



REGISTRATION NO. 1998/009584/06



**PROPOSED STRENGTHENING (PARTIAL  
RECONSTRUCTION) OF NATIONAL ROUTE R27  
SECTIONS 7 & 8 BETWEEN THE  
WESTERN/NORTHERN CAPE BORDER (KM 40.0)  
AND CALVINIA (KM 70.0)**

**FINAL BASIC ASSESSMENT REPORT**

Prepared for:  
**Department of Environmental Affairs**

On behalf of:  
**Aurecon SA (Pty) Ltd for  
South African National Roads Agency SOC Ltd**

Prepared by:  
**CCA Environmental (Pty) Ltd**





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Prepared for:  
**Department of Environmental Affairs  
Private Bag X447  
Pretoria, 0001**

On behalf of:  
**Aurecon SA (Pty) Ltd  
PO Box 494,  
Cape Town, 8000**  
for  
**South African National Roads Agency SOC Ltd  
Private Bag X19  
Bellville, 7530**

Prepared by:  
**CCA Environmental (Pty) Ltd  
PO Box 10145  
Caledon Square, 7905**



## PROJECT INFORMATION

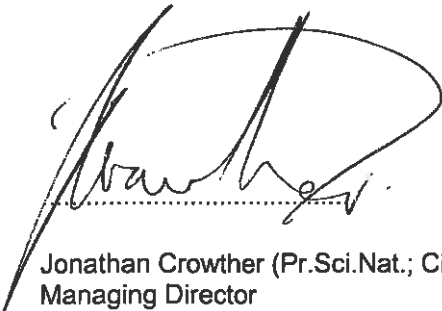
<b>TITLE</b>	Final Basic Assessment Report for the proposed strengthening (partial reconstruction) of National Route R27 Sections 7 & 8 between the Western/Northern Cape border (km 40.0) and Calvinia (km 70.0)
<b>APPLICANT</b>	South African National Roads Agency SOC Limited (SANRAL)
<b>ENVIRONMENTAL CONSULTANTS</b>	CCA Environmental (Pty) Ltd
<b>REPORT REFERENCE</b>	AUR02R27/DBAR/1
<b>DEA REFERENCE</b>	12/12/20/2272
<b>REPORT DATE</b>	25 October 2011

**REPORT COMPILED BY:** Ena de Villiers



Ena de Villiers  
Environmental Consultant

**REPORT REVIEW BY:** Jonathan Crowther



Jonathan Crowther (Pr.Sci.Nat.; CEAPSA )  
Managing Director



# EXPERTISE OF ENVIRONMENTAL ASSESSMENT PRACTITIONER

<b>NAME</b>	Jonathan Crowther
<b>RESPONSIBILITY ON PROJECT</b>	Project management and quality control.
<b>DEGREE</b>	B.Sc. Hons (Geol.), M.Sc. (Env. Sci.)
<b>PROFESSIONAL REGISTRATION</b>	Pr.Sci.Nat., CEAPSA
<b>EXPERIENCE IN YEARS</b>	22
<b>EXPERIENCE</b>	Jonathan Crowther has been involved in environmental consulting since 1988 and is currently the Managing Director of CCA Environmental (Pty) Ltd. He has expertise in a wide range of environmental disciplines, including Environmental Impact Assessments (EIA), Environmental Management Plans/ Programmes, Environmental Planning & Review, Environmental Auditing & Monitoring, Environmental Control Officer, Public Consultation & Facilitation. He has project managed a number of offshore oil and gas EIAs for various exploration and production activities in South Africa and Namibia. He also has extensive experience in projects related to roads, property developments and waste landfill sites.

<b>NAME</b>	Ena de Villiers
<b>RESPONSIBILITY ON PROJECT</b>	Project consultant and report writing.
<b>DEGREE</b>	B.A. Hons (Philosophy), B.A. Hons (Demography), M.Phil (Environmental Ethics)
<b>PROFESSIONAL REGISTRATION</b>	-
<b>EXPERIENCE IN YEARS</b>	3
<b>EXPERIENCE</b>	Ena de Villiers has worked as an environmental assessment practitioner since 2008 and has been involved in a number of projects covering a range of environmental disciplines, including Basic Assessments (BA), Environmental Impact Assessments and Environmental Management Plans/Programmes and Environmental Control Officer. She has been exposed to a range of projects relating to mining (e.g. mineral prospecting and borrow pit development), property development and infrastructure (e.g. bridges, roads, waste water treatment works).

# EXECUTIVE SUMMARY

## 1. INTRODUCTION

This Executive Summary summarises the main findings of the Final Basic Assessment Report (BAR) prepared for the proposed strengthening (partial reconstruction) of National Route R27 Sections 7 & 8 between the Western/Northern Cape border (km 40.0) and Calvinia (km 70.0). The Draft BAR, which was available for public review and comment from 19 August to 27 September 2011, has been updated into this Final BAR. It should be noted that all significant changes to the Draft BAR are underlined and in a different font (Times New Roman) to the rest of the text.

The Final BAR has been released for a further 30-day public and authority review and comment period from 28 October to 28 November 2011. Copies of the Final BAR will be available at the following locations:

1. Calvinia Library, Calvinia;
2. Niewoudtville Library, Niewoudtville;
3. Offices of CCA Environmental (Pty) Ltd; and
4. On the CCA website ([www.ccaenvironmental.co.za](http://www.ccaenvironmental.co.za)).

Any written comments on the Final BAR must be submitted directly to the competent authority and a copy must be provided to CCA (contact details presented below).

<p><u>Deputy Director-General: Environmental Impact Management</u></p> <p><u>Department of Environmental Affairs</u> <u>Private Bag X447, PRETORIA, 0001.</u></p> <p><u>Tel: (012) 310 3911</u> <u>Fax: (012) 322 2682</u> <u>E-mail: <a href="mailto:sdlomo@environment.gov.za">sdlomo@environment.gov.za</a></u></p> <p><u>Attention Mr Dumasani Mtembu</u> <u>Reference: 12/12/20/2272</u></p>	<p><u>CCA Environmental (Pty) Ltd</u></p> <p><u>PO Box 10145</u> <u>Caledon Square, 7905</u></p> <p><u>Tel: (021) 461 1118 / 9</u> <u>Fax: (021) 461 1120</u> <u>E-mail: <a href="mailto:ena@ccaenvironmental.co.za">ena@ccaenvironmental.co.za</a></u></p> <p><u>Attention: Ena de Villiers</u></p>
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The Final BAR has also been submitted to the Department of Environmental Affairs (DEA) for consideration of the application in terms of the National Environmental Management Act (NEMA) (No. 107 of 1998). After DEA has reached a decision, all Interested and Affected Parties (I&APs) registered on the project database will be notified of the outcome of the application and the reasons for the decision. A statutory Appeal Period in terms of Chapter 7 of the EIA Regulations 2010 will follow the issuing of the decision.

## 2. APPLICABILITY OF THE NEMA EIA REGULATIONS

A Basic Assessment is required in accordance with the Environmental Impact Assessment (EIA) Regulations 2010 promulgated in terms of Sections 24(5), 24M and 44 of the National Environmental Management Act (No. 107 of 1998) (NEMA), as amended, in Government Notice (GN) No. R543. The proposed project triggers the following activities listed in GN No. R544 and R 546:

**Table 1: Relevant listed activities and corresponding project components**

<b>Government Notice No. R544 - Listing Notice 1 of 2010</b>		
<b>No.</b>	<b>Activity description</b>	<b>Corresponding project component</b>
18	<i>The infilling or depositing of any material of more than 5 m<sup>3</sup> into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock from (i) a watercourse ...</i>	These activities would be undertaken as part of the process of widening four bridges along Section 8 of the R27, at km 22.67, 34.92; 59.20; and 67.10, over the Oorlogskloof River, as well as the possible lengthening of some of the culverts over watercourses and drainage channels associated with the watercourses along the R27 Sections 7 & 8.
39	<i>The expansion of (iii) bridges; within a watercourse or within 32 m of a watercourse, measured from the edge of a watercourse, where such expansion would result in an increased development footprint but excluding where such expansion will occur behind the development setback line.</i>	This activity would be undertaken as part of the process of widening the four bridges along Section 8 of the R27.
40	<i>The expansion of (iv) infrastructure by more than 50 m<sup>2</sup> within a watercourse or within 32 m of a watercourse, measured from the edge of a watercourse, but excluding where such expansion will occur behind the development setback line.</i>	This activity would be undertaken as part of the process of widening the four bridges along Section 8 of the R27.
<b>Government Notice No. R546 - Listing Notice 3 of 2010</b>		
<b>No.</b>	<b>Activity description</b>	<b>Corresponding project component</b>
13	<i>The clearance of an area of 1 hectare (ha) or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation. (a) Critical biodiversity areas and ecological support areas as identified in systematic biodiversity plans adopted by the competent authority.</i>	Two of the three borrowpits (BP) proposed for development are situated within an ecological support area, namely BP R27-8 km 45.0 RHS 0.2 and BP R27-8 km 61.6 RHS 1.0.

### 3. PROPOSED PROJECT DESCRIPTION

The South African National Roads Agency SOC Limited (SANRAL) is proposing to strengthen and partially reconstruct the R27, Sections 7 and 8, between the Western / Northern Cape border (km 40.0) and Calvinia (km 70.0) (see Figure 1). This would entail road works, rehabilitation of culverts, widening of bridges and the development of borrowpits to provide material for the proposed project. The upgrade is necessary to improve the safety levels and road condition of this section of the R27.

The widening of the four bridges along Section 8 of the R27 and the development of two of the three proposed borrowpits triggered the requirement for compliance with the EIA Regulations 2010 promulgated in terms of Sections 24(5), 24M and 44 of the National Environmental Management Act (No. 107 of 1998) (NEMA), as amended, in Government Notice (GN) No. R543. The development of borrowpits as material sources also requires compliance with the Mineral and Petroleum Resources Development Act (No. 28 of 2002)(MPRDA).

SANRAL appointed Aurecon SA (Pty) Ltd to undertake the design and planning of the project. CCA Environmental (Pty) Ltd was appointed as the independent environmental consultant to undertake the necessary Basic Assessment (BA) and MPRDA process.

The following four bridge structures have been earmarked for widening:

- Bridge NB35, known as the Oorlogskloof River Bridge 1, which spans the Oorlogskloof River on Section 8 of the R27 at km 22.7, approximately 23 km south-east of Niewoudtville;

- Bridge NB36, known as the Oorlogskloof River Bridge 2, which spans the Oorlogskloof River on Section 8 of the R27 at km 34.9. The bridge is situated approximately half way between Niewoudtville and Calvinia at 35 km south-east of the former and 32 km west of the latter;
- Bridge NB37, known as the Oorlogskloof River Bridge 3, which spans the Oorlogskloof River on Section 8 of the R27 at km 59.2, approximately 8 km west of Calvinia; and
- Bridge NB38, known as the Oorlogskloof River Bridge 4, which spans the Oorlogskloof River on Section 8 of the R27 at km 67.1. This historical bridge dating from 1937-38 is located at the western entrance to Calvinia.

The following three areas have been selected for borrowpit development:

- BP R27-8 km 32.6 RHS 6.2 is situated along the R364 approximately 6 km south-west of the R27, on Portion 1 of Farm Bloedzuigerfontein North 782 (“Merino”);
- BP R27-8 km 45.0 RHS 0.2 is situated along the R27 approximately 23 km west of Calvinia, on the Remainder of Portion 1 of Farm Buffelskopfontein 773; and
- BP R27-8 km 61.6 RHS 1.0 is situated approximately 7 km south-west of Calvinia on the Remainder of Portion 1 of Farm Enkelde Wilgenboom 768 near the Calvinia Airfield.

#### 4. ENVIRONMENTAL IMPACT STATEMENT

The proposed project would result in a limited number of potential positive impacts during the operational phase of **LOW** to **MEDIUM** significance after mitigation. The direct operational phase impact on improved road safety for users and the indirect impact on tourism and regional economic development have been assessed as of **LOW (POSITIVE)** and **MEDIUM (POSITIVE)** significance, respectively. The project also holds the potential to rehabilitate lost vegetation in the road reserve during the operational phase. This would have an impact of **MEDIUM (POSITIVE)** significance on Niewoudtville-Roggeveld Dolerite Renosterveld and Niewoudtville Shale Renosterveld along the R27 Section 8, which is currently in a poor condition.

A key risk related to the project is damage to and/or loss of remaining areas of natural vegetation in the road reserve and at borrowpit sites as a result of construction activities. The significance of the potential loss of Bokkeveld Sandstone Fynbos and Hantam Karoo vegetation has been assessed as **Medium to High** without mitigation, but would be reduced to **LOW** if the recommended mitigation measures were to be consistently implemented. The protection of the natural vegetation during construction is therefore essential to avoid long-term negative consequences resulting from the proposed project.

Potential negative operational phase impacts of the proposed project have all been assessed as of **VERY LOW** to **LOW** significance after mitigation. These relate to two broad categories, namely:

- Heritage impacts, the most important of which is the impact on the built environment of the proposed modifications to Bridge NB38, which is older than 60 years; and
- Biophysical impacts associated with freshwater ecology and botany.

On balance, the benefit of the potential positive impacts of the operational phase for the local community and beyond is considered to outweigh the disadvantages of the potential negative impacts mostly associated with the changes to the cultural environment due to the alterations to the historical bridge. This is because the retention of the *status quo* is not considered a viable option for safety and road condition considerations.

Impacts associated with the construction phase are mostly negative. The nuisance value of some of these impacts may be experienced as high intensity in the immediate vicinity of the works at times, such as increased dust and noise levels. However, since all construction phase impacts would be localised and of short-term duration, the significance rating is **very low** to **low** in most cases prior to mitigation. With the implementation of the proposed mitigation measures the significance of the negative construction phase impacts would be contained to **VERY LOW** to **LOW**.

The impact of the construction phase activities on the local economy is assessed to be of **LOW (POSITIVE)** significance.

A summary of the overall project impacts is represented in Table 2.

**Table 2: Summary of overall project impacts**

IMPACT	Significance Without Mitigation	Significance With Mitigation
<b>OPERATIONAL PHASE IMPACTS</b>		
<b>Impacts related to freshwater ecology: Loss or modification of riparian habitat</b>	Very low	VERY LOW
<b>Botanical impacts:</b>	Low	VERY LOW
Loss of Bokkeveld Sandstone Fynbos along the R27 Section 7	High	LOW
Loss of Niewoudtville-Roggeveld Dolerite Renosterveld and Niewoudtville Shale Renosterveld along the R27 Section 8	Low	<b>MEDIUM (POSITIVE)</b>
Loss of Hantam Karoo vegetation along the R27 Section 8	High	LOW
Loss of Hantam Karoo vegetation as a result of borrowpit development	Medium	LOW
Loss of ecological processes	Low	LOW
<b>Heritage impacts:</b>		
Impact on the built environment of modifications to Bridge NB38	Medium	LOW
Impact on pre-colonial archaeology of borrowpit development	Low	LOW
<b>Road safety</b>	<i>Medium (positive)</i>	<b>MEDIUM (POSITIVE)</b>
<b>Tourism and regional economic impact</b>	<i>Low (positive)</i>	<b>LOW (POSITIVE)</b>
<b>CONSTRUCTION PHASE IMPACTS</b>		
<b>Impacts related to freshwater ecology:</b>		
Disturbance of riparian habitats	Very low	VERY LOW
Impedance of river flow	Very low	VERY LOW
Reduction of river water quality	Very low	VERY LOW
<b>Botanical impacts: Damage to or loss of vegetation along the R27 due to construction activities</b>	High	LOW
<b>Impacts associated with borrowpit development on affected landowners</b>	Low	VERY LOW
<b>Air quality impairment: Dust</b>	Very low	VERY LOW
<b>Increased noise levels</b>	Very low	VERY LOW
<b>Traffic flow disruptions</b>	Very low	VERY LOW
<b>Local economic contributions</b>	<i>Very low (positive)</i>	<b>VERY LOW (POSITIVE)</b>



## 5. RECOMMENDATIONS

The following mitigation measures are recommended to minimise the potential negative impacts and to enhance the potential positive impacts of the proposed project:

- 5.1 The key mitigation measure is that construction should be managed through the effective implementation of the Construction Environmental Management Programme (EMP).
- 5.2 The following conditions are proposed with the purpose of mitigating the impact of modifications to Bridge NB38:
- Ensure that the addition and modifications to Bridge NB38 adheres to the design style and characteristics of the existing arch bridge.
  - Change the fabric of the structure only where unavoidable.
  - Submit the detailed designs for the widening of Bridge NB38 to Heritage Northern Cape for approval by the Permit Committee of the Northern Cape Provincial Heritage Resources Council to ensure that the appropriate design solution for the proposed modifications is acceptable both from a heritage and an engineering perspective.
  - Commission a systematic recording of fabric of Bridge NB38 prior to alteration by means of measured drawings and a photographic survey.
  - Undertake a comprehensive photographic survey of the site before work commences and during construction to generate an archive of information.
  - Lodge a compact disc containing the above information with the Provincial Heritage Authority and SAHRA.
- 5.3 The following conditions are proposed with the purpose of mitigating the impact of borrowpit development on affected landowners:
- Include individual landowner requests and prerequisites as part of the SANRAL land acquisition process formalising the temporary expropriation of borrowpit areas.
  - Demarcate and fence off borrowpit areas in accordance with the Construction EMP.
  - Implement measures regarding access control to private property and security in adjacent private properties in accordance with the Construction EMP.
- 5.4 The following mitigation measures have been incorporated into the Construction EMP:
- Limit disturbance in the river channel and riparian zone as far as possible to ensure minimum disturbance of these areas.
  - Rehabilitate and revegetate disturbed areas within the riparian zone with suitable indigenous riparian vegetation as soon as possible after construction is complete.
  - If possible, construction should take place during the low rainfall months when runoff volumes will be low.
  - Minimise the duration and extent of construction activities in the rivers.
  - Clear rubble and waste material associated with the construction activities from the river and drainage channels.
  - Divert run-off from construction sites through screens and off-channel retention ponds in order to prevent contaminated water from directly entering the stream.
  - Ensure that materials on the construction sites are appropriately stored and contained to prevent water pollution.
  - Manage waste disposal from the construction sites appropriately in order to prevent water pollution.
  - Provide ablution facilities for construction workers at the construction sites that are located away from the river system and regularly serviced.

- Appoint a botanical specialist at the commencement of the construction period to identify any remaining areas/patches of natural vegetation in the road reserve along the R27 to be protected from damage due to construction activities.
  - Demarcate identified areas of remaining natural vegetation in the road reserve as No-go areas for the duration of the construction period.
  - Remove invasive alien plants and weedy species from the road reserve prior to construction to inhibit further spread of these species along the road as a result of construction activities.
  - Avoid causing any further disturbance of the vegetation within the road reserve in the zone between the verge and the boundary fences.
  - Where disturbance is unavoidable, identify and monitor these disturbed areas and earmark them for rehabilitation post-construction to enhance regeneration of the roadside vegetation.
  - Rehabilitate disturbed areas by collecting seed from plants in the same community in nearby undisturbed vegetation for sowing on disturbed areas. Hydroseeding using commercially available seed should be avoided.
  - Confine stockpiling of construction material to strictly demarcated areas such as at existing lay-bys to limit the distribution of this material in the road reserve.
  - Landscape excavated borrowpit slopes after removal of required material so that gradients are smooth to moderate in order to encourage active re-colonisation of the sites by the natural Hantam vegetation and limit erosion.
  - Prohibit construction crews from lighting any fires in the road reserve.
  - Implement an educational programme with the Contractor and workforce to impress upon them the importance of conserving remaining natural vegetation along the R27.
  - Implement a dust control programme to minimize the generation of dust, including spraying water on exposed surfaces and roads whenever required.
  - Ensure that exposed areas and material stockpiles are adequately protected against wind.
  - Maintain all construction machinery and vehicles in good working order so that noise is minimized.
  - Adhere to any regulations and local by-laws regarding the generation of noise and hours of operation.
  - Display warning signs and traffic control notifications well in advance on either side of the construction activities.
  - Make specific provision for safe passage of pedestrians and cyclists at bridge crossing points during the construction phase.
- 5.5 The following mitigation is proposed during the operational phase:
- Monitor disturbed areas at the bridge and borrowpit sites to prevent infestation by invasive alien plant growth after the construction phase is complete.
  - Revise management plans and procedures for the maintenance of the road reserve post-construction so as to minimise disturbance of vegetation in the road reserve.
  - These management plans and procedures should include the following aspects:
    - To actively control invasive alien plants and weedy species to prevent competition with more desirable species in the road reserve.
    - Restore and rehabilitate Nieuwoudtville-Roggeveld Dolerite Renosterveld and Nieuwoudtville Shale Renosterveld in the road reserve along the R27 Section 8.

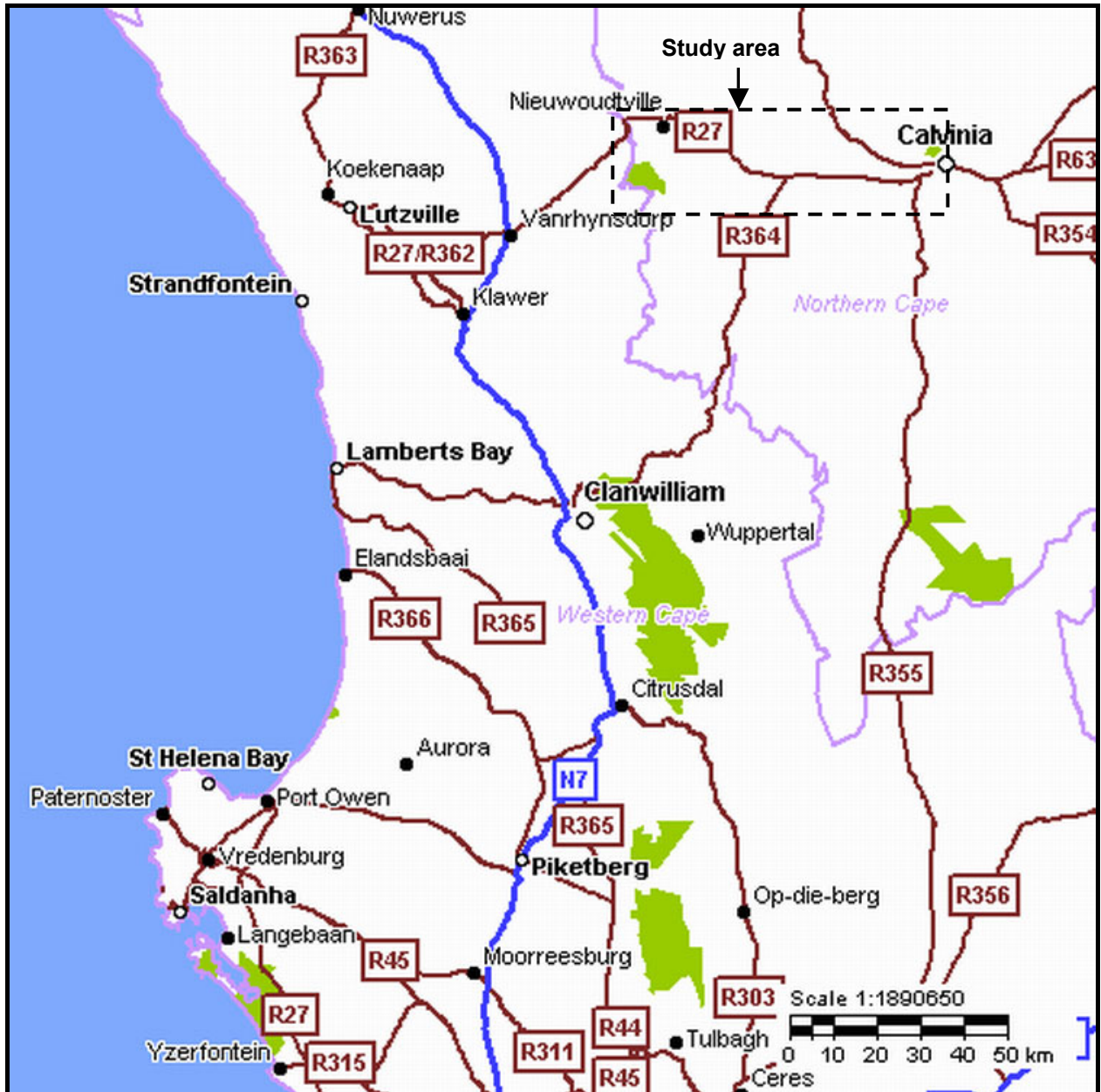


Figure 1: Locality map showing the study area between the Western/Northern Cape border and Calvinia along the R27

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**Appendix D: Specialist reports**

- Appendix D1: Specialist Terms of Reference  
Appendix D2: Specialist details and declaration of interest  
Appendix D3: Freshwater Assessment for the proposed strengthening of National Route 27 Sections 7 & 8 between the Western/Northern Cape border and Calvinia  
Appendix D4: Botanical Assessment for the proposed strengthening (partial reconstruction) of National Route 27 Sections 7 & 8 between the Western/Northern Cape Province border and Calvinia  
Appendix D5: Proposed strengthening (partial reconstruction) of National Route 27 Section 7 & 8 between Western/ Northern Cape border (km 40.0) and Calvinia (km 70.0). Contract R.027-080-2011/1D. Heritage Impact Assessment conducted under Section 38(8) of the National Heritage Resources Act No 25 of 1999 as part of a Basic Assessment

**Appendix E: Comments and responses report**

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- Appendix H1: Application Forms  
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## environmental affairs

Department:  
Environmental Affairs  
REPUBLIC OF SOUTH AFRICA

(For official use only)

File Reference Number:  
Application Number:  
Date Received:


### BASIC ASSESSMENT REPORT IN TERMS OF THE ENVIRONMENTAL IMPACT ASSESSMENT REGULATIONS, 2010, PROMULGATED IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998), AS AMENDED

#### SECTION A: ACTIVITY INFORMATION

Has a specialist been consulted to assist with the completion of this section?	YES	NO ✓
If YES, please complete the form entitled "Details of specialist and declaration of interest" for appointment of a specialist for each specialist thus appointed: N/A		

#### 1. ACTIVITY DESCRIPTION

Describe the activity, which is being applied for, in detail:

##### 1.1 INTRODUCTION

South African National Roads Agency SOC Limited (SANRAL) is proposing to strengthen and partially reconstruct the R27, Sections 7 and 8, between the Western / Northern Cape border (km 40.0) and Calvinia (km 70.0) (see Figures A1, A2 and A3 in Appendix A). This would entail road works, rehabilitation of culverts, widening of bridges and the development of borrowpits to provide material for the proposed project. The upgrade is necessary to improve the safety levels and road condition of this section of the R27.

A Basic Assessment is required in accordance with the Environmental Impact Assessment (EIA) Regulations 2010 promulgated in terms of Sections 24(5), 24M and 44 of the National Environmental Management Act (No. 107 of 1998) (NEMA), as amended, in Government Notice (GN) No. R543. The proposed project triggers activities listed in GN No. 544 and R546. The relevant listed activities and corresponding project components are presented in Table 1 below<sup>1</sup>.

**Table 1: Relevant listed activities and corresponding project components**

Government Notice No. R544 - Listing Notice 1 of 2010		
No.	Activity description	Corresponding project component
18	<i>The infilling or depositing of any material of more than 5 m<sup>3</sup> into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock from (i) a watercourse ...</i>	These activities would be undertaken as part of the process of widening four bridges along Section 8 of the R27, at km 22.67; 34.92; 59.20; and 67.10, over the Oorlogskloof River, as well as the possible lengthening of

<sup>1</sup> Please note that a revised version of "Application Form for EIA Environmental Authorisation" has been prepared for submission to the Department of Environmental Affairs (DEA). The reason is that the listed activities identified as relevant in the Final BAR differ from those included in the original "Application Form for EIA Environmental Authorisation" which was submitted to DEA on 20 April 2011 and accepted on 16 May 2011 (see Appendix H1).

		some of the culverts over watercourses and drainage channels associated with the watercourses along the R27 Sections 7 & 8.
39	<i>The expansion of (iii) bridges; within a watercourse or within 32 m of a watercourse, measured from the edge of a watercourse, where such expansion would result in an increased development footprint but excluding where such expansion will occur behind the development setback line.</i>	This activity would be undertaken as part of the process of widening the four bridges along Section 8 of the R27.
40	<i>The expansion of (iv) infrastructure by more than 50 m<sup>2</sup> within a watercourse or within 32 m of a watercourse, measured from the edge of a watercourse, but excluding where such expansion will occur behind the development setback line.</i>	This activity would be undertaken as part of the process of widening the four bridges along Section 8 of the R27.
<b>Government Notice No. R546 - Listing Notice 3 of 2010</b>		
<b>No.</b>	<b>Activity description</b>	<b>Corresponding project component</b>
13	<i>The clearance of an area of 1 hectare (ha) or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation. (a) Critical biodiversity areas and ecological support areas as identified in systematic biodiversity plans adopted by the competent authority.</i>	Two of the three borrowpits (BP) proposed for development are situated within an ecological support area, namely BP R27-8 km 45.0 RHS 0.2 and BP R27-8 km 61.6 RHS 1.0.

A more detailed description of the main components of the proposed project follows below:

## 1.2 ROAD WORKS

It is proposed to rehabilitate and upgrade the road by strengthening the existing layers and widening the cross section to a uniform total width of 9.4 m. The 9.4 m cross section would accommodate 3.4 m surfaced lanes, 1.0 m surfaced shoulders and a 0.3 m rounding in each direction (see Figure C1 in Appendix C). This would apply throughout the length of the rehabilitation sections of the project, which would include Section 7, km 42.6 to km 51.0, and Section 8, km 0 to km 13.5 and km 24.0 to km 64.0. Three short road sections would be resealed only, namely km 40.0 to 42.6 of Section 7 and km 13.5 to 24.0 and km 67.0 to 70.0 of Section 8 (see Figure A2 in Appendix A). The total cross section width of the existing main carriageway and the unsurfaced shoulders currently varies between 6.5 m and 8.3 m. The proposed road upgrade would occur within the existing road reserve of 30 m. No horizontal or vertical realignment of the road would be undertaken.

## 1.3 BRIDGES AND CULVERTS

It is proposed to rehabilitate a number of culverts along the route as part of the project. This project component does not require EA since the repair work would be undertaken on or within the existing culvert footprints. The detailed list of affected culverts is therefore not included in this project description.

The proposed project would entail the widening of the four existing bridges along Section 8 of the R27 between Niewoudtville and Calvinia and the lengthening of two culverts immediately adjacent to the bridge at km 67.1 near Calvinia to accommodate the bridge widening. The narrow bridge decks currently accommodate sub-standard width traffic lanes and very narrow walkways for pedestrians to cross the bridges, with obvious safety implications for road users.

A brief description of each of the four bridge structures is provided below.



### 1.3.1 Bridge NB35

Bridge NB35, known as the Oorlogskloof River Bridge 1, spans the Oorlogskloof River on Section 8 of the R27 at km 22.7, approximately 23 km south-east of Niewoudtville (see Figures A2, A3 and A4 in Appendix A). The five span bridge is 48.63 m long and 10.49 m wide. Its substructure consists of two closed cantilever wall type abutments with splayed wing walls and four wall type piers (see Figures B1 to B5 in Appendix B). It is proposed to widen the bridge on both sides by 2.43 m in order to retain the current centre line of the bridge in line with the existing road alignment. The substructures would therefore also be widened on both sides, which would increase the physical footprint of the bridge by approximately 36.6 m<sup>2</sup>. The widening of the bridge deck would increase the bridge cross section to 13.35 m so as to allow for the standard road width of 12.4 m between parapets, consisting of a 3.7 m lane in each direction and a road shoulder of 2.5 m. The proposed parapets on each side of the deck would be approximately 0.475 m wide and 1.105 m high to further improve safety conditions (see Figure C2 in Appendix C).

### 1.3.2 Bridge NB36

Bridge NB36, known as the Oorlogskloof River Bridge 2, spans the Oorlogskloof River on Section 8 of the R27 at km 34.9. The bridge is situated approximately half way between Niewoudtville and Calvinia at 35 km south-east of the former and 32 km west of the latter (see Figures A2, A3 and A5 in Appendix A). The three span bridge is 38.7 m long and 7.9 m wide. Its substructure consists of two closed cantilever wall type abutments with return walls and two wall type piers (see Figures B6 to B9 in Appendix B). It is proposed to widen the bridge on both sides by 2.725 m, which would increase the physical footprint of the bridge substructure by approximately 70.4 m<sup>2</sup>. The bridge cross section would be increased to 13.35 m to accommodate a similar lane configuration as described for Bridge NB35 (see Section A.1.3.1 above and Figure C2 in Appendix C).

### 1.3.3 Bridge NB37

Bridge NB37, known as the Oorlogskloof River Bridge 3, spans the Oorlogskloof River on Section 8 of the R27 at km 59.2, approximately 8 km west of Calvinia (see Figures A2, A3 and A6 in Appendix A). The five span bridge is 49.25 m long and 7.1 m wide. Its substructure consists of two closed cantilever wall type abutments with splayed wing walls and four wall type piers (see Figures B10 to B14 in Appendix B). It is proposed to widen the bridge on both sides by 2.69 m, which would increase the physical footprint of the bridge substructure by approximately 79 m<sup>2</sup>. The bridge cross section would be increased to 13.35 m to accommodate a similar lane configuration as described for Bridge NB35 (see Section A.1.3.1 above and Figure C2 in Appendix C).

### 1.3.4 Bridge NB38

Bridge NB38, known as the Oorlogskloof River Bridge 4, spans the Oorlogskloof River on Section 8 of the R27 at km 67.1 (see Figures A2, A3 and A7 in Appendix A). This historical bridge dating from 1937-38 is located at the western entrance to Calvinia. It is a three span concrete closed-spandrel arch bridge typical of bridges built by the engineering firm Murray and Stewart Ltd. shortly after its establishment around 1930 (see Figures B15 to B20 in Appendix B).

It is proposed to widen the bridge by 6.15 m to the downstream side only so as to retain as much as possible of the existing historical substructure. The additional structure would be designed in the form of arch-type piers in order to match the existing design style. The physical footprint of the bridge substructure would increase by approximately 41.1 m<sup>2</sup> as a result of the additions. The existing balustrades pose a safety hazard as they are sub-standard of strength and would not be capable of absorbing current vehicle impact loads in the event of an accident (see Figure B15 in Appendix B). It is therefore proposed to replace the balustrades in order to comply with the minimum required safety standards for the bridge. Detailed design proposals for this bridge are not yet available at this stage. It will

be undertaken by specialist bridge design engineers to ensure compliance with both SANRAL safety standards and heritage requirements to conserve the historical structure. Preliminary facility illustrations have been included as Figure C3 in Appendix C).

#### 1.4 BORROWPIT DEVELOPMENT

The proposed project would require various materials for road and bridge construction from sources in the surrounding area. Application will therefore also be made to develop three borrowpits as material sources in terms of the Mineral and Petroleum Resources Development Act (No. 28 of 2002)(MPRDA) through the submission of a Environmental Management Programme report to the Department of Mineral Resources (DMR). Environmental Authorisation (EA) would be required for two of the three borrowpits as they trigger listed activities (see Section A.1.1 above).

A brief description of each of the three proposed borrowpits is provided below.

##### 1.4.1 BP R27-8 km 32.6 RHS 6.2

This borrowpit is situated along the R364 approximately 6 km south-west of the R27, on Portion 1 of Farm Bloedzuigerfontein North 782 ("Merino") (see Figures A3 and A8 in Appendix A). In the past a considerable amount of weathered dolerite rock had been excavated in the process of mining for Iceland Spar (a variety of calcite) and subsequently abandoned in tailings-heaps consisting of variable quality materials. The area of the mine itself is highly disturbed with high exposed vertical rock faces. The surrounding lands have been cleared of Hantam Karoo vegetation and have been invaded *en masse* by the exotic invasive *Atriplex lindleyi* subsp. *inflata*. An exotic fodder plant, *Atriplex nummularia* (Old Man Saltbush) has also been planted on the cleared land (MacDonald, 2011: 42-43)(see Figures B21 to B22 in Appendix B).

Trial hole excavations in the tailings-heaps have indicated that the site could provide a viable volume of material of acceptable quality. Crushing would be required to break down harder dolerite boulders. The site has therefore been recommended for development as a borrowpit (Aurecon, 2011: 44). However, EA in terms of the NEMA EIA Regulations 2010 is not required and the borrowpit is therefore not subjected to detailed assessment in this Final BAR. Figure C4 in Appendix C presents the lay-out plan for the proposed borrowpit.

##### 1.4.2 BP R27-8 km 45.0 RHS 0.2

This borrowpit is situated along the R27 approximately 23 km west of Calvinia, on the Remainder of Portion 1 of Farm Buffelskopfontein 773 ("Doega B") (see Figures A2, A3 and A9 in Appendix A). The area is extensively disturbed due to previous excavation and has been rehabilitated to a limited extent in certain parts. The disturbance has encouraged the invasion of exotic invasive species such as *Prosopis glandulosa*. The site is located in an area of Hantam Karoo 'bossieveld' (*Eriocephalus ericoides* – *Pteronia glomerata* Roggeveld Karoo) dominated by low succulent shrubs and composites such as *Pentzia incana*, *Eriocephalusericoides* and *Chrysocoma ciliata*. It has "Least Threatened" conservation status (MacDonald, 2011: 44-45) (see Figures B23 to B25 in Appendix B).

The results of trial hole excavations in the floor of the existing pit and the surrounding terrain indicated that the source would consistently yield the required quality material. Crushing would be required to break down harder dolerite boulders found at shallow depth on the western extremity of the area. It was initially recommended that the existing pit be extended south- and westwards (Aurecon, 2011: 46). Figure C5 in Appendix C presents the initial lay-out plan, which included a southwards extension of approximately 50 m with a further 20 m reserved for stockpiling topsoil against the southern boundary fence. In response to feedback from the landowner, it was subsequently agreed to amend the approach to mining the area in order to minimise the potential impact on the more valuable grazing to the south. These amendments entail relocating the stockpile area to the floor of the existing pit and demarcating the area to the south of the borrowpit as a "No-go" area. In addition, the 50 m extension to the south would be marked as Phase 2 and included in the "No-go" zone. The Contractor would be permitted to proceed

with mining Phase 2 only if Phase 1 had been depleted and found to not have yielded sufficient material. In addition, mining would start on the northern part of the site adjacent to the road and move southwards so as to further minimise the impact on grazing to the south. These amendments have been incorporated into an amended lay-out plan for the proposed borrowpit (see Figure C6).

### 1.4.3 BP R27-8 km 61.6 RHS 1.0

This borrowpit is situated approximately 7 km south-west of Calvinia on the Remainder of Portion 1 of Farm Enkelde Wilgenboom 768 near the Calvinia Airfield (see Figures A2, A3 and A10 in Appendix A). It is on an undulating plain where previous excavations have created a small rise around the existing pit. The geology is weathered dolerite and calcrete. The proposed extension would be southwards and south-eastwards into the surrounding area that is already disturbed. The vegetation that would be impacted is low succulent Hantam Karoo shrubland of the Calvinia Mosaic, more specifically the *Eriocephalus ericoides* – *Pteronia glomerata* Roggeveld Karoo (MacDonald, 2011: 46) (see Figures B26 to B28 in Appendix B).

The results of tested samples from trial hole excavations indicated that the site would be a reliable source of the required material. It has therefore been recommended that the site should be considered for development as a borrowpit (Aurecon, 2011: 48). Figure C7 in Appendix C presents the lay-out plan for the proposed borrowpit

## 2. FEASIBLE AND REASONABLE ALTERNATIVES

### 2.1 SITE ALTERNATIVES

No site alternatives were considered in relation to the proposed bridge widening component of this project, as the existing route alignment determines the location of the four bridges.

Different site alternatives were considered in the case of the proposed borrowpit development. Eight potential borrowpit and three potential quarry sites were identified during an initial investigation undertaken by the design engineers in November 2010. A further detailed investigation was undertaken into only seven of the eight potential borrow areas. See Table 2 below for a summary of the investigation into potential borrowpit sites.

**Table 2: Summary of investigation into potential borrowpit sites**

No.	Borrowpit Name	Location		Finding
		Latitude	Longitude	
1	BP R27-7 km 51.0 LHS 6.9	S 31° 20' 01.3"	E 19° 07' 06.1"	Unsuitable due to botanical sensitivity (see Section A.2.1.1).
2	BP R27-8 km 9.5 LHS 0.2	S 31° 23' 57.7"	E 19° 12' 40.3"	Unsuitable due to both botanical sensitivity and material quality (see Section A.2.1.2).
3	BP R27-8 km 32.6 RHS 6.2	S 31° 32' 15.4"	E 19° 24' 11.9"	Suitable material. Application to be made in terms of MPRDA (see Section A.1.4.1).
4	BP R27-8 km 39.6 LHS 0.1	S 31° 29' 26.4"	E 19° 29' 28.3"	Unsuitable due to material quality (see Section A.2.1.3).
5	BP R27-8 km 45.0 RHS 0.2	S 31° 29' 43.7"	E 19° 32' 44.7"	Suitable material. Application to be made in terms of MPRDA and NEMA (see Section A.1.4.2).
6	BP R27-8 km 50.4 LHS 0.1	S 31° 29' 43.0"	E 19° 36' 08.2"	Unsuitable due to material quality (see Section A.2.1.4).
7	BP R27-8 km 61.6 RHS 1.0	S 31° 30' 35.3"	E 19° 43' 00.0"	Suitable material. Application to be made in terms of MPRDA and NEMA (see Section A.1.4.3).

The three borrowpits proposed for subsequent development are described in Section A.1.4 above. A brief description of each of the four potential borrowpit sites considered to be unsuitable for development follows below:

#### **2.1.1 BP R27-7 km 51.0 LHS 6.9**

This site is situated on the crest of a low hill approximately 7 km north of Nieuwoudtville and the R27. Dolerite has been previously mined leaving an exposed near vertical face. The site is located in Nieuwoudtville-Roggeveld Dolerite Renosterveld, which harbours a very high concentration of geophytic (bulb) species, many of which are endemic. This ecosystem is considered as highly sensitive because it is an extremely important repository for plant biodiversity, despite the fact that the vegetation type has been listed as Least Threatened in the National Spatial Biodiversity Assessment. In addition, this area falls within the mapped Critical Biodiversity Areas for Namakwa District Municipality. Although this site was considered viable from a material quality point of view, it was decided to not pursue possible borrowpit development due to its botanical sensitivity (Aurecon, 2011:42; MacDonald, 2011: 41).

#### **2.1.2 BP R27-8 km 9.5 LHS 0.2**

This site is situated in an undulating landscape adjacent to the R27 approximately 10 km east of Nieuwoudtville. This area also falls within the mapped Critical Biodiversity Areas for Namakwa District Municipality, which should be avoided in principle. Any future excavation would impact undisturbed natural succulent-dominated shrubland. The results of tested samples from trial hole excavations indicated that the site would not be a reliable source of quality material. It was therefore recommended that this site should not be considered further for development as a borrowpit (Aurecon, 2011:43; MacDonald, 2011: 42).

#### **2.1.3 BP R27-8 km 39.6 LHS 0.1**

This site is adjacent to the R27 on the north side approximately 28 km west of Calvinia. The existing pit is extensive and the proposal is to extend it westwards and northwards away from the road. The soil is weathered "sugar" dolerite resulting from a dolerite intrusion into the Ecca shales. The results of tested soil samples indicated that the source would consistently yield material of a relatively poor quality. It was therefore recommended that this site should not be considered further for development as a borrowpit (Aurecon, 2011: 45)

#### **2.1.4 BP R27-8 km 50.4 LHS 0.1**

This site is located close to the R27 on the north side approximately 18 km west of Calvinia. The disturbed area of the existing borrowpit has rehabilitated to a limited extent. The proposal is to extend it northwards away from the road. The soil is weathered "sugar" dolerite resulting from a dolerite intrusion into the Ecca shales. The results of tested soil samples indicated that the source would yield variable and relatively poor quality material. It was therefore recommended that this site should not be considered further for development as a borrowpit (Aurecon, 2011: 47).

### **2.2 ACTIVITY ALTERNATIVES**

Two activity alternatives were considered for the proposed bridge widening component of the project, namely to widen or to replace the bridges. The proposed widening of the existing bridge structure is the preferred alternative in each case. The alternative of reconstructing each bridge is not considered viable due to the prohibitive cost implications and traffic accommodation considerations. The heritage significance of the arch type structure was a further prohibitive implication in the case of Bridge NB38.

## 2.3 DESIGN OR LAYOUT ALTERNATIVES

The following design alternatives were considered in the case of the four bridges, namely to widen each bridge substructure and bridge deck in equal measure to both sides or to widen the bridge substructure and bridge deck to one side only. The following design solutions were selected for the different bridges:

- In the case of Bridges NB 35, NB36 and NB37, widening the bridge substructure and bridge deck to both sides is considered the most feasible approach to providing the overall additional width required so as to comply with the SANRAL standard for this road section. In addition, the existing centreline of each bridge has to be retained in order to facilitate linking to the existing vertical and horizontal road alignment of the R27. The requirement to accommodate traffic on the existing bridge decks for the duration of the construction period also dictates the proposed design to widen each bridge to both sides.
- In the case of Bridge NB38 the heritage considerations outweighed all the potential advantages of widening the bridge in equal measure to both sides. It was recognised that the most sensitive design approach in response to the style and age of the bridge structure would be to widen the structure to one side only. This would allow the rehabilitation and strengthening of the historical portion of the bridge and retaining the existing design style in the new addition to the bridge. The difference between the historical bridge structure and the contemporary addition would be clearly visible as is considered appropriate in current design approaches.

In the light of the above considerations, only the preferred activities and design alternatives as described in Section 1.2 are assessed further in this Basic Assessment Report.

## 2.4 NO-GO ALTERNATIVE

The No-Go alternative entails maintaining the *status quo*, which is basically the non-occurrence of the proposed project. In this case it would mean that the bridges would not be widened and Sections 7 and 8 of the R27 not be upgraded. The short-term benefits of local employment creation and participation in the local economy by the contractor would not accrue to the local community under the No-Go alternative. The longer term positive outcomes in relation to improved safety and condition of the R27 route would also not be realised. In relation to safety considerations, the key implications of the No-Go alternative is that the advantages to vehicles, pedestrians and cyclists crossing the bridges under improved safety conditions as a result of the provision of wider lanes, adequate pavements and road shoulders in both directions would not be realised. Ultimately, the asset value of the national road network would not be maintained as a result of not strengthening the route to accommodate existing and future traffic loading (see Section A9.2.3).

## 3. ACTIVITY POSITION

Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site.

	Latitude (S):		Longitude (E):	
Bridge NB35	31°	28' 34.84"	19°	18' 57.86"
Bridge NB36	31°	29' 18.23"	19°	29' 25.80"
Bridge NB37	31°	30' 19.07"	19°	41' 39.06"
Bridge NB38	31°	28' 46.50"	19°	46' 14.05"
BP R27-8 km 45.0 RHS 0.2	31°	29' 43.7"	19°	32' 44.7"
BP R27-8 km 61.6 RHS 1.0	31°	30' 35.3"	19°	43' 00.0"

For linear activities:

	Latitude (S):		Longitude (E):	
Starting point	31°	22' 26.94"	19°	00' 58.56"
Middle point	31°	29' 23.84"	19°	22' 39.78"
End point	31°	28' 07.32"	19°	46' 24.35"

#### 4. PHYSICAL SIZE OF THE ACTIVITY

Indicate the physical size of the preferred activity/technology as well as alternative activities/technologies (footprints):

Bridge sites:	Total size of bridge deck*:		Total size of physical footprint**:	
	Current	Increased	Current	Increased
Bridge NB35	509.8 m <sup>2</sup>	649.1 m <sup>2</sup>	111.2 m <sup>2</sup>	148.8 m <sup>2</sup>
Bridge NB36	305.7 m <sup>2</sup>	516.6 m <sup>2</sup>	84.0 m <sup>2</sup>	154.6 m <sup>2</sup>
Bridge NB37	392.5 m <sup>2</sup>	657.5 m <sup>2</sup>	117.0 m <sup>2</sup>	197.1 m <sup>2</sup>
Bridge NB38	332.6 m <sup>2</sup>	616.8 m <sup>2</sup>	55.7 m <sup>2</sup>	96.8 m <sup>2</sup>

\* The total size of the deck bridge is the area of the bridge structure visible above the ground, but is distinguished from the physical footprint since it is not in direct contact with the ground. These dimensions are included for each bridge for the sake of clarity.

\*\* The total size of the physical footprint is the area of the bridge substructure that is in contact with the ground, comprising the size of the abutments, abutment walls and piers for each bridge.

#### Borrowpit sites:

BP R27-8 km 45.0 RHS 0.2

BP R27-8 km 61.6 RHS 1.0

#### Size of the activity:

3.92 ha
4.76 ha

#### 5. SITE ACCESS

Does ready access to the site exist?

Bridge NB35

Bridge NB36

Bridge NB37

Bridge NB38

BP R27-8 km 45.0 RHS 0.2

BP R27-8 km 61.6 RHS 1.0

If NO, what is the distance over which a new access road will be built:

Describe the type of access road planned:

YES ✓	NO
YES ✓	NO
YES ✓	NO
YES ✓	NO
YES ✓	NO
YES	NO ✓
Approximately 1 km from the borrowpit site to the R27	
Temporary gravel road approximately 4 m wide located on an existing track	

#### 6. SITE OR ROUTE PLAN

The following site maps have been included in Appendix A:

Figure A1: Locality map showing the study area between the Western/Northern Cape border and Calvinia along the R27

Figure A2: Locality map of the study area (adapted from 1:50 000 map)

Figure A3: Google Earth air photo of the study area

Figure A4: Google Earth air photo of Bridge NB35

Figure A5: Google Earth air photo of Bridge NB36

Figure A6: Google Earth air photo of Bridge NB37

Figure A7: Google Earth air photo of Bridge NB38

Figure A8: Google Earth air photo of proposed Borrowpit BP R27-8 km 32.6 RHS 6.2

Figure A9: Google Earth air photo of proposed Borrowpit BP R27-8 km 45.0 RHS 0.2

Figure A10: Google Earth air photo of proposed Borrowpit BP R27-8 km 61.6 RHS 1.0

Figure A11: Portion of Vegetation Map of South Africa, Lesotho & Swaziland (Mucina et al, 2005), showing the vegetation types along the R27 Sections 7 & 8 (Image supplied by MacDonald, 2011: 20)

Figure A12: Extract of the Hantam Municipality Critical Biodiversity Areas map showing the position of the R27 Section 7 & 8 in relation to sensitive areas

## 7. SITE PHOTOGRAPHS

See Appendix B for site photographs.

## 8. FACILITY ILLUSTRATIONS

See Appendix C for facility illustrations.

## 9. ACTIVITY MOTIVATION

### 9.1 SOCIO-ECONOMIC VALUE OF THE ACTIVITY

What is the expected capital value of the activity on completion?	R250 000 000	
What is the expected yearly income that will be generated by or as a result of the activity?	R0*	
*Please note: This applies to the operational phase since Routine Road Maintenance contracts for the route are already in place.		
Will the activity contribute to service infrastructure?	YES ✓	NO
Is the activity a public amenity?	YES ✓	NO
How many new employment opportunities will be created in the development phase of the activity?	Approximately 90 per month	
What is the expected value of the employment opportunities during the development phase?	R98 000 000	
What percentage of this will accrue to previously disadvantaged individuals?	Approximately 7%*	
* Please note: Calculation is based on value of R7 000 000 of the total value of R98 000 000.		
How many permanent new employment opportunities will be created during the operational phase of the activity?	None**	
What is the expected current value of the employment opportunities during the first 10 years?	R0**	
What percentage of this will accrue to previously disadvantaged individuals?	0%**	
**Please note: The operational phase will not contribute to employment creation as Routine Road Maintenance contracts for the route are already in place.		

### 9.2 NEED AND DESIRABILITY OF THE ACTIVITY

Motivate and explain the need and desirability of the activity (including demand for the activity):

<b>9.2.1 NEED:</b>			
1.	Was the relevant provincial planning department involved in the application?	YES ✓	NO
2.	Does the proposed land use fall within the relevant provincial planning framework?	YES ✓	NO
3.	If the answer to questions 1 and / or 2 was NO, please provide further motivation / explanation:		
	N/A		
<b>9.2.2 DESIRABILITY:</b>			
1.	Does the proposed land use / development fit the surrounding area?	YES ✓	NO
2.	Does the proposed land use / development conform to the relevant structure plans, SDF and planning visions for the area?	YES ✓	NO
3.	Will the benefits of the proposed land use / development outweigh the negative impacts of it?	YES ✓	NO
4.	If the answer to any of the questions 1-3 was NO, please provide further motivation / explanation:		
	N/A		
5.	Will the proposed land use / development impact on the sense of place?	YES	NO ✓
6.	Will the proposed land use / development set a precedent?	YES	NO ✓
7.	Will any person's rights be affected by the proposed land use / development?	YES	NO ✓
8.	Will the proposed land use / development compromise the "urban edge"?	YES	NO ✓
9.	If the answer to any of the question 5-8 was YES, please provide further motivation / explanation.		
	N/A		

9.2.3 BENEFITS:			
1.	Will the land use / development have any benefits for society in general?	YES ✓	NO
2.	Explain:		
<p>The proposed strengthening would increase the carrying capacity of this section of the route to accommodate existing and future traffic volumes along standard width cross sections and bridge crossings. This has become necessary as a result of a pattern of constant increase in traffic volumes along the route. Average daily truck traffic has increased by 4.4% annually for the period 2000 to 2009. Road safety would be enhanced by the provision of wider lanes and surfaced road shoulders along the length of the road. Another important safety consideration is to accommodate pedestrians and cyclists by providing adequate shoulders in both directions on the bridge structures. Road safety would be further enhanced by the replacement of the existing sub-standard parapets on Bridges NB38 to comply with safety standards.</p> <p>The asset value of the national road network would be maintained through the strengthening of the route to accommodate existing and future traffic loading. The R27 provides an important access route from the southernmost areas of the Northern Cape through the inland centre of the Province to the economic hub of Upington in the north and beyond to the Kgalagadi Transfrontier Park. As such, it forms an integral part of the national and regional road network and contributes to the network's strategic role. The main factors which illustrate this are the following:</p> <ul style="list-style-type: none"> <li>• An effective road network facilitates the safe and efficient movement of people, goods and services over medium to long distances between the main cities and economic regions of the country for business and for recreational purposes.</li> <li>• The R27 route fulfils a strategic role in the Northern Cape Province road network by connecting the southern areas to the Western Cape via the N7. To the north, it provides a crucial route to the relatively remote inland areas and Upington.</li> <li>• The route is well used by a range of vehicles, from commercial heavy vehicles to private vehicles, for business, agricultural, public service and recreational purposes.</li> <li>• At a regional level, the R27 route provides the necessary mobility for the local communities to enable participation in socio-economic development and growth, most importantly agricultural activities.</li> <li>• Tourism forms an important element of economic opportunities in the Northern Cape Province. The Niewoudtville area is especially renowned for its spring flowers, and the R27 route plays a pivotal role to facilitate the exploitation of the tourism potential of the area.</li> </ul>			
3.	Will the land use / development have any benefits for the local communities where it will be located?	YES ✓	NO
4.	Explain:		
<p>The main benefits of the upgrade project for the local communities would be the improved road safety for all local road users as described above (see Section 9.2.3.2).</p> <p>The construction phase would create a limited number of jobs – it is estimated that 90 temporary jobs would be available to the local population during the construction phase of approximately 20 months duration. Unemployment is high amongst unskilled job seekers in the Calvinia and Niewoudtville areas and job creation is therefore a priority objective of the relevant authorities. In this context, the creation of a limited number of temporary job opportunities would not contribute substantially to the long-term solution of this development issue. In addition, contractors may prefer to fill some of these vacancies with existing employees from other areas. However, the construction contract would stipulate requirements regarding the use of small, medium and macro enterprises (SMME), including black economic empowerment (BEE), which would create additional economic opportunities in relation to, for example, procurement. In addition, the contractor and employees would participate in the local economy for the duration of the contract. The contribution to the local economy through creating employment opportunities at the individual and enterprise level as well as the participation in the local economy by the contractor would bring a considerable short-term benefit to the local community.</p>			



## 10. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

List all legislation, policies and/or guidelines of any sphere of government that are applicable to the application as contemplated in the EIA regulations, if applicable:

Title of legislation, policy or guideline:	Administering authority:	Date:
National Environmental Management Act (No. 107 of 1998) (NEMA), as amended	Department of Environmental Affairs (DEA)	1998
EIA Regulations 2010 promulgated in terms of Section 24(5) of NEMA	DEA	2010 (June)
National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004)	DEA	2004
National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)	DEA	2004
National Water Act (No. 36 of 1998)	Department of Water Affairs (DWA)	1998
National Heritage Resources Act (No. 25 of 1999)	South African Heritage Resources Authority (SAHRA); Heritage Northern Cape	1999
Mineral and Petroleum Resources Development Act (No. 28 of 2002)(MPRDA)	Department of Mineral Resources (DMR)	2002
South African National Roads Agency Limited and National Roads Act (No. 7 of 1998)	SANRAL	1998
Guideline on interpretation of listed activities	DEA	2010 (June)
Guideline on public participation	Western Cape Department of Environmental Affairs and Development Planning (DEA&DP)	2010 (August)
Guideline on alternatives	DEA&DP	2010 (August)
Guideline on involving specialists in EIA processes	DEA&DP	2010 (August)
Northern Cape Provincial Growth and Development Strategy	Provincial Government of the Northern Cape	2004-2014
Northern Cape Province 15-year Review	Provincial Government of the Northern Cape	2009 (March)
Integrated Development Plan	Namakwa District Municipality	2006-2011
Integrated Development Plan	Hantam Local Municipality	2011-2012

## 11. WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT

### 11(a) Solid waste management

Will the activity produce solid construction waste during the construction/initiation phase?

YES ✓	NO
25 m <sup>3</sup>	

If yes, what estimated quantity will be produced per month?

How will the construction solid waste be disposed of (describe)?

The Contractor would collect waste on site and store it at a temporary waste collection area, before removing off-site by truck to dispose of at a registered landfill site – see Section 3.7.2 of the Draft CEMP.

Where will the construction solid waste be disposed of (describe)?

The Municipal Waste Disposal Sites used by Calvinia and/or Niewoudtville municipalities

Will the activity produce solid waste during its operational phase?

YES	NO ✓
N/A	

If yes, what estimated quantity will be produced per month?

How will the solid waste be disposed of (describe)?

N/A

Where will the solid waste be disposed if it does not feed into a municipal waste stream (describe)?

N/A

Can any part of the solid waste be classified as hazardous in terms of the relevant legislation?

YES

NO ✓

If yes, inform the competent authority and request a change to an application for scoping and EIA.

Is the activity that is being applied for a solid waste handling or treatment facility?

YES

NO ✓

11(b) Liquid effluent

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system?

YES

NO ✓

If yes, what estimated quantity will be produced per month?

N/A

Will the activity produce any effluent that will be treated and/or disposed of on site?

YES

NO ✓

Will the activity produce effluent that will be treated and/or disposed of at another facility?

YES

NO ✓

If yes, provide the particulars of the facility: N/A

Describe the measures that will be taken to ensure the optimal reuse or recycling of waste water, if any:

N/A

11(c) Emissions into the atmosphere

Will the activity release emissions into the atmosphere?

YES ✓

NO

If yes, is it controlled by any legislation of any sphere of government?

YES

NO ✓

If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

N/A – see response below

If no, describe the emissions in terms of type and concentration:

Air emissions would be generated by combustion of fuel from construction vehicles and equipment. The air emissions would be no greater than that from any other similar construction vehicles and equipment.

11(d) Generation of noise

Will the activity generate noise?

YES ✓

NO

If yes, is it controlled by any legislation of any sphere of government?

YES ✓

NO

If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

If no, describe the noise in terms of type and level:

During the construction phase equipment and vehicles would be used which would generate noise emissions. The noise emissions would be no greater than that from any other similar construction site.

12. WATER USE

Please indicate the source(s) of water that will be used for the activity by ticking the appropriate box(es)

Municipal ✓ water board groundwater ✓ river, stream, dam or lake other the activity will not use water

If water is to be extracted from groundwater, river, stream, dam, lake or any other natural feature, please indicate the volume that will be extracted per month:

900 kilolitre / month\*

Does the activity require a water use permit from the Department of Water Affairs (DWA)?

YES

NO ✓

If yes, please submit the necessary application to the Department of Water Affairs and attach proof thereof to this application if it has been submitted.

An application for a general authorisation in terms of GN No. 1191 of 2009 for Section 21(c) and (i) water uses as defined in the National Water Act (No.36 of 1998) will be submitted to DWA together with this Final BAR.

\* The total monthly water use requirements of approximately 900 kilolitres would be obtained from local municipal water sources and/or four existing boreholes on privately owned farms. This aspect would not require a water use permit from DWA on condition that the water to be abstracted would not exceed the existing authorisation for each specific water source.

13. ENERGY EFFICIENCY

Describe the design measures, if any, that have been taken to ensure that the activity is energy efficient:

N/A

Describe how alternative energy sources have been taken into account or been built into the design of the activity, if any:

N/A

## SECTION B: SITE/AREA/PROPERTY DESCRIPTION

Important notes:

(i) Specialist involvement:

Has a specialist been consulted to assist with the completion of this section?

YES ✓	NO
-------	----

If YES, please complete the form entitled "Details of specialist and declaration of interest" for each specialist thus appointed. All specialist reports must be contained in Appendix D.

Three specialist studies were undertaken to address the key potential impacts associated with the proposed project, in accordance with formal Specialist Terms of Reference (see Appendix D1). The relevant forms are presented in Appendix D2.

Details of the specialists and specialist studies undertaken are as follows:

- Ms A Belcher – Freshwater Ecology Assessment (see Appendix D3);
- Dr DJ McDonald – Botanical Assessment (see Appendix D4); and
- Mr T Hart – Heritage Statement Report (see Appendix D5).

(ii) Property description

Property description/ physical address:

Bridge NB35	R27 Section 8, km 22.7
Bridge NB36	R27 Section 8, km 34.9
Bridge NB37	R27 Section 8, km 59.2
Bridge NB38	R27 Section 8, km 67.1
BP R27-8 km 45.0 RHS 0.2	A portion of Portion 1 of the farm Buffelskopfontein 773 ("Doega B") located 0.2 km south of the R27 Section 8 at km 45..
BP R27-8 km 61.6 RHS 1.0	A portion of the farm Enkelde Wilgenboom 768 located 1.0 km south of the R27 Section 8 at km 61.6
Current land-use zoning:	Road reserve in the case of the four bridges and agriculture in the case of the two proposed borrowpit sites.

Is a change of land-use or a consent use application required?

YES	NO ✓
-----	------

Must a building plan be submitted to the local authority?

YES	NO ✓
-----	------

Locality map:

See Figures A1 to A7, A9 and A10 in Appendix A
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### 1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Alternative S1 (preferred site alternative):

Flat	1:50 – 1:20 ✓	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
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### 2. LOCATION IN LANDSCAPE

Indicate the landform(s) that best describes the site:

- 2.1 Ridgeline
- 2.2 Plateau ✓
- 2.3 Side slope of hill/mountain
- 2.4 Closed valley
- 2.5 Open valley
- 2.6 Plain
- 2.7 Undulating plain / low hills ✓
- 2.8 Dune
- 2.9 Seafront

### 3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

Is the site(s) located on any of the following (tick the appropriate boxes)?

	Bridge sites		BP sites	
	YES ✓	NO	YES	NO ✓
Shallow water table (less than 1.5m deep)	YES ✓	NO	YES	NO ✓
Dolomite, sinkhole or doline areas	YES	NO ✓	YES	NO ✓
Seasonally wet soils (often close to water bodies)	YES ✓	NO	YES	NO ✓
Unstable rocky slopes or steep slopes with loose soil	YES	NO ✓	YES	NO ✓
Dispersive soils (soils that dissolve in water)	YES	NO ✓	YES	NO ✓
Soils with high clay content (clay fraction more than 40%)	YES	NO ✓	YES	NO ✓
Any other unstable soil or geological feature	YES	NO ✓	YES	NO ✓
An area sensitive to erosion	YES ✓	NO	YES	NO ✓

### 4. GROUNDCOVER

Indicate the types of groundcover present on the site:

The location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s).

Natural veld – good condition <sup>E</sup> ✓	Natural veld with scattered aliens <sup>E</sup> ✓	Natural veld with heavy alien infestation <sup>E</sup> ✓	Veld dominated by alien species <sup>E</sup>	Gardens
Sport field	Cultivated land	Paved surface ✓	Building or other structure	Bare soil

If any of the boxes marked with an “<sup>E</sup>” is ticked, please consult an appropriate specialist to assist in the completion of this section if the environmental assessment practitioner doesn’t have the necessary expertise.

Specialists were appointed to undertake a freshwater ecological assessment (see Appendix D3) and a botanical assessment (see Appendix D4). Their main findings regarding the existing groundcover in the study area have been summarised below.

Biogeographically the study area falls mainly within the Succulent Karoo Biome and partly within the Fynbos Biome in the west, with Hantam Karoo vegetation (“Least threatened” status) the dominant natural vegetation type of the study area (MacDonald, 2011: 18; Belcher, 2011: 10).

A sequence of vegetation types occurs from west to east, namely from the Bokkeveld Escarpment, i.e. from the Vanrhyns Pass at the Western/Northern Cape border inland to Calvinia, as described in broad terms in the national classification of the vegetation of South Africa. The vegetation of the Bokkeveld Escarpment, which occurs on sandstone-derived soils and receives higher rainfall than further inland to the east, is classified as Bokkeveld Sandstone Fynbos. Nieuwoudtville Shale Renosterveld occurs on the clay-rich soils derived from Dwyka sediments. Next in the sequence is Nieuwoudtville-Roggeveld Dolerite Renosterveld, in a narrow north-south band which is widest in the north and tapers southwards to terminate south of the Oorlogskloof River. Hantam Karoo vegetation occurs to the east on the clay-rich soils towards Calvinia and beyond (see Figure A11 in Appendix A) (MacDonald, 2011: 18-20). According to the Critical Biodiversity Areas (CBA) map of the Hantam Municipality, the R27 route in the vicinity of Nieuwoudtville traverses CBA 1 (irreplaceable sites earmarked as the most important areas for biodiversity conservation) and CBA 2 (other important areas of high biodiversity value), which would coincide with Nieuwoudtville Shale Renosterveld and Nieuwoudtville-Roggeveld Dolerite Renosterveld, respectively. In addition, Section 8 of the R27 largely falls in a designated Ecological Support Area (see Figure A12 in Appendix A).

Within the road reserve, vegetation between the road verge and the border fence is in poor condition over considerable distances, mainly as a result of regular mowing of the road verge, which has compromised

the value of the roadside habitat as a biodiversity corridor. However, isolated areas of natural vegetation still exist in the road reserve that warrant conservation (MacDonald, 2011: 19; 22-40).

Vegetation within the Oorlogskloof River is of a wetland nature, dominated by phragmites reeds, with some *Juncus* sp., weedy shrubs and grasses. This vegetation would be sustained for much of the year by subsurface and groundwater contributions rather than surface water flows. The Oorlogskloof River downstream of Calvinia is in a moderately modified state, with the major impacts being some flow modification, farming within the riparian zone and a low density of invasive alien vegetation growth (*Prosopis* sp.) (Belcher, 2011: 13; 15; 22- 23).

## 5. LAND USE CHARACTER OF SURROUNDING AREA

Indicate land uses and/or prominent features that does currently occur within a 500 m radius of the site and give description of how this influences the application or may be impacted upon by the application:

- 5.1 **Natural area** ✓
- 5.2 Low density residential
- 5.3 **Medium density residential** ✓
- 5.4 High density residential
- 5.5 Informal residential<sup>A</sup>
- 5.6 **Retail commercial & warehousing** ✓
- 5.7 Light industrial
- 5.8 Medium industrial<sup>AN</sup>
- 5.9 Heavy industrial<sup>AN</sup>
- 5.10 Power station
- 5.11 Office/consulting room
- 5.12 Military or police base/station/compound
- 5.13 Spoil heap or slimes dam<sup>A</sup>
- 5.14 Quarry, sand or borrow pit
- 5.15 Dam or reservoir
- 5.16 Hospital/medical centre
- 5.17 School
- 5.18 Tertiary education facility
- 5.19 Church
- 5.20 Old age home
- 5.21 Sewage treatment plant<sup>A</sup>
- 5.22 Train station or shunting yard<sup>N</sup>
- 5.23 Railway line<sup>N</sup>
- 5.24 Major road (4 lanes or more)<sup>N</sup>
- 5.25 Airport<sup>N</sup>
- 5.26 Harbour
- 5.27 Sport facilities
- 5.28 Golf course
- 5.29 Polo fields
- 5.30 Filling Station<sup>H</sup>
- 5.31 Landfill or waste treatment site
- 5.32 Plantation
- 5.33 **Agriculture** ✓
- 5.34 **River, stream or wetland** ✓
- 5.35 Nature conservation area
- 5.36 Mountain, koppie or ridge
- 5.37 Museum
- 5.38 Historical building
- 5.39 Protected Area
- 5.40 Graveyard
- 5.41 Archaeological site
- 5.42 Other land uses (describe)

If any of the boxes marked with an "N" are ticked, how will this impact / be impacted upon by the proposed activity?

N/A

If any of the boxes marked with an "An" are ticked, how will this impact / be impacted upon by the proposed activity?

N/A

If any of the boxes marked with an "H" are ticked, how will this impact / be impacted upon by the proposed activity.

N/A

## 6. CULTURAL/HISTORICAL FEATURES

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including

YES ✓	NO
-------	----

Archaeological or palaeontological sites, on or close (within 20m) to the site?

YES ✓	NO
-------	----

If YES, explain:

Bridge NB38 is historically significant as it dates from 1937-38.

If uncertain conduct a specialist investigation by a recognised specialist in the field to establish whether there is such a feature(s) present on or close to the site:

A specialist was appointed to undertake a heritage assessment, including archaeology and cultural history. His full report is attached as Appendix D5. His key findings and recommendations have been summarised below.

Briefly explain the findings of the specialist:

The field study identified impacts to archaeological material at two of the seven potential borrowpit sites. These are of very low significance and no mitigation is deemed necessary.

The proposed activities will result in negligible impacts apart from the impacts that could be generated through the proposed widening of the Calvinia bridge over the Oorlogskloof River. This bridge is more than 60 years old and is therefore generally protected under the provisions of the National Heritage Resources Act. Alteration of this structure will require a heritage-sensitive approach that is sympathetic to the age and heritage qualities of the bridge. An application for permission to modify a structure older than 60 years will have to be submitted to Heritage Northern Cape

All of the other activities proposed are acceptable in heritage terms. The proposed activities are therefore supported.

Human remains can be found anywhere on the landscape. Any finds made during excavation of borrowpits must be reported to SAHRA Archaeology Unit in Cape Town, who will advise as to the necessary action.

A copy of the Basic Assessment should be sent to SAHRA in Cape Town and to Ngwao Boswa Kapa Bokone (Heritage Northern Cape, Kimberly).

Will any building or structure older than 60 years be affected in any way?

YES ✓	NO
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Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?

YES ✓	NO
-------	----

If yes, please submit or, make sure that the applicant or a specialist submits the necessary application to SAHRA or the relevant provincial heritage agency and attach proof thereof to this application if such application has been made.

A formal application for permission to modify a structure older than 60 years has not yet been submitted to Heritage Northern Cape, as the recently appointed Northern Cape Provincial Heritage Resources Council has not yet constituted its Permit Committee. A formal application in this regard will be submitted as soon as the Permit Committee is operational.

## SECTION C: PUBLIC PARTICIPATION

### 1. ADVERTISEMENT

The person conducting a public participation process must take into account any guidelines applicable to public participation as contemplated in section 24J of the Act and must give notice to all potential Interested and Affected Parties (I&APs) of the application which is subjected to public participation by—

- (a) fixing a notice board (of a size at least 60cm by 42cm; and must display the required information in lettering and in a format as may be determined by the competent authority) at a place conspicuous to the public at the boundary or on the fence of—
  - (i) the site where the activity to which the application relates is or is to be undertaken; and
  - (ii) any alternative site mentioned in the application;
- (b) giving written notice to—
  - (i) the owner or person in control of that land if the applicant is not the owner or person in control of the land;
  - (ii) the occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
  - (iii) owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
  - (iv) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;
  - (v) the municipality which has jurisdiction in the area;
  - (vi) any organ of state having jurisdiction in respect of any aspect of the activity; and
  - (vii) any other party as required by the competent authority;
- (c) placing an advertisement in—
  - (i) one local newspaper; or
  - (ii) any official *Gazette* that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;
- (d) placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or local municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official *Gazette* referred to in subregulation 54(c)(ii); and
- (e) using reasonable alternative methods, as agreed to by the competent authority, in those instances where a person is desiring of but unable to participate in the process due to—
  - (i) illiteracy;
  - (ii) disability; or
  - (iii) any other disadvantage.

Tasks undertaken to date to ensure adequate public consultation during the Basic Assessment included the following:

- An Application Form was submitted to DEA, on behalf of SANRAL, on 20 April 2011. On 16 May 2011 DEA acknowledged receipt of the submission (see Appendix H1). An amended Application Form was subsequently compiled for submission to DEA to incorporate the amended listed activities in accordance with the proposed project, as described in Section A.1.1 of the Final BAR (see Appendix H1).
- A preliminary I&AP database was compiled of landowners, authorities, councillors, community organisations such as farmers associations and other key stakeholders. A total of 37 I&APs have been registered on the database. The database has been amended on an ongoing basis as required during the Basic Assessment process (see Appendix G1).
- Landowners or their representatives and occupiers of property on which proposed borrowpits are situated were contacted individually by telephone to inform them of the proposed project and to obtain their contact particulars. Notification letters were sent to the landowners/representatives and occupiers to formally notify them of the proposed borrowpit development (see Appendix G2).
- An advertisement (in Afrikaans) was placed in the local newspaper on 10 June 2011 (see Appendix G3).
- Notices (in Afrikaans) announcing the proposed project were erected at the start and finish of the project on site on 9 and 10 June 2011. A site notice was also placed at the three proposed borrowpit sites (see Appendix G4 for copy of notices and photographs as evidence).



- Acknowledgement forms and comments were received from the three affected landowners or their representatives (see Appendix E2). No other I&APs submitted comments prior to the release of the Draft BAR. The comments have been collated into a Comments and Responses Report (see Appendix E1).
- This Draft BAR was released for a 40-day public review and comment period from 19 August to 27 September 2011 in order to provide I&APs and authorities with an opportunity to comment on any aspect of the Basic Assessment process and the proposed project. Copies of the full report are available at:
  1. Niewoudtville Public Library;
  2. Calvinia Public Library;
  3. Offices of CCA Environmental (Pty) Ltd; and
  4. On the CCA website ([www.ccaenvironmental.co.za](http://www.ccaenvironmental.co.za)).
- An I&AP notification letter (in English and/or Afrikaans) has been sent to I&APs registered on the project database (see Appendix G2). The notification letter notifies I&APs of the EIA Regulations 2010 compliance process, of the opportunity to register as an I&AP and the 40-day public review and comment period on the Draft BAR. Copies of the Draft BAR Executive Summary were enclosed with the letter.
- On 16 September 2011 an advertisement (in Afrikaans) (see Appendix G3) was placed in the local newspaper, the “Noordwester en Oewernuus”, announcing the inclusion of a fourth bridge in the scope of works, subsequent to the initial advertisement of 10 June 2011. The public was invited to submit further comments by 27 September 2011. No comment in this regard was received.
- All issues raised in submissions received by CCA after the release of the Draft BAR have been compiled into a Second Comments and Responses Report (see Appendix E3). A total of five written comments were received in response to the Draft BAR, four from I&APs and one from a of a government department (DWA). Copies of these written comments are presented in Appendix E4.
- The Draft BAR has been updated into a Final BAR and submitted to DEA for consideration and decision-making.
- The Final BAR has also been released for a further 30-day comment period from 28 October 2011 to 28 November 2010. An I&AP notification letter has been sent to I&APs registered on the project database informing them of the release of the Final BAR for a 30-day public review and comment period. I&APs have been notified to submit any comment directly to DEA for consideration (see Appendix G2).
- Any comment received by CCA from I&APs on the Final BAR will be forwarded directly to DEA for consideration.

After DEA has reached a decision, all I&APs on the project database will be notified of the outcome of the application, the reasons for the decision and the associated appeal process.

## 2. CONTENT OF ADVERTISEMENTS AND NOTICES

A notice board, advertisement or notices must:

- (a) indicate the details of the application which is subjected to public participation; and
- (b) state—
  - (i) that the application has been submitted to the competent authority in terms of these Regulations, as the case may be;
  - (ii) whether basic assessment or scoping procedures are being applied to the application, in the case of an application for environmental authorisation;
  - (iii) the nature and location of the activity to which the application relates;
  - (iv) where further information on the application or activity can be obtained; and
  - (v) the manner in which and the person to whom representations in respect of the application may be made.

The text of the advertisement and site notices contained the relevant details as prescribed above. Copies of the advertisements and site notices are presented in Appendices G3 and G4. Also see Section C3 below for details regarding the placement of the advertisements and site notices.

### 3. PLACEMENT OF ADVERTISEMENTS AND NOTICES

Where the proposed activity may have impacts that extend beyond the municipal area where it is located, a notice must be placed in at least one provincial newspaper or national newspaper, indicating that an application will be submitted to the competent authority in terms of these regulations, the nature and location of the activity, where further information on the proposed activity can be obtained and the manner in which representations in respect of the application can be made, unless a notice has been placed in any *Gazette* that is published specifically for the purpose of providing notice to the public of applications made in terms of the EIA regulations. Advertisements and notices must make provision for all alternatives.

- An advertisement (in Afrikaans) announcing the proposed project and inviting the public and/or organisations to register as an I&APs was placed in the local newspaper, the “Noordwester en Oewernuus” of 10 June 2011 (see Appendix G3).
- On 16 September 2011 an advertisement (in Afrikaans) (see Appendix G3) was placed in the local newspaper, the “Noordwester en Oewernuus”, announcing the inclusion of a fourth bridge in the scope of works, subsequent to the initial advertisement of 10 June 2011. The public was invited to submit further comments by 27 September 2011. No comment in this regard was received.
- Notices (in Afrikaans) announcing the proposed project were erected on site on 9 and 10 June 2011. Site notices were displayed at the beginning (western point, at R27 Section 7 km 43 at the eastern approach to the Vanrhyns Pass) and end point (eastern point, at R27 Section 8 km 67.5 at the western entrance to Calvinia) of the proposed project. A site notice was also placed at the three proposed borrowpit sites. See Appendix G4 for copies of the site notices and photographs of the notices *in-situ*.

### 4. DETERMINATION OF APPROPRIATE MEASURES

The practitioner must ensure that the public participation is adequate and must determine whether a public meeting or any other additional measure is appropriate or not based on the particular nature of each case. Special attention should be given to the involvement of local community structures such as Ward Committees, ratepayers associations and traditional authorities where appropriate. Please note that public concerns that emerge at a later stage that should have been addressed may cause the competent authority to withdraw any authorisation it may have issued if it becomes apparent that the public participation process was inadequate.

A comprehensive public participation process to ensure that all stakeholders were given sufficient notice of the proposed project and the opportunity to comment on the Draft BAR has been undertaken (see Section C1 for details).

It was not deemed necessary to arrange a public meeting regarding the proposed development as the project entails relatively minor changes which are regarded as uncontroversial improvements to existing road infrastructure. The longer term advantages of improved safety and increased traffic capacity to the local communities and the broader society are considered to outweigh possible short-term inconvenience that may result from construction activities.

Relevant community representatives were included on the I&AP project database, for example, ward councillors of relevant municipal wards, the Calvinia Ratepayers Association and representatives of farmers associations.

This report was released for a 40-day public and authority review / comment period. A notification letter was sent to all registered and identified I&APs to inform them of the release of the Draft BAR and where the full report can be reviewed (see Appendix G2).

The Final BAR has been released for a further 30-day public and authority review period from 28 October to 28 November 2011. A notification letter has been sent to all registered and identified I&APs to inform them of the release of the Final BAR and where the report can be reviewed (see Appendix G2).

## 5. COMMENTS AND RESPONSE REPORT

The practitioner must record all comments and respond to each comment of the public before the application is submitted. The comments and responses must be captured in a comments and response report as prescribed in the EIA regulations and be attached to this application. The comments and response report must be attached under Appendix E.

Comments were received from the affected landowners who acknowledged notification of the proposed borrowpit development on their properties. All comments received have been collated into a Comments and Responses Report (see Appendix E1). Copies of written comments received are included in Appendix E2.

All issues raised in submissions received by CCA after the release of the Draft BAR have been compiled into a Second Comments and Responses Report (see Appendix E3). A total of five written comments were received in response to the Draft BAR, four from I&APs and one from a government department (DWA). Copies of these written comments are presented in Appendix E4.

## 6. AUTHORITY PARTICIPATION

Please note that a complete list of all organs of state and / or any other applicable authority with their contact details must be appended to the basic assessment report.

The information on organs of state is included in Appendix G5.

Authorities are key interested and affected parties in each application and no decision on any application will be made before the relevant local authority is provided with the opportunity to give input.

### List of authorities informed:

The following provincial and national authorities were informed of the application:

- Department of Mineral Resources;
- Department of Water Affairs;
- Provincial Government Northern Cape: Department of Agriculture; and
- Provincial Government Northern Cape: Department of Environmental Affairs and Nature Conservation.

The following local authorities were informed of the application:

- Hantam Local Municipality; and
- Namakwa District Municipality.

### List of authorities from whom comments have been received:

Written comments on the Draft BAR were received from DWA and have been collated into the Second Comments and Responses Report (see Appendix E3).

## 7. CONSULTATION WITH OTHER STAKEHOLDERS

Has any comment been received from stakeholders?

YES ✓	NO
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If "YES", briefly describe the feedback below (also attach copies of any correspondence to and from the stakeholders to this application):

Prior to the release of the Draft BAR, comments were received from the affected landowners who acknowledged notification of the proposed borrowpit development on their properties. Five further submissions were received in response to the Draft BAR. All comments received have been collated into two Comments and Responses Report (see Appendices E1 and E3). Written comments received are included in Appendices E2 and E4.

The main issues raised in the comments are listed in Section D1 below.

## **SECTION D: IMPACT ASSESSMENT**

The assessment of impacts must adhere to the minimum requirements in the EIA Regulations, 2010, and should take applicable official guidelines into account. The issues raised by interested and affected parties should also be addressed in the assessment of impacts.

Three specialist studies were undertaken to address the key potential impacts associated with the proposed project, in accordance with formal Specialist Terms of Reference (see Appendix D1).

Specialist studies undertaken are listed below:

- Appendix D3: Freshwater Ecology Assessment;
- Appendix D4: Botanical Assessment; and
- Appendix D5: Heritage Statement Assessment.

Impacts have been assessed according to a convention for assigning significance to impacts (see Appendix H5).

### **1. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES**

List the main issues raised by interested and affected parties:

Comments were received from three I&APs prior to the release of the Draft BAR. All issues raised are presented in the Comments and Responses Report (see Appendix E1). A summary of the key issues raised is presented below:

1. Extent of borrowpit development;
2. Issues relating to borrowpit access; and
3. Dust.

All issues raised in submission received by CCA after the release of the Draft BAR have been compiled into a Second Comments and Responses Report (see Appendix E3). A summary of the key issues raised during the Draft BAR review and comment period is presented below:

1. Extent of borrowpit development;
2. Legal requirements in respect of water use; and
3. Recommendations regarding the Construction EMP.

Response from the practitioner to the issues raised by the interested and affected parties (A full response must be given in the Comments and Response Report that must be attached to this report as Annexure E):

Responses to the issues raised by I&APs are contained in the two Comments and Responses Reports (see Appendix E1 and Appendix E3) and the key issues are assessed in the sections that follow.

### **2. IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN, CONSTRUCTION, OPERATIONAL, DECOMMISSIONING AND CLOSURE PHASES AS WELL AS PROPOSED MANAGEMENT OF IDENTIFIED IMPACTS AND PROPOSED MITIGATION MEASURES**

List the potential direct, indirect and cumulative property/activity/design/technology/operational alternative related impacts (as appropriate) that are likely to occur as a result of the planning and design phase, construction phase, operational phase, decommissioning and closure phase, including impacts relating to the choice of site/activity/technology alternatives as well as the mitigation measures that may eliminate or reduce the potential impacts listed.

The assessment of potential impacts that follows is based on specialist input and analysis and professional experience and judgment of the environmental consultant. Note that no significant impacts have been identified during the design phase and that a decommissioning and closure phase is not relevant in this case. The potential impacts of the project on the surrounding environment are described first. Once these medium and longer terms implications of the project have been assessed, the construction phase impacts, which have relatively short-term implications, are considered.

## 2.1 POTENTIAL PROJECT IMPACTS

### 2.1.1 IMPACTS RELATED TO FRESHWATER ECOLOGY: LOSS OR MODIFICATION OF RIPARIAN HABITAT

#### Description of impact

The widening of the bridges along Section 8 of the R27 could result in the loss of riparian vegetation and habitat at these sites. The potential loss of riparian vegetation could result in the alteration of the riparian habitat of the affected streams. The disturbance of riparian habitat due to construction activities could also provide an opportunity for invasive alien plants to proliferate in these areas.

#### Assessment

As the riparian zones of the streams are already disturbed and alien plants present, the existing riparian habitats perform a limited function in protecting the river from surrounding land-use activities. Thus the small-scale disturbance associated with bridge widening on riparian zones is expected to be of low intensity. The impact would be localised, of medium-term duration and thus the impact significance is considered to be **very low** without mitigation.

#### Mitigation

- Limit construction activities taking place within the river channel and riparian zone as far as possible to ensure minimum disturbance of this area.
- Rehabilitate and revegetate disturbed areas within the riparian zones with suitable indigenous riparian vegetation as soon as possible after construction has been completed.
- Monitor disturbed areas to prevent infestation by invasive alien plant growth after the construction phase is complete.

Provided that the suggested mitigation measures are implemented, this impact is assessed to be of **VERY LOW** significance (see Table 3).

**Table 3: Impact table relating to the loss or modification of riparian habitat**

CRITERIA	WITHOUT MITIGATION	WITH MITIGATION
Extent	Local	Local
Duration	Medium-term	Medium-term
Intensity	Low	Very low
Probability	Probable	Probable
Confidence	High	High
Significance	<b>Very low</b>	<b>VERY LOW</b>
Cumulative impact	None	None
Nature of Cumulative impact	N/A	
Degree to which impact can be reversed	Fully reversible	
Degree to which impact may cause irreplaceable loss of resources	Low	
Degree to which impact can be mitigated	Very low	

## 2.1.2 BOTANICAL IMPACTS

### 2.1.2.1 Loss of Bokkeveld Sandstone Fynbos along the R27 Section 7

#### Description of impact

An area of natural vegetation consisting of Bokkeveld Sandstone Fynbos exists in the road reserve on both sides of Section 7 of the R27 between the Vanrhyn's Pass and the R357/R27 intersection (near Nieuwoudtville), approximately between km 40 and 50.2. Road construction in this area could damage or completely destroy a significant portion of this vegetation.

#### Assessment

Bokkeveld Sandstone Fynbos is under serious threat from agriculture, particularly rooibos tea cultivation, on the Bokkeveld Plateau. Any remaining areas of this vegetation should therefore be conserved wherever possible. Any damage to or loss of vegetation in this area would entail a localised, long-term impact of high intensity. The significance of the impact is therefore considered to be **high**.

#### Mitigation

- Plan the extent of the road widening in such a way that it would not exceed the boundary of the existing road verge in order to conserve the remaining Bokkeveld Sandstone Fynbos along Section 7 of the R27.
- Appoint a botanical specialist at the commencement of the construction period to identify the areas of Bokkeveld Sandstone Fynbos in the road reserve on both sides of Section 7 of the R27 between the Vanrhyn's Pass and the R357/R27 intersection (near Nieuwoudtville), approximately between km 40 and 50.2, to be protected from damage due to construction activities.
- Protect the identified remaining areas/patches of natural Bokkeveld Sandstone Fynbos from construction activities by clearly demarcating it as no-go areas and preventing any incursion into it for the full duration of the construction period.
- Implement an educational programme with the Contractor and workforce to impress upon them the importance of conserving Bokkeveld Sandstone Fynbos vegetation along Section 7 of the R27.
- Identify any areas of Bokkeveld Sandstone Fynbos vegetation that may be inadvertently or unavoidably damaged for special attention during post-construction rehabilitation.
- If removal of fynbos vegetation is unavoidable, appropriate post-construction restoration measures should be implemented, for example, using plant material harvested by acceptable methods as a mulch to promote rehabilitation of the specific local vegetation. Hydroseeding using commercially available seed should be avoided at all costs.

Implementation of the recommended mitigation measures would reduce the significance of the potential negative impact to **LOW** (see Table 4).

Table 4: Impact table relating to the loss of Bokkeveld Sandstone Fynbos along the R27 Section 7

CRITERIA	WITHOUT MITIGATION	WITH MITIGATION
Extent	Local	Local
Duration	Long-term	Long-term
Intensity	High	Low
Probability	Highly probable	Probable
Confidence	High	High
Significance	<b>High</b>	<b>LOW</b>
Cumulative impact	High	Low
<b>Nature of Cumulative impact</b>		
	Loss of Bokkeveld Sandstone Fynbos in the road reserve would contribute to overall loss of this important vegetation	

	type as well as loss of important road reserve habitat.
<b>Degree to which impact can be reversed</b>	Irreversible
<b>Degree to which impact may cause irreplaceable loss of resources</b>	High
<b>Degree to which impact can be mitigated</b>	Medium

### 2.1.2.2 Loss of Nieuwoudtville-Roggeveld Dolerite Renosterveld and Nieuwoudtville Shale Renosterveld along the R27 Section 8

#### Description of impact

Road construction could potentially damage or destroy two types of Renosterveld vegetation within the road reserve of Section 8 of the R27, namely Nieuwoudtville-Roggeveld Dolerite Renosterveld and Nieuwoudtville Shale Renosterveld.

#### Assessment

Nieuwoudtville-Roggeveld Dolerite Renosterveld and Nieuwoudtville Shale Renosterveld are two of the most important vegetation types along Section 8 of the R27 due to the high conservation value of Renosterveld, as indicated in the Hantam Municipality CBA map. In addition, the spring bulb display associated with the Renosterveld vegetation is an important tourism attraction in the Nieuwoudtville area. However, road maintenance activities in the road reserve have impacted negatively on this vegetation in the past with the result that it has been transformed mainly to grasses, particularly exotic annual species, and weedy shrubs such as *Gomphocarpus fruticosus*. The geophytic flora appears to have already been lost in the road reserve, probably due to the application of weed-killer. Future road-building activities on the roadside flora in the area where Nieuwoudtville-Roggeveld Dolerite Renosterveld and Nieuwoudtville Shale Renosterveld should occur would therefore have only a localised impact of low intensity in the long term, which has been rated as of **low** significance.

#### Mitigation

Mitigation for impacts caused by road-building *per se* would not be necessary due to the degraded state of Nieuwoudtville-Roggeveld Dolerite Renosterveld and Nieuwoudtville Shale Renosterveld in the road reserve. However, it is recommended that post-construction activities should be undertaken to restore the Renosterveld flora within the road reserve.

- Revise management plans and procedures for the maintenance of the road reserve post-construction so as to minimise disturbance of vegetation in the road reserve.
- Restore and rehabilitate Nieuwoudtville-Roggeveld Dolerite Renosterveld and Nieuwoudtville Shale Renosterveld in the road reserve after construction has been completed

Implementation of the suggested mitigation measures would result in a **MEDIUM (POSITIVE)** impact in this case (see Table 5).

**Table 5: Impact table relating to the loss of Nieuwoudtville-Roggeveld Dolerite Renosterveld and Nieuwoudtville Shale Renosterveld along the R27 Section 8**

CRITERIA	WITHOUT MITIGATION	WITH MITIGATION
<b>Extent</b>	Local	Local
<b>Duration</b>	Long-term	Long-term
<b>Intensity</b>	Low	Medium
<b>Probability</b>	Highly probable	Probable
<b>Confidence</b>	High	High
<b>Significance</b>	<b>Low</b>	<b>MEDIUM (POSITIVE)</b>
<b>Cumulative impact</b>	Low	Medium (Positive)



<b>Nature of Cumulative impact</b>	Continued disturbance of Nieuwoudtville Shale Renosterveld along Section 8 of the R27 during road maintenance activities would inhibit this vegetation from re-colonising the road reserve.
<b>Degree to which impact can be reversed</b>	Partially reversible
<b>Degree to which impact may cause irreplaceable loss of resources</b>	Low
<b>Degree to which impact can be mitigated</b>	Medium

### 2.1.2.3 Loss of Hantam Karoo vegetation along the R27 Section 8

#### Description of impact

Road construction could potentially damage or destroy Hantam Karoo vegetation within the road reserve of Section 8 of the R27.

#### Assessment

The Hantam Karoo vegetation is very extensive and covers large areas of natural rangeland beyond the road reserve of Section 8 of the R27. These rangelands are in variable condition since they are mainly grazed by sheep. Although the Hantam Karoo vegetation in the road reserve is generally in poor condition due to historically inappropriate management of the roadside vegetation, various areas of vegetation in fair to good condition have been identified along the route. Further loss of Hantam Karoo habitat as a result of road building would therefore lead to a long-term, regional impact of medium intensity, with an associated **high** significance rating without mitigation.

#### Mitigation

- Appoint a botanical specialist at the commencement of the construction period to identify the areas of natural Hantam Karoo vegetation in fair to good condition in the road reserve on both sides of Section 8 of the R27, approximately between km 6.0 and 67.0, to be protected from damage due to construction activities.
- Protect identified remaining areas/patches of natural Hantam Karoo vegetation in the road reserve from construction activities by clearly demarcating it as no-go areas and preventing any incursion into it for the full duration of the construction period.
- Revise management plans and procedures for the maintenance of the road reserve post-construction so as to minimise disturbance of vegetation in the road reserve.
- Implement an educational programme with the Contractor and workforce to impress upon them the importance of conserving Hantam Karoo vegetation along Section 8 of the R27.
- Identify any areas of Hantam Karoo vegetation that may be inadvertently or unavoidably damaged for special attention during post-construction rehabilitation.
- If removal of Hantam Karoo vegetation is unavoidable, appropriate post-construction restoration measures should be implemented.

With mitigation the significance of the impact would be **LOW** (see Table 6).

**Table 6: Impact table relating to the loss of Hantam Karoo vegetation along the R27 Section 8**

CRITERIA	WITHOUT MITIGATION	WITH MITIGATION
<b>Extent</b>	Regional	Regional
<b>Duration</b>	Long-term	Medium-term
<b>Intensity</b>	Medium	Low
<b>Probability</b>	Highly probable	Highly probable

<b>Confidence</b>	High	High
<b>Significance</b>	<b>High</b>	<b>LOW</b>
<b>Cumulative impact</b>	High	Low
<b>Nature of Cumulative impact</b>		
	Loss of Hantam Karoo habitat within the road reserve on both sides of the R27 Section 8 over a long distance.	
<b>Degree to which impact can be reversed</b>	Partially reversible	
<b>Degree to which impact may cause irreplaceable loss of resources</b>	Medium	
<b>Degree to which impact can be mitigated</b>	Medium	

#### 2.1.2.4 Loss of Hantam Karoo vegetation as a result of borrowpit development

##### Description of impact

Excavation of material at the proposed borrowpit sites could potentially damage or destroy Hantam Karoo vegetation.

##### Assessment

The sites proposed for borrowpit development are all located in the Hantam Karoo vegetation area. The selected sites have been assessed as acceptable for further excavation from a botanical perspective. The botanical impact associated with excavation would be of local extent, long-term duration and medium intensity and is considered to be of **medium** significance.

##### Mitigation

- Landscape excavated borrowpit slopes after removal of the required material so that gradients are smooth to moderate in order to encourage active re-colonisation of the sites by the natural Hantam Karoo vegetation and limit erosion.
- Monitor the borrowpit sites post-construction and control infestation by weedy species such as *Dittrichia graveolens*, *Atriplex lindleyi* subsp. *inflata* and *Prosopis glandulosa* (mesquite).

The significance of the impact would be contained to **LOW** with implementation of the recommended mitigation measures (see Table 7).

Table 7: Impact table relating to the loss of Hantam Karoo vegetation as a result of borrowpit development

CRITERIA	WITHOUT MITIGATION	WITH MITIGATION
<b>Extent</b>	Local	Local
<b>Duration</b>	Long-term	Long-term
<b>Intensity</b>	Medium	Low
<b>Probability</b>	Highly probable	Highly probable
<b>Confidence</b>	High	High
<b>Significance</b>	<b>Medium</b>	<b>LOW</b>
<b>Cumulative impact</b>	Medium	Low
<b>Nature of Cumulative impact</b>		
	More than one borrowpit is allocated in similar vegetation.	
<b>Degree to which impact can be reversed</b>	Partially reversible	
<b>Degree to which impact may cause irreplaceable loss of resources</b>	Low	
<b>Degree to which impact can be mitigated</b>	Low	

### 2.1.2.5 Loss of ecological processes

#### Description of impact

The potential damage to, and loss of vegetation, within the R27 road reserve could potentially result in the loss of essential ecological processes.

#### Assessment

As ecological processes vary from one vegetation type and from one habitat to the next, Karoo vegetation has different ecological processes to Fynbos vegetation. Generally the impacts of loss of ecological processes in the study area would be less in the Karoo vegetation than in the Fynbos vegetation. Given the overall poor to fair condition of the vegetation and habitat in the road reserves on Sections 7 and 8 of the R27, loss of ecological processes concomitant with loss of vegetation due to the road upgrade has been assessed to be of regional extent, long-term duration and low intensity, with an associated significance rating of **low**.

#### Mitigation

No additional mitigation measures have been identified, therefore the significance of the impact remains at **LOW** (see Table 8).

**Table 8: Impact table relating to the loss of ecological processes**

CRITERIA	WITHOUT MITIGATION	WITH MITIGATION
Extent	Regional	Regional
Duration	Long-term	Long-term
Intensity	Low	Low
Probability	Highly probable	Highly probable
Confidence	High	High
Significance	<b>Low</b>	<b>LOW</b>
Cumulative impact	Low	Low
<b>Nature of Cumulative impact</b>		
	Loss of ecological processes in the road reserve along Sections 7 & 8 of the R27.	
<b>Degree to which impact can be reversed</b>	Irreversible	
<b>Degree to which impact may cause irreplaceable loss of resources</b>	Low	
<b>Degree to which impact can be mitigated</b>	Low	

### 2.1.3 HERITAGE IMPACTS

#### 2.1.3.1 Impact on the built environment of modifications to Bridge NB38

#### Description of impact

The proposed widening of Bridge NB38 would impact negatively on the heritage value of this historical four-pier arch bridge structure dating from 1937-38.

#### Assessment

Bridge NB38, known as the Calvinia Bridge, provides access over the Oorlogskloof River to the western built edge of the town of Calvinia. The Calvinia Bridge is significant on account of its age, its aesthetic qualities and gateway position at the western "entrance" to Calvinia. Similar examples exist at Keimoes,

Upington, Middleton (Eastern Cape) and Laingsburg. Impacts to the built environment involve the potential changing of a bridge structure that shows very little evidence of change in that last 70 to 80 years. Insensitive alterations will detract from its authenticity, historic and aesthetic qualities.

However, the bridge balustrades do not comply with modern load requirements and currently are a safety hazard. Its alteration has therefore become necessary for safety considerations. The design approach of limiting the bridge widening to one side only has been adopted in order to preserve as much of possible of the original structure. In addition, the design would retain the essential arch form to match the existing design style and characteristics. Without mitigation the impact of alterations to Bridge NB38 has been assessed as of local extent, permanent duration and high intensity, with an associated significance rating of **Medium**.

### Mitigation

- Ensure that the addition and modifications to Bridge NB38 adhere to the design style and characteristics of the existing arch bridge.
- Change the fabric of the structure only where unavoidable.
- Submit the detailed designs for the widening of Bridge NB38 to Heritage Northern Cape for approval by the Permit Committee of the Northern Cape Provincial Heritage Resources Council to ensure that the appropriate design solution for the proposed modifications is acceptable both from a heritage and an engineering perspective.
- Commission a systematic recording of fabric of Bridge NB38 prior to alteration by means of measured drawings and a photographic survey.
- Undertake a comprehensive photographic survey of the site before work commences and during construction to generate an archive of information.
- Lodge a compact disc containing the above information with the Provincial Heritage Authority and SAHRA.

Provided that the recommended mitigation measures are implemented, the significance of the impact would be contained to **LOW** (see Table 9).

**Table 9: Impact table relating to the built environment: Alterations for Bridge NB38**

CRITERIA	WITHOUT MITIGATION	WITH MITIGATION
<b>Extent</b>	Local	Local
<b>Duration</b>	Permanent	Permanent
<b>Intensity</b>	Medium	Low
<b>Probability</b>	Highly probable	Highly probable
<b>Confidence</b>	High	High
<b>Significance</b>	<b>Medium</b>	<b>LOW</b>
<b>Cumulative impact</b>	Medium	Low
<b>Nature of Cumulative impact</b>	This relates to the loss or modification of early bridge structures in response to modern traffic needs. Although other similar bridges are known, the exact number of surviving early bridges in South Africa is unknown. It is therefore not possible to accurately gauge the extent of the cumulative impact.	
<b>Degree to which impact can be reversed</b>	Irreversible	
<b>Degree to which impact may cause irreplaceable loss of resources</b>	Low	
<b>Degree to which impact can be mitigated</b>	Medium	

### 2.1.3.1 Impact on pre-colonial archaeology of borrowpit development

#### Description of impact

Pre-colonial archaeological resources could potentially be impacted as a result of excavations undertaken during the borrowpit development.

#### Assessment

Archaeological material is highly context sensitive, which means that its disturbance or removal from site of origin destroys its significance. Disturbance or destruction can occur as a result of any activity that involves ground surface disturbance or alterations to the landscape. The resulting impacts are generally permanent, but the significance of the impact relates to the rarity or importance of the archaeological material, and the extent to which it will be disturbed. Material identified at proposed borrowpit site BP R27-8 km 61.6 RHS 1.0 is typical and found elsewhere and therefore not regarded as significant. The potential archaeological impact would be permanent, of very low intensity at the local level and is thus considered to have **low** significance.

#### Mitigation

No mitigation has been recommended in this case, therefore the significance of the impact remains at **LOW** (see Table 10).

**Table 10: Impact table relating to pre-colonial archaeology as a result of borrowpit development**

CRITERIA	WITHOUT MITIGATION	WITH MITIGATION
Extent	Local	Local
Duration	Permanent	Permanent
Intensity	Very low	Very low
Probability	Probable	Probable
Confidence	High	High
Significance	<b>Low</b>	<b>LOW</b>
Cumulative impact	Low	Low
<b>Nature of Cumulative impact</b>		
	Diffuse scatters of artefacts are to be found throughout the Karoo although good quality archaeological sites are quite rare in the western areas. Since the material identified is highly diffuse, but common, the cumulative impacts are low.	
<b>Degree to which impact can be reversed</b>		
	Impacts to archaeological material are not reversible. However, the material identified in this study is of such low significance, that irreversibility of any impacts is of no consequence.	
<b>Degree to which impact may cause irreplaceable loss of resources</b>		
	The archaeological material located is typical, and found elsewhere. No irreplaceable loss of resources is expected.	
<b>Degree to which impact can be mitigated</b>		
	None	

### 2.1.4 ROAD SAFETY

#### Description of impact

The proposed road strengthening, specifically widening of the road to a uniform cross section with a total width of 9.4 m and the widening of the four existing bridges to include a 2.5 m wide pedestrian friendly shoulder, would improve road safety for all road users.

### Assessment

The provision of wider traffic lanes with surfaced road shoulders would enable all vehicles, especially heavy traffic, to use the route and cross the bridges in safer conditions. Pedestrians and cyclists would benefit much from the provision of road shoulders along the length of the road and at the bridge crossings in both directions. The proposed new balustrades on Bridge NB38 would significantly improve safety conditions associated with this bridge. The impact on road safety for all road users is expected to be positive, of medium intensity at the local to regional level in the long term. The impact is therefore considered to be of **medium (positive)** significance.

### Mitigation

As no mitigation has been identified, the significance of the impact remains at **MEDIUM (POSITIVE)** (see Table 11).

**Table 11: Impact table relating to improved road safety**

CRITERIA	WITHOUT MITIGATION	WITH MITIGATION
Extent	Local to regional	Local to regional
Duration	Medium-term	Medium-term
Intensity	Medium	Medium
Probability	Highly probable	Highly probable
Confidence	High	High
Significance	<b>Medium (positive)</b>	<b>MEDIUM (POSITIVE)</b>
Cumulative impact	None	None
Nature of Cumulative impact	N/A	
Degree to which impact can be reversed	Irreversible	
Degree to which impact may cause irreplaceable loss of resources	N/A	
Degree to which impact can be mitigated	None	

## 2.1.5 TOURISM AND REGIONAL ECONOMIC DEVELOPMENT

### Description of impact

The increased safety and capacity of the R27 national route would indirectly contribute to the improved potential for tourism and regional economic development of the Hantam area and particularly for Neiwoudville and Calvinia.

### Assessment

The R27 provides the necessary mobility of the local communities to enable participation in socio-economic development and growth within the regional context. Tourism is an important element of local economic opportunities and the R27 route plays a pivotal role to facilitate the exploitation of the tourism potential of the area. The improved safety and condition of the R27 would therefore contribute indirectly to the further development of the tourism potential of the area. This is regarded as a regional, medium-term impact of low intensity. The impact has therefore been assessed as of **low (positive)** significance.

### Mitigation

No mitigation has been recommended in this case, thus the assessment of the significance of the impact remains unchanged at **LOW (POSITIVE)** (see Table 12).

**Table 12: Impact table relating to tourism and regional economic development**

CRITERIA	WITHOUT MITIGATION	WITH MITIGATION
Extent	Regional	Regional
Duration	Medium-term	Medium-term
Intensity	Low	Low
Probability	Highly probable	Highly probable
Confidence	High	High
Significance	<i>Low (positive)</i>	<i>LOW (POSITIVE)</i>
Cumulative impact	None	None
<b>Nature of Cumulative impact</b>		
Nature of Cumulative impact	N/A	
Degree to which impact can be reversed	Irreversible	
Degree to which impact may cause irreplaceable loss of resources	N/A	
Degree to which impact can be mitigated	None	

## 2.2 POTENTIAL CONSTRUCTION PHASE IMPACTS

### 2.2.1 IMPACTS RELATED TO FRESHWATER ECOLOGY

#### 2.2.1.1 Disturbance of riparian habitats

##### Description of impact

Construction activities associated with the road and bridge upgrades could impact on the riparian habitat of the Oorlogskloof River and its tributaries along the R27 at the construction sites and possibly for a short distance downstream of the bridge structures.

##### Assessment

The existing riparian habitat has already been disturbed by surrounding farming activities, with much of the vegetation associated with the river being limited to within the river channel. The disturbance of the riparian habitat during and after the construction activities provides an opportunity for invasive alien plants to proliferate in these areas that are already in a disturbed condition. The impact would be localised, of short-term duration and low intensity, therefore, the significance is rated as **very low**.

##### Mitigation

- Limit construction activities taking place within the river channel and riparian zone as far as possible to ensure minimum disturbance of this area.
- Rehabilitate and revegetate disturbed areas within the riparian zones with suitable indigenous riparian vegetation as soon as possible after construction has been completed.

After mitigation the significance rating of the impact remains **VERY LOW** (see Table 13).

**Table 13: Impact table relating to the disturbance of riparian habitats**

CRITERIA	WITHOUT MITIGATION	WITH MITIGATION
Extent	Local	Local
Duration	Short-term	Short-term
Intensity	Low	Low

<b>Probability</b>	Probable	Highly probable
<b>Confidence</b>	High	High
<b>Significance</b>	<b>Very low</b>	<b>VERY LOW</b>
<b>Cumulative impact</b>	Very low	None
<b>Nature of Cumulative impact</b>		
	N/A	
<b>Degree to which impact can be reversed</b>	Fully reversible	
<b>Degree to which impact may cause irreplaceable loss of resources</b>	N/A	
<b>Degree to which impact can be mitigated</b>	Very low	

### 2.2.1.2 Impedance of river flow

#### Description of impact

Construction activities in the river channel could result in a temporary impedance of flow in the Oorlogskloof River at the river crossing sites.

#### Assessment

The impact would be localised due to the small scale of the construction works, limited to the short-term duration of the construction operation and of low intensity as the affected tributaries flow only seasonally. The significance of the impact is therefore considered to be **very low**.

#### Mitigation

- If possible, construction should take place during the low flow period.
- Minimise the duration and extent of construction activities in the rivers.
- Clear rubble and waste material associated with the construction activities from the river and drainage channels.

Significance of impacts after mitigation would be **VERY LOW** if the suggested mitigation measures were implemented (see Table 14).

**Table 14: Impact table relating to the impedance of flow during the construction phase**

<b>CRITERIA</b>	<b>WITHOUT MITIGATION</b>	<b>WITH MITIGATION</b>
<b>Extent</b>	Local	Local
<b>Duration</b>	Short-term	Short-term
<b>Intensity</b>	Low	Very low
<b>Probability</b>	Probable	Probable
<b>Confidence</b>	High	High
<b>Significance</b>	<b>Very low</b>	<b>VERY LOW</b>
<b>Cumulative impact</b>	None	None
<b>Nature of Cumulative impact</b>		
	N/A	
<b>Degree to which impact can be reversed</b>	Fully reversible	
<b>Degree to which impact may cause irreplaceable loss of resources</b>	N/A	
<b>Degree to which impact can be mitigated</b>	Very low	



### 2.2.1.3 Reduction of river water quality

#### Description of impact

Construction activities could cause sedimentation in watercourses, which would increase turbidity and reduce river water quality downstream of the construction sites. Contamination of streams due to hydrocarbon spills or leakages or solid waste emanating from the construction sites would also affect water quality.

#### Assessment

This impact is more likely to occur during the rainy season, when run-off from the construction sites directly into the streams could cause sedimentation and localised pollution. Due to the small scale of the construction operation and largely dry nature of the riverbeds, this would lead to a localised, short-term impact of low intensity on water quality, therefore, the significance is rated as **very low**.

#### Mitigation

- If possible, construction should take place during the low rainfall months when runoff volumes will be low.
- Divert run-off from construction sites through screens and off-channel retention ponds in order to prevent contaminated water from directly entering the stream.
- Ensure that materials on the construction sites are appropriately stored and contained to prevent water pollution.
- Manage waste disposal from the construction sites appropriately in order to prevent water pollution.
- Provide ablution facilities for construction workers at the construction sites that are located away from the river system and regularly serviced.

After mitigation the significance rating of the impact remains **VERY LOW** (see Table 15).

**Table 15: Impact table relating to the reduction of river water quality**

CRITERIA	WITHOUT MITIGATION	WITH MITIGATION
Extent	Local	Local
Duration	Short-term	Short-term
Intensity	Low	Low
Probability	Probable	Probable
Confidence	High	High
Significance	<b>Very low</b>	<b>VERY LOW</b>
Cumulative impact	None	None
<b>Nature of Cumulative impact</b>		
	N/A	
<b>Degree to which impact can be reversed</b>	Fully reversible	
<b>Degree to which impact may cause irreplaceable loss of resources</b>	N/A	
<b>Degree to which impact can be mitigated</b>	Very low	

### 2.2.2.1 BOTANICAL IMPACTS: DAMAGE TO OR LOSS OF VEGETATION ALONG THE R27 DUE TO CONSTRUCTION ACTIVITIES

#### Description of impact

Construction activities could potentially result in damage to or even permanent loss of all types of vegetation within the road reserve of the R27.

#### Assessment

Construction activities along the route could cause further disturbance of the vegetation within the road reserve, causing damage or loss of vegetation. This would contribute to the further loss of natural vegetation in the road reserve, undermining its role as an important biodiversity corridor, as well as to the loss of ecological processes in the region. The implications of these losses have been assessed in section 2.1.2. The localised impact would be of high intensity and long-term duration with an associated impact significance rating of **high** without mitigation.

#### Mitigation

- Demarcate areas of natural vegetation as No-go areas for the duration of the construction period.
- Remove weedy species such as *Galenia africana* (kraalbos), *Atriplex semibaccata*, *Atriplex lindleyi* subsp. *Inflata* (blasiebrak), *Prosopis glandulosa* (mesquite) and especially *Salsola kali* (Russian tumbleweed; rolbos) from the road reserve prior to construction to inhibit further spread of these species along the road as a result of construction activities.
- After construction these species should be actively controlled to prevent competition with more desirable species.
- Avoid causing any further disturbance of the vegetation within the road reserve in the zone between the verge and the boundary fences.
- Where disturbance is unavoidable, identify and monitor these disturbed areas and earmark them for rehabilitation post-construction to enhance regeneration of the roadside vegetation.
- Rehabilitate disturbed areas by collecting seed from plants in the same community in nearby undisturbed vegetation for sowing on disturbed areas.
- Confine stockpiling of construction material to strictly demarcated areas such as at existing lay-bys to limit the distribution of this material in the road reserve.
- Prohibit construction crews from lighting any fires in the road reserve.

Implementation of the recommended mitigation measure would reduce the significance of the potential negative impact to **LOW** (see Table 16).

Table 16: Impact table relating to damage to or loss of vegetation along the R27 due to construction activities

CRITERIA	WITHOUT MITIGATION	WITH MITIGATION
Extent	Local	Local
Duration	Long-term	Long-term
Intensity	High	Low
Probability	Highly probable	Probable
Confidence	High	High
Significance	<b>High</b>	<b>LOW</b>
Cumulative impact	High	Low
<b>Nature of Cumulative impact</b>	Damage to vegetation in the road reserve would contribute to the overall loss of important road reserve habitat and the loss of ecological processes.	
<b>Degree to which impact can be reversed</b>	Irreversible	

Degree to which impact may cause irreplaceable loss of resources	High
Degree to which impact can be mitigated	Medium

### 2.2.3 IMPACTS ASSOCIATED WITH BORROWPIT DEVELOPMENT ON AFFECTED LANDOWNERS

#### Description of impact

The development and operation of borrowpits on portions of affected landowner properties would impact on the affected landowners for the duration of the construction period.

#### Assessment

Affected landowners have raised two main areas of concern regarding borrowpit development, namely the size and extent of borrowpit development on their properties and issues associated with borrowpit access. The latter included the demarcation of borrowpit areas; various measures to ensure the safety and security of the surrounding land and movable property of landowners; and the provision of access to a water source for livestock. The impact would be localised and of short-term duration and medium to high intensity prior to mitigation, with an associated significance rating of **low**.

#### Mitigation

- Include individual landowner request and prerequisites as part of the SANRAL land acquisition process formalising the temporary expropriation of borrowpit areas.
- Demarcate and fence off borrowpit areas in accordance with the Construction EMP.
- Implement measures regarding access control to private property and security in adjacent private properties in accordance with the Construction EMP.

Provided that the recommended mitigation measures are implemented, the significance rating of the impact would be contained to **VERY LOW** (see Table 17).

**Table 17: Impact table relating to the impairment of air quality: dust**

CRITERIA	WITHOUT MITIGATION	WITH MITIGATION
Extent	Local	Local
Duration	Short-term	Short-term
Intensity	Medium to high	Low
Probability	Highly probable	Highly probable
Confidence	High	High
Significance	<b>Low</b>	<b>VERY LOW</b>
Cumulative impact	None	None
<b>Nature of Cumulative impact</b>		
Nature of Cumulative impact	N/A	
Degree to which impact can be reversed	Fully reversible	
Degree to which impact may cause irreplaceable loss of resources	N/A	
Degree to which impact can be mitigated	Low	

### 2.2.4 AIR QUALITY IMPAIRMENT: DUST

### Description of impact

Construction activities, including borrowpit development would generate dust, which would impact negatively on local air quality. It could also increase road safety risks as a result of reduced visibility which would negatively affect traffic on this relatively busy regional route.

### Assessment

The impact would be of local extent. The intensity is rated as medium since only at one bridge site do local residents live in close proximity to the bridge, namely Bridge N38 at the western entrance to Calvinia. With short-term duration the significance of the impact is therefore considered to be **very low**.

### Mitigation

- Implement a dust control programme to minimize the generation of dust, including spraying water on exposed surfaces and roads whenever required.
- Ensure that exposed areas and material stockpiles are adequately protected against wind.

After implementation of the suggested mitigation measures, the significance rating of the impact would remain **VERY LOW** (see Table 18).

**Table 18: Impact table relating to the impairment of air quality: dust**

CRITERIA	WITHOUT MITIGATION	WITH MITIGATION
Extent	Local	Local
Duration	Short-term	Short-term
Intensity	Medium	Low
Probability	Highly probable	Highly probable
Confidence	High	High
Significance	<b>Very low</b>	<b>VERY LOW</b>
Cumulative impact	None	None
<b>Nature of Cumulative impact</b>		
Nature of Cumulative impact	N/A	
<b>Degree to which impact can be reversed</b>	Fully reversible	
<b>Degree to which impact may cause irreplaceable loss of resources</b>	N/A	
<b>Degree to which impact can be mitigated</b>	Low	

## 2.2.5 INCREASED NOISE LEVELS

### Description of impact

Construction activities (e.g. construction vehicles, excavators etc.) would increase noise levels during the construction phase, which could be a nuisance for road users and nearby residents.

### Assessment

The potential noise impact would be localised and of medium intensity since only at one bridge site do local residents live in close proximity to the bridge, namely Bridge N38 at the western entrance to Calvinia. With the short-term duration the impact is thus considered to have a **very low** significance.

### Mitigation

- Maintain all construction machinery and vehicles in good working order so that noise is minimized.
- Adhere to any regulations and local by-laws regarding the generation of noise and hours of operation.

This impact would be of **VERY LOW** significance if the suggested mitigation measures were to be implemented (see Table 19).

**Table 19: Impact table relating to the noise impact of construction activities**

CRITERIA	WITHOUT MITIGATION	WITH MITIGATION
Extent	Local	Local
Duration	Short-term	Short-term
Intensity	Medium	Low
Probability	Highly probable	Highly probable
Confidence	High	High
Significance	<b>Very low</b>	<b>VERY LOW</b>
Cumulative impact	None	None
Nature of Cumulative impact	N/A	
Degree to which impact can be reversed	Fully reversible	
Degree to which impact may cause irreplaceable loss of resources	N/A	
Degree to which impact can be mitigated	Low	

## 2.2.6 TRAFFIC FLOW DISRUPTIONS

### Description of impact

Traffic would be disrupted due to lane closure for limited periods during the construction phase. Traffic flow may also be disrupted in the area by heavy vehicles and construction machinery travelling towards and in the vicinity of the construction sites.

### Assessment

Traffic would be disrupted at each bridge site during the last phase of constructing the additional bridge deck sections when temporary stop/go traffic control would be implemented. This could result in the temporary increase in traffic congestion and safety risks. The movement of pedestrians and cyclists using the limited space on the existing bridges to cross the rivers may also be impeded by construction activities. The potential traffic flow impact would be of medium intensity, at a local level in the short-term and is thus considered to have a **very low** significance.

### Mitigation

- Display warning signs and traffic control notifications well in advance on either side of the construction activities.
- Make specific provision for safe passage of pedestrians and cyclists at bridge crossing points during the construction phase.

If the suggested mitigation measures are implemented this impact is assessed to be of **VERY LOW** significance (see Table 20).

**Table 20: Impact table relating to traffic flow disruptions**

CRITERIA	WITHOUT MITIGATION	WITH MITIGATION
Extent	Local	Local
Duration	Short-term	Short-term
Intensity	Medium	Low
Probability	Highly probable	Highly probable
Confidence	High	High
Significance	<b>Very low</b>	<b>VERY LOW</b>
Cumulative impact	None	None
<b>Nature of Cumulative impact</b>		
	N/A	
<b>Degree to which impact can be reversed</b>	Fully reversible	
<b>Degree to which impact may cause irreplaceable loss of resources</b>	N/A	
<b>Degree to which impact can be mitigated</b>	Low	

## 2.2.7 LOCAL ECONOMIC CONTRIBUTIONS

### Description of impact

The construction phase would result in a positive spending injection into the area that would lead to increased economic activity.

### Assessment

Construction expenditure related to the proposed project would bring a new investment in the order of R250 million to the area. The consequent increase in economic activity could be measured in terms of impacts on employment and associated incomes in the local area and the region. The construction phase would create approximately 90 temporary jobs per month available to the local population during the construction phase. This would be in addition to contributing to the maintenance of existing semi- and skilled jobs in the civil and other construction sectors in the region. Local SMME and BEE service providers would also be utilised for procurement of goods and service as far as possible. Further indirect opportunities may stem from expenditure by construction workers in the vicinity of the construction sites and in the local communities. The direct participation of the contractor and employees in the local economy for the duration of the contract would directly benefit the local economy.

These contributions to the local economy would result in a local, short-term impact of medium to high intensity, and is therefore considered to have a **low (positive)** significance.

### Mitigation

- Ensure maximum possible employment of local SMME and BEE service providers and local labour in line with SANRAL's standard procurement policy.
- Ensure appropriate training is provided, where necessary.
- Ensure that contractual requirements regarding local affirmative business enterprises are met.

With appropriate mitigation measures the significance of the impact would remain at **LOW (POSITIVE)** (see Table 21).

**Table 21: Impact table relating to local economic contributions**

CRITERIA	WITHOUT MITIGATION	WITH MITIGATION
Extent	Local	Local
Duration	Short-term	Short-term
Intensity	Low to medium	Medium
Probability	Probable	Probable
Confidence	High	High
Significance	<b>Very low (Positive)</b>	<b>VERY LOW (POSITIVE)</b>
Cumulative impact	None	None
<b>Nature of Cumulative impact</b>		
Nature of Cumulative impact	N/A	
Degree to which impact can be reversed	Fully reversible	
Degree to which impact may cause irreplaceable loss of resources	N/A	
Degree to which impact can be mitigated	Very low	

## 2.3 NO-GO ALTERNATIVE

### Description of impact

The No-go alternative of not strengthening Sections 7 and 8 of the R27 and not widening the bridges would continue to compromise the safety of the route and limit its carrying capacity in the longer term. Two main impacts result from this situation, namely road safety and cost to road users.

### Assessment

(1) Road safety: The impact on road safety for all road users of the continuation of the current sub-standard road conditions has been assessed as negative, of medium intensity at the local to regional level in the long term, with an associated significance rating of **medium to high**.

(2) Cost to road users: The impact of the sub-standard general operating standards of these sections of the R27 translate into increased cost to road users due to additional running and maintenance costs on their vehicles. The impact is considered to be of local to regional level and long-term duration. The intensity could vary depending on the condition of different vehicles, and is therefore assessed to range from low to medium. The significance of the impact is therefore rated as **medium to high**.

### Mitigation

In the absence of mitigation, i.e. if the proposed project is not implemented, the significance of the two main impacts would remain at **HIGH** (see Table 22).

**Table 22: Impact table relating to the impact of the No-go Alternative on road safety and cost to road users**

CRITERIA	Road safety	Cost to road users
	WITHOUT MITIGATION	WITHOUT MITIGATION
Extent	Local to regional	Local to regional
Duration	Long-term	Long-term
Intensity	Medium	Low to medium
Probability	Highly probable	Highly probable
Confidence	High	High

<b>Significance</b>	<b>Medium to high</b>	<b>Medium to high</b>
<b>Cumulative impact</b>	High	High
<b>Nature of Cumulative impact</b>		
	N/A	
<b>Degree to which impact can be reversed</b>	Fully reversible	
<b>Degree to which impact may cause irreplaceable loss of resources</b>	N/A	
<b>Degree to which impact can be mitigated</b>	Mitigation is possible in the form of implementation of the proposed project.	

### 3. ENVIRONMENTAL IMPACT STATEMENT

Taking the assessment of potential impacts into account, please provide an environmental impact statement that summarises the impact that the proposed activity and its alternatives may have on the environment after the management and mitigation of impacts have been taken into account, with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

The proposed project would result in a limited number of potential positive impacts during the operational phase of **LOW to MEDIUM** significance after mitigation. The direct operational phase impact on improved road safety for users and the indirect impact on tourism and regional economic development have been assessed as of **LOW (POSITIVE)** and **MEDIUM (POSITIVE)** significance, respectively. The project also holds the potential to rehabilitate lost vegetation in the road reserve during the operational phase. This would have an impact of **MEDIUM (POSITIVE)** significance on Niewoudtville-Roggeveld Dolerite Renosterveld and Niewoudtville Shale Renosterveld along the R27 Section 8, which is currently in a poor condition.

A key risk related to the project is damage to and/or loss of remaining areas of natural vegetation in the road reserve and at borrowpit sites as a result of construction activities. The significance of the potential loss of Bokkeveld Sandstone Fynbos and Hantam Karoo vegetation has been assessed as **Medium to High** without mitigation, but would be reduced to **LOW** if the recommended mitigation measures were to be consistently implemented. The protection of the natural vegetation during construction is therefore essential to avoid long-term negative consequences resulting from the proposed project.

Potential negative operational phase impacts of the proposed project have all been assessed as of **VERY LOW to LOW** significance after mitigation. These relate to two broad categories, namely:

- Heritage impacts, the most important of which is the impact on the built environment of the proposed modifications to Bridge NB38, which is older than 60 years; and
- Biophysical impacts associated with freshwater ecology and botany.

On balance, the benefit of the potential positive impacts of the operational phase for the local community and beyond is considered to outweigh the disadvantages of the potential negative impacts mostly associated with the changes to the cultural environment due to the alterations to the historical bridge. This is because the retention of the *status quo* is not considered a viable option for safety and road condition considerations.

Impacts associated with the construction phase are mostly negative. The nuisance value of some of these impacts may be experienced as high intensity in the immediate vicinity of the works at times, such as increased dust and noise levels. However, since all construction phase impacts would be localised and of short-term duration, the significance rating is **very low to low** in most cases prior to mitigation. With the implementation of the proposed mitigation measures the significance of the negative construction phase impacts would be contained to **VERY LOW to LOW**.



The impact of the construction phase activities on the local economy is assessed to be of **LOW (POSITIVE)** significance.

A summary of the overall project impacts is represented in Table 23.

**Table 23: Summary of overall project impacts**

<b>IMPACT</b>	<b>Significance Without Mitigation</b>	<b>Significance With Mitigation</b>
<b>OPERATIONAL PHASE IMPACTS</b>		
<b>Impacts related to freshwater ecology: Loss or modification of riparian habitat</b>	Very low	VERY LOW
<b>Botanical impacts:</b>	Low	VERY LOW
Loss of Bokkeveld Sandstone Fynbos along the R27 Section 7	High	LOW
Loss of Niewoudtville-Roggeveld Dolerite Renosterveld and Niewoudtville Shale Renosterveld along the R27 Section 8	Low	<b>MEDIUM (POSITIVE)</b>
Loss of Hantam Karoo vegetation along the R27 Section 8	High	LOW
Loss of Hantam Karoo vegetation as a result of borrowpit development	Medium	LOW
Loss of ecological processes	Low	LOW
<b>Heritage impacts:</b>		
Impact on the built environment of modifications to Bridge NB38	Medium	LOW
Impact on pre-colonial archaeology of borrowpit development	Low	LOW
<b>Road safety</b>	<i>Medium (positive)</i>	<b>MEDIUM (POSITIVE)</b>
<b>Tourism and regional economic impact</b>	<i>Low (positive)</i>	<b>LOW (POSITIVE)</b>
<b>CONSTRUCTION PHASE IMPACTS</b>		
<b>Impacts related to freshwater ecology:</b>		
Disturbance of riparian habitats	Very low	VERY LOW
Impedance of river flow	Very low	VERY LOW
Reduction of river water quality	Very low	VERY LOW
<b>Botanical impacts: Damage to or loss of vegetation along the R27 due to construction activities</b>	High	LOW
<b>Impacts associated with borrowpit development on affected landowners</b>	Low	VERY LOW
<b>Air quality impairment: Dust</b>	Very low	VERY LOW
<b>Increased noise levels</b>	Very low	VERY LOW
<b>Traffic flow disruptions</b>	Very low	VERY LOW
<b>Local economic contributions</b>	<i>Very low (positive)</i>	<b>VERY LOW (POSITIVE)</b>

## SECTION E. RECOMMENDATION OF PRACTITIONER

Is the information contained in this report and the documentation attached hereto sufficient to make a decision in respect of the activity applied for (in the view of the environmental assessment practitioner)?

YES ✓	NO
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If "NO", indicate the aspects that should be assessed further as part of a Scoping and EIA process before a decision can be made (list the aspects that require further assessment):

N/A

If "YES", please list any recommended conditions, including mitigation measures that should be considered for inclusion in any authorisation that may be granted by the competent authority in respect of the application:

1. The key mitigation measure is that construction should be managed through the effective implementation of the Construction Environmental Management Programme (EMP).
2. The following conditions are proposed with the purpose of mitigating the impact of modifications to Bridge NB38:
  - Ensure that the addition and modifications to Bridge NB38 adheres to the design style and characteristics of the existing arch bridge.
  - Change the fabric of the structure only where unavoidable.
  - Submit the detailed designs for the widening of Bridge NB38 to Heritage Northern Cape for approval by the Permit Committee of the Northern Cape Provincial Heritage Resources Council to ensure that the appropriate design solution for the proposed modifications is acceptable both from a heritage and an engineering perspective.
  - Commission a systematic recording of fabric of Bridge NB38 prior to alteration by means of measured drawings and a photographic survey.
  - Undertake a comprehensive photographic survey of the site before work commences and during construction to generate an archive of information.
  - Lodge a compact disc containing the above information with the Provincial Heritage Authority and SAHRA.
3. The following conditions are proposed with the purpose of mitigating the impact of borrowpit development on affected landowners:
  - Include individual landowner requests and prerequisites as part of the SANRAL land acquisition process formalising the temporary expropriation of borrowpit areas.
  - Demarcate and fence off borrowpit areas in accordance with the Construction EMP.
  - Implement measures regarding access control to private property and security in adjacent private properties in accordance with the Construction EMP.
4. The following mitigation measures have been incorporated into the Construction EMP:
  - Limit disturbance in the river channel and riparian zone as far as possible to ensure minimum disturbance of these areas.
  - Rehabilitate and revegetate disturbed areas within the riparian zone with suitable indigenous riparian vegetation as soon as possible after construction is complete.
  - If possible, construction should take place during the low rainfall months when runoff volumes will be low.
  - Minimise the duration and extent of construction activities in the rivers.
  - Clear rubble and waste material associated with the construction activities from the river and drainage channels.

- Divert run-off from construction sites through screens and off-channel retention ponds in order to prevent contaminated water from directly entering the stream.
  - Ensure that materials on the construction sites are appropriately stored and contained to prevent water pollution.
  - Manage waste disposal from the construction sites appropriately in order to prevent water pollution.
  - Provide ablution facilities for construction workers at the construction sites that are located away from the river system and regularly serviced.
  - Appoint a botanical specialist at the commencement of the construction period to identify any remaining areas/patches of natural vegetation in the road reserve along the R27 to be protected from damage due to construction activities.
  - Demarcate identified areas of remaining natural vegetation in the road reserve as No-go areas for the duration of the construction period.
  - Remove invasive alien plants and weedy species from the road reserve prior to construction to inhibit further spread of these species along the road as a result of construction activities.
  - Avoid causing any further disturbance of the vegetation within the road reserve in the zone between the verge and the boundary fences.
  - Where disturbance is unavoidable, identify and monitor these disturbed areas and earmark them for rehabilitation post-construction to enhance regeneration of the roadside vegetation.
  - Rehabilitate disturbed areas by collecting seed from plants in the same community in nearby undisturbed vegetation for sowing on disturbed areas. Hydroseeding using commercially available seed should be avoided.
  - Confine stockpiling of construction material to strictly demarcated areas such as at existing lay-bys to limit the distribution of this material in the road reserve.
  - Landscape excavated borrowpit slopes after removal of required material so that gradients are smooth to moderate in order to encourage active re-colonisation of the sites by the natural Hantam vegetation and limit erosion.
  - Prohibit construction crews from lighting any fires in the road reserve.
  - Implement an educational programme with the Contractor and workforce to impress upon them the importance of conserving remaining natural vegetation along the R27.
  - Implement a dust control programme to minimize the generation of dust, including spraying water on exposed surfaces and roads whenever required.
  - Ensure that exposed areas and material stockpiles are adequately protected against wind.
  - Maintain all construction machinery and vehicles in good working order so that noise is minimized.
  - Adhere to any regulations and local by-laws regarding the generation of noise and hours of operation.
  - Display warning signs and traffic control notifications well in advance on either side of the construction activities.
  - Make specific provision for safe passage of pedestrians and cyclists at bridge crossing points during the construction phase.
5. The following mitigation is proposed during the operational phase:
- Monitor disturbed areas at the bridge and borrowpit sites to prevent infestation by invasive alien plant growth after the construction phase is complete.
  - Revise management plans and procedures for the maintenance of the road reserve post-construction so as to minimise disturbance of vegetation in the road reserve.
  - These management plans and procedures should include the following aspect:
    - To actively control invasive alien plants and weedy species to prevent competition with more desirable species in the road reserve.
    - Restore and rehabilitate Nieuwoudtville-Roggeveld Dolerite Renosterveld and Nieuwoudtville Shale Renosterveld in the road reserve along the R27 Section 8.

Is an EMPr attached?

YES ✓	NO
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A copy of the Draft Construction Environmental Management Programme is attached as Appendix F.

**SECTION F: APPENDICES**

Appendix A: Site plan(s)

Appendix B: Photographs

Appendix C: Facility illustration(s)

Appendix D: Specialist reports

Appendix E: Comments and responses report

Appendix F: Draft Construction Environmental Management Programme (EMP)

Appendix G: Public participation information

Appendix H: Other information