



**BASIC ASSESSMENT PROCESS**  
for  
**THE PROPOSED CONSTRUCTION OF A BRIDGE BETWEEN SAGEWOOD AND LE  
ROUX STREET TO NOORDWYK IN MIDRAND, CITY OF JOHANNESBURG**

**DRAFT BASIC ASSESSMENT REPORT**

Public Review Period:  
**09 November 2018 to 10 December 2018**

**COMPILED BY:**  
Envirolution Consulting (Pty) Ltd  
PO Box 1898  
Sunninghill  
Tel: (0861)44 44 99  
Fax: (0861) 62 62 22  
E-mail: [info@envirolution.co.za](mailto:info@envirolution.co.za)  
Website: [www.envirolution.co.za](http://www.envirolution.co.za)

**PREPARED FOR:**  
Johannesburg Roads Agency (Pty) Ltd  
Private Bag X70  
Braamfontein  
2017  
Tel: 011 298 5099  
Fax: 086 216 0408

**COPYRIGHT WARNING**

With very few exceptions the copyright of all text and presented information is the exclusive property of Envirolution Consulting (Pty) Ltd. It is a criminal offence to reproduce and/or use, without written consent, any information, technical procedure and/or technique contained in this document. Criminal and civil proceedings will be taken as a matter of strict routine against any person and/or institution infringing the copyright of Envirolution Consulting (Pty) Ltd.



Basic Assessment Report in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended, and the Environmental Impact Assessment Regulations, 2014 (Version 1)

---

**Kindly note that:**

1. This **Basic Assessment Report** is the standard report required by GDARD in terms of the EIA Regulations, 2014.
  2. This application form is current as of 8 December 2014. It is the responsibility of the EAP to ascertain whether subsequent versions of the form have been published or produced by the competent authority.
  3. A draft Basic Assessment Report must be submitted, for purposes of comments within a period of thirty (30) days, to all State Departments administering a law relating to a matter likely to be affected by the activity to be undertaken.
  4. A draft Basic Assessment Report (1 hard copy and two CD's) must be submitted, for purposes of comments within a period of thirty (30) days, to a Competent Authority empowered in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended to consider and decide on the application.
  5. Five (5) copies (3 hard copies and 2 CDs-PDF) of the final report and attachments must be handed in at offices of the relevant competent authority, as detailed below.
  6. The report must be typed within the spaces provided in the form. The size of the spaces provided is not necessarily indicative of the amount of information to be provided. The report is in the form of a table that can extend itself as each space is filled with typing.
  7. Selected boxes must be indicated by a cross and, when the form is completed electronically, must also be highlighted.
  8. An incomplete report may lead to an application for environmental authorisation being refused.
  9. **Any report that does not contain a titled and dated full colour large scale layout plan of the proposed activities including a coherent legend, overlain with the sensitivities found on site may lead to an application for environmental authorisation being refused.**
  10. The use of "not applicable" in the report must be done with circumspection because if it is used in respect of material information that is required by the competent authority for assessing the application, it may result in the application for environmental authorisation being refused.
  11. No faxed or e-mailed reports will be accepted. Only hand delivered or posted applications will be accepted.
  12. Unless protected by law, and clearly indicated as such, all information filled in on this application will become public information on receipt by the competent authority. The applicant/EAP must provide any interested and affected party with the information contained in this application on request, during any stage of the application process.
  13. Although pre-application meeting with the Competent Authority is optional, applicants are advised to have these meetings prior to submission of application to seek guidance from the Competent Authority.
-

**DEPARTMENTAL DETAILS**

Gauteng Department of Agriculture and Rural Development  
Attention: Administrative Unit of the of the Environmental Affairs Branch  
P.O. Box 8769  
Johannesburg  
2000

Administrative Unit of the of the Environmental Affairs Branch  
Ground floor Diamond Building  
11 Diagonal Street, Johannesburg

Administrative Unit telephone number: (011) 240 3377  
Department central telephone number: (011) 240 2500

(For official use only)

NEAS Reference Number:						
File Reference Number:						
Application Number:						
Date Received:						

If  
this  
BAR  
has  
not

been submitted within 90 days of receipt of the application by the competent authority and permission was not requested to submit within 140 days, please indicate the reasons for not submitting within time frame.

**Not Applicable**

Is a closure plan applicable for this application and has it been included in this report?

**No**

if not, state reasons for not including the closure plan.

**There are currently no plans to decommission**

Has a draft report for this application been submitted to a competent authority and all State Departments administering a law relating to a matter likely to be affected as a result of this activity?

