SANRAL

BASIC ASSESSMENT

PROPOSED CAPACITY IMPROVEMENTS TO NATIONAL ROUTE 3 (N3), KWAZULU-NATAL

CAPACITY UPGRADES TO THE N3 FROM CATO RIDGE (KM 19.4) TO LYNNFIELD PARK (KM 30.6)

<table>
<thead>
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<th>Original Contract No. N003-020-2009/1ES</th>
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<tr>
<td>DETAILED DESIGN PROJECT NO</td>
</tr>
<tr>
<td>------------------------------</td>
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<td>N.003-020-2017/4</td>
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<td>N.003-020-2017/5</td>
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Assessment of Vegetation Ecology
Updated Specialist Report 2018

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August 2018
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EXECUTIVE SUMMARY

The South African National Roads Agency SOC limited (SANRAL) Eastern Region initiated a project to improve sections of the N2 and N3 national roads by providing additional lanes between the areas of Durban and Cedara. Specialist assessments were conducted in 2013, however, the project was put on hold and subsequently the applications to the Department of Environmental Affairs lapsed. The project has been resumed and applications are to be resubmitted for environmental authorisation, for the proposed capacity improvements. The resumption of the project included some changes to the original footprint.

The vegetation study was originally undertaken by an in-house vegetation specialist at ACER in 2013, which covered the relevant section of the N3 national road between Durban and Cedara, namely: the N3 from Cato Ridge (km 19.4) to Lynnfield Park (km 30.6). This updated vegetation assessment was largely informed by the original vegetation study conducted by ACER's in house specialist in 2013, which was reviewed to ensure that the content is still valid in terms of describing vegetation features, as well as assessing impacts from the latest proposed N3 road reserve upgrades. The latest proposed extension/upgrade of the N3 road reserve between Cato Ridge and Lynnfield Park does not include significant changes compared to the original layout that was assessed in the 2013 vegetation study. In fact, the footprint has been reduced at certain points along this section of the N3.

The main construction activities for the capacity upgrades will include the following:

- Site preparation (e.g. vegetation clearing, site camps, stockpiles, storage sites, etc.)
- Road and bridge widening (e.g. demolition, excavation, erection of structures, etc.)
- Re-instatement and rehabilitation (e.g. reinstate soil, revegetation, erosion control, etc.)

During the site visits in February 2013, preliminary qualitative botanical surveys were undertaken where vegetation types were identified, species composition noted, and vegetation structure recorded. Important plant species and sensitive areas of vegetation were noted and opportunities for mitigation of impacts were identified. A brief literature review was undertaken to source and collated any relevant data and information pertaining to vegetation within the study area. A specialist report on rivers and wetlands has been completed by Groundtruth (2013), and updated more recently (GroundTruth, 2018). Consequently accurate wetland boundaries were not determined in the field during the vegetation assessment.

The original, reference vegetation defining the study area includes two dominant vegetation types, namely Dry Coast Hinterland Grassland and KwaZulu-Natal Hinterland Thornveld. Nested within this grassland/savanna mosaic are aquatic ecosystems containing wetland vegetation (e.g. Temperate Alluvial Wetland andEastern Temperate Wetland Vegetation). In terms of the proposed N3 upgrades, impacts will only affect a portion of the aforementioned vegetation types that remain in the landscape owing to the high levels of transformation. Furthermore, it is to be expected that pristine/near natural representations of remaining, untransformed vegetation (i.e. Dry Coast Hinterland Grassland and KwaZulu-Natal Hinterland Thornveld in good to excellent condition) are unlikely due to a high degree of disturbance and degradation caused by surrounding land use activities and pressures. Wetland and river
ecosystems have been assessed GroundTruth (2018), and are not explicitly included in this study.

A Threatened terrestrial ecosystem, i.e. Ngongoni Veld (listed as Vulnerable), is intersected by the section of the N3 under investigation. There are also several areas along this section of the N3 that adjoin Critical Biodiversity Areas (CBAs: Irreplaceable and Optimal), particularly areas north west of the Dardanelles interchange.

Land use within the study area is mixed and comprises agriculture (sugarcane and some dryland and irrigated crops), agri-industrial (Rainbow Chickens), suburban/residential and commercial areas associated with the small towns of Cato Ridge and Camperdown, national and provincial roads, rural dwellings and open grassland/scrub areas. In these areas, vegetation is largely transformed or very disturbed. Approximately 27% of the study area is untransformed. Most of the riparian zones and wetlands are similarly disturbed and modified due to development and land use impacts. For the section of the N3 investigated in this study, the highway does not bisect any protected areas, stewardship sites or municipal reserves.

Disturbed grassland/thicket is the most widespread community within the direct footprint of the existing and proposed extensions of the road reserve, and comprises a patchy mosaic of degraded and secondary grassland dominated by ruderal, weedy and alien invasive species. Any resemblances of the natural vegetation to Hinterland Grassland/Ngongoni Veld by a few indicator species tends to be limited, degraded, and often isolated at interchanges and along the tops of road embankments or road cuttings. Essentially, much of the Hinterland Grassland/Ngongoni Veld present has experienced some form of historical disturbance to varying degrees. The greater the levels of disturbance, the lower the biodiversity present. A range of species specially protected under the Natal Nature Conservation Ordinance (Act no. 15 of 1974) were found, as well as one bulb listed as Declining in South African National Biodiversity Institute (SANBI's) National Red List of South African Plants.

The majority of the riparian areas and wetlands have been variably impacted upon by the road and associated drainage structures, by canalisation and by urban and agricultural development. The patch of hygrophilous grassland highlighted during the 2013 study will be largely avoided by the updated N3 extension/upgrades, but may be indirectly influenced by edge effects and stormwater runoff.

The main impacts of concern on natural vegetation include clearance of vegetation cover, edge effects, habitat fragmentation, alien invasive plants, soil erosion and siltation, deterioration of riparian and wetland habitat and harvesting of indigenous plants. Due to the disturbed nature of the majority of the natural vegetation along the N3, the significance of impacts within sections of disturbed grassland/thicket mosaic are likely to be low with mitigation. Similarly, with mitigation, the significance of impacts in the riparian and wetland areas is likely to be low due to the disturbed nature of these systems. A number of general mitigation measures have been recommended to minimise impacts with further input from an ecologist/botanist during the spring and summer flowering seasons, impacts can be minimised and recovery of natural vegetation can be encouraged. Negative impacts can be minimised by strict enforcement and compliance with an Environmental Management Programme (EMP), which takes into account the recommendations for managing impacts detailed in this report.
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**VEGETATION SPECIALIST STUDY REPORT**

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ACRONYMS AND ABBREVIATIONS

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
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<tr>
<td>ACER</td>
<td>ACER (Africa) Environmental Management Consultants</td>
</tr>
<tr>
<td>CARA</td>
<td>Conservation of Agricultural Resources Act (Act No 43 of 1983)</td>
</tr>
<tr>
<td>DAFF</td>
<td>Department of Agriculture, Forestry and Fisheries</td>
</tr>
<tr>
<td>D’MOSS</td>
<td>Durban Metropolitan Open Space System</td>
</tr>
<tr>
<td>ECO</td>
<td>Environmental Control Officer</td>
</tr>
<tr>
<td>EKZNW</td>
<td>Ezemvelo KZN Wildlife</td>
</tr>
<tr>
<td>EMPr</td>
<td>Environmental Management Programme</td>
</tr>
<tr>
<td>EPCPD</td>
<td>Environmental Planning and Climate Protection Department</td>
</tr>
<tr>
<td>IAP</td>
<td>Invasive alien plant</td>
</tr>
<tr>
<td>IUCN</td>
<td>International Union for the Conservation of Nature</td>
</tr>
<tr>
<td>MINSET</td>
<td>Minimum Set Analysis</td>
</tr>
<tr>
<td>NEMA</td>
<td>National Environmental Management Act (Act No 107 of 1998)</td>
</tr>
<tr>
<td>NEMBA</td>
<td>National Environmental Management: Biodiversity Act (Act No 10 of 2004)</td>
</tr>
<tr>
<td>NNCO</td>
<td>Natal Nature Conservation Ordinance (Act No 15 of 1974)</td>
</tr>
<tr>
<td>NFA</td>
<td>National Forests Act (Act No 84 of 1998)</td>
</tr>
<tr>
<td>SANRAL</td>
<td>South African National Roads Agency Limited</td>
</tr>
<tr>
<td>SANBI</td>
<td>South African National Biodiversity Institute</td>
</tr>
</tbody>
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1. INTRODUCTION

STATEMENT OF VALIDITY

This updated vegetation assessment was largely informed by the original vegetation study conducted by ACER’s in house specialist in 2013, which was reviewed to ensure that the content is still valid in terms of describing vegetation features, as well as assessing impacts from the latest proposed N3 road reserve upgrades. The latest proposed extension/upgrade of the N3 road reserve between Cato Ridge and Lynnfield Park does not include significant changes compared to the original layout that was assessed in the 2013 vegetation study. In fact, the footprint has been reduced at certain points along this section of the N3. Nevertheless, the updated vegetation report confirms that road reserve upgrades for this section of the N3 will only affect degraded/moderately degraded Hinterland Grassland/Ngongoni Veld, with no vegetation in good or pristine condition observed in the 2013 study. Thus, the findings and recommendations presented in the original 2013 vegetation study remain valid for the proposed road reserve upgrade for this section of the N3.

1.1 Background

The South African National Roads Agency SOC limited (SANRAL) Eastern Region initiated a project to improve sections of the N2 and N3 national roads by providing additional lanes between the areas of Durban and Cedara. This project forms a part of the Strategic Infrastructure Projects as described in the 2011 National Development Plan. Specialist assessments were conducted in 2013, however the project was put on hold and subsequently the applications to the Department of Environmental Affairs lapsed. The project has been resumed and applications are to be resubmitted for environmental authorisation, for the proposed capacity improvements. The resumption of the project included some changes to the original footprint.

