significance:
LOW</td>
</tr>
<tr>
<td colspan="2">IAP Interest:
Undermined, to be completed based on review of draft BAR</td>
<td colspan="2">Potential to Mitigate:
High potential / easy to mitigate</td>
<td colspan="3">Assessment Confidence:
Complete</td>
</tr>
</table>

7.3 - Impact 3: The potential spread of alien vegetation

<table>
<tr>
<td>Environmental Impact:
Increase in alien plant species.</td>
<td>Activity/Aspect & Impact Source:
Alien vegetation is currently sparse with isolated clumps of alien Acacias or Solanum species.</td>
<td colspan="4">Proposed Mitigation:
• Clearing of vegetation should be kept to a minimum, keeping to the width and length of the earth works to a minimum and only as required considering the duration of the construction period.
• Re-vegetation as part of a rehabilitation plan is always advocated, however due the nature of the vegetation, this may not be practical. It is suggested that the shallow topsoil layer be stockpiled separately from the subsoil layers, should the excavation exceed 0.5 m. When the construction has been completed, then the topsoil layers, which contain seed and vegetative material, should be reinstated last thus allowing plants to rapidly re-colonise the bare soil areas.
• An alien invasive management plan to be implemented during construction and operation phases. The plan must include mitigation measures to reduce the invasion of alien species and ensure that the continuous monitoring and removal of alien species is undertaken. Observed species included the following:
<table>
<tr><th>Declared alien / weed plants along / proximate to the road reserve</th><th>Legislation and required actions</th></tr>
<tr><td>Acacia mearnsii</td><td>Category 2 according to the Conservation of Agricultural Resources Act (CARA) (43 of 1998), which may be propagated in controlled conditions, but may not be traded.</td></tr>
<tr><td>Eucalyptus grandis</td><td>Category 2 CARA, must be controlled</td></tr>
<tr><td>Opuntia ficus indica</td><td>Category 1 CARA, which must be destroyed.</td></tr>
<tr><td>Solanum mauritianum</td><td>Category 1 CARA, which must be destroyed.</td></tr>
</table>
Reference to EMP section:
EMP to be completed after review of draft basic assessment report.</td>
</tr>
<tr><td colspan="6">Impact Significance</td></tr>
<tr><td>Without Mitigation:</td><td>Duration:
Long term</td><td>Frequency:
Often</td><td>Extent/Scale:
Site Impact</td><td>Probability:
Probable</td><td>Impact Status:
NEGATIVE</td><td>Significance:
MEDIUM</td></tr>
<tr><td>With Mitigation:</td><td>Duration:
Medium term</td><td>Frequency:
Often</td><td>Extent/Scale:
Site Impact</td><td>Probability:
Probable</td><td>Impact Status:
NEGATIVE</td><td>Significance:
LOW</td></tr>
<tr><td colspan="2">IAP Interest:
Undermined, to be completed based on review of draft BAR</td><td colspan="2">Potential to Mitigate:
High potential / easy to mitigate</td><td colspan="3">Assessment Confidence:
Complete</td></tr>
</table>

7.4 - Impact 4: Loss of fauna

Environmental Impact: Loss of animal species.	***Activity/Aspect & Impact Source:*** Frequent vehicle activity will result in mortality of animals crossing the roads. In the case of this study area, small and medium sized mammals and reptiles would be the most frequent road kills, for reasons that include searching for food, basking during the day, "moon basking" which occurs when reptiles lie on roads at night to absorb warmth from the road surface, or merely to cross to the other side. The risk to amphibians would be lower in the study area due to the lack of available habitat, which limits the need for migration events usually seen in the breeding season			***Proposed Mitigation:*** Mitigations with respect to minimising these incidents are minimal and not always practical. Therefore, awareness should be created during the staff induction programme. Staff should be made aware of the general speed limits as well the potential animals that may cross and how to react in these situations. The majority of the species have large areas adjacent to the site and could easily disperse into these suitable areas. However a search and rescue operation for fauna (particularly amphibians and reptiles) must be initiated prior to the commencement of any construction once the required permits are in place per section of road being upgraded. Applications must be submitted to the Provincial Department of Economic Development, Environmental Affairs and Tourism (DEDEAT). Rescued animals could be released on the adjacent farms ***Reference to EMP section:*** EMP to be completed after review of draft basic assessment report.		
Impact Significance						
Without Mitigation:	Duration: Long term	Frequency: Often	Extent/Scale: Site Impact	Probability: Probable	Impact Status: **NEGATIVE**	Significance: **MEDIUM**
With Mitigation:	Duration: Medium term	Frequency: Often	Extent/Scale: Site Impact	Probability: Probable	Impact Status: **NEGATIVE**	Significance: **LOW**
IAP Interest: Undermined, to be completed based on review of draft BAR	***Potential to Mitigate:*** High potential / easy to mitigate			***Assessment Confidence:*** Complete		

7.5 - Impact 5: Habitat fragmentation and loss of Critical Biodiversity Area corridors

Environmental Impact: Fragmentation of habitats and loss of ecological corridors.	***Activity/Aspect & Impact Source:*** The construction of roads and the installation of the perimeter fences would pose a barrier to animal movement within the area. This would obviously restrict those species that are not able to move through the fencing such as the medium sized mammals. However these are already present			***Proposed Mitigation:*** It is recommend that the standard fencing remains unchanged. This will provide a degree of movement between farms, allowing the passage of small and medium sized mammals. ***Reference to EMP section:*** EMP to be completed after review of draft basic assessment report.		
Impact Significance						
Without Mitigation:	Duration: Long term	Frequency: Often	Extent/Scale: Site Impact	Probability: Probable	Impact Status: **NEGATIVE**	Significance: **MEDIUM**
With Mitigation:	Duration: Medium term	Frequency: Often	Extent/Scale: Site Impact	Probability: Probable	Impact Status: **NEGATIVE**	Significance: **LOW**
IAP Interest: Undermined, to be completed based on review of draft BAR	***Potential to Mitigate:*** High potential / easy to mitigate			***Assessment Confidence:*** Complete		

8 Conclusion and recommendations

The N2 Section 19 & 20 presently traverses a largely uniform grassland environment, interspersed with areas of thicket or rocky outcrops. However it the mitigation listed in the impact assessment are upheld, coupled to the fact that the existing servitude will be used, the overall impacts were all rated as LOW.

The most important considerations to timeous submission of the required plant removal permits as per of a Search and Rescue operation. This must also be coupled to a re-vegetation plan that must also focus on adequate alien plant management.

With regard the borrow pits and quarries the following summary is present, in particular if a new area is proposed or the current mining area will be expanded:

	Type	Site Sensitivity	Rationale
Borrow Pit A	Existing	Low	Degraded grasslands
Borrow Pit B	Existing	Low	Degraded grasslands
Borrow Pit C	Existing	Low	Degraded grasslands
Borrow Pit D	Existing	Low	Degraded grasslands
Borrow Pit E	Existing	Low	Degraded grasslands
Borrow Pit F	Proposed	High	Rocky outcrop and in close proximity to large floodplain and watercourses
Quarry A	Proposed	Moderate	Close to water course and rock outcrops
Quarry B1	Existing	Low	Degraded grassland
Quarry B2	Existing	Low	Degraded grassland
Doring Crushers Quarry	Proposed	Moderate	Located within Priority forest corridor although area is very degraded.

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10 Appendix 1: Indigenous / naturalised plant species list – observed within the region and / or study area

Family	Naturalised	Species	Threat status	SA Endemic
ACANTHACEAE		*Barleria obtusa Nees*	LC	No
ACANTHACEAE		*Blepharis integrifolia (L.f.) E.Mey. ex Schinz var. integrifolia*	LC	No
ACANTHACEAE		*Chaetacanthus setiger (Pers.) Lindl.*	LC	No
ACANTHACEAE		*Hypoestes forskaolii (Vahl) R.Br.*	LC	No
ACANTHACEAE		*Sclerochiton harveyanus Nees*	LC	No
AGAPANTHACEAE		*Agapanthus praecox Willd. subsp. minimus (Lindl.) F.M.Leight.*	LC	No
AMARANTHACEAE	*	*Achyranthes aspera L. var. aspera*	Not Evaluated	No
AMARYLLIDACEAE		*Cyrtanthus epiphyticus J.M.Wood*	LC	No
AMARYLLIDACEAE		*Haemanthus deformis Hook.f.*	VU	No
AMARYLLIDACEAE		*Haemanthus humilis Jacq. subsp. hirsutus (Baker) Snijman*	LC	No
ANACARDIACEAE		*Searsia chirindensis (Baker f.) Moffett*	LC	No
ANACARDIACEAE		*Searsia dentata (Thunb.) F.A.Barkley*	LC	No
ANACARDIACEAE		*Searsia discolor (E.Mey. ex Sond.) Moffett*	LC	No
ANACARDIACEAE		*Searsia undulata (Jacq.) T.S.Yi, A.J.Mill. & J.Wen*	LC	No
ANACARDIACEAE		*Smodingium argutum E.Mey. ex Sond.*	LC	No
ANEMIACEAE		*Mohria vestita Baker*	LC	No
APIACEAE		*Alepidea cirsiifolia Schltr. & H.Wolff*	LC	No
APIACEAE		*Alepidea natalensis J.M.Wood & M.S.Evans*	LC	No
APIACEAE		*Alepidea peduncularis A.Rich.*	DDT	No
APIACEAE		*Bupleurum mundii Cham. & Schltdl.*	LC	No
APIACEAE		*Heteromorpha arborescens (Spreng.) Cham. & Schltdl. var. abyssinica (Hochst. ex A.Rich.) H.Wolff*	LC	No
APIACEAE		*Polemannia montana Schltr. & H.Wolff*	LC	No

Family	Naturalised	Species	Threat status	SA Endemic
APIACEAE		*Sanicula elata Buch.-Ham. ex D.Don*	LC	No
APOCYNACEAE		*Carissa bispinosa (L.) Desf. ex Brenan*	LC	No
APOCYNACEAE		*Orbea verrucosa (Masson) L.C.Leach*	LC	No
APOCYNACEAE		*Pachycarpus campanulatus (Harv.) N.E.Br. var. sutherlandii N.E.Br.*	LC	No
APOCYNACEAE		*Riocreuxia torulosa (E.Mey.) Decne. var. torulosa*	LC	No
ARALIACEAE		*Cussonia spicata Thunb.*	LC	No
ASPARAGACEAE		*Asparagus denudatus (Kunth) Baker*	LC	No
ASPARAGACEAE		*Asparagus ramosissimus Baker*	LC	No
ASPARAGACEAE		*Asparagus setaceus (Kunth) Jessop*	LC	No
ASPHODELACEAE		*Aloe ecklonis Salm-Dyck*	LC	No
ASPHODELACEAE		*Aloe micracantha Haw.*	NT	No
ASPHODELACEAE		*Kniphofia laxiflora Kunth*	LC	No
ASPHODELACEAE		*Kniphofia linearifolia Baker*	LC	No
ASPLENIACEAE		*Asplenium aethiopicum (Burm.f.) Bech.*	LC	No
ASPLENIACEAE		*Asplenium monanthes L.*	LC	No
ASPLENIACEAE		*Asplenium rutifolium (P.J.Bergius) Kunze*	LC	No
ASTERACEAE		*Berkheya acanthopoda (DC.) Roessler*	LC	No
ASTERACEAE		*Berkheya rhapontica (DC.) Hutch. & Burtt Davy subsp. aristosa (DC.) Roessler var. aristosa*	LC	No
ASTERACEAE	*	*Bidens pilosa L.*	Not Evaluated	No
ASTERACEAE		*Cineraria atriplicifolia DC.*	VU	No
ASTERACEAE		*Conyza obscura DC.*	LC	No
ASTERACEAE		*Cymbopappus hilliardiae B.Nord.*	VU	No
ASTERACEAE		*Felicia muricata (Thunb.) Nees subsp. muricata*	LC	No
ASTERACEAE		*Helichrysum cephaloideum DC.*	LC	No

Family	Naturalised	Species	Threat status	SA Endemic
ASTERACEAE		*Helichrysum confertifolium Klatt*	LC	No
ASTERACEAE		*Helichrysum glomeratum Klatt*	LC	No
ASTERACEAE		*Helichrysum griseolanatum Hilliard*	LC	No
ASTERACEAE		*Helichrysum herbaceum (Andrews) Sweet*	LC	No
ASTERACEAE		*Helichrysum krebsianum Less.*	LC	No
ASTERACEAE		*Helichrysum krookii Moeser*	LC	No
ASTERACEAE		*Helichrysum monticola Hilliard*	LC	No
ASTERACEAE		*Helichrysum odoratissimum (L.) Sweet var. odoratissimum*	Not Evaluated	No
ASTERACEAE		*Helichrysum petiolare Hilliard & B.L.Burtt*	LC	No
ASTERACEAE		*Helichrysum simillimum DC.*	LC	No
ASTERACEAE		*Helichrysum tenax M.D.Hend. var. pallidum Hilliard & B.L.Burtt*	Rare	No
ASTERACEAE		*Helichrysum tenax M.D.Hend. var. tenax*	LC	No
ASTERACEAE		*Inulanthera leucoclada (DC.) Källersjö*	LC	No
ASTERACEAE		*Mikaniopsis cissampelina (DC.) C.Jeffrey*	LC	No
ASTERACEAE		*Phymaspermum acerosum (DC.) Källersjö*	LC	No
ASTERACEAE		*Phymaspermum villosum (Hilliard) Källersjö*	Rare	No
ASTERACEAE		*Printzia pyrifolia Less.*	LC	No
ASTERACEAE		*Schistostephium hippiifolium (DC.) Hutch.*	LC	No
ASTERACEAE		*Senecio affinis DC.*	LC	No
ASTERACEAE		*Senecio oxyodontus DC.*	LC	No
ASTERACEAE		*Senecio pterophorus DC.*	LC	No
ASTERACEAE		*Senecio seminiveus J.M.Wood & M.S.Evans*	LC	No
ASTERACEAE		*Ursinia alpina N.E.Br.*	LC	No
ASTERACEAE		*Ursinia saxatilis N.E.Br.*	LC	No

Family	Naturalised	Species	Threat status	SA Endemic
BALSAMINACEAE		*Impatiens hochstetteri Warb. subsp. hochstetteri*	LC	No
BEGONIACEAE		*Begonia dregei Otto & A.Dietr.*	EN	No
BEGONIACEAE		*Begonia sutherlandii Hook.f. subsp. sutherlandii*	LC	No
BEHNIACEAE		*Behnia reticulata (Thunb.) Didr.*	LC	No
BLECHNACEAE		*Blechnum attenuatum (Sw.) Mett.*	LC	No
BLECHNACEAE		*Blechnum australe L. subsp. australe*	LC	No
BORAGINACEAE		*Cynoglossum hispidum Thunb.*	LC	No
BRYACEAE		*Rhodobryum umbraculum (Bruch ex Hook.) Schimp. ex Paris*		No
BUDDLEJACEAE		*Buddleja auriculata Benth.*	LC	No
BURSERACEAE		*Commiphora woodii Engl.*	LC	No
CAPPARACEAE		*Boscia oleoides (Burch. ex DC.) Toelken*	LC	No
CELASTRACEAE		*Cassine schinoides (Spreng.) R.H.Archer*	LC	No
CELASTRACEAE		*Gymnosporia devenishii Jordaan*	Rare	No
CELASTRACEAE		*Gymnosporia harveyana Loes. subsp. harveyana*	LC	No
CELASTRACEAE		*Gymnosporia nemorosa (Eckl. & Zeyh.) Szyszyl.*	LC	No
CELASTRACEAE		*Gymnosporia rubra (Harv.) Loes.*	LC	No
CELASTRACEAE		*Maytenus acuminata (L.f.) Loes. var. acuminata*	LC	No
CELASTRACEAE		*Mystroxylon aethiopicum (Thunb.) Loes. subsp. aethiopicum*	LC	No
CELASTRACEAE		*Pleurostylia capensis (Turcz.) Loes.*	LC	No
CELASTRACEAE		*Pterocelastrus rostratus (Thunb.) Walp.*	Declining	No
CELASTRACEAE		*Putterlickia pyracantha (L.) Szyszyl.*	LC	No
COMBRETACEAE		*Combretum caffrum (Eckl. & Zeyh.) Kuntze*	LC	No
COMBRETACEAE		*Combretum erythrophyllum (Burch.) Sond.*	LC	No
COMBRETACEAE		*Combretum kraussii Hochst.*	LC	No

Family	Naturalised	Species	Threat status	SA Endemic
CONVOLVULACEAE		*Falkia repens Thunb.*	LC	No
CONVOLVULACEAE		*Ipomoea oblongata E.Mey. ex Choisy*	LC	No
CONVOLVULACEAE		*Merremia pterygocaulos (Choisy) Hallier f.*	LC	No
CORNACEAE		*Curtisia dentata (Burm.f.) C.A.Sm.*	NT	No
CUCURBITACEAE		*Cucumis zeyheri Sond.*	LC	No
CUPRESSACEAE		*Widdringtonia nodiflora (L.) Powrie*	LC	No
CYPERACEAE		*Cyperus schlechteri C.B.Clarke*	LC	No
CYPERACEAE		*Schoenoxiphium lehmannii (Nees) Steud.*	LC	No
DIOSCOREACEAE		*Dioscorea rupicola Kunth*	LC	No
DRYOPTERIDACEAE		*Dryopteris lewalleana Pic.Serm.*	LC	No
DRYOPTERIDACEAE		*Polystichum pungens (Kaulf.) C.Presl*	LC	No
DRYOPTERIDACEAE		*Polystichum transkeiense W.Jacobsen*	LC	No
EBENACEAE		*Diospyros lycioides Desf. subsp. sericea (Bernh.) De Winter*	LC	No
EBENACEAE		*Euclea crispa (Thunb.) Gürke subsp. crispa*	LC	No
ELAPHOGLOSSACEAE		*Elaphoglossum acrostichoides (Hook. & Grev.) Schelpe*	LC	No
ERICACEAE		*Erica caffra L. var. caffra*	LC	No
ERICACEAE		*Erica caffrorum Bolus var. caffrorum*	LC	No
ERICACEAE		*Erica evansii (N.E.Br.) E.G.H.Oliv.*	LC	No
ERICACEAE		*Erica frigida Bolus*	LC	No
ERICACEAE		*Erica tysonii Bolus var. tysonii*	LC	No
ERICACEAE		*Erica woodii Bolus var. woodii*	LC	No
EUPHORBIACEAE		*Adenocline acuta (Thunb.) Baill.*	LC	No
EUPHORBIACEAE		*Adenocline pauciflora Turcz.*	LC	No
EUPHORBIACEAE		*Clutia pulchella L. var. pulchella*	LC	No

Family	Naturalised	Species	Threat status	SA Endemic
EUPHORBIACEAE		*Dalechampia capensis A.Spreng.*	LC	No
EUPHORBIACEAE		*Excoecaria simii (Kuntze) Pax*	LC	No
EUPHORBIACEAE		*Tragia glabrata (Müll.Arg.) Pax & K.Hoffm. var. glabrata*	LC	No
FABACEAE		*Varchellia ataxacantha DC.*	LC	No
FABACEAE		*Varchellia karroo Hayne*	LC	No
FABACEAE		*Bauhinia natalensis Oliv. ex Hook.*	LC	No
FABACEAE		*Desmodium repandum (Vahl) DC.*	LC	No
FABACEAE		*Indigofera longibarbata Engl.*	LC	No
FABACEAE		*Lotononis eriocarpa (E.Mey.) B.-E.van Wyk*	LC	No
FABACEAE		*Lotononis pulchella (E.Mey.) B.-E.van Wyk*	LC	No
FABACEAE		*Lotononis stricta (Eckl. & Zeyh.) B.-E.van Wyk*	LC	No
FABACEAE		*Psoralea glabra E.Mey.*	LC	No
FABACEAE		*Rhynchosia adenodes Eckl. & Zeyh.*	LC	No
FABACEAE		*Rhynchosia caribaea (Jacq.) DC.*	LC	No
FABACEAE		*Rhynchosia nervosa Benth. ex Harv. var. nervosa*	LC	No
FABACEAE		*Schotia brachypetala Sond.*	LC	No
FABACEAE		*Tephrosia polystachya E.Mey. var. polystachya*	LC	No
FABACEAE		*Vigna unguiculata (L.) Walp. subsp. unguiculata var. unguiculata*	LC	No
GENTIANACEAE		*Sebaea filiformis Schinz*	LC	No
GENTIANACEAE		*Sebaea macrophylla Gilg*	LC	No
GENTIANACEAE		*Sebaea sedoides Gilg var. confertiflora (Schinz) Marais*	LC	No
GERANIACEAE		*Geranium flanaganii R.Knuth*	LC	No
HAEMODORACEAE		*Barberetta aurea Harv.*	LC	No
HYACINTHACEAE		*Albuca juncifolia Baker subsp. xanthocodon (Hilliard & B.L.Burtt) U.Müll.-Doblies*	Not Evaluated	No

Family	Naturalised	Species	Threat status	SA Endemic
HYPOXIDACEAE		*Rhodohypoxis baurii (Baker) Nel var. platypetala (Baker) Nel*	LC	No
ICACINACEAE		*Cassinopsis ilicifolia (Hochst.) Kuntze*	LC	No
IRIDACEAE		*Aristea torulosa Klatt*	LC	No
IRIDACEAE		*Crocosmia aurea (Pappe ex Hook.) Planch. subsp. aurea*	LC	No
IRIDACEAE		*Dierama reynoldsii I.Verd.*	LC	No
IRIDACEAE		*Dietes iridioides (L.) Sweet ex Klatt*	LC	No
IRIDACEAE		*Tritonia disticha (Klatt) Baker subsp. rubrolucens (R.C.Foster) M.P.de Vos*	LC	No
IRIDACEAE		*Watsonia confusa Goldblatt*	LC	No
LAMIACEAE		*Leonotis dubia E.Mey.*	LC	No
LAMIACEAE		*Leonotis ocymifolia (Burm.f.) Iwarsson*	LC	No
LAMIACEAE		*Leucas glabrata (Vahl) Sm. var. glabrata*	LC	No
LAMIACEAE		*Plectranthus ciliatus E.Mey. ex Benth.*	LC	No
LAMIACEAE		*Plectranthus fruticosus L'Hér.*	LC	No
LAMIACEAE		*Plectranthus grallatus Briq.*	LC	No
LAMIACEAE		*Plectranthus laxiflorus Benth.*	LC	No
LAMIACEAE		*Pycnostachys reticulata (E.Mey.) Benth.*	LC	No
LAMIACEAE		*Rabdosiella calycina (Benth.) Codd*	LC	No
LAMIACEAE		*Salvia aurita L.f. var. aurita*	LC	No
LAMIACEAE		*Salvia repens Burch. ex Benth. var. repens*	LC	No
LAMIACEAE		*Solenostemon latifolius (Hochst. ex Benth.) J.K.Morton*	LC	No
LAMIACEAE		*Stachys caffra E.Mey. ex Benth.*	LC	No
LAMIACEAE		*Stachys cymbalaria Briq.*	LC	No
LAMIACEAE		*Stachys grandifolia E.Mey. ex Benth.*	LC	No
LAMIACEAE		*Syncolostemon densiflorus Benth.*	LC	No

Family	Naturalised	Species	Threat status	SA Endemic
LAURACEAE		*Cryptocarya woodii Engl.*	LC	No
LAURACEAE		*Ocotea bullata (Burch.) Baill.*	EN	No
LYCOPODIACEAE		*Huperzia verticillata (L.f.) Trevis.*	LC	No
MALVACEAE		*Grewia lasiocarpa E.Mey. ex Harv.*	LC	No
MALVACEAE		*Hibiscus aethiopicus L. var. ovatus Harv.*	LC	No
MALVACEAE		*Hibiscus pusillus Thunb.*	LC	No
MALVACEAE	*	*Hibiscus trionum L.*		No
MALVACEAE		*Melhania didyma Eckl. & Zeyh.*	LC	No
MALVACEAE		*Pavonia columella Cav.*	LC	No
MALVACEAE		*Sparrmannia ricinocarpa (Eckl. & Zeyh.) Kuntze var. ricinocarpa*	LC	No
MONIMIACEAE		*Xymalos monospora (Harv.) Baill.*	LC	No
MYRICACEAE		*Morella pilulifera (Rendle) Killick*	LC	No
OCHNACEAE		*Ochna serrulata (Hochst.) Walp.*	LC	No
OLEACEAE		*Jasminum multipartitum Hochst.*	LC	No
ONAGRACEAE		*Ludwigia palustris (L.) Elliott*	Not Evaluated	No
ORCHIDACEAE		*Bonatea polypodantha (Rchb.f.) L.Bolus*	LC	No
ORCHIDACEAE		*Brownleea recurvata Sond.*	LC	No
ORCHIDACEAE		*Corycium dracomontanum Parkman & Schelpe*	LC	No
ORCHIDACEAE		*Disa crassicornis Lindl.*	LC	No
ORCHIDACEAE		*Disa oreophila Bolus subsp. oreophila*	LC	No
ORCHIDACEAE		*Disperis fanniniae Harv.*	LC	No
ORCHIDACEAE		*Eulophia zeyheriana Sond.*	LC	No
ORCHIDACEAE		*Satyrium bracteatum (L.f.) Thunb.*	LC	No
ORCHIDACEAE		*Satyrium parviflorum Sw.*	LC	No

Family	Naturalised	Species	Threat status	SA Endemic
ORCHIDACEAE		*Satyrium sphaerocarpum Lindl.*	LC	No
ORCHIDACEAE		*Stenoglottis fimbriata Lindl. subsp. fimbriata*	LC	No
OROBANCHACEAE		*Striga asiatica (L.) Kuntze*	LC	No
PHYLLANTHACEAE		*Andrachne ovalis (E.Mey. ex Sond.) Müll.Arg.*	LC	No
PIPERACEAE		*Peperomia retusa (L.f.) A.Dietr. var. retusa*	LC	No
PIPERACEAE		*Piper capense L.f. var. capense*	LC	No
PITTOSPORACEAE		*Pittosporum viridiflorum Sims*	LC	No
POACEAE		*Aristida bipartita (Nees) Trin. & Rupr.*	LC	No
POACEAE		*Aristida congesta Roem. & Schult. subsp. barbicollis (Trin. & Rupr.) De Winter*	LC	No
POACEAE		*Aristida junciformis Trin. & Rupr. subsp. galpinii (Stapf) De Winter*	LC	No
POACEAE		*Bothriochloa insculpta (Hochst. ex A.Rich.) A.Camus*	LC	No
POACEAE		*Cymbopogon nardus (L.) Rendle*	LC	No
POACEAE		*Diandrochloa namaquensis (Nees) De Winter*	LC	No
POACEAE		*Ehrharta erecta Lam. var. erecta*	LC	No
POACEAE		*Ehrharta erecta Lam. var. natalensis Stapf*	LC	No
POACEAE		*Eragrostis curvula (Schrad.) Nees*	LC	No
POACEAE		*Hyparrhenia hirta (L.) Stapf*	LC	No
POACEAE		*Leptochloa eleusine (Nees) Cope & N.Snow*	LC	No
POACEAE		*Monocymbium ceresiiforme (Nees) Stapf*	LC	No
POACEAE		*Oplismenus hirtellus (L.) P.Beauv.*	LC	No
POACEAE		*Panicum maximum Jacq.*	LC	No
POACEAE		*Sporobolus fourcadii Stent*	LC	No
POACEAE		*Stipa dregeana Steud. var. elongata (Nees) Stapf*	LC	No
PODOCARPACEAE		*Podocarpus falcatus (Thunb.) R.Br. ex Mirb.*	LC	No

Family	Naturalised	Species	Threat status	SA Endemic
PODOCARPACEAE		*Podocarpus latifolius (Thunb.) R.Br. ex Mirb.*	LC	No
POLYGALACEAE		*Muraltia saxicola Chodat*	LC	No
POLYGALACEAE		*Polygala gymnoclada MacOwan*	LC	No
POLYGALACEAE		*Polygala hottentotta C.Presl*	LC	No
POLYGALACEAE		*Polygala serpentaria Eckl. & Zeyh.*	LC	No
POLYGONACEAE		*Rumex lanceolatus Thunb.*	LC	No
POLYPODIACEAE		*Lepisorus schraderi (Mett.) Ching*	LC	No
POLYPODIACEAE		*Pleopeltis macrocarpa (Bory ex Willd.) Kaulf.*	LC	No
POLYPODIACEAE		*Pleopeltis polypodioides (L.) E.G.Andrews & Windham subsp. ecklonii (Kunze) J.P.Roux*	LC	No
PORELLACEAE		*Porella capensis (Gottsche) Steph.*		No
PROTEACEAE		*Protea simplex E.Phillips*	LC	No
PROTEACEAE		*Protea subvestita N.E.Br.*	VU	No
PTERIDACEAE		*Adiantum poiretii Wikstr.*	LC	No
PTERIDACEAE		*Pteris catoptera Kunze var. catoptera*	LC	No
PTERIDACEAE		*Pteris cretica L.*	LC	No
RANUNCULACEAE		*Anemone fanninii Harv. ex Mast.*	NT	No
RANUNCULACEAE		*Thalictrum rhynchocarpum Quart.-Dill. & A.Rich.*	LC	No
RHAMNACEAE		*Phylica paniculata Willd.*	LC	No
RHAMNACEAE		*Rhamnus prinoides L'Hér.*	LC	No
ROSACEAE		*Agrimonia procera Wallr.*	LC	No
ROSACEAE		*Alchemilla woodii Kuntze*	LC	No
ROSACEAE	*	*Duchesnea indica (Andrews) Focke*	Not Evaluated	No
ROSACEAE		*Rubus apetalus Poir. var. apetalus*	Not Evaluated	No
RUBIACEAE		*Anthospermum herbaceum L.f.*	LC	No

Family	Naturalised	Species	Threat status	SA Endemic
RUBIACEAE		*Galium thunbergianum Eckl. & Zeyh. var. hirsutum (Sond.) Verdc.*	LC	No
RUBIACEAE		*Galopina circaeoides Thunb.*	LC	No
RUBIACEAE		*Keetia gueinzii (Sond.) Bridson*	LC	No
RUBIACEAE		*Pavetta cooperi Harv. & Sond.*	LC	No
RUBIACEAE		*Psychotria capensis (Eckl.) Vatke subsp. capensis var. capensis*	LC	No
RUTACEAE		*Zanthoxylum davyi (I.Verd.) P.G.Waterman*	LC	No
SALICACEAE		*Homalium dentatum (Harv.) Warb.*	LC	No
SALICACEAE		*Scolopia mundii (Eckl. & Zeyh.) Warb.*	LC	No
SALICACEAE		*Trimeria grandifolia (Hochst.) Warb. subsp. grandifolia*	LC	No
SAPINDACEAE		*Allophylus dregeanus (Sond.) De Winter*	LC	No
SAPOTACEAE		*Sideroxylon inerme L. subsp. inerme*	LC	No
SCROPHULARIACEAE		*Anastrabe integerrima E.Mey. ex Benth.*	LC	No
SCROPHULARIACEAE		*Bowkeria verticillata (Eckl. & Zeyh.) Schinz*	LC	No
SCROPHULARIACEAE		*Chaenostoma floribundum Benth.*	LC	No
SCROPHULARIACEAE		*Diascia rigescens E.Mey. ex Benth.*	LC	No
SCROPHULARIACEAE		*Jamesbrittenia breviflora (Schltr.) Hilliard*	LC	No
SCROPHULARIACEAE		*Nemesia silvatica Hilliard*	LC	No
SCROPHULARIACEAE		*Zaluzianskya angustifolia Hilliard & B.L.Burtt*	LC	No
SELAGINELLACEAE		*Selaginella kraussiana (Kunze) A.Braun*	LC	No
SINOPTERIDACEAE		*Cheilanthes eckloniana (Kunze) Mett.*	LC	No
SINOPTERIDACEAE		*Cheilanthes quadripinnata (Forssk.) Kuhn*	LC	No
SOLANACEAE	*	*Solanum chenopodioides Lam.*	Not Evaluated	No
THELYPTERIDACEAE		*Amauropelta bergiana (Schltdl.) Holttum var. bergiana*	LC	No
THYMELAEACEAE		*Gnidia cuneata Meisn.*	LC	No

Family	Naturalised	Species	Threat status	SA Endemic
THYMELAEACEAE		*Peddiea africana Harv.*	LC	No
URTICACEAE		*Laportea alatipes Hook.f.*	LC	No
URTICACEAE		*Laportea peduncularis (Wedd.) Chew subsp. peduncularis*	LC	No
VITACEAE		*Rhoicissus tridentata (L.f.) Wild & R.B.Drumm. subsp. tridentata*	Not Evaluated	No

APPENDIX D5

TERMS OF REFERENCE FOR HERITAGE IMPACT ASSESSMENT

Jeffares & Green (Pty) Ltd, acting on behalf of SFC Engineers and the South African National Roads Agency SOC Limited (SANRAL)

HERITAGE IMPACT ASSESSMENT FOR THE REHABILITATION OF NATIONAL ROUTE 2 (N2) SECTIONS 19 (KM 92.4 TO 94.8) AND 20 (KM 0.0 TO 39.4) BETWEEN MOUNT FRERE AND THE NGCWELENI RIVER, ALFRED NZO DISTRICT MUNICIPALITY, EASTERN CAPE PROVINCE (PROJECT REF: NRA N002-200-2011/1ENV)

TERMS OF REFERENCE

1. INTRODUCTION

Jeffares & Green (Pty) Ltd, in our capacity as Environmental Consultants for the Environmental Authorisation of the above-mentioned project, hereby invite the submission of a written quotation for the undertaking of a Heritage Impact Assessment along Sections 19 (km 92.4 – 94.8) and 20 (km 0.0 – 39.4) between Mount Frere and the Ngcweleni River Bridge, located within Alfred Nzo District Municipality, Eastern Cape Province.

2. BACKGROUND

The proposed project comprises the rehabilitation of the entire Section 20 of the N2 (km 0.0 to km 39.4) and a portion of Section 19 (km 92.4 to km 94.8), including capacity upgrades to the interchange between the N2 National Route and the R405 Provincial Route.

The proposed rehabilitation will include:

- General widening of the existing road cross section to allow for the incorporation of climbing lanes, passing lanes and 2.5 m shoulders;
- Vertical and horizontal geometric improvements to increase design speeds from the current 60 km/h to 100 km/h;
- The rehabilitation and general strengthening of the pavement on the existing road alignment, as well as the construction of new pavement on sections of proposed new alignment;
- Stabilisation of both existing and proposed new cut faces;
- Widening of existing bridges, agricultural underpasses and drainage structures; and
- The upgrade and extension of 173 minor culverts.

In total, the route proposed for rehabilitation within Section 19 is 2.4 km in length, whilst in Section 20 it measures 39.4 km, equating to a total of 41.8 km. The existing road reserve within these sections is proposed to be widened to 50 metres, requiring the acquisition of additional land.

The proposed construction activities will require the sourcing of material for use as both fill and road building material. This has necessitated the identification of potential sites for the establishment of new hard rock quarries and borrow pits. The Geotechnical Engineers have identified four potential hard rock quarry sites (2 existing and 2 new) and six borrow pit sites (5 existing and one new). All of these potential sites will need to be assessed for Heritage Impacts to assist in the selection of preferred material sources.

3. THE SITE

3.1 The Road

Sections 19 and 20 of the N2 Freeway are proposed for re-alignment and upgrade. The co-ordinates of the start and end points of these sections are indicated below

SECTION 19	***South Co-ordinate***	***East Co-ordinate***
START POINT	30° 54’ 38.23” S	28° 59’ 27.56” E
END POINT	30° 53’ 24.59” S	28° 59’ 48.37” E

SECTION 20	***South Co-ordinate***	***East Co-ordinate***
START POINT	30° 53’ 24.59” S	28° 59’ 48.37” E
END POINT	30° 48’ 31.45” S	29° 19’ 17.41” E

Please refer to Annexure 1 for a locality plan.

3.2 Materials Sources

Material will be sourced from a combination of hard rock quarries and borrow pits.

Hard Rock Quarry Sites

Name	***Material***	***Type***	***South Co-ordinate***	***East Co-ordinate***
Quarry A	Dolerite	New	30° 49’ 29.9” S	28° 59’ 54.7” E
Quarry B1	Dolerite	Existing	30° 49’ 39.5” S	29° 09’ 25.9” E
Quarry B2	Dolerite	New	30° 49’ 37.4” S	29° 09’ 14.5” E
Dorning Crushers	Dolerite	Existing	30° 35’ 54.7” S	29° 27”’ 57.1” E

Borrow Pit Sites

Name	*Material*	*Type*	*South Co-ordinate*	*East Co-ordinate*
Borrow Pit A	Dolerite	Existing	30° 50' 26.2" S	29° 00' 11.4" E
Borrow Pit B	Dolerite	Existing	30° 51' 42.5" S	29° 01' 19.8" E
Borrow Pit C	Dolerite	Existing	30° 50' 55.3" S	29° 02' 47.0" E
Borrow Pit D	Dolerite	Existing	30° 49' 51.3" S	29° 08' 40.9" E
Borrow Pit E	Dolerite	Existing	30° 48' 35.0" S	29° 18' 09.1" E
Borrow Pit F	Dolerite	New	30° 48' 31.6" S	29° 19' 11.2" E

4. SCOPE OF REQUIRED SERVICES

As part of the application process for Environmental Authorisation it is necessary to consider the requirements of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) and its Regulations (published in GN R548 of 2 June 2000).

The Project Team is seeking to appoint an appropriately qualified and experienced specialist to provide the services required to ensure compliance with the above Act and Regulations. As such the scope of services would, as a minimum, include:

(i) Engaging with the responsible Heritage Resources Authority at the earliest stage in order to notify them of the proposed development and to furnish it with details regarding the location, nature and extent of the proposed development.

(ii) Undertaking of a Phase 1 Heritage Impact Assessment (HIA), (including both an Archaeological and Paleontological Assessment) for the areas which will be directly affected by the proposed development. This must incorporate an assessment of areas affected by both road upgrade and expansion activities as well as materials sourcing activities.

(iii) The investigation should include the identification of any National Heritage Sites, Provincial Heritage Sites or Protected Areas declared in terms of the Act, a querying of the inventory of the National Estate as well as the Heritage Register, together with a site visit.

(iv) A number of graves were noted within the existing road reserve area. The possibility exists that some of these may be impacted upon by the proposed rehabilitation and widening activities. As such, the specialist will be responsible for obtaining the necessary permissions and approvals in terms of the Act and its associated Regulations, to facilitate the proceeding of construction activities.

(v) The HIA Report must, as a minimum, include the following:

a. The identification and mapping of all heritage resources in the area affected;

b. An assessment of the significance of such resources in terms of the heritage assessment criteria set out in the Act;

c. An assessment of the impact of the development on such heritage resources;

d. An evaluation of the impact of the development on heritage resources, relative to the sustainable social and economic benefits to be derived from the development;

e. Plans for mitigation of any adverse effects during and after the completion of the proposed development.

(vi) Three hard copies and one digital copy of the HIA Report must be submitted to Jeffares & Green (Pty) Ltd (one for use in the Environmental Authorisation Report, one for submission to the Project Engineers and one for the Employer, SANRAL).

(vii) In addition, the appointed specialist will be expected to submit the report, together with the relevant application form, prescribed fee (if applicable) and any other supporting documentation required, to the relevant Heritage Authority, with the aim of obtaining their comment and approval for the proposed development. This comment will be included as part of the Public Participation Process for the Environmental Authorisation Process and will therefore need to be forwarded to Jeffares & Green once received.

At this time, costs for permit applications do not need to be submitted. Should the need for these applications arise (informed by the comment received from the Heritage Authority) additional costs will be requested.

5. GENERAL

- It is a requirement of SANRAL that the area of investigation extend to include areas located 100 meters to either side of the edge of the road route and the proposed material source locations, under investigation.
- This assessment is intended to be utilised in the Basic Assessment Report and will assist the Competent Authority in decision-making.
- Please note that Jeffares & Green (Pty) Ltd expects that specialists will be aware of and utilise the following guidelines for involving Specialists in EIA Processes, to more precisely determine methods and approaches to specialist studies:
    - DEA (2002) Integrated Environmental Management Information Series 4: Specialist Studies. Department of Environmental Affairs (DEA), Pretoria; and

- DEA&DP (2005) Guideline for involving heritage specialists in EIA processes: Edition 1. Department of Environmental Affairs & Development Planning, (DEA&DP), Cape Town.

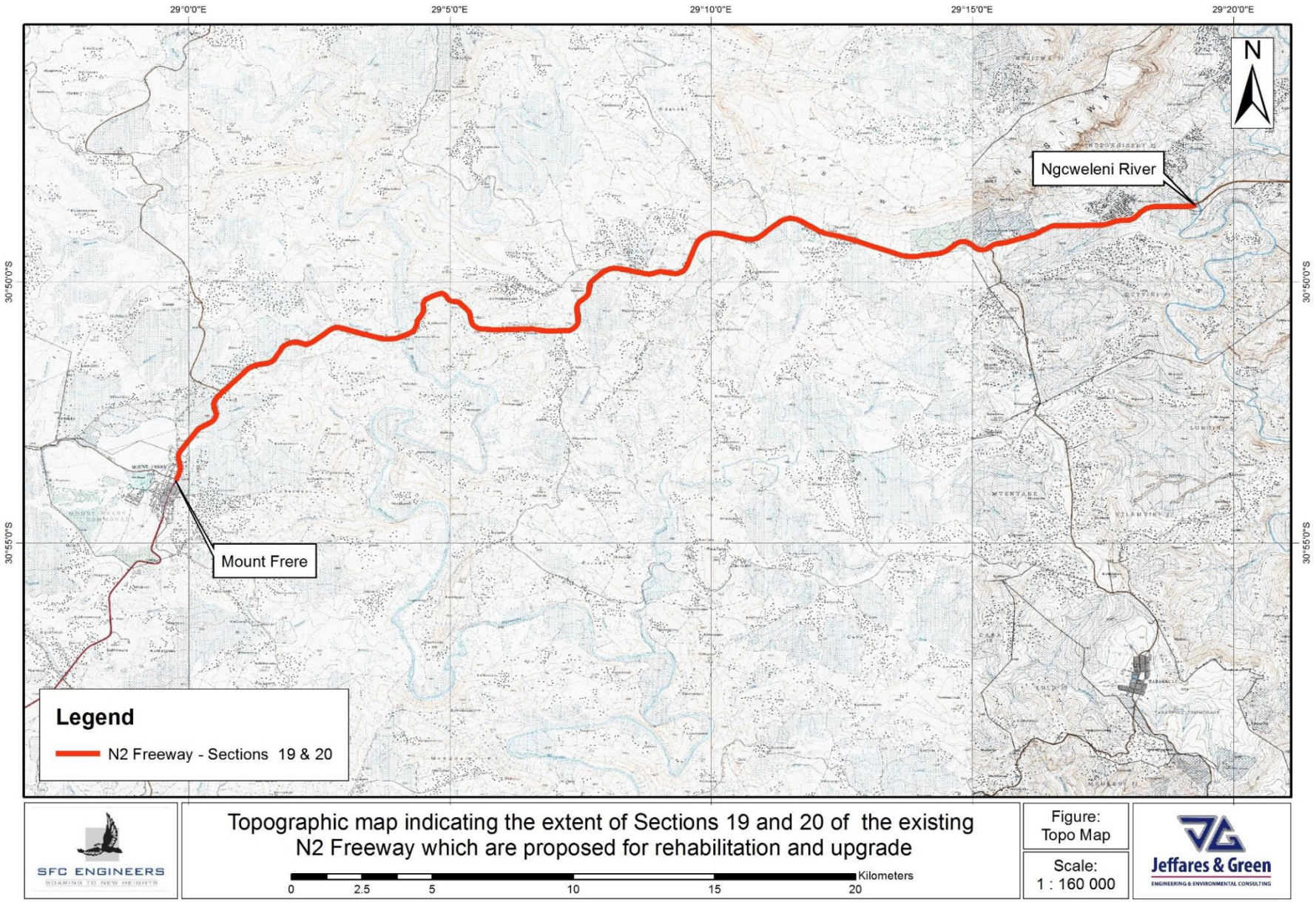
6. DEADLINE FOR SUBMISSION OF PROPOSALS

Proposals are to be submitted by email to Jeffares & Green by 16:30 on 10 March 2015.

Enquires may be directed to:

Sarah Baxter
Tel: 041 363 1900
Email: baxters@jgi.co.za

ANNEXURE 1 – LOCALITY PLAN


29°0'0"E
29°5'0"E
29°10'0"E
29°15'0"E
29°20'0"E
30°50'0"S
30°55'0"S
N
Ngcweleni River
Mount Frere
Legend
N2 Freeway - Sections 19 & 20
SFC ENGINEERS
SOARING TO NEW HEIGHTS
Topographic map indicating the extent of Sections 19 and 20 of the existing N2 Freeway which are proposed for rehabilitation and upgrade
0 2.5 5 10 15 20 Kilometers
Figure: Topo Map
Scale: 1 : 160 000
Jeffares & Green
ENGINEERING & ENVIRONMENTAL CONSULTING

APPENDIX D6

HERITAGE IMPACT ASSESSMENT REPORT

FIRST PHASE HERITAGE IMPACT ASSESSMENT OF THE REHABILITATION OF NATIONAL ROUTE 2 (N2) SECTIONS 19 (KM 92.4 TO 94.8) AND 20 (KM 0.0 TO 39.4) BETWEEN MOUNT FRERE AND THE NGCWELENI RIVER, ALFRED NZO DISTRICT MUNICIPALITY, EASTERN CAPE PROVINCE (PROJECT REF: NRA N002-200-2011/1ENV)

ACTIVE HERITAGE cc.

For: J G Afrika

Frans Prins
MA (Archaeology)

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www.activeheritage.webs.com

16/06/2016

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LIST OF ABBREVIATIONS AND ACRONYMS

EIA	Early Iron Age
ESA	Early Stone Age
HISTORIC PERIOD	Since the arrival of the white settlers - c. AD 1820 in this part of the country
IRON AGE	Early Iron Age AD 200 - AD 1000 Late Iron Age AD 1000 - AD 1830
LIA	Late Iron Age
LSA	Late Stone Age
MSA	Middle Stone Age
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998 and associated regulations (2010).
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999) and associated regulations (2000)
SAHRA	South African Heritage Resources Agency
STONE AGE	Early Stone Age 2 000 000 - 250 000 BP Middle Stone Age 250 000 - 25 000 BP Late Stone Age 30 000 - until c. AD 200

EXECUTIVE SUMMARY

A first phase heritage survey of the proposed rehabilitation of National Route 2 (N2) sections 19 (km 92.4 to 94.8) and 20 (km 0.0 to 39.4) between Mount Frere and the Ngcweleni River, Alfred Nzo District Municipality Eastern Cape Province identified three heritage sites adjacent to the N2. None of these sites occur in the close environs of the identified borrow pits and quarry sites in area. The area is also not part of any known cultural landscape. However, a buffer zone of at least 30m must be strictly maintained around each identified heritage site. There is no archaeological reason why development may not proceed in the rest of the study areas as planned. However, attention is drawn to the South African Heritage Resources Act, 1999 (Act No. 25 of 1999) which, requires that operations that expose archaeological or historical remains should cease immediately, pending evaluation by the provincial heritage agency.

1 BACKGROUND INFORMATION ON THE PROJECT

Table 1. Background information

Consultant:	Frans Prins (Active Heritage cc) for J G Afrika
Background to the study	The proposed project comprises the rehabilitation of the entire Section 20 of the N2 (km 0.0 to km 39.4) and a portion of Section 19 (km 92.4 to km 94.8), including capacity upgrades to the interchange between the N2 National Route and the R405 Provincial Route. In total, the route proposed for rehabilitation within Section 19 is 2.4 km in length, whilst in Section 20 it measures 39.4 km, equating to a total of 41.8 km. The existing road reserve within these sections is proposed to be widened to 50 metres, requiring the acquisition of additional land. The proposed construction activities will require the sourcing of material for use as both fill and road building material. This has necessitated the identification of potential sites for the establishment of new hard rock quarries and borrow pits. The Geotechnical Engineers have identified four potential hard rock quarry sites (2 existing and 2 new) and six borrow pit sites (5 existing and one new). All of these potential sites will need to be assessed for Heritage Impacts to assist in the selection of preferred material sources.
Type of development:	The proposed rehabilitation will include: General widening of the existing road cross section to allow for the incorporation of climbing lanes, passing lanes and 2.5 m shoulders; Vertical and horizontal geometric improvements to increase design speeds from the current 60 km/h to 100 km/h; The rehabilitation and general strengthening of the pavement on the existing road alignment, as well as the construction of new pavement on sections of proposed new alignment; Stabilisation of both existing and proposed new cut faces; Widening of existing bridges, agricultural underpasses and drainage structures; and The upgrade and extension of 173 minor culverts.
Rezoning or subdivision:	Not applicable
Terms of reference	To carry out a First Phase Heritage Impact Assessment (HIA)

Legislative requirements:	The Heritage Impact Assessment was carried out in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and following the requirements of the National Heritage Resources Act, 1999 (Act No. 25 of 1999)

1.1. Details of the area surveyed:

Sections 19 and 20 of the N2 Freeway are proposed for re-alignment and upgrade. The GPS co-ordinates of the start and end points of these sections are indicated below.

Section 19 of the N2
START POINT: 30° 54' 38.23" S 28° 59' 27.56" E
END POINT: 30° 53' 24.59" S 28° 59' 48.37" E

Section 20 of the N2
START POINT: 30° 53' 24.59" S 28° 59' 48.37" E
END POINT: 30° 48' 31.45" S 29° 19' 17.41" E

Material will be sourced from a combination of hard rock quarries and borrow pits. The GPS coordinates of these and their contexts are presented in Table 2.

Table 2. Hard Rock Quarry Sites

Name	***Material***	***Type***	***South Co-ordinate***	***East Co-ordinate***
Quarry A	Dolerite	New	30° 49' 29.9" S	28° 59' 54.7" E
Quarry B1	Dolerite	Existing	30° 49' 39.5" S	29° 09' 25.9" E
Quarry B2	Dolerite	New	30° 49' 37.4" S	29° 09' 14.5" E
Dorning Crushers	Dolerite	Existing	30° 35' 54.7" S	29° 27"' 57.1" E

Table 3. Borrow Pits

Name	***Material***	***Type***	***South Co-ordinate***	***East Co-ordinate***
Borrow Pit A	Dolerite	Existing	30° 50' 26.2" S	29° 00' 11.4" E
Borrow Pit B	Dolerite	Existing	30° 51' 42.5" S	29° 01' 19.8" E
Borrow Pit C	Dolerite	Existing	30° 50' 55.3" S	29° 02' 47.0" E
Borrow Pit D	Dolerite	Existing	30° 49' 51.3" S	29° 08' 40.9" E
Borrow Pit E	Dolerite	Existing	30° 48' 35.0" S	29° 18' 09.1" E
Borrow Pit F	Dolerite	New	30° 48' 31.6" S	29° 19' 11.2" E

The proposed road upgrade and rehabilitation crosses the middle reaches of the Mzimvubu River an area characterised by steep valley sides and impressive views. Current land use within the proposed development area is extensive livestock grazing. Some commercial forestry plantations are situated in the close environs of the Thaba Ntsizwe Mountains in the north eastern section of the project area. Degradation is due to extensive livestock grazing (cows, goats and sheep), access paths and access tracks, which comprise rural land use activities. Human settlements and rural housing occurs in various sections along the N2.

1.2. Cultural Heritage legislation

According to Section 3 (2) of the NHRA, the heritage resources of South Africa include:

"a. places, buildings, structures and equipment of cultural significance;
b. places to which oral traditions are attached or which are associated with living heritage;
c. historical settlements and townscapes;
d. landscapes and natural features of cultural significance;
e. geological sites of scientific or cultural importance;
f. archaeological and palaeontological sites;
g. graves and burial grounds, including.
ancestral graves;

ii. royal graves and graves of traditional leaders;
iii. graves of victims of conflict;
iv. graves of individuals designated by the Minister by notice in the Gazette;
v. historical graves and cemeteries; and
vi. other human remains which are not covered in terms of the Human Tissue Act, 1983 (Act No. 65 of 1983);
h. sites of significance relating to the history of slavery in South Africa;
i. movable objects, including objects recovered from the soil or waters of South Africa, including
archaeological and palaeontological objects and material, meteorites and rare geological specimens;
ii. objects to which oral traditions are attached or which are associated with living heritage;
iii. ethnographic art and objects;
iv. military objects;
v. objects of decorative or fine art;
vi. objects of scientific or technological interest; and
vii. books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings, excluding those that are public records as defined in section 1(xiv) of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996).

In terms of section 3 (3) of the NHRA, a place or object is to be considered part of the national estate if it has cultural significance or other special value because of:
“a. its importance in the community, or pattern of South Africa's history;
b. its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
c. its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
d. its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
e. its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
f. its importance in demonstrating a high degree of creative or technical achievement at a particular period;
g. its strong or special association with a particular community or cultural group for

social, cultural or spiritual reasons;
h. its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa; and
i. sites of significance relating to the history of slavery in South Africa."

2 BACKGROUND TO ARCHAEOLOGICAL HISTORY OF AREA

The archaeological history of the Province of the Eastern Cape Province dates back to about 2 million years and possibly older, which marks the beginning of the Stone Age. The Stone Age in the Eastern Cape Province was extensively researched by archaeologists attached to the Albany Museum in Grahamstown, the University of Stellenbosch, the then University of Transkei (UNITRA), Fort Hare University and more recently by rock art researchers attached to the Rock Art Research Institute at the University of the Witwatersrand. The Stone Age period has been divided in to three periods namely: Early Stone Age (ESA) dating between 2 million years ago to about 200 000 years ago, Middle Stone Age (MSA) dating between 200 000 years ago to about 30 000 years ago, and the Later Stone Age (LSA) which dates from 30 000 to about 2 000 year ago. The Stone Age period ends around approximately 2 000 years ago when Bantu-speaking Iron Age farmers from the north arrived in southern Africa. The Iron Age is also divided into three periods, namely: Early Iron Age (EIA) dating between AD 200 and AD 900, Middle Iron Age (MIA) dating between AD 900 and AD 1300, Late Iron Age (LIA) dating between AD 1 300 and 1 820.

2.1 Stone Age

2.1.1 Early Stone Age (ESA)

The ESA is considered as the beginning of the stone tool technology. It dates back to over 2 million years ago until 200 000 years ago. This period is characterised by the Oldowan and Acheulean industries. The Oldowan Industry, dating to approximately between over 2 million years and 1.7 million years predates the later Acheulean. The Oldowan Industry consists of very simple, crudely made core tools from which flakes are struck a couple of times. To date, there is no consensus amongst archaeologists as to which hominid species manufactured these artefacts. The Acheulean Industry lasted from about 1.7 million years until 200 thousand years ago. Acheulean tools were more specialized tools than those of the earlier industry. They were shaped intentionally to

carry out specific tasks such as hacking and bashing to remove limbs from animals and marrow from bone. These duties were performed using the large sharp pointed artefacts known as hand axes. Cleavers, with their sharp, flat cutting edges were used to carry out more heavy duty butchering activities (Esterhuysen 2007). The ESA technology lasted for a very long time, from early to middle Pleistocene and thus seems to have been sufficient to meet the needs of early hominids and their ancestors. Although not identified on the study area, ESA tools occurrence have been reported in other sites in the Transkei (Derricourt 1977: Feely 1987). Apart from stone artefacts, the ESA sites in the Transkei have produced very little as regards other archaeological remains. This has made it difficult to make inferences pointing to economical dynamics of the ESA people in this part of the world (Mazel 1989).

2.1.2 Middle Stone Age (MSA)

The MSA dates to between 200 000 and 30 000 years ago, and is generally associated with the emergence of anatomically modern humans. The MSA technology is therefore believed to have been manufactured by fully modern humans known as *Homo sapiens* who emerged around 250 000 years ago. While some of the sites belonging to this time period occur in similar contexts as those of ESA, most of the MSA sites are located in rock shelters. Palaeoenvironmental data suggest that the distribution of MSA sites in the high lying Drakensberg and surrounding areas was influenced by the climate conditions, specifically the amount and duration of snow (Carter, 1976). In general, the MSA stone tools are smaller than those of the ESA. Although some MSA tools are made from prepared cores, the majority of MSA flakes are rather irregular and are probably waste material from knapping exercises. A variety of MSA tools include blades, flakes, scrapers and pointed tools that may have been hafted onto shafts or handles and used as spearheads. Between 70 000 and 60 000 years ago new tool types appear known as segments and trapezoids. These tool types are referred to as backed tools from the method of preparation. Residue analyses on the backed tools from South African MSA sites including those in KZN indicate that these tools were certainly used as spear heads and perhaps even arrow points (Wadley, 2007). Derricourt (1977) reported a few MSA sites in the Transkei and some sites investigated by Opperman (1987) in the 1970's and 1980's occur near Maclear directly to the north east of the project area. A large surface scatter of Middle Stone Age artefacts occur near Thaba Ntsizwe approximately 2km from the N2.

2.1.3 Late Stone Age (LSA)

Compared to the earlier MSA and ESA, more is known about the LSA which dates from around 30 000 to 2 000 (possibly later) years ago. This is because LSA sites are more recent than ESA and MSA sites and therefore achieve better preservation of a greater variety of organic archaeological material. The Later Stone Age is usually associated with the San (Bushmen) or their direct ancestors. The tools during this period were even smaller and more diverse than those of the preceding Middle Stone Age period. LSA tool technology is observed to display rapid stylistic change compared to the slower pace in the MSA. The rapidity is more evident during the last 10 000 years. The LSA tool sequence includes informal small blade tradition from about 22 000 – 12 000 years ago, a scraper and adze-rich industry between 12 000 – 8 000 years ago, a backed tool and small scraper industry between 8 000 – 4 000 years and ending with a variable set of other industries thereafter (Wadley, 2007). Adzes are thought to be wood working tools and may have also been used to make digging sticks and handles for tools. Scrapers are tools that are thought to have been used to prepare hides for clothing and manufacture of other leather items. Backed tools may have been used for cutting as well as tips for arrows It was also during Later Stone Age times that the bow and arrow was introduced into southern Africa – perhaps around 20 000 years ago. Because of the extensive use of the bow and arrow and the use of traps and snares, Later Stone Age people were far more efficient in exploiting their natural environment than Middle Stone Age people. Up until 2 000 years ago Later Stone Age people dominated the southern African landscape. However, shortly after 2 000 years ago the first Khoi herders and Bantu-speaking agro-pastoralists immigrated into southern Africa from the north. This led to major demographic changes in the population distribution of the subcontinent. San hunter-gatherers were either assimilated or moved off to more marginal environments such as the Kalahari Desert or some mountain ranges unsuitable for small-scale subsistence farming and herding. The San in the coastal areas of the study area were the first to have been displaced by incoming African agro pastoralists. However, some independent and sometimes hybrid groups continue to practice their hunter gatherer lifestyle in the foothills of the Drakensberg until the period of white colonialisation around the 1840's (Opperman 1987; Wright & Mazel, 2007; Mallen 2008; Henry 2010).

The renowned San rock paintings of the Drakensberg region also belongs to the Later Stone Age period although the majority were made between 4000 years ago and about 120 years ago. Rock Art can be in the form of rock paintings or rock engravings. The

Eastern Province is renowned for the prolific San rock painting sites concentrated in the southern Drakensberg and adjacent areas (Blundell 2004; Mallen 2008; Henry 2010). These sites are the subject of ongoing research by post-graduate students of the Rock Art Research Institute, University of the Witwatersand. Recently researchers identified 3 new traditions/styles of rock art in the Eastern Cape Drakensberg (*ibid*). No rock art sites are known from Qumbu, however, Tsolo and Maclear to the immediate south and southwest of Qumbu do have rock art sites. Derricourt (1977) reported 5 rock art sites in the greater Tsolo district. All these sites include typical San fineline paintings. These include paintings of wild ungulates such as eland and other wild bovids as well contact period imagery with depictions of early African agriculturists in contact with San hunter-gatherers. Various other Later Stone Age open air sites are known from the greater Tsolo area. Unfortunately, these have not been well recorded and many are now only known from badly provenanced museum collections (Derricourt 1977). Feely (1988) did locate LSA sites with a possible association with pastoralism in near Cofimvaba and Queenstown to the south west of the study area. It is also known from the historical literature that Khoi pastoralist groups frequented the Cofimvaba area in the recent past (Peires 1981). However, more systematic research is needed on pastoralism in this part of the Eastern Cape Province.

2.2 Iron Age

2.2.1 Early Iron Age (EIA)

Unlike the Stone Age people whose life styles were arguably egalitarian, Iron Age people led quite complex life styles. Their way of life of greater dependence on agriculture necessitated more sedentary settlements. They cultivated crops and kept domestic animals such as cattle, sheep, goats and dogs. Pottery production is also an important feature of Iron Age communities. Iron smelting was practised quite significantly by Iron Age society as they had to produce iron implements for agricultural use. Although Iron Age people occasionally hunted and gathered wild plants and shellfish, the bulk of their diet consisted of the crops they cultivated as well as the meat of the animals they kept. EIA villages were relatively large settlements strategically located in valleys beside rivers to take advantage of the fertile alluvial soils for growing crops (Maggs 1989; Huffman 2007). The EIA sites in the Eastern Cape Province dates back between AD 600 to AD 900. Based on extensive research on EIA sites in the eastern seaboard they can be divided along the following typological criteria and time lines according to ceramic styles (Maggs, 1989; Huffman 2007):

_ Msuluzi (AD 500-700);
_ Ndondondwane (AD 700 – 800);
_ Ntshekane (AD 800 – 900).

The vast majority of Early Iron Age sites occur below the 1000m contour along areas in the large river valleys with a rainfall of less than 700mm a year (Huffman 2006). A few have been recorded by Jim Feely (1986) in the Mzimvubu River Valley in the near environs to the project area.

2.2.2 Late Iron Age (LIA)

The LIA is not only distinguished from the EIA by greater regional diversity of pottery styles but is also marked by extensive stone wall settlements. However, in this part of the world, stone walls were not common as the Nguni people used thatch and wood to build their houses (Derricourt 1977). This explains the failure to obtain sites from the aerial photograph investigation of the study area. LIA sites in the Eastern Cape Province occur adjacent to the major rivers in low lying river valleys but also along ridge crests above the 800m contour. The LIA in the greater project area can be ascribed to the Thembu tribal cluster or their immediate predecessors (Feely 1987). It is also possible that some stone walled sites, especially those incorporating shelters or caves, were constructed by hybrid Khoisan/Nguni groups. Trade played a major role in the economy of LIA societies. Goods were traded locally and over long distances. The main trade goods included metal, salt, grain, cattle and thatch. This led to the establishment of economically driven centres and the growth of trade wealth. Keeping of domestic animals, metal work and the cultivation of crops continued with a change in the organisation of economic activities (Maggs, 1989; Huffman 2007). The existing data indicate the location of some Later Iron Age sites along the middle reaches of the Mzimvubu River not far from the N2. These were most probably inhabited by the Bhaca or other refugee groups who came to this area as a direct result of the expansionistic policies of the Zulu State of King Shaka in the 1820's. It is possible that systematic archaeological ground surveys will locate more sites of this period in due course.

2.3 Historic Period

Oral tradition is the basis of the evidence of historical events that took place before written history could be recorded. This kind of evidence becomes even more reliable in cases where archaeology could be utilised to back up the oral records. Sources of evidence for socio political organization during the mid-eighteenth to early nineteenth

century in the study area and the Transkei suggest that the people here existed in numerous small-scale political units of different sizes, population numbers and political structures (Feely 1987; Wright & Hamilton, 1989). This period was largely characterised by rage and instability as political skirmishes broke due to the thirst for power and resources between chiefdoms. During the 2nd half of the eighteenth century, stronger chiefdoms and paramouncies emerged. However, these were not fully grown states as there was no proper formal central political body established. This changed in the 1780's when a shift towards a more centralized political state occurred in parts of KwaZulu-Natal to the north of the study area. The Zulu kingdom, established by King Shaka became the most powerful in KwaZulu-Natal in the early years of the 19th century and had a marked influence on the local Nguni chiefdoms of the project area (Feely 1987). Refugees from north of the Umtavuna River such as the Bhaca and Qwabe tribes moved into the Transkei and asked the Mpondo chief for permission to settle in adjacent parts. The Mount Frere area was settled by the amaBhaca after they obtained permission from the Mpondo Paramount chief Faku to settle in the area. Further south at Qumbu refugees asked the permission of the Mpondomise chief to settle in parts of the area. These refugees were collectively called amaMfengu and many of these people were settled in parts of the project area and the adjacent areas near Qumbu and Mount Fletcher. One group of refugees from the north, the amaNgwane, crossed the Umthatha River to the south if the project area, and fought a decisive battle against British colonial troops and their Thembu and Xhosa allies in 1828 at Mbholompo Point. During this episode the amaNgwane was defeated and the tribe broken-up (Peires 1981).

3 BACKGROUND INFORMATION OF THE SURVEY

3.1 Methodology

A desktop study was conducted of the archaeological databases housed in the KwaZulu-Natal Museum and the SAHRA inventory of heritage sites in the Eastern Cape Province. The SAHRIS website was also consulted in order to locate additional sites and to evaluate the results of previous surveys near the study area. In addition, the available archaeological and historical literature covering the Eastern Cape was also consulted.

A visit was made to the study area on 10-11 September 2015. A ground survey, following standard and accepted archaeological procedures, was conducted during this visit.

3.2 Restrictions encountered during the survey

3.2.1 Visibility

Visibility was relatively good in most of the project area. No sites or features were masked by vegetation or other factors. Overgrazing and erosion contributed to site visibility in many areas.

3.2.2 Disturbance

No disturbance of potential heritage features was noted. .

3.3 Details of equipment used in the survey

GPS: Garmin Etrek
Digital cameras: Canon Powershot A460
All readings were taken using the GPS. Accuracy was to a level of 5 m.

4 DESCRIPTION OF SITES AND MATERIAL OBSERVED

4.1 Locational data

Province: Eastern Cape Province
Towns: Mount Frere
Municipality: Alfred Nzo District Municipality

4.2 Description of the general area surveyed

4.3 Heritage Survey Results

The survey identified three heritage sites adjacent to the N2. The heritage context, rating and GPS coordinates of these sites are provided in Tables 4 & 5. None of these sites occur closer than 30m to the proposed development. I addition, none of the sites are situated in the close environs of the identified borrow pits and quarry sites. These sites are therefore not threatened by the proposed road rehabilitation and no mitigation will be necessary.

Although many graves were observed by the consultant during the survey the vast majority of them occur further than 30 metres from the proposed road rehabilitation. No graves will be threatened by the activities associated with the road rehabilitation. However, there is a possibility that excavation activities may unearth "invisible graves" – especially in the close environs of human settlement. All activities should cease immediately and the heritage consultant or ECPHRA be contacted should any graves be exposed or threatened. Should the developer decide to proceed in those areas where graves have been exposed then a second phase heritage impact Assessment will be called for (Appendix 1). This second phase heritage impact assessment will be time consuming and may implicate the removal and exhumation of graves of by Grave Exhumation Expert. The general area is also not part of any known cultural landscape (Table 6).

Table 4. Heritage sites on N2 (Route 19 and Route 20)

No	Heritage Site	Estimated Age and context.	Significance	Requires Mitigation?	Type of Mitigation	GPS Latitude and Longitude
1 (Figs 2 & 4)	Thaba Ntsizwe (battlefield and living heritage site)	Approximately 1820. Historic battle between Zulu and Bhaca people. No archaeological remains visible on surface. However, historical records refer to the battle that took place here. The mountain also contains a small copper mine of historical significance (Derricourt 1977).	High significance locally	No but maintain 20m buffer around site	Not applicable as road is more than 150m distant.	30 48 36.74 S 29 13 05.27 E
2 (Figs 2, 3 & 5)	Later Iron Age site	Between 200 and 800 years ago. Feely (1987) found Later Iron Age potsherds at this locality in the 1980's. None were visible during the present survey. Archaeological remains are most probably buried or hidden in the dense vegetation.	High to medium significance locally	No, but maintain 20 m buffer	Not applicable as the road is more than 50m distant	30 51 22.62 S 29 04 00.24 E
3 (Figs 2, 3 & 6)	Old trading store	Approximately 100 years old. The main building is still in use although some of the out-buildings appear dilapidated.	High to medium significance locally	No, but maintain 20 m buffer	Not applicable as the road is more than 50m distant.	30 50 58.33 S 29 03 58.57 E

4.4 Field Rating

SAHRA developed a methodology to evaluate the significance of heritage sites (Table 5). All the identified heritage sites are graded as high significance locally. However, it is possible that the Thaba Ntsizwe Mountain may be nominated provincial heritage status in the near future.

Table 5. Field rating and recommended grading of sites (SAHRA 2005)

Level	Details	Action
National (Grade I)	The site is considered to be of National Significance	Nominated to be declared by SAHRA
Provincial (Grade II)	This site is considered to be of Provincial significance	Nominated to be declared by Provincial Heritage Authority
Local Grade IIIA	This site is considered to be of HIGH significance locally	The site should be retained as a heritage site
Local Grade IIIB	This site is considered to be of HIGH significance locally	The site should be mitigated, and part retained as a heritage site
Generally Protected A	High to medium significance	Mitigation necessary before destruction
Generally Protected B	Medium significance	The site needs to be recorded before destruction
Generally Protected C	Low significance	No further recording is required before destruction

Table 6. Evaluation of heritage sites

Significance criteria in terms of Section 3(3) of the NHRA		
	Significance	**Rating**
1.	**Historic and political significance -** The importance of the cultural heritage in the community or pattern of South Africa's history.	Thaba Ntsizwe is rated as locally high
2.	**Scientific significance** – Possession of uncommon, rare or endangered aspects of South Africa's cultural heritage.	None.
3.	**Research/scientific significance** – Potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage.	Thaba Ntsizwe is rasted as locally high
4.	**Scientific significance** – Importance in demonstrating the principal characteristics of a particular class of South Africa's cultural places/objects.	None.
5.	**Aesthetic significance** – Importance in exhibiting particular aesthetic characteristics valued by a community or cultural group.	None.
6.	**Scientific significance** – Importance in demonstrating a high degree of creative or technical achievement at a particular period.	None.
7.	**Social significance** – Strong or special association with a particular community or cultural group for social, cultu-ral or spiritual reasons.	High, Thaba Ntsizwe is associated with the cultural history of the Bhaca people
8.	**Historic significance** – Strong or special association with the life and work of a person, group or organization of importance in the history of South Africa.	None.
9.	The significance of the site relating to the history of slavery in South Africa.	None.

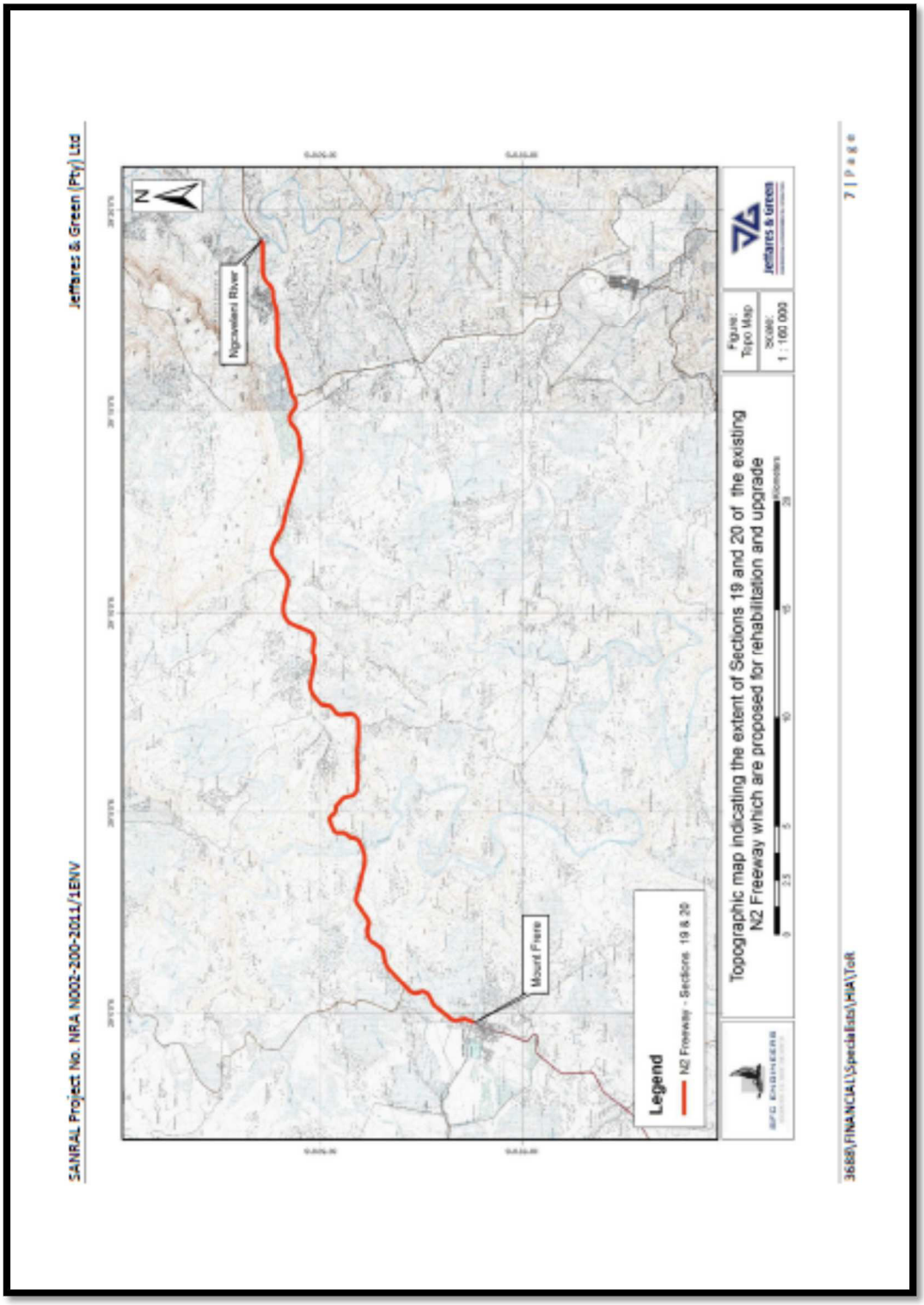
5 RECOMMENDATIONS

The study area is not part of any known cultural landscape. Only three heritage sites are located adjacent to this section of the N2. However, all these sites occur more than 30m from the proposed road upgrade and none of them are located in the close proximity of the proposed borrow pits. The proposed rehabilitation of the N2 between Mount Frere and the Ngcweleni River may proceed from a heritage perspective but under the following conditions:

- Strictly maintain a buffer zone of 30m around the identified Later Iron Age Site.
- Strictly maintain a buffer zone of 30m around the Old Trading Store.
- Maintain a buffer zone of 50m around Thaba Ntsizwe.

It should be pointed out that the South African Heritage Resources Act requires that all activities should cease immediately should the developers unearth any heritage sites, graves or artefacts pending an evaluation by the heritage authorities.

6 MAPS AND PHOTOGRAPHS



1. Topographical Map indicating the location and route of the proposed N2 Road rehabilitation (Source: J G Afrika).

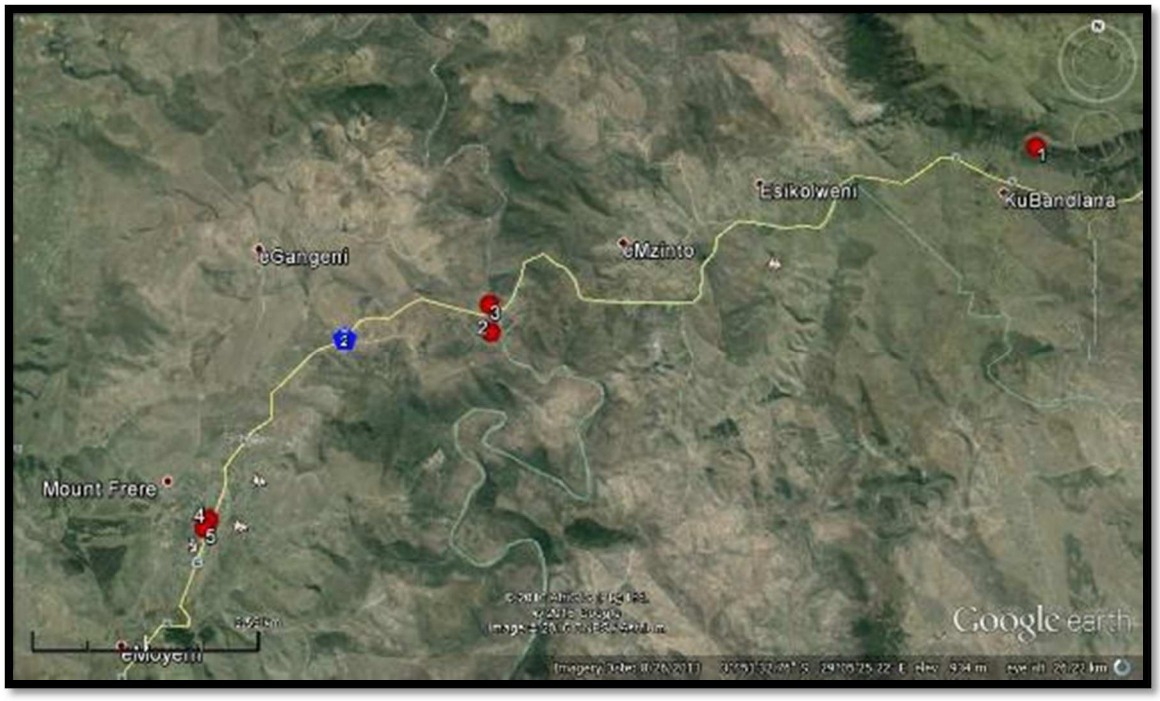


Figure 2. Google aerial photograph showing the location of heritage sites along the N2 between Mt Frere and the Ncweleni River. Markers 4 & 5 indicate heritage sites situated within Mt Frere but outside of the project area.

Figure 3. Google aerial photograph showing the location of the Old Trading Store (3) and the Later Iron Age Site (2).

Figure 4. Thaba Ntsizwe

Figure 5. Later Iron Age locality identified by Jim Feely in 1987.

Figure 6. Old Trading Store.

Figure 6. No heritage sites or features occur in the close environs of borrow pits and other earth works observed along the N2.

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APPENDIX 1

RELOCATION OF GRAVES

Burial grounds and graves are dealt with in Article 36 of the NHR Act, no 25 of 1999. Below follows a broad summary of how to deal with grave in the event of proposed development.

- If the graves are younger than 60 years, an undertaker can be contracted to deal with the exhumation and reburial. This will include public participation, organising cemeteries, coffins, etc. They need permits and have their own requirements that must be adhered to.
- If the graves are older than 60 years old or of undetermined age, an archaeologist must be in attendance to assist with the exhumation and documentation of the graves. This is a requirement by law.

Once it has been decided to relocate particular graves, the following steps should be taken:

- Notices of the intention to relocate the graves need to be put up at the burial site for a period of 60 days. This should contain information where communities and family members can contact the developer/archaeologist/public-relations officer/undertaker. All information pertaining to the identification of the graves needs to be documented for the application of a SAHRA permit. The notices need to be in at least 3 languages, English, and two other languages. This is a requirement by law.

- Notices of the intention needs to be placed in at least two local newspapers and have the same information as the above point. This is a requirement by law.

- Local radio stations can also be used to try contact family members. This is not required by law, but is helpful in trying to contact family members.

- During this time (60 days) a suitable cemetery need to be identified close to the development area or otherwise one specified by the family of the deceased.

- An open day for family members should be arranged after the period of 60 days so that they can gather to discuss the way forward, and to sort out any problems. The developer needs to take the families requirements into account. This is a requirement by law.

- Once the 60 days has passed and all the information from the family members have been received, a permit can be requested from SAHRA. This is a requirement by law.

- Once the permit has been received, the graves may be exhumed and relocated.
- All headstones must be relocated with the graves as well as any items found in the grave