**No**

Is a list of the State Departments referred to above attached to this report including their full contact details and contact person?

**Yes**

**Refer to Appendix E9 – IAP Register**

If no, state reasons for not attaching the list.

**Not Applicable**

Have State Departments including the competent authority commented?

**N/A**

If no, why?

**This information will be available after DBAR has been reviewed**

## PROJECT DETAILS

---

<b>Reference #:</b>	Not yet assigned
<b>Title:</b>	Environmental Impact Assessment Process The proposed construction of a Bridge between Sagewood and Le Roux Street to Noordwyk in Midrand, City of Johannesburg, Gauteng Province
<b>Report compiled by:</b>	Company Name: Envirolution Consulting Contact person: Ms Sheila Bolingo Postal Address: P.O. Box 1898, Sunninghill, 2157 Telephone Number: 0861 44 44 99 Fax Number: 0861 62 62 22 Email: sheila@envirolution.co.za
<b>Client</b>	: Johannesburg Roads Agency (JRA)
<b>Report Status</b>	: Draft Basic Assessment Report for Public Review
<b>Review period</b>	<b>The 30-day period for review is from</b> <b>09 November 2018 to 10 December 2018</b>

**TABLE OF CONTENTS**

PROJECT DETAILS .....	1
TABLE OF CONTENTS .....	2
LIST OF APPENDICES:.....	3
PUBLIC REVIEW OF THE DRAFT BASIC ASSESSMENT REPORT .....	4
EXECUTIVE SUMMARY.....	5
<b>SECTION A: ACTIVITY INFORMATION .....</b>	<b>6</b>
1. PROPOSAL OR DEVELOPMENT DESCRIPTION.....	6
2. APPLICABLE LEGISLATION, POLICIES AND / OR GUIDELINES.....	11
3. ALTERNATIVES.....	15
4. PHYSICAL SIZE OF THE ACTIVITY .....	17
5. SITE ACCESS.....	18
6. LAYOUT OR ROUTE PLAN.....	19
7. SITE PHOTOGRAPHS.....	20
8. FACILITY ILLUSTRATION.....	20
<b>SECTION B: DESCRIPTION OF RECEIVING ENVIRONMENT .....</b>	<b>21</b>
1. PROPERTY DESCRIPTION .....	22
2. ACTIVITY POSITION .....	22
3. GRADIENT OF THE SITE .....	23
4. LOCATION IN LANDSCAPE.....	23
5. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE .....	23
6. AGRICULTURE .....	28
7. GROUNDCOVER .....	28
8. LAND USE CHARACTER OF SURROUNDING AREA.....	38
9. SOCIO-ECONOMIC CONTEXT .....	39
10. CULTURAL/HISTORICAL FEATURES .....	41
<b>SECTION C: PUBLIC PARTICIPATION (SECTION 41) .....</b>	<b>42</b>
1. THE ENVIRONMENTAL ASSESSMENT PRACTITIONER MUST CONDUCT PUBLIC PARTICIPATION PROCESS IN ACCORDANCE WITH THE REQUIREMENT OF THE EIA REGULATIONS, 2014. ....	42
2. LOCAL AUTHORITY PARTICIPATION.....	42
3. CONSULTATION WITH OTHER STAKEHOLDERS.....	42
4. GENERAL PUBLIC PARTICIPATION REQUIREMENTS.....	43
5. APPENDICES FOR PUBLIC PARTICIPATION.....	43
<b>SECTION D: RESOURCE USE AND PROCESS DETAILS .....</b>	<b>44</b>
1. WASTE, EFFLUENT, AND EMISSION MANAGEMENT .....	44
2. WATER USE .....	46
3. POWER SUPPLY .....	46
4. ENERGY EFFICIENCY .....	47
<b>SECTION E: IMPACT ASSESSMENT .....</b>	<b>48</b>
1. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES .....	48
2. IMPACTS THAT MAY RESULT FROM THE CONSTRUCTION AND OPERATIONAL PHASE ....	48
2.1 IMPACTS THAT MAY RESULT FROM THE CONSTRUCTION PHASE.....	51
2.2 IMPACTS THAT MAY RESULT FROM THE OPERATION PHASE.....	67
2.3 NO GO OPTION.....	83
3. IMPACTS THAT MAY RESULT FROM THE DECOMMISSIONING AND CLOSURE PHASE.....	85
4. CUMULATIVE IMPACTS.....	86
5. ENVIRONMENTAL IMPACT STATEMENT .....	87
6. IMPACT SUMMARY OF THE PROPOSAL AND ALTERNATIVE .....	89