ACER (Africa) Environmental Management Consultants (ACER) and Metamorphosis have been appointed by SANRAL to take responsibility for environmental authorisation requirements for the proposed capacity improvements. ACER, on behalf of SANRAL, has commissioned a number of specialist studies including a vegetation impact assessment. The vegetation study was originally undertaken by an in-house vegetation specialist at ACER in 2013, which covered the relevant section of the N3 (Cato Ridge to Lynnfield Park). The extent of this section remains from Cato Ridge (km 19.4) to Lynnfield Park (km 30.6).

With the project resuming, GroundTruth was requested to review the original vegetation report compiled by ACER in order to update the vegetation study and assessment based on the more recent changes to the project footprint, as well as to ascertain whether the content presented herein correctly reflects current conditions in terms of the receiving environment originally assessed.
This report is essentially an update of the original ACER vegetation report in terms of characterising and assessing vegetation, with no significant additional impacts identified for the updated project footprint for this section of the N3.

1.2 Original Scope of work

As per the original Terms of Reference provided by ACER, the 2013 vegetation study was specifically tasked with the following:

- Description of the current state of the vegetation in the study area, outlining vegetation types, important characteristics and components thereof, which may be influenced by the proposed project or which may influence the proposed project during construction and operation.
- The early identification of any red flag and fatal flaw issues or impacts.
- The identification of Red Data species potentially affected by the project.
- Identification of sensitive habitats and systems, including areas near waterways and wetlands, potentially affected by the proposed road upgrades.
- Where possible, Red Data or protected species and sensitive habitats must be mapped and indicated on a site plan.
- The identification of potential impacts (positive and negative, including cumulative impacts, if relevant) of the proposed upgrades on vegetation during construction and operation.
- The identification of mitigation measures for enhancing benefits and avoiding, reducing or mitigating negative impacts and risks (to be implemented during design, construction and operation of the proposed projects). Particular attention should be paid to wetlands potentially traversed by the N3 and proposed interchanges.
- The provision of clear guidelines to reduce the damage and loss of vegetation, and, where damage is unavoidable, the provision of clear rehabilitation guidelines, inclusive of measures to reduce the risk of the spread of alien vegetation. These measures will be incorporated into the Environmental Management Programme (EMPr) that will be prepared for the proposed projects.
- Discuss any other sensitivities and important issues from a specialist perspective that are not identified in these terms of reference.
- All applicable legislation and guidelines are to be duly considered during the assessment.
- The formulation of a clear and simple system to monitor impacts, and their management, based on key indicators.

1.3 Required Updates to the Original Vegetation Report

As part of the updates the following was required:

- Make changes directly in the original report, rather than providing a separate attachment/addendum, with changes clearly visible in the updated report by using track changes or text in a different colour.
- The title page reflecting that this is an updated vegetation specialist report, displaying the new project name with associated detailed design contract numbers.
1.4 Applicable legislation

Legislation pertinent to protection of vegetation in the context of this project includes:

- Conservation of Agricultural Resources Act (CARA; Act No 43 of 1983).
- National Environmental Management Act (NEMA; Act No 107 of 1998), which sets out the fundamental principles that apply to environmental decision making, some of which derive from international environmental law and others from the constitution. NEMA also specifies the requirements of Environmental Impact Assessments (EIAs) as per the 2014 EIA Regulations published in government notices R982, R983, R984 and R985, as amended by Government Gazette 40772 (April 2017). These regulations include three Listing Notices, namely Listing Notice 1, 2 and 3, which define various activities that require environmental authorisation. Activity 12 of Listing Notice 3 is particularly relevant to the N3 upgrades, and is triggered should there be removal of 300 square metres of indigenous vegetation within designated biodiversity areas as defined for KwaZulu-Natal (e.g. Critical Biodiversity Areas (CBAs), formally protected areas, stewardship sites, sensitive areas defined by Environmental Management Frameworks (EMFs), land zoned as open space/conservation, etc.).
- National Environmental Management: Biodiversity Act (NEMBA; Act No 10 of 2004), which provides for the listing of Threatened or Protected ecosystems, in one of four categories: Critically Endangered (CR), Endangered (EN), Vulnerable (VU) or Protected (as per Government Gazette, 9 December 2011). NEMBA also provides regulations relating to listed Threatened or Protected species (TOPS).
- National Forests Act, 1998 (NFA; Act No 84 of 1998) and lists of protected indigenous trees published under this Act.
Natal Nature Conservation Ordinance (NNCO; Act No 15 of 1974) and the KwaZulu-Natal Nature Conservation Act (Act No 29 of 1992), which states that no person shall, among others: damage, destroy, or relocate any specially protected indigenous plants, except under the authority and in accordance with a permit from Ezemvelo KZN Wildlife.
2. PROJECT DESCRIPTION

2.1 Study area and location

This is a linear project, which spans across the boundary between the eThekwini Metropolitan Municipality and the Mkhambathini Local Municipality (of the uMgungundlovu District Municipality) in KwaZulu-Natal. The study area is focused mostly within the existing road reserve and smaller sections outside of existing road reserve along the N3. Figure 1 illustrates the position of the proposed extensions to the N3 road reserve (green lines) in relation to the existing road reserve (yellow lines). The original extension to the road reserve proposed in 2013 is shown by the red lines in Figure 1 illustrating areas where additional in-field assessments are required to update the vegetation study.

The section of interest extends along the N3 between Cato Ridge and Lynnfield Park near Ashburton. A 500-metre buffer of the existing and proposed extension of the N3 road reserve was used to define the study area, and particularly for the purpose of desktop mapping of vegetation features.

2.2 Project description and components (general for all sections of N3)

The proposed capacity improvements, which will provide 4 lanes in each direction, will improve safety and accommodate traffic growth to 2047.

Use will be made of the median and existing road reserve to accommodate widening; however, additional land will be required where further space is needed. Counter flow lanes will be divided by a concrete barrier and retaining walls will be constructed on the road perimeters where required. Interchanges will be upgraded, bridges will require widening and demolition of redundant structures will occur.

During the planning phase, additional land will be acquired by SANRAL where needed. Contractors will make use of existing roads for construction access. Should new borrow pits, quarries or batching plants be required, these will be dealt with under a separate application process.

The main changes from the original extension of the N3 road reserve proposed in 2013, and which were considered in updating the vegetation specialist report are as follows:

- Realignment of Fairview Road.
- Relocation of various services (including Eskom, Telkom, Umgeni Water, fibre optic cables, RTI cameras and information screens, and Link Africa).
- Upgrading sections of the R56 to Thornville and Richmond, R103 to Ashburton, and R603 Umlaas Road to Umbumbulu, as well as upgrading other roads within the road reserve and crossings over and under the N3.
- Closure of the east facing ramps of the existing Cato Ridge Interchange should the proposed D12 Interchange go ahead.
Figure 1  Location of proposed N3 capacity improvements between the Cato Ridge Interchange and Lynnfield Park
The main construction activities for the capacity upgrades will include the following:

SITE PREPARATION
- Establishment of site camps and stockpile areas.
- Provision for on-site waste management – sewage, waste water, solid waste, etc.
- Provision for storage/handling/disposal of hazardous substances (e.g. cement, asphalt, fuels and oils).
- Clearance of vegetation.
- Removal and stockpiling of topsoil and subsoil.

ROAD AND BRIDGE WIDENING
- Accommodation of traffic.
- Demolition of structures (where required).
- Blasting (where required).
- Excavation with heavy plant.
- Stockpiling of spoil for building and leveling on site or other parts of the proposed N3 upgrades.
- Stockpiling of demolition rubble for building and leveling on site or other parts of the proposed N3 upgrades.
- Disposal of excess spoil/rubble to authorized landfill sites.
- Provision of drainage structures where crossing drainage lines and watercourses.
- Haulage and placement of materials with heavy plant.
- Water abstraction from local streams.
- Water spraying.
- Rolling and compaction with heavy plant.
- Bridge jacking.
- Retaining walls/other stabilisation/erosion control structures (as required).
- Erection of lighting, Armco or concrete barriers, road signs, and road lane markings.
- Relocation of existing traffic management infrastructure (cameras, etc).

RE-INSTATEMENT AND REHABILITATION
- Reinstatement of slopes.
- Reinstatement of topsoil.
- Revegetation.
- Erosion control.
- Alien plant control.

3. ASSUMPTIONS, LIMITATIONS AND GAPS IN KNOWLEDGE

The following assumptions and limitations apply to this project.

3.1 Project footprint and extent of affected areas assessed

The information used to inform this vegetation assessment was largely based on the 2013 ACER vegetation study, and it is important to note that this vegetation study did not include additional infield surveys as the current proposed extension of the N3 road reserve does not
have significant changes compared to the original N3 road reserve extension as proposed in 2013. In addition, verification of the original 2013 vegetation assessment was provided by driving the length of the section of the N3, as well as through inspection of aerial imagery.

The following assumptions have been made regarding affected areas and associated impacts on vegetation, and assumes a worst case scenario:

- All vegetation within the existing road reserve (as shown in yellow in Figure 1) will be completely destroyed by construction.
- All areas within proposed extensions to the road reserve (as shown in green in Figure 1) will be completely destroyed by construction.
- Habitat degradation is likely to occur directly adjacent to cleared areas, due to edge effects that will manifest over time once construction activities have commenced (edge effects are described in Section 6.2).

The detailed survey, identification and assessment of areas to gain access below viaducts, underpasses and culverts are outside the scope of this study. General recommendations have, however, been made for these inaccessible areas.

3.2 Seasonality and detection of plants

It is important to note that the original field survey was undertaken in late summer (i.e. February 2012), and the true botanical diversity present is under-represented by this study, particularly amongst the herbaceous plants. However, all effort was made to identify Red Data, specially protected and other important species, and surrounding land use and condition of natural vegetation were surveyed to identify levels of disturbance and potential biodiversity issues. This said, edge effects caused by the existing road reserve has no doubt compromised the plant species composition over all the years to the extent that natural vegetation within and adjacent to the existing road reserve is generally degraded, supporting few and/or isolated occurrences of conservation important plant species.
4. METHODOLOGY

4.1 Identification and evaluation of affected vegetation

Biophysical data for this report was derived from a single site visit conducted during February 2013. Goba supplied geographic information system (GIS) and Google Earth KML files showing the extent of the widening along various sections of the N3, along with some background information on project details and construction methods (see Figure 1 and Section 2.2).

During the site visit, a qualitative botanical survey was undertaken, plant species composition noted, and vegetation structure recorded. Important plant species and sensitive areas of vegetation were identified and mapped, and opportunities noted in terms of mitigation of impacts. In addition, verification of the original 2013 vegetation assessment was provided by driving the length of the section of the N3, as well as through inspection of aerial imagery. A brief literature review was also undertaken to source and collate any relevant data and information pertaining to vegetation within the study area. A specialist report on rivers and riparian habitats has been completed by Groundtruth (2013), and updated more recently (GroundTruth, 2018). Consequently, mapping of wetland boundaries was included in the wetland specialist studies.

Red Data status of plants, based on International Union for the Conservation of Nature (IUCN) categories (IUCN, 2012), and legal status was obtained from a range of literature sources, including the South African National Biodiversity Institute’s (SANBI’s) Threatened Species Programme and online National Red List of South African Plants (Raimondo et al., 2009; SANBI, 2017). Other conservation important plant species were also obtained from EKZNW’s MINSET (Minimum Set Analysis) dataset for the areas along the section of the N3. Other important datasets that were consulted included:

- Classification systems and maps of vegetation types for South Africa (Mucina and Rutherford, 2006) and KwaZulu-Natal (Scott-Shaw and Escott, 2011);
- Threatened and protected ecosystems (SANBI and DAEA, 2009); and
- EKZNW’s Systematic Conservation Assessment/Planning (SCA) (EKZNW, 2016), provincially important plant species from MINSET (Minimum Set Analysis).

All spatially relevant data (e.g. habitats/ecosystems, vegetation communities, sensitive areas/ecosystems, etc.) were mapped at a desktop level using ESRI ArcMap 10.

4.2 Impact assessment criteria

The significance of the impacts of construction and operation within the section of the N3 investigated in this study are assessed in terms of the impact assessment criteria provided in Table 1 below.
Table 1  Impact assessment criteria applied for this study

<table>
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<th>Criteria</th>
<th>Rating Scales</th>
<th>Notes</th>
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<tbody>
<tr>
<td>Nature</td>
<td>Positive</td>
<td>This is an evaluation of the overall impact of the construction, operation and management that the proposed N3 upgrades would have on the affected environment (social, biophysical and economic).</td>
</tr>
<tr>
<td></td>
<td>Negative</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Neutral</td>
<td></td>
</tr>
<tr>
<td>Spatial extent</td>
<td>Low</td>
<td>Site-specific, affects only the development footprint.</td>
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<td></td>
<td>Medium</td>
<td>Local (&lt;2 km from site).</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>Regional (within 30 km of site) to national.</td>
</tr>
<tr>
<td>Duration</td>
<td>Very low</td>
<td>Temporary (less than 1 year).</td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>Short term (1-4 years, i.e. duration of construction phase).</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>Medium term (5-10 years).</td>
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<tr>
<td></td>
<td>High</td>
<td>Long term (impact will only cease after the operational life of the activity) to permanent.</td>
</tr>
<tr>
<td>Intensity</td>
<td>Low</td>
<td>Negligible alteration of natural systems, patterns or processes.</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>Noticeable alteration of natural systems, patterns or processes.</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>Severe alteration of natural systems, patterns or processes.</td>
</tr>
<tr>
<td>Irreplaceability of resource caused by impacts</td>
<td>Low</td>
<td>No irreplaceable resources will be impacted (the affected resource is easy to replace/rehabilitate).</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>Resources that will be impacted can be replaced, with effort.</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>Project will destroy unique resources that cannot be replaced.</td>
</tr>
<tr>
<td>Reversibility of impacts</td>
<td>Low</td>
<td>Low reversibility to non-reversible.</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>Moderate reversibility of impacts.</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>High reversibility of impacts.</td>
</tr>
<tr>
<td>Consequence (a combination of spatial extent, duration, intensity and irreplaceability of impact on resources)</td>
<td>Low</td>
<td>A combination of any of the following: - Intensity, duration, extent and impact on irreplaceable resources are all rated low. - Intensity is low and up to two of the other criteria are rated medium. - Intensity is medium and all three other criteria are rated low.</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>Intensity is medium and at least two of the other criteria are rated medium.</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>Intensity and impact on irreplaceable resources are rated high, with any combination of extent and duration. Intensity is rated high, with all of the other criteria being rated medium or high.</td>
</tr>
<tr>
<td>Probability (the likelihood of the impact occurring)</td>
<td>Low</td>
<td>It is highly unlikely or there is a less than 50% chance that an impact will occur.</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>It is between 50 and 70% certain that the impact will occur.</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>It is more than 75% certain that the impact will occur or it is definite that the impact will occur.</td>
</tr>
<tr>
<td>Significance (all impacts including potential cumulative impacts)</td>
<td>Low</td>
<td>Low consequence and low probability. Low consequence and medium probability. Low consequence and high probability.</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>Medium consequence and low probability. Medium consequence and medium probability. Medium consequence and high probability. High consequence and low probability.</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>High consequence and medium probability. High consequence and high probability.</td>
</tr>
</tbody>
</table>
5. DESCRIPTION OF THE VEGETATION AFFECTED BY THE PROJECT

5.1 Overview

Land use within the study area is mixed and comprises agriculture (sugarcane and some dryland and irrigated crops), agri-industrial (Rainbow Chickens), suburban/residential and commercial areas associated with the small towns of Cato Ridge and Camperdown, national and provincial roads, rural dwellings and open grassland/scrub areas. In these areas, vegetation is largely transformed or very disturbed. With reference to the 2011 KZN land cover mapping of EKZNW and GTI (2013), approximately 27% of the study area is untransformed. Most of the riparian zones and wetlands are similarly disturbed and modified due to development and land use impacts. For the section of the N3 investigated in this study, the highway does not bisect any protected areas, stewardship sites or municipal reserves.

5.2 Background/Reference Vegetation Types

The original, reference vegetation according to the provincial mapping and classification of Scott-Shaw and Escott (2011) that defines the study area includes two dominant vegetation types, namely: Dry Coast Hinterland Grassland and KwaZulu-Natal Hinterland Thornveld. Nested within this grassland/savanna mosaic are aquatic ecosystems containing wetland vegetation (e.g. Temperate Alluvial Wetland and Eastern Temperate Wetland Vegetation). The spatial extent and occurrence of the abovementioned vegetation types are illustrated in Figure 2.

In terms of the proposed N3 upgrades, impacts will only affect a portion of the aforementioned vegetation types that remain in the landscape owing to the high levels of transformation. Furthermore, it is to be expected that pristine/near natural representations of remaining, untransformed vegetation (i.e. Dry Coast Hinterland Grassland and KwaZulu-Natal Hinterland Thornveld in good to excellent condition) are unlikely due to a high degree of disturbance and degradation caused by surrounding land use activities and pressures.

Note:
- Wetland ecosystems have been assessed by GroundTruth (2018) and are not explicitly included in this study. These vegetation types are described in more detail in the following sections.
- Invasive alien plant (IAP) species are denoted with an asterisk (*).
- The mapping extent of KZN vegetation types according to Scott-Shaw and Escott (2011) largely identical to that of Muncina and Rutherford (2006), however, the classifications are slightly different for certain vegetation types (e.g. Dry Coast Hinterland Grassland and Moist Coast Hinterland Grassland are described by Muncina and Rutherford (2006) as the single vegetation type, Ngongoni Veld. 
KZN Vegetation Types (Threat Status)

- Dry Coast Hinterland Grassland (VU)
- KwaZulu-Natal Sandstone Sourveld (CR)
- Moist Coast Hinterland Grassland (EN)
- Eastern Valley Bushveld
- KwaZulu-Natal Hinterland Thornveld
- Southern Coastal Scarp Forest
- Eastern Temperate Wetlands (VU)
- Temperate Alluvial Wetland (VU)
- Temperate Alluvial Wetland (Midland Floodplain Grasslands)

Figure 2 Map of reference KZN vegetation types and conservation status between Cato Ridge Interchange and Lynnfield Park (after Scott-Shaw and Escott, 2011)
5.2.1 Dry Coast Hinterland Grassland

Dry Coast Hinterland Grassland is a subclass of Ngongoni Veld, that once occupied most of the areas (around 85%) along this section of N3. It is classified as a Vulnerable vegetation type by Rutherford et al. (2006), as well as the more recent and regionally appropriate assessment (of Dry Coast Hinterland Grassland) by Scott-Shaw and Escott (2011).

SANBI and the Department of Environmental Affairs and Tourism (DEAT) (2009), in accordance with Section 52 of the NEMBA (Act 10 of 2004), also regards Hinterland Grassland/Ngongoni Veld as a Threatened ecosystems, listed as Vulnerable (Government Gazette, 2011). This is on the basis that 61% of the original extent (approximately 10,000 km²) remains, with less than 1% under formal protection – it is more likely that the remaining extent is less than 61% as estimated ten years ago by SANBI and DEAT (2009).

Dry Coast Hinterland Grassland can be described (using the description of Ngongoni Veld by Rutherford et al., 2006) as dense, tall grassland that is dominated by the unpalatable grass, Aristida junciformis, and with a low plant species diversity owing to an Aristida monodominance. Other common grasses present include Chloris gayana, Hyparrhenia hirta, Sporobolus spp., Eragrostis spp., Cymbopogon nardus and Themeda triandra. Various broad-leaved herbs (forbs) that tend to be common include Stylochiton natalensis, Pentanisia prunelloides, Leonotis intermedia, Helichrysum spp., Senecio spp., Acalypha angustata, Vernonia tigna, Polygala virgata and Cyphostemma natalitium.

At lower altitudes, where the Hinterland Grassland/Ngongoni Veld transitions into KwaZulu-Natal Hinterland Thornveld, there tends to be higher occurrences of woody vegetation. Here, termitaria support bush clumps with *Acacia* spp., *Gymnosporia buxiifolia*, *Melia azedarach*, *Lantana camara*, *Erythrina lysistemon*, *Searsia rehrmanniana*, *Ziziphus mucronata*, and *Ehretia rigida*.

Table 2 provides a list of plant species that typically characterise Hinterland Grassland/Ngongoni Veld.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Important taxa(^1) - 27 species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small trees</td>
<td><em>Acacia natalitia</em>, A. nilotica and A. sieberiana var. woodii (3 species).</td>
</tr>
<tr>
<td>Low Shrubs</td>
<td><em>Agathis anthemum bojeri</em>, Euryops laxus and <em>Gnidia anthyloides</em> (3 species).</td>
</tr>
<tr>
<td>Graminoids</td>
<td><em>Aristida junciformis</em> subsp. junciformis (d), <em>Bothriochloa insculpta</em>, <em>Eragrostis curvula</em>, <em>Hyparrhenia hirta</em>, <em>Panicum maximum</em>, <em>Paspalum scrobiculatum</em>, <em>Sporobolus africanus</em>, <em>S. pyramidalis</em> and <em>Themeda triandra</em> (9 species).</td>
</tr>
<tr>
<td>Herbs</td>
<td><em>Chamaecrista mimosoides</em>, <em>Conostomium natalense</em>, <em>Gerbera ambigua</em>, <em>Helichrysum allioides</em>, <em>Herrmannia grandistipula</em>, <em>Pentanisia prunelloides</em>, <em>Selago</em></td>
</tr>
</tbody>
</table>

\(^1\) Species (and lower taxa) that have a high abundance, a frequent occurrence or are prominent in the landscape.
KwaZulu-Natal Hinterland Thornveld falls within the Savannah Biome, and is described by Rutherford et al. (2006) as open “thornveld” dominated by Acacia trees on undulating plains found on upper margins of river valleys. Compared to Dry Coast Hinterland Grassland, the more savanna-like KwaZulu-Natal Hinterland Thornveld generally supports a greater floristic richness of trees, shrubs, climbers, herbs and grasses. Table 3 provides a list of plant species that characterise KwaZulu-Natal Hinterland Thornveld (after Rutherford et al., 2006). This vegetation type is classified as Vulnerable by Rutherford et al. (2006), however, according to the more recent and regionally appropriate assessments by Scott-Shaw and Escott (2011) it is Least Threatened. Only a small portion of the study area is defined by KwaZulu-Natal Hinterland Thornveld (Figure 2).

Table 3 List of important, biogeographically important and endemic plant taxa defining KwaZulu-Natal Hinterland Thornveld (Rutherford et al., 2006)

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tall tree</td>
<td>Acacia robusta.</td>
</tr>
<tr>
<td>Small trees</td>
<td>Acacia natalitia (d), A. nilotica (d), Combretum molle (d), Ziziphus mucronata (d), Brachylaena elliptica, Cussonia spicata and Erythrina latissimi.</td>
</tr>
<tr>
<td>Succulent trees</td>
<td>Aloe marlothii subsp. marlothii and Euphorbia ingens.</td>
</tr>
<tr>
<td>Tall Shrubs</td>
<td>Calpurnia aurea, Coddia rudis, Diospyros dichrophylla, Ehretia rigida subsp. rigida, Grewia occidentalis, Gymnosporia buxifolia, Hibiscus calyphyllus and Rhus pentheri.</td>
</tr>
<tr>
<td>Low Shrubs</td>
<td>Barleria obtusa, Chaetacanthus setiger, Crossandra greenstockii and Justicia flava.</td>
</tr>
<tr>
<td>Soft Shrub</td>
<td>Hypoestes aristata (d).</td>
</tr>
<tr>
<td>Woody Climbers</td>
<td>Jasminum breviflorum, Putterlickia verrucosa and Tecoma capensis.</td>
</tr>
<tr>
<td>Woody Succulent Climber</td>
<td>Sarcostemma viminale (1 species).</td>
</tr>
<tr>
<td>Graminoids</td>
<td>Aristida junciformis subsp. junciformis (d), Eragrostis curvula (d), Hyparrhenia hirta (d), Melinis nerviglumis (d), Themeda triandra (d), Cymbopogon nardus, Eragrostis capensis, E. chloromelas, E. racemosa, E. superba, Heteropogon contortus, Panicummaximum, Sporobolus fimbratus, S. pyramidalis and Tristachya leucothrix.</td>
</tr>
<tr>
<td>Herbs</td>
<td>Commelina Africana and Ruellia patula.</td>
</tr>
<tr>
<td>Geophytic Herb</td>
<td>Sansevieria hyacinthoides.</td>
</tr>
</tbody>
</table>
5.3 Description of vegetation along the N3 section

The proportion of untransformed (i.e. natural, near natural and degraded vegetation) versus transformed habitats areas is summarised in Appendix A, with additional detailed describing the actual vegetation associated with this section of the N3 presented in the following sections.

5.3.1 Disturbed grassland/thicket mosaic

This is the most widespread community within the study area and comprises a patchy mosaic of degraded and secondary grassland, approximately 1-1.5 m tall, shrubland between 4 and 5 m tall and thicket between 3 and 8 m tall, together with taller stands of *Eucalyptus*, *Pinus* and *Acacia mearnsii* trees, up to 15 m tall. The original natural vegetation has become degraded through road construction, residential and agricultural development, earthworks, footpaths, illegal dumping, borrow pits and sand winning activities. Mowed grass verges are included here. A range of generalist, ruderal\(^4\) and alien invasive species are common. Grasses and forbs such as *Aristida junciformis*, *Chamaecrista mimosaoides*, *Conyza albida*, *Cymbopogon caesius*, *Digitaria eriantha*, *Helichrysum nudifolium*, *Hyparrhenia hirta*, *Hypoxis colchicifolia*, *Imperata cylindrica*, *Leonotis intermedia*, *Melinis repens*, *Plantago lanceolata*, *Polygala hottentotta*, *Rubus sp.**, *Sporobolus africanus*, *S. pyramidalis*, *Tagetes minuta*, *Veronica sp.*, *Wahlenbergia grandiflora* and *Zornia capensis* are common. Common shrubs and trees include *Acacia mearnsii*, *Acacia sieberiana*, *Cussonia spicata*, *Erythrina lysistemon*, *Eucalyptus sp.**, *Jacaranda mimosifolia*, *Lantana camara* and *Melia azedarach*. A few patchy/isolated occurrences of the original natural grassland cover are present, including protected species and other geophytes\(^5\) such as *Eulophia sp.*, *Hypoxis hemerocallidea* and *H. colchicifolia*.

Notable species found include:
- *Aloe arborescens*, *A. maculata* and *A. ferox* and a *Eulophia sp.*, which are all designated as specially protected under the NNCO (Act No. 15 of 1974).
- The geophyte\(^6\) *Hypoxis hemerocallidea*, which has a status of Declining in the National Red List of South African Plants (Williams et al., 2016).

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\(^2\) Taxa that are not necessarily endemic, and are important, but carry additional importance being limited to a small group of vegetation units, they are listed a regionally endemic in an established Centre of Endemism, they occur at the limits of their distribution area and they show a very disjunct distribution pattern.

\(^3\) Plant taxa that occur exclusively within the vegetation unit concerned (i.e. KwaZulu-Natal Coastal Belt).

\(^4\) A plant that is associated with human dwellings or agriculture, or one that colonises waste ground. Ruderals are often weeds, which have high demands for nutrients and/or are intolerant of competition.

\(^5\) A plant that survives unfavourable periods by means of underground food-storage organs such as rhizomes, tubers and bulbs.

\(^6\) A plant that survives unfavourable periods by means of underground food-storage organs such as rhizomes, tubers and bulbs.
5.3.2 Riparian and wetland areas

While rivers and wetlands have been assessed by GroundTruth (2018), the vegetation within affected riparian areas and wetlands is described and assessed in this study. The section of the N3 under investigation passes through the headwaters of tributaries of the uMngeni River catchment (to the north) and the uMlazi River catchment (to the south), with the road either crossing or passing within 50m proximity to tributaries of the following river systems:

- Mshwati River (uMngeni River catchment)
- Mnambiti River (uMngeni River catchment)
- uMlazi River tributaries

Many of the waterways and wetlands present have been variably impacted upon by the road and associated drainage structures, by canalisation, and by urban and agricultural development. Livestock impacts such as grazing, trampling and siltation are common. Natural environmental gradients are often obscured and vegetation is largely degraded or disturbed.

In temporarily to seasonally wet areas, disturbed hygrophilous grassland between 0.5 and 1.5 m tall is common, and typically contains a range of grasses, sedges and forbs including *Centella asiatica*, *Chloris gayana*, *Commelina erecta*, *Cynodon dactylon*, *Cyperus spp.*, *Imperata cylindrica*, *Paspalum urvillei*, *Pennisetum clandestinum*, *Pycereus polystachyos*, *Senecio polyanthemoides*, *Tagetes minuta*, *Verbena bonariensis* and *Xanthium strumarium*.

Where more permanently wet conditions prevail, *Typha capensis* reedbeds up to about 2 m tall occur. There are a variety of indigenous species that tend to increase in abundance in response to disturbance events (Macfarlane *et. al.*, 2009), and it is likely that nutrient pollution and grazing impacts have contributed to the dominance of *Typha capensis* in these situations.

Widening of the N3 is likely to permanently remove a relatively small sections of these wetlands, and with mitigation the significance of the impact is likely to be low. It is important that mitigation actions for wetlands specified in Section 7 are followed during construction to reduce impacts to acceptable levels. It is also important that the findings of the specialist report on rivers and wetlands are taken into account (Groundtruth, 2018).

5.3.3 Hygrophilous grassland

The section of hygrophilous grassland highlighted in the 2013 study will be largely avoided by the updated N3 extension/upgrades immediately south west of the Cato Ridge Interchange (see Site 1; Figure 3 and Appendix C), but may be indirectly influenced by continued edge effects and stormwater runoff from the existing road reserve. The species composition indicates that the majority of this wetland experiences temporary to seasonally wet conditions, which may be largely influenced by stormwater runoff from the N3 and other roads that surround this hygrophilous grassland patch. The sward is approximately 1.5 m tall and common grasses include *Leersia hexandra*, *Chloris gayana*, *Cymbopogon nardus*, *Eragrostis capensis* and
Aristida junciformis, together with sections of Typha capensis rushes where conditions are wetter. Parts have been visibly disturbed through adjacent road works and spoiling of material. The diversity of forbs is relatively low, and it appears that there has been a history of disturbance across the whole wetland (e.g. the area is often mowed).

Anecdotally, this hygrophilous grassland/wetland is known to support a small population of the sensitive Natal Leaf-folding Frog Afrixalus spinifrons (Near Threatened), which resulted in a significant realignment of a pipeline to avoid this area.

5.4 Areas of Conservation Importance

5.4.1 National Threatened Ecosystems

The study area for this section of the N3 passes through Dry/Moist Coast Hinterland Grassland (or Ngongoni Veld) based on the mapping of the original extent of this vegetation type. As mentioned in Section 5.2.1, Ngongoni Veld (as classified nationally by Mucina and Rutherford, 2006) is a listed Threatened Ecosystem according to NEMBA (Act No 10 of 2004). The conservation status of Ngongoni Veld is Vulnerable, and thus it is required that impacts on these ecosystems be avoided, minimised, mitigated and/or offset as appropriate (Government Gazette, 2011). The actual occurrence of Ngongoni Veld along this section of the N3 is rather limited, with very few indications of vegetation in good condition (see Section 5.3.3).

5.4.2 Provincial Conservation Planning

EKZNW's Systematic Conservation Assessment (SCA, also referred to as systematic conservation planning) highlights areas that vary in terms of conservation importance as identified and mapped under the KZN biodiversity spatial planning terms and processes (EKZNW, 2016). This includes areas that are proclaimed as conservation areas or formally protected areas (e.g. provincial reserves, private reserves and stewardship sites), as well as unprotected areas that are considered a priority in terms of containing important biodiversity features. In terms of the latter, areas within KZN are subdivided into Planning Units (PUs) of varying spatial scales each supporting/potentially supporting biodiversity features (e.g. conservation important species, vegetation types/ecosystem, etc.). The SCA broadly classifies areas of biodiversity value/importance using two categories, namely Critical Biodiversity Area’s (CBA’s) and Ecological Support Areas (ESAs). CBAs comprise two subcategories, CBA: Irreplaceable and CBA: Optimal. The SCA areas are defined as follows:

- **CBA: Irreplaceable** represent the only localities where conservation targets for specific biodiversity features can be met under the current conservation planning scenario. From a conservation perspective, these areas are considered “irreplaceable” in terms of maintaining biodiversity targets, and should ideally be avoided.
- **CBA: Optimal** represent the best localities that provide critical linkages for CBA: Irreplaceable areas.
**SANRAL BASIC ASSESSMENT**

**PROPOSED CAPACITY IMPROVEMENTS TO NATIONAL ROUTE 3 (N3), KWAZULU-NATAL**

**CAPACITY UPGRADES TO THE N3 FROM CATO RIDGE (KM 19.4) TO LYNNFIELD PARK (KM 30.6)**

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**Figure 3** Overview of important conservation areas between Cato Ridge and Lynnfield Park (after EKZNW, 2016)
ESAs represent areas that support and sustain the ecological functioning of the CBAs thereby ensuring the persistence and maintenance of biodiversity patterns and ecological processes.

There are several areas along this section of the N3 that adjoin, but that do not directly impact, land classified as CBA: Irreplaceable, particularly areas just north west of the Dardanelles interchange (Figure 3).

5.4.3 Environmental Management Framework (EMF) Sensitive Areas

The 2010 Environmental Management Framework (EMF) Regulations (General Notice R547 of Government Gazette 33306, 18 June 2010) requires that any EMF, as gazetted under NEMA (Act No 107 of 1998), is considered in applications for environmental authorisation by taking into account sensitive areas as identified in the EMF. For this section of the N3, this includes sensitive areas for biodiversity as identified in the Draft 2017 EMF developed for the Umgungundlovu District Municipality. Appendix B highlights areas of varying development constraint based on biodiversity sensitivity (i.e. low, medium, high, very high). For this section of the N3, these are largely areas of low constraint/sensitivity, with a few areas of very high constraint/sensitivity that are not directly impacted, but which may be affected indirectly by the proposed N3 upgrades. Nevertheless, it is recommended that all areas identified as high or very high sensitivity/development constraint are safeguarded as far as possible through implementation of appropriate mitigation measures as presented in the Section 7, and treated in a similar manner as CBAs as per Section 5.4.2 above.

5.4.4 Durban Metropolitan Open Space System (D’MOSS)

The eastern parts of this section of the N3 runs adjacent to green open spaces of eThekwini, and which form part of the Durban Metropolitan Open Space System (D’MOSS). These areas do not include any formal reserves but comprise rural landscapes and riverine corridors (Figure 4).

D’MOSS includes municipal nature reserves, large rural landscapes in upper catchments and riverine and coastal corridors, as well as privately owned land. D’MOSS is mapped by the Biodiversity Planning Branch of the Environmental Planning and Climate Protection Department (EPCPD) in consultation with relevant experts. D’MOSS has been adopted as a layer within the various town planning schemes formulated under various legislation found throughout the city. The practical effect of this, is that in the case of any land affected by D’MOSS, prior to developing, excavating, levelling, removing any natural vegetation, erecting any structure, dumping or carrying out any work on a site, the prior approval of the Council must be obtained.

It should be noted that any future changes to the DMOSS footprint will be undertaken in terms of the Planning and Development Act, 2008 (Act No 6 of 2008).
Figure 4 Overview of Durban Metropolitan Open Space System (D’MOSS) between the Cato Ridge Interchange and Lynnfield Park
In this regard, no approval for such work will be given unless the Council is satisfied that the proposed activities will not materially degrade, destroy, or negatively impact on the integrity of the biodiversity and/or environmental goods and services that may be found or generated within the affected area (http://www.durban.gov.za/City_Services/development_planning_management/environmental_planning_climate_protection/Pages/default.aspx).

The eThekwini Municipality will need to be engaged with as the widening of the N3 will affect several D’MOSS areas.

5.5 Plants of Conservation Importance

A number of biogeographically important and endemic taxa are associated with natural occurrences of Hinterland Grassland/Ngongoni Veld and Hinterland Thornveld as described in Sections 5.2.1 and 5.2.2 respectively. In addition, there are several conservation important plant species (i.e. Red Listed, rare and endemics, and protected species) that may occur within the study area based on known species distribution ranges (Raimondo et al., 2009; SANBI, 2017). A number of these are listed as Threatened species, for example:

- Aloe neilcrouchii (Endangered), Aloe pruinosa (Vulnerable), Argyrolobium longifolium (Vulnerable), Brachystelma franksiae subsp. franksiae (Vulnerable), Brachystelma gerrardii (Endangered), Cineraria atriplicifolia (Vulnerable), Dierama nixonianum (Vulnerable), Drimia echinostachya (Vulnerable), Euphorbia gerstneriana (Vulnerable), Hermannia sandersonii (Vulnerable), Kniphofia latifolia (Endangered), Senecio dregeanus (Vulnerable), Sisyranthus fanniniae (Vulnerable), Woodia verruculosa (Vulnerable).

The aforementioned list of Threatened species obviously excludes a greater number of other conservation important species (e.g. species that are listed as Near Threatened or Data Deficient, rare and endemic species, as well as protected species). This highlights the potential for the site to support a fair number of important and sensitive plant species.

Modelled and recorded data from EKZNW’s MINSET data highlights one specie:

- Acalypha angustata, which has a conservation status of Least Concern (Pillay, 2004), and its typical habitat is Hinterland Grassland/Ngongoni Veld.

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8 Threatened species – species facing a high risk of extinction as classified using the IUCN categories, i.e. Critically Endangered, Endangered or Vulnerable is a threatened species.
6. ASSESSMENT OF IMPACTS

A description of impacts and assessment of their significance according to the impact assessment criteria listed in Table 1 in Section 4.2 is provided in the following sections. Impact significance is assessed both before and after the implementation of recommended mitigation measures.

6.1 Project activities likely to have an impact on vegetation

Activities and aspects of construction and operation that are likely to impact negatively on natural vegetation include the following:

**Construction**
- Clearing of vegetation during site preparation to accommodate the extended areas of the N3 upgrade (including establishment of site camps, stockpile areas, waste management facilities, storage/handling/disposal facilities, retaining walls, stabilisation/erosion control structures, etc.).
- Upgrading of existing tracks or construction of new access roads where no access is available for heavy vehicles, including temporary crossings over rivers/streams.
- Gaining vehicle access to the edge of streams and rivers for purposes of extracting water for construction.
- Movement of heavy machinery over vegetated areas out-side of the existing road network causing compaction of soils.
- Earthworks, blasting and demolition, resulting in stockpiles of spoil which may temporarily smother and damage vegetated areas.
- Operation of heavy machinery for piling and erection of additional bridge piers under bridges and near rivers/streams/wetlands.
- Temporary impoundment of rivers/streams.
- Widening of existing piers under bridges and drainage structures will affect rivers, streams and drainage lines and associated vegetation.
- Establishment and use of stockpile areas, lay down areas and construction camps.
- Transport and use of hazardous substances on site (asphalt, cement, fuels, oils, lubricants), which may lead to accidental spills and contamination of soils and vegetation.
- The spread of IAP species as a result of construction activities (note that a high cover of IAPs is already present within large sections of the road reserve and along watercourses/wetlands, which will exacerbate the spread of IAPs).

**Operation**
- Soil erosion, incision of drainage lines and smothering of vegetation where erosion prevention measures are inadequate or not maintained.
- Hazardous substances spills resulting from vehicle accidents and failures.
- Spread and establishment of IAPs in areas that are not properly rehabilitated/revegetated or through road maintenance activities.
6.2 Description of Main Impacts on Natural Vegetation

- **Clearance of vegetation cover**
  The clearing of vegetation for widening of the road reserve, stockpiling of materials, vehicular access during construction and operation, and the establishment of construction camps will lead to the direct loss of vegetation cover, but only within the road reserve. Based on the existing road reserve and proposed extensions, there is up to 35 ha of mostly degraded/secondary grassland and thicket, possibly with some relic elements of Hinterland Grassland/Ngongoni Veld, of which only parts may be directly affected. Based on the existing road reserve and proposed extensions, up to 35 ha of mostly degraded/secondary grassland and thicket, possibly with some relic elements of Hinterland Grassland/Ngongoni Veld. Any direct impact to natural vegetation would result in the loss of indigenous plant species, largely common/widespread species, but potentially also a fair number of notable and/or protected species.

In terms of the environmental regulations of NEMA (Act No 107 of 1998), the clearance of indigenous vegetation\(^9\) is likely to trigger Activity 12 of Listing Notice 3 due to the removal of up to 580 square metres of indigenous vegetation from within CBAs (as defined in the KZN 2016 Systematic Conservation Assessment; see Section 5.4.2) and/or areas highlighted in the Draft 2017 EMF for the Umgungundlovu District Municipality as having a very high sensitivity for biodiversity (see Section 5.4.3).

- **Edge effects**
  The clearing of vegetation during construction will result in an increase in disturbed edge habitat immediately adjacent to developed areas. Edge habitat is characterised by a predominance of generalist and alien species because these areas experience higher levels of stress and more frequent disturbance (in both time and space), for example higher light conditions, lower soil moisture conditions and higher exposure to wind (and fire for closed woody communities). Edge habitat is characterised by highly competitive species which can invade areas of established vegetation, resulting in a loss of sedentary species of mature habitats which are normally considered sensitive. Within the area of interest, edge effects will be lowest where natural vegetation is already disturbed (i.e. disturbed grassland/thicket) and highest where vegetation is more intact (i.e. Hinterland Grassland/Ngongoni Veld in good condition). Shade cast on habitat under viaducts, particularly towards the abutments will have a small effect on the composition of plant communities under bridges.

- **Habitat fragmentation**
  Because the N3 route is already in existence, it is expected that widening will increase the distance between natural areas bisected by the highway, although this effect is likely to be small relative to the current width of the highway. Clearing of vegetation for temporary vehicle access and stream crossings through riparian and wetland vegetation

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\(^9\) According to NEMA (Act No 107 of 1998) indigenous vegetation refers to area “consisting of indigenous plant species occurring naturally in an area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding 10 years”.
will, however, result in further habitat fragmentation and the consequent loss of habitat connectivity. Rehabilitation would be important to reinstate (and potentially improve) habitat connectivity in the long-term, particularly for sections of D’MOSS affected by the upgrade.

- **Alien invasive plants**
  The clearing of vegetation during construction and operation, and the operation of machinery and stockpile/lay down areas during construction will result in increased levels of disturbance. Alien invasive plants often out-compete indigenous plants and are likely to become established in disturbed areas, thereby reducing habitat quality and contributing to the loss of indigenous species/biodiversity. Some alien plants exacerbate soil erosion while others contribute to reduction of natural streamflow.

- **Soil erosion and siltation**
  The clearing of vegetation for vehicular access during construction, stockpiling of materials, establishment of construction camps and operation of machinery will result in the removal of protective plant cover and compaction of soils, which will expose soils to erosion by water and wind. Habitat quality will be degraded by soil erosion and siltation of down slope areas. This will increase the disturbance experienced in surrounding areas of natural vegetation and increase the footprint of the development. It is likely that the ecology of wetland and riparian systems will also be adversely impacted. Similarly, temporary crossings over riparian zones and wetlands can have negative impacts on natural habitats downstream. Negative ecological impacts can operate long after construction is complete if soil erosion and siltation remains uncontrolled.

- **Deterioration of riparian and wetland vegetation**
  If new access roads need to be constructed, adverse impacts on wetland and riparian vegetation could result from poorly designed culverts/drainage systems associated with temporary crossings, through destruction of natural vegetation, erosion/incision of stream banks and drying of wetland/riparian areas, compaction of hydromorphic soils, concentration and increased energy of water flows, incorrect culvert capacity or incorrect culvert invert levels. Adverse impacts will negatively impact on the integrity of wetland/riparian vegetation, as well as delivery of ecosystem services (e.g. flood attenuation, streamflow regulation and enhancement of water quality), especially if mitigation measures and monitoring are not adequately considered.

- **Harvesting of indigenous plants**
  Increased access for labour during construction and operation could result in the increased collection of medicinal plants, firewood, building wood, and other plant material. This could impact negatively on biodiversity, as well as result in the general degradation of habitat quality.
6.3 Key issues and evaluation of impacts

Due to the disturbed nature of the majority of the natural vegetation along the N3, the significance of impacts within sections of Disturbed Grassland/Thicket Mosaic (Section 5.3.1) are likely to be medium. With mitigation, particularly through alien plant and soil erosion control, the significance is likely to be low.

Similarly, with mitigation, the significance of impacts in the riparian and wetland areas (Section 5.3.2), which include *Typha capensis* reedbeds and disturbed hygrophilous grassland, is likely to be low due to the disturbed nature of these systems. Key mitigation actions required include alien plant and soil erosion control, construction of temporary crossings which alter the normal hydrological regime as little as possible, and thorough rehabilitation which neutralises impacts on stream banks, compaction of wetland soils, and restores (and improves) natural riparian and wetland habitat at temporary crossings. During operation, the provision and maintenance of adequate energy dissipaters at the end of drainage structures will be key in reducing long-term impacts on these habitats.

When considering the impact assessment criteria in Table 2, it is assumed that recommendations and mitigation detailed in this report are followed. There are a number of impacts which can be minimised through strict enforcement of an EMPr during construction, rehabilitation and operation, and these are identified in Section 7 below, together with simple methods to monitor impacts based on key indicators in Section 8 below.
### Table 4  Assessment of impacts of the proposed N3 Road upgrade (Cato Ridge to Lynnfield Park) before and after mitigation

<table>
<thead>
<tr>
<th>Vegetation unit/ location</th>
<th>Mitigation</th>
<th>Nature</th>
<th>Spatial Extent</th>
<th>Duration</th>
<th>Intensity</th>
<th>Irreplaceability of resource caused by impacts</th>
<th>Reversibility of impacts</th>
<th>Consequence combination of spatial extent, duration, intensity, irrereplaceability</th>
<th>Probability likelihood of impact occurring</th>
<th>Significance all impacts including cumulative impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disturbed Grassland/ Thicket Mosaic</td>
<td>Without Mitigation</td>
<td>Negative</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>With Mitigation</td>
<td>Negative</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Riparian and Wetland Vegetation</td>
<td>Without Mitigation</td>
<td>Negative</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>With Mitigation</td>
<td>Negative</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Hygrophilous Grassland</td>
<td>Without Mitigation</td>
<td>Negative</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>With Mitigation</td>
<td>Negative</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
</tr>
</tbody>
</table>
7. RECOMMENDED MITIGATION

There are a number of impacts which can be minimised through strict enforcement of an Environmental Management Programme (EMP) during construction, rehabilitation and operation and these are identified below, together with mitigation measures and simple methods to monitor impacts based on key indicators.

Sensitive areas

- Where construction occurs close to any sensitive areas of natural vegetation (e.g. grassland in good/near-natural condition, wetland/riparian habitat, hygrophilous grassland) or areas supporting any plants of conservation concern (i.e. listed Red Data, TOPS, protected and rare plant species), these areas must be clearly/visibly demarcated and cordoned off by an environmental control officer (ECO) prior to, and during the construction phase.
- The construction footprint must be kept to a minimum, with no works occurring outside of the negotiated servitude/working area – the working area must also be clearly demarcated.
- Stockpile and lay down areas are to be kept away from areas of sensitive natural vegetation.
- Where good quality Hinterland Grassland/Ngongoni Veld are to be affected by construction activities, then the following, species mitigation measures need to be carefully considered to avoid or reduce impacts:
  - The construction footprint is kept to an absolute minimum.
  - A plant ‘search and rescue’ operation must be undertaken prior to construction (as detailed below under ‘plant rescue’).
  - Once all plants of conservation value/concern have been rescued, impacted sections of Hinterland Grassland/Ngongoni Veld affected by construction should be carefully removed and transplanted at nearby disturbed sites\(^{10}\) within the same vegetation type and with similar habitat characteristics. This can be done by carefully removing strips of grassland along with the first 250 mm of topsoil using a front-end loader (or by hand). The removed grassland strips/swards should then be transported to the new site where they are to be placed on the ground in sections side-by-side. Gaps between sections should then be filled with sand and the grass must be given a good watering. Depending on the time of year and natural rainfall patterns, watering should continue approximately once a week for six to eight weeks until the grassland has become established.
- It will be particularly important to ensure that construction contractors are made aware of the CBAs that are proximal to the N3 as shown in Figure 3, with due guidance and monitoring by an environmental control officer (ECO) prior to, and during the construction phase to ensure that the construction footprint is kept to a minimum, with no works occurring outside of the negotiated servitude/working area – the working area/s must also be clearly demarcated. Ancillary infrastructure (e.g. construction camps, lay down areas, stockpiles, etc.) should be positioned away from any CBAs.

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\(^{10}\) Care should be taken to select sites which are not subject to ongoing disturbance that would destroy translocated sections of grassland and to ensure that compacted soils on receiving areas are ripped before grassland is translocated.
Plant rescue

- A plant ‘search and rescue’ operation must be undertaken under the direction of an ecologist/botanist prior to construction, in areas where plants of conservation concern will be impacted by any part of the development, particularly in relation to the construction phase.
- Since visibility of herbaceous plants varies depending on flowering season, an ecologist/botanist should visit the site during spring and summer to identify any additional plants of high conservation value, so that these plants can be marked and transplanted prior to construction commencing. Areas dominated by grassland vegetation, where possible, should be burnt one to two months beforehand to improve detection, as well as stimulate flowering.
- The necessary permits and authorisations must be obtained from EKZNW for the removal and/or relocation of protected plants such as Aloe species and Eulophia sp.
- Suitable ‘search and rescue’ candidate species should be identified, recorded and marked before being carefully removed from the soil. Rescued plants should be transplanted to a suitable, nearby site as soon as possible, then watered (depending on species) until established. Refer to Sections 5.2, 5.3 and 5.5 for candidate species that occur/potentially occur within the area.
- All rescued plants should be planted out into suitable sites as soon as possible. Geophytes may be stored temporarily in a cool, dry environment. Where plants need to be stored for a longer period of time, they should be planted into suitable containers and housed in a designated area (e.g. nursery) where they can be taken care of by an approved horticulturalist.
- Indigenous trees and shrubs should be inspected before they are cleared for the presence of epiphytic orchids. Any orchids found should be removed and relocated to similar habitat outside of the construction footprint.
- The locality of relocated plants should be recorded using a GPS, and preferably marked, and routinely inspected to a point when the plants are stable/properly established.

Clearance of vegetation

- Clearance, disturbance and cutting back of indigenous vegetation is kept to a minimum.
- Where construction may impact on plants designated as ‘specially protected’ under the NNCO (Act No. 15 of 1974), an application must be submitted to EKZNW to clear or translocate these plants as part of the plant rescue operation. (See Appendix B).
- Where construction requires tree species that are protected in terms of the NFA (Act No 84 of 1998) to be cut, disturbed, damaged or destroyed protected tree; and, an application must be submitted to the Department of Water Affairs (DWA).
- Where construction may impact on D’MOSS areas, then the eThekwini EPCPD will need to be engaged to authorise and consent to the clearing of vegetation within D’MOSS areas.
- In wetland and riparian areas, it is recommended that mitigation measures presented by GroundTruth (2018) are taken into account while ensuring the following:
  - The Contractor supplies a method statement outlining the intended approach to construction and rehabilitation within these sensitive areas, which must be reviewed and approved by the supervising Engineer and the ECO prior to commencing the work.
  - As far as possible, work takes place during the winter low flow period.
SANRAL BASIC ASSESSMENT
PROPOSED CAPACITY IMPROVEMENTS TO NATIONAL ROUTE 3 (N3), KWAZULU-NATAL
CAPACITY UPGRADES TO THE N3 FROM CATO RIDGE (KM 19.4) TO LYNNFIELD PARK (KM 30.6)

- Existing crossings are used as far as possible for vehicle access.
- The width of the crossings are kept to the absolute minimum required for access. Construction of new and/or temporary crossings must be suitably designed and constructed to limit interference of hydrological flows and connectivity. Crossing designs must be accompanied by stormwater management plans.
- Temporarily impacted areas are re-habilitated as quickly as possible in accordance with detailed rehabilitation plans that ensure that riparian and wetland vegetation is appropriately restored together with natural characteristics and ecological process (i.e. topographical, geomorphological and hydrological).
- Where dewatering of silt laden water is required at excavations, it is recommended that this water is not pumped directly into watercourses (i.e. wetlands and rivers), and that separate collection areas/sumps should be created in existing disturbed areas where suspended sediments can be settled out.

Site access

The majority of viaducts and culverts in need of widening are already serviced by existing roads and access tracks. However, where additional access tracks or widening of access tracks is required, it is recommended that:

- The number of access tracks is kept to a minimum. Adequate drainage (mitre drains) should be constructed at regular intervals in accordance with the local topography to minimise soil erosion potential. Alien plant control should also be undertaken along these access tracks.
- Soil compaction should be minimised by keeping access and parking areas for vehicle and construction plant to a minimum, and making use of existing compacted/hardened surfaces wherever possible.
- Where new tracks are required, sensitive areas of vegetation, wetlands and riparian zones are to be avoided. Wherever feasible, shaping new tracks with a grader is to be avoided, and new vehicle tracks are to be created by simply driving over the grass cover without removing grass cover/topsoil.
- The same track is to be used to access a site and widening and creating alternative or parallel tracks must not be allowed. Likewise, the same vehicle turning areas are to be used (for both construction and maintenance).
- Where new access tracks are required, as far as possible, these must follow the contour on steep slopes, rather than being aligned directly down steep slopes. Stormwater runoff must be such to limit concentration of runoff, and consequently erosion of soils.
- Where watercourse and drainage line crossings are unavoidable, drains and culverts must be designed in conjunction with relevant experts to the correct invert levels to prevent damming of flows or draining of wet areas. Culverts should be designed to prevent concentration of flows, and to maintain natural flows as free flowing as possible. Levels and elevations must also be set and aligned according to the natural flow of water to limit headcuts and channel incision developing.
- If water for construction is to be sourced from local water bodies, then this must occur at existing disturbed sites due to potential for damage by temporary access roads and water tankers.
- Temporary access tracks are rehabilitated as quickly as possible after construction ceases by removing excess imported material, ripping compacted soils, reinstating
natural ground levels, implementing soil erosion controls and re-establishing a dense cover of indigenous vegetation appropriate to the plant community in which the road/track is located.

Soil erosion

- Where there is potential for erosion, energy dissipaters are to be installed at the end of drainage structures to reduce the velocity and erosive force of water. Energy dissipaters could include gabion mattresses, riprap and stilling chambers, along with planting of indigenous vegetation buffers to encourage diffuse runoff.
- Where soil requires excavation, the original topsoil (the upper most 250 mm of soil, together with plant roots and organic matter) must be stripped and stockpiled separately. Topsoil stockpiles should not be handled/moved, and should be kept free of IAPs.
- During rehabilitation, prompt and progressive reinstatement of bare areas is required. The topsoil layer is to be replaced on top during reinstatement.
- Any trenches associated with the upgrade are to be reinstated to a convex (as opposed to flat or concave) surface to prevent the channelling of any surface runoff as the soil settles/compacts over time.
- The control of soil erosion and siltation associated with construction and operation is important at all locations on site, and particularly adjacent to wetlands, drainage lines and streams/rivers. Both temporary and permanent soil erosion control measures must be used during the construction and operation phases. Any earth-worked areas, which may lay bare for extended periods, should be temporarily grassed.
- Bare surfaces should be grassed as soon as possible after construction to minimise time of exposure. These areas should be seeded using a typical veld grass mix (comprising grass species such as *Eragrostis curvula*, *Chloris gayana*, *Digitaria eriantha*, along with a sterile form of *Eragrostis teff* (to establish immediate cover), and an indigenous stoloniferous/runner grass such as *Cynodon dactylon*. Alien invasive grasses such as *Pennisetum clandestinum* (Kikuyu) must not be used.
- Soil erosion controls must be inspected and maintained on a regular basis during construction and operation phases.

Alien invasive plants

- Alien invasive plants around any excavated areas/work areas and within the road reserve must be kept under control during both construction and operation.
- During construction, mechanical methods should be encouraged as the main form of control, together with the judicial use of herbicides (Guideline Document from eThekwini’s Environmental Planning and Climate Protection Department - EPCPD).
- The colonisation and rate of growth of alien plants must be closely monitored so that they can be controlled by simple hand pulling while plants are still small. If alien plants are allowed to grow too large, herbicide use will be compounded.
- Clearance, follow-up operations (initially at 3 month intervals, down to biannual over time) and monitoring should continue during both the construction and operational phases. Follow-up operations will become easier if done regularly.
Camps and construction team

- Contractor’s camps and any concrete batching sites are to be sited within existing disturbed areas and at least 100 m from areas of sensitive natural vegetation, wetlands, streams, drainage lines and river banks.
- The construction team must remain within the construction site boundaries and must not interfere with areas of natural vegetation in any way. All indigenous vegetation which does not need to be cleared for construction or operation should not be disturbed.
- Collection of medicinal plants, firewood, building wood, and poaching within areas of natural vegetation should be prohibited.
- No dumping of solid waste or domestic ablutions is to occur within areas of natural vegetation and adequate ablutions must be provided.
- Adequate precautions must be taken to ensure that fires are not started as a result of the construction team. Open fires should not be permitted anywhere on site.

Pollution and waste management

- It is important that pollution spills are prevented at all locations on site, and particularly near sensitive natural vegetation, wetlands, drainage lines and streams/rivers by strict control/handling of hazardous substances such as bitumen, fuels, oils, lubricants, cement, paints, solvents, and any other chemicals to be used on site, and provision of on-site sanitation for labour.
- Natural water bodies must not be used to wash out construction vehicles, concrete mixers, or for domestic ablutions.
- Any emergency protocol should be developed to manage accidental spills with immediate effect.
8. RECOMMENDATIONS FOR MONITORING BASED ON KEY INDICATORS

A clear and simple system to monitor impacts, and their management, based on key indicators is provided below:

- During construction, regular visual assessment of the progress of clearing and grubbing within the road reserve to ensure no works occur beyond the road reserve boundaries.
- During construction, regular visual assessment of the condition of translocated plants, checking for signs of water stress such as wilted leaves.
- During construction and operation, regular visual checks for the presence of unnecessary vehicle tracks through areas of natural vegetation.
- During construction and operation, regular visual assessment to identify any soil erosion issues, particularly any erosion scars or recently deposited drifts of silt associated with construction, drainage structures or spoil.
- Within riparian and wetland areas, regular visual checks for any head-cut erosion, erosion scars, die-off of riparian/wetland vegetation or drying out of a riparian or wetland area, particularly at the outer edges.
- During construction, operation, and rehabilitation, regular visual observation to identify emerging alien plants in any area disturbed by project activities. If alien plant control is successful, follow-up checks should reveal that the cover of alien plants is decreasing over time.
- During construction, regular visual assessments to identify any pollution issues within and downstream/down slope of work areas. These include death of fish and other aquatic organisms, unexplained dieback of vegetation, unusual discoloration of water/soil/vegetation, silt plumes, and unusual odours emanating from wetlands or water bodies.
9. RECOMMENDATIONS FOR OFFSETTING IMPACTS

Biodiversity offsets are measurable conservation outcomes resulting from actions designed to compensate for negative residual impacts on biodiversity that arise from a project development (ICMM IUCN, 2012; McKenny and Kiesecker, 2010). The goal of biodiversity offsets is to achieve “no-net-loss”, and preferably a “net gain” of biodiversity in terms of species composition, habitat structure, ecosystem function and human use and cultural values associated with biodiversity. Ultimately, a biodiversity offset is a commitment by the developer to compensate for residual impacts on biodiversity after appropriate avoidance, minimisation and on-site rehabilitation measures have been taken into account according to the mitigation hierarchy (DEADP, 2007). Error! Reference source not found. provides an illustration of the mitigation hierarchy in the EIA process, and how offsets are eventually defined to account for residual impacts to achieve a no-net-loss/net-gain.

![Figure 5 A strategic approach for mitigating potential impacts across a site (after Kiesecker et al., 2009)](image)

The impact on natural vegetation that can be expected from upgrading the N3 between Cato Ridge and Lynnfield Park is not likely to require any offsetting on the basis that the impacts (as presented in Section 6) can be adequately mitigated, assuming that the recommendations (as presented in Section 7) are effectively implemented, along with monitoring (as per Section 8).
10. CONCLUSION

Most of the proposed N3 upgrade will affect existing disturbed and degraded areas of natural vegetation, some of which comprises remnant elements of Hinterland Grassland/Ngongoni Veld. Impacts to vegetation has been assessed, and a number of general mitigation measures have been recommended to minimise impacts. Further input from an ecologist/botanist during the spring and summer flowering seasons will help to significantly reduce impacts by facilitating and implementing a plant ‘search and rescue’ operation. This will also serve to further inform and guide authorisations and permitting procedures through engagement with EKZNW. Ultimately, negative impacts can be minimised by strict enforcement and compliance with the EMPr, which takes into account the recommendations for managing impacts as detailed in this report.
11. REFERENCES


EPCPD. General Invasive Alien Plant Control: Insight into Best Practice, Removal Methods, Training and Equipment. Guideline document prepared by the eThekwin Municipality Environmental Planning and Climate Protection Department (EPCPD).


Internet sources

http://www.opengreenmap.org/greenmap/durban-ethekwini-municipality-south-africa

www.durban.gov.za/City_Services/development_planning_management/environmental_planning_climate_protection/projects)
### APPENDIX A – SUMMARY OF VEGETATION/HABITAT CONDITION

<table>
<thead>
<tr>
<th>Vegetation/Habitat Condition</th>
<th>Percentage (%) of Vegetation/Habitat Condition Class</th>
<th>Description and Additional Comments and Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural</td>
<td>0.0%</td>
<td>There is no Dry Coast Hinterland Grassland (or Ngongoni Veld) or KwaZulu-Natal Hinterland Thornveld along this section on the N3 that is considered to be in a natural/pristine condition.</td>
</tr>
<tr>
<td>Near Natural</td>
<td>7.0%</td>
<td>A relatively small proportion of the remaining untransformed areas along this section on the N3 comprise vegetation that is considered to be in a near natural state, with a reasonable diversity of indigenous plant species (including some species that are indicative of Dry Coast Hinterland Grassland (or Ngongoni Veld) or KwaZulu-Natal Hinterland Thornveld, as well as hygrophilous grassland that is associated with wetland habitats (notably the wetland located at Site 1, south west of the Cato Ridge Interchange; see Figure 3 and Appendix C). Patches of near natural vegetation are largely located along the N3 between Camperdown and Lynnfield Park.</td>
</tr>
<tr>
<td>Degraded</td>
<td>16.4%</td>
<td>A significant proportion of the remaining untransformed areas along this section on the N3 comprise vegetation that is degraded as a result of a long history of disturbance and edged effects associated with the land transformation and land use activities that typically have occurred along the N3 (e.g. road construction, earthworks, footpaths, illegal dumping, borrow pits, mowing/burning, residential/industrial/commercial development, etc.). The vegetation is thus largely a patchy/fragmented mosaic of secondary grassland (particularly in and around interchanges), grassland in poor condition, and degraded thicket. Indigenous plant diversity is generally low, and made up of mostly ruderal/weedy species, as well as a number of invasive alien plant species.</td>
</tr>
<tr>
<td>Transformed</td>
<td>76.6%</td>
<td>Most of the areas along this section on the N3 is already transformed by the existing N3 national road, interchanges, bridges and other roads, as well as by cultivated lands.</td>
</tr>
</tbody>
</table>
APPENDIX B – DISTRIBUTION OF PROTECTED PLANTS BETWEEN CATO RIDGE AND LYNNFIELD PARK
APPENDIX C – HYGROPHILOUS GRASSLAND VEGETATION AT THE CATO RIDGE INTERCHANGE
APPENDIX D – UMGUNGUNDLOVU DISTRICT ENVIRONMENTAL MANAGEMENT FRAMEWORK

Projection: Transverse Mercator
Datum: WGS84
Meridian: 1,031

GT0791: N3 CAPACITY UPGRADES
Cato Ridge to Lynnfield: Biodiversity Constraints (2017 Umgungundlovu EMF)
Several “specially protected” plants as listed under the Natal Nature Conservation Ordinance (NNCO; Act No. 15 of 1974) occur along this section of the N3. These include *Aloe arborescens*, *Aloe ferox*, *Aloe maculata* and *Eulophia sp.* These species are largely scattered along the entire length of this section of the N3 (see Appendix B). Should any listed plants need to be cleared or translocated, then an application for a permit in terms of the NNCO will need to be placed with Ezemvelo KZN Wildlife (EKZNW) via the permits office (Permits.Permits@kznwildlife.com), along with a nominal application fee of R100 per application.

Each permit application will need to be completed to include the following information:

- Full description of the activity/s to be undertaken (e.g. removal and/or translocation of specially protected species);
- Required period (i.e. from when, to when) to perform each activity;
- Property details where each activity will take place (e.g. removed from, translocated to);
- Details of who will be undertaking the activity;
- Proof of payment for the application fee;
- Relevant species requiring authorisation, including the number of individuals; and
- Signed declaration by the applicant.

It is recommended that the permit application is only undertaken once the following steps have taken place:

- **Step 1** – the direct footprint (including construction camps, stockpile areas, laydown areas, etc.) has been finalised to determine, which areas will need to be cleared of vegetation, and potentially, protected plants;
- **Step 2** – a specialist (either a botanist or an ecologist, both with experience in permit applications) will need to, as far as possible, determine the number of individuals of each protected plant species that will need to be removed and/or translocated;
- **Step 3** – SANRAL will need to agree on a protocol for rescue and relocation, which will need to establish areas of suitable habitat to receive translocated plants; and
- **Step 4** – obtain a permit from EKZNW to authorise the removal and/or translocation.

Step 3 will require a method statement to rescue and relocate plants, which should also include procedures for monitoring translocated individuals and/or populations.

Estimated timeframes and costs to undertake the aforementioned steps are as follows:

- **Step 1** – an internal SANRAL process;
- **Step 2** – a one to two week process that will cost approximately R 12,500;
- **Step 3** – a one to two month process that will cost approximately R 20,000; and
- **Step 4** – a one month process that will cost approximately R 3,500.
APPENDIX F – SPECIALIST CV
APPENDIX G – DETAILS OF SPECIALIST AND DECLARATION OF INTEREST