7. SPATIAL DEVELOPMENT TOOLS .....	92
8. RECOMMENDATION OF THE PRACTITIONER .....	93
9. THE NEEDS AND DESIREABILITY OF THE PROPOSED DEVELOPMENT .....	94
10. THE PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED .....	94
11. THE PERIOD ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR).....	95
<b>SECTION F: APPENDICES.....</b>	<b>96</b>

## **LIST OF APPENDICES:**

---

### **Appendix A: Site plan(s)**

- Appendix A1: Locality Map
- Appendix A2: Sensitivity Maps

### **Appendix B: Site Photographs**

### **Appendix C: Facility illustration(s)**

- Appendix C1: Proposed Bridge Designs
- Appendix C2: Route Alternative Designs

### **Appendix D: Route position information**

### **Appendix E: Public participation information**

- Appendix E1: Proof of site notice
- Appendix E2a: Written Notification to I&APs
- Appendix E2b - Written Notification to Organs of States
- Appendix E3: Newspaper advertisements
- Appendix E4: Correspondences with I&APs
- Appendix E5: Minutes of any public and/or stakeholder meetings
- Appendix E6 - Comments and Responses Report
- Appendix E7: Comments from I&APs on Draft Basic Assessment (BA) Report
- Appendix E8: Comments from I&APs on amendments to the BA Report (N/A)
- Appendix E9: Registered I&APs Database

### **Appendix F: Water use license(s) authorisation, SAHRA information, service letters from municipalities, water supply information**

### **Appendix G: Specialist reports**

- Appendix G1:Vegetation Report
- Appendix G2: Fauna Report
- Appendix G3: Wetland Assessment Report
- Appendix G4: Wetland Rehabilitation Plans
- Appendix G5: Heritage Report

### **Appendix H: EMPr**

### **Appendix I: Other information**

- Appendix I1: EAP CVs and Declaration
- Appendix I2: Preliminary Design Report
- Appendix I3: Hydraulic and Hydrology Analysis Report

## **PUBLIC REVIEW OF THE DRAFT BASIC ASSESSMENT REPORT**

---

The Draft Basic Assessment Report (BAR) has been prepared by Envirolution Consulting (Pty) Ltd in order to assess the potential environmental impacts associated with the proposed Bridge between Sagewood and Le Roux Street to Noordwyk in Midrand,. The report is made available for public review for 30-day review period from **09 November 2018 to 10 December 2018** at the following places:

- Halfway House Library

In order to obtain further information, register on the project database or submit your written comment to:

### **Environmental Assessment Practitioner**

Name: Sheila Bolingo  
Physical Address: Vista Place, Suite 1a & 2, No 52,  
Cnr Vorster Avenue & Glen Avenue,  
Glenanda  
Postal Address: PO Box 1898, Sunninghill, 2157  
Telephone Number: (0861) 44 44 99  
Fax Number: (0861) 62 62 22  
E-mail: [sheila@envirolution.co.za](mailto:sheila@envirolution.co.za)

**The due date for comments on the Draft Basic Assessment Report is 10 December 2018**



## EXECUTIVE SUMMARY

---

**Johannesburg Roads Agency (JRA)** proposes the construction of a bridge between Sagewood and Le Roux Street to Noordwyk in Midrand within the City of Johannesburg, Gauteng Province. There is currently no road or bridge along the proposed route which is currently used as a pedestrian access route by the community and a majority of learners from Noordwyk Secondary and Sagewood College. This route is currently not safe as it is a low-lying area and has on occasion flooded with fast moving water streams in some areas. This poses a danger to the community and learners in particular. Hence the JRA has allocated funds for planning, design and construction monitoring of a proposed bridge to cross between Sagewood and Le Roux Street to Noordwyk.

Public participation has been conducted in line with the NEMA requirements; engagement through public meetings, site notices, newspaper advert and email correspondence with authorities and interested and affected members from the community.

Based on the findings of this Basic Assessment Report, no environmental fatal flaws were identified to be associated with any of the three alternative routes proposed for the construction of a bridge and road. Table 10 gives an overall summary of comparative assessment undertaken for the alternative routes in order of preference.

Alternative 3 would be more favourable environmentally as this will have the least impact on the ecology in terms of wetland and vegetation with the least distance through the Rietspruit and associated moist grasslands, while also following the current compacted footpaths through the Rietspruit. It is assumed that the shorter the distance of the route, the shorter the time frame that construction related impacts will last. However from a technical and social perspective Alternative 2 is the preferred option as, this will run parallel to the property boundary avoiding cutting the affected property into two pieces, which would not be acceptable by the landowner and following the property boundary is negotiable.

Based on the above, the types of impacts that should be avoided would be those that cannot be mitigated with good result. Usually this would be the visual impacts and the heritage. Sensitive ecological features such as vegetation and fauna habitats could be avoided during the detail design phase of the project, by careful placing of footprints and following the measures contained in the EMPr. Environmentally, Alternative 3 is preferred however technically Alternative 2 is preferred. For this reason it is believed that the alternative with the least impacts socially would be the best option, in this case Alternative 2 is therefore the best option, carefully design of the alignment and the bridge with special precautions as recommended by the various specialists is required. It is noted, however, that the selection of the technically preferred route alternative will be incumbent on JRA.

Cognisant of the above-mentioned conclusions established through the basic assessment investigation, there were areas of environmental sensitivity identified along the recommended route. These include areas such as sensitive vegetation (i.e. protected plants) & watercourses, these are shown in the environmental sensitivity map (refer to appendix A). The significance levels of the majority of identified negative impacts for all alternatives investigated can generally be reduced to acceptable levels thus, the proposed developments could proceed provided that the mitigation measures set out in this report and in the EMPr are diligently implemented to limit the potential impacts on vegetation, watercourses and social during construction and operation of the developments.

Through the implementation of the EMPr (Appendix H) and the Rehabilitation Plans (Appendix G4), impacts on these sensitive areas can be mitigated to acceptable levels. .

## SECTION A: ACTIVITY INFORMATION

### 1. PROPOSAL OR DEVELOPMENT DESCRIPTION

#### Project title (must be the same name as per application form):

##### 1.1 Project Title

THE PROPOSED CONSTRUCTION OF A BRIDGE BETWEEN SAGEWOOD AND LE ROUX STREET TO NOORDWYK IN MIDRAND, CITY OF JOHANNESBURG, GAUTENG PROVINCE

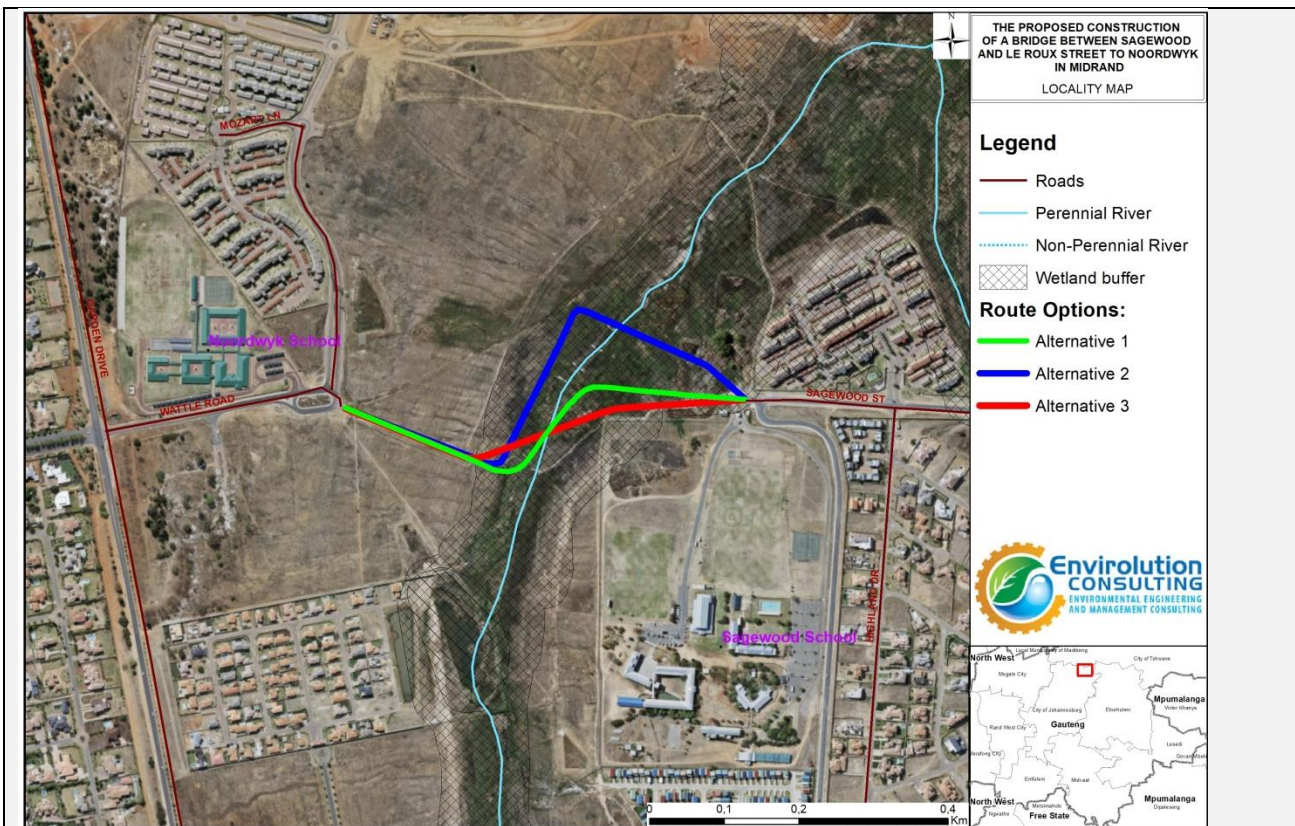
##### 1.2 Project Background

**Johannesburg Roads Agency (JRA)** proposes the construction of a bridge between Sagewood and Le Roux Street to Noordwyk in Midrand within the City of Johannesburg, Gauteng Province (**Figure 1**). JRA appointed ASD Consulting Engineers on to provide professional engineering services for the preliminary investigation and detailed design of Sagewood and Le Roux Street Bridge.

There is currently no road or bridge along the proposed route which is currently used as a pedestrian access route by the community and a majority of learners from Noordwyk Secondary and Sagewood College. The crossing (bridge) comprises of 1m wide gabion mattress filled with stone. The crossing has been severely affected by flooding in the past which has compromised its functional capabilities. This route is currently not safe as it is a low-lying area and has on occasion flooded with fast moving water streams in some areas. This poses a danger to the community and learners in particular. Hence the JRA has allocated funds for planning, design and construction monitoring of a proposed bridge to cross between Sagewood and Le Roux Street to Noordwyk.

##### 1.3 Project Description

Topographical survey, hydrology and hydraulic test analysis of the area were conducted successfully. Based on information collected **three (3) alternative routes** as shown in, Figure 1 **are proposed** with **three (3)** bridge structure options to provide crossing between Sagewood and Le Roux street to Noordwyk.



**Figure 1:** Locality Map showing the proposed routes alternatives for the road/bridge crossing. (Refer to **Appendix A** for A3 maps).

#### 1.4 Requirement for a Basic Assessment Process

In terms of sections 24(2) and 24D of the National Environmental Management Act (Act No. 107 of 1998), as read with the Environmental Impact Assessment (EIA) Regulations of GNR 982 to R985 (as amended 07 April 2017 (GNR 326)), a Basic Assessment process is required for the proposed project. **Table 1** contains the listed activities in terms of the EIA Regulations and includes a description of those project activities which relate to the applicable listed activities.

**Table 1:** Listed Activities Applicable applied for to be authorise

Listed activities	Description of project activity that triggers listed activity
<p><b>Activity 12 of GNR R.983</b> The development of (ii) infrastructure or structures with a physical footprint of 100 square meters or more where such development occurs where such development occurs— (a) Within a watercourse;</p>	<p>The proposed bridge/culvert which does not impede flow or natural functioning of the watercourse will be constructed within the watercourse</p>
<p><b>Activity 19 of Listing Notice (LN) 1 of GNR 983</b> The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of</p>	<p>The proposed project will result in infilling and depositing of more than 10m<sup>3</sup> into a watercourse. In addition the excavation and removal of soil materials of more than 10</p>

<p>soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse</p>	<p>m<sup>3</sup> from a watercourse will take place during the construction of the road structure.</p>
<p><b>Activity 27 of GNR R.983</b> The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation.</p>	<p>The clearance of an area of approximately 2 hectares of indigenous vegetation is required for the proposed road</p>
<p><b>Activity 4 of Listing Notice (LN) 3 of GNR 985</b>  The development of a road wider than 4 metres with a reserve less than 13,5 metres</p> <p><b>c) In Gauteng:</b></p> <ul style="list-style-type: none"> <li>iv. sites identified as Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) Gauteng Conservation Plan or in bioregional plans;</li> <li>v. sites identified within threatened ecosystems listed in terms of the National Environmental Management Act: Biodiversity Act (Act No. 10 of 2004);</li> <li>vi. sensitive areas identified in an environmental management framework adopted by relevant environmental body</li> </ul>	<p>The project will entail the construction of a road of 6-9m wide with a reserve of 16 - 30m in areas falling within an area defined as a CBA.</p>
<p><b>Activity 12 of GNR R.985:</b> The clearance of an area of 300 square metres or more of indigenous vegetation</p> <p><b>(b) In Gauteng:</b></p> <ul style="list-style-type: none"> <li>i. Within any critically endangered or <b>endangered ecosystem listed in terms of section 52 of the NEMBA</b> or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;</li> <li>ii. Within Critical Biodiversity Areas or Ecological Support Areas identified in the Gauteng Conservation Plan or bioregional plans; or</li> </ul>	<p>The clearance of an area of 2 hectares of indigenous vegetation is required for the proposed road within endangered ecosystem listed in terms of section 52 of the NEMBA and Critical Biodiversity Areas /Ecological Support Areas identified in the Gauteng Conservation Plan.</p>
<p><b>Activity 14 of Listing Notice (LN) 3 of GNR 985</b>  The development of:– (ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs – a) within a watercourse;</p> <p><b>c) In Gauteng:</b></p> <ul style="list-style-type: none"> <li>iv. sites identified as Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) Gauteng Conservation Plan or in bioregional plans;</li> <li>v. sites identified within threatened ecosystems listed in terms of the National Environmental Management Act: Biodiversity Act (Act No. 10 of 2004);</li> </ul>	<p>The proposed project will result in the construction of bulk storm water outlet structures each with a physical footprint of approximately ±20 square metres within a watercourse on areas identified as Important and Ecological Support Area by the Gauteng Conservation Plan.</p>

vi. sensitive areas identified in an environmental management framework adopted by relevant environmental body	
--	--

The above listed activities have triggered a Basic Assessment Process, these activities may not commence without an environmental authorization from the competent Authority. The aim of the Environmental Impact Assessment is to ensure that:

- The potential environmental impacts and risks associated with the proposed project are taken into consideration
- Public Participation Process is conducted i.e. to afford any Interested and or Affected parties (I&AP) sufficient opportunity: to provide comments
- Sufficient information is provided to decision markers in order to ensure an informed decision making.

The nature and extent of the proposed project are explored in more detail in this Basic Assessment Report. This report has been compiled in accordance with the requirements of the EIA Regulations and includes details of the activity description; the site, area and property description; the public participation process; the impact assessment; and the recommendations of the Environmental Assessment Practitioner.

### 1.5 Details of Environmental Assessment Practitioner and Expertise to conduct the Basic Assessment

**Envirolution Consulting** was appointed by ASD Consulting Engineers on behalf of JRA to undertake a Basic Assessment process and Water Use License for the proposed project. Furthermore, Envirolution Consulting does not have any interests in secondary developments that may arise out of the authorisation of the proposed project. Envirolution Consulting is a specialist environmental consulting company providing holistic environmental management services, including environmental impact assessments and planning to ensure compliance with environmental legislation and evaluate the risk of development; and the development and implementation of environmental management tools Envirolution Consulting benefits from the pooled resources, diverse skills and experience in environmental field held by its team. We offer solutions to environmental issues that are key during our clients' planning and decision-making processes. The Envirolution Consulting team have considerable experience in environmental impact assessments and environmental management, and have been actively involved in undertaking environmental studies, for a wide variety of projects in South Africa, including those associated with linear developments.

The EAPs from Envirolution Consulting who are responsible for this project are (refer to **Appendix I** for CV's):

- Cheda Sheila Bolingo, the principle author of this Basic Assessment holds an Msc degree in Environmental Management with 7 years of experience in the consulting field. Her key focus areas are on strategic environmental assessment and advice on environmental impact assessments; public participation; environmental management programmes, and mapping through ArcGIS for variety of environmental projects. She is currently involved in several diverse projects across the country.
- Gesan Govender, the project manager and Environmental Assessment Practitioner (EAP) responsible for this project, is a registered Professional Natural Scientist and holds an Honours degree in Botany. He has over 15

years of experience within the field of environmental management. His key focus is on strategic environmental assessment and advice; management and co-ordination of environmental projects, which includes integration of environmental studies and environmental processes into larger engineering-based projects and ensuring compliance to legislation and guidelines; compliance reporting; the identification of environmental management solutions and mitigation/risk minimising measures; and strategy and guideline development. He is currently responsible for the project management of EIA's for several diverse projects across the country.

Select the appropriate box

The application is for an upgrade of an existing development       The application is for a new development       Other, specify

Does the activity also require any authorisation other than NEMA EIA authorisation?

YES

If yes, describe the legislation and the Competent Authority administering such legislation

The proposed road and bridge is will be constructed in low lying area prone to flooding within the watercourse. It is for such reasons that a Water Use License has to be undertaken for the development. According to the National Water Act (NWA), 1998 (Act No.36 of 1998), the proposed development requires a Water Use License as per the following regulations:

- Section 21(c): impeding or diverting the flow of water in a watercourse and;
- Section 21 (i): altering the bed, banks, course or characteristics of a watercourse.

If yes, have you applied for the authorisation(s)?

YES

NO

If yes, have you received approval(s)? (attach in appropriate appendix)

Impacts on the watercourse have been assessed through the BA process (**Appendix G3 - Wetland Report**) for the infrastructure. The following reports / studies as outlined below will be required to be attached to the water use license application forms which will be submitted to the competent authority the Department of Water and Sanitation following the decision of the Basic Assessment Process by the Competent Authority GDARD.

- Basic Assessment Report
- Environmental authorization from GDARD once issued
- Wetland Assessment Specialist Study and Rehabilitation Plan

Note that timeframes for obtaining a WUL from DWS is not specified in the GDARD.

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

**Table 2:** List all legislation, policies and/or guidelines of any sphere of government that are applicable to the application as contemplated in the EIA regulations:

<u>Title of legislation, policy or guideline (Promulgation Date)</u>	<u>Applicable Requirements</u>	<u>Administering Authority</u>	<u>Description of compliance</u>
<b>National</b>			
National Environmental Management Act (Act No. 107 of 1998)	<ul style="list-style-type: none"> <li>• NEMA requires, inter alia, that:               <ul style="list-style-type: none"> <li>* Development must be socially, environmentally, and economically sustainable.”</li> <li>* Disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied.”</li> <li>* A risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions.”</li> </ul> </li> <li>• EIA Regulations have been promulgated in terms of Chapter 5. Activities which may not commence without an environmental authorisation are identified within these Regulations.</li> <li>• In terms of S24(1) of NEMA, the potential impact on the environment associated with these listed activities must be considered, investigated, assessed and reported on to the competent authority charged by NEMA with granting of the relevant environmental authorisation.</li> </ul>	<ul style="list-style-type: none"> <li>» National Department of Environmental Affairs</li> <li>» Gauteng Department of Agriculture and Resource Development</li> </ul>	<ul style="list-style-type: none"> <li>• In terms of sections 24(2) and 24D of the National Environmental Management Act (No 107 of 1998), as read with the EIA Regulations 2014 of GN R983 and R985; a Basic Assessment process is required to be undertaken for the proposed project.</li> </ul>
National Environmental Management Act (Act No. 107 of 1998)	<ul style="list-style-type: none"> <li>• A project proponent is required to consider a project holistically and to consider the cumulative effect of potential impacts.</li> </ul>	<ul style="list-style-type: none"> <li>» National Department of Environmental Affairs</li> <li>» Gauteng Department of Agriculture</li> </ul>	<ul style="list-style-type: none"> <li>• While no permitting or licensing requirements arise directly, the holistic consideration of the potential impacts of the</li> </ul>

Title of legislation, policy or guideline (Promulgation Date)	Applicable Requirements	Administering Authority	Description of compliance
	<ul style="list-style-type: none"> <li>In terms of the Duty of Care provision in S28(1) the project proponent must ensure that reasonable measures are taken throughout the life cycle of this project to ensure that any pollution or degradation of the environment associated with a project is avoided, stopped or minimised.</li> </ul>	and Resource Development	<p>proposed project has found application in the EIA Phase.</p> <ul style="list-style-type: none"> <li>The implementation of mitigation measures are included as part of the Draft EMPr and will continue to apply throughout the life cycle of the project.</li> </ul>
National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)	<ul style="list-style-type: none"> <li>The Minister may by notice in the Gazette publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment.</li> <li>In terms of the regulations published in terms of this Act (GN 921 of November 2013), a Basic Assessment or Environmental Impact Assessment is required to be undertaken for identified listed activities.</li> <li>Any person who stores waste must at least take steps, unless otherwise provided by this Act, to ensure that               <ol style="list-style-type: none"> <li>The containers in which any waste is stored, are intact and not corroded or in any other way rendered unfit for the safe storage of waste;</li> <li>Adequate measures are taken to prevent accidental spillage or leaking;</li> <li>The waste cannot be blown away;</li> <li>Nuisances such as odour, visual impacts and breeding of vectors do not arise; and</li> <li>Pollution of the environment and harm to health are prevented.</li> </ol> </li> </ul>	<ul style="list-style-type: none"> <li>» National Department of Environmental Affairs (hazardous waste)</li> <li>» Gauteng Department of Agriculture and Resource Development (general waste)</li> </ul>	<ul style="list-style-type: none"> <li>In terms of GNR921, no waste license is required for the project</li> <li>Waste handling, storage and disposal during construction and operation is required to be undertaken in accordance with the requirements of this Act, as detailed in the applicable EMPr, as well as in accordance with the relevant Norms and Standards.</li> </ul>
National Environmental Management: Air Quality Act (Act No. 39 of 2004)	<ul style="list-style-type: none"> <li>S18, S19 and S20 of the Act allow certain areas to be declared and managed as "priority areas".</li> <li>Dust control regulations promulgated in November 2013 may require the implementation of a dust management plan.</li> </ul>	<ul style="list-style-type: none"> <li>» National Department of Environmental Affairs</li> <li>» City of Ekurhuleni</li> </ul>	<ul style="list-style-type: none"> <li>Reporting in terms of compliance to GNR831 will be required.</li> <li>While no permitting or licensing requirements arise from this legislation, this Act will find application during the</li> </ul>



Title of legislation, policy or guideline (Promulgation Date)	Applicable Requirements	Administering Authority	Description of compliance
			construction phase of the project. The Air Emissions Authority (AEL) may require the compilation of a dust management plan.
National Water Act (Act No. 36 of 1998)	<ul style="list-style-type: none"> <li>• Under S21 of the Act, water uses must be licensed unless such water use falls into one of the categories listed in S22 of the Act or falls under the general authorisation.</li> <li>• In terms of S19, the project proponent must ensure that reasonable measures are taken throughout the life cycle of this project to prevent and remedy the effects of pollution to water resources from occurring, continuing, or recurring.</li> </ul>	<ul style="list-style-type: none"> <li>» National Department of Water Affairs</li> <li>» Gauteng Department of Agriculture and Resource Development</li> </ul>	<p>The proposed development requires a Water Use License as per the following regulations:</p> <ul style="list-style-type: none"> <li>• Section 21(c): impeding or diverting the flow of water in a watercourse and;</li> <li>• Section 21 (i): altering the bed, banks, course or characteristics of a watercourse.</li> <li>• Requirements set by S19 will apply throughout the life-cycle of the project.</li> </ul>
Environment Conservation Act (Act No. 73 of 1989)	<ul style="list-style-type: none"> <li>• National Noise Control Regulations (GN R154 dated 10 January 1992)</li> </ul>	<ul style="list-style-type: none"> <li>» National Department of Environmental Affairs</li> <li>» Gauteng Department of Agriculture and Resource Development</li> <li>» Local Authorities</li> </ul>	There is no requirement for a noise permit in terms of the legislation.
National Heritage Resources Act (Act No. 25 of 1999)	<ul style="list-style-type: none"> <li>• S38 states that Heritage Impact Assessments (HIAs) are required for certain kinds of development including: <ul style="list-style-type: none"> <li>* The construction of a road, powerline, pipeline, canal or other similar linear development or barrier exceeding 300 m in length;</li> <li>* Any development or other activity which will change the character of a site exceeding 5 000 m<sup>2</sup> in extent</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>» South African Heritage Resources Agency</li> </ul>	<ul style="list-style-type: none"> <li>• The proposed development does not exceed 5 000 m<sup>2</sup> in extent</li> <li>• A Heritage Assessment has been undertaken as part of this Basic Assessment (refer to <b>Appendix G5</b>).</li> <li>• Due to the density of the urban development in the region, it is very unlikely that any sites or features dating to the pre-colonial history of the region would still exist in the study area. However, isolated objects such as Stone Age artefacts might be exposed in areas close to stream beds.</li> </ul>
National Environment Management	<ul style="list-style-type: none"> <li>• Wetlands and other critical Biodiversity areas are</li> </ul>	<ul style="list-style-type: none"> <li>» National Department of</li> </ul>	<ul style="list-style-type: none"> <li>• No permitting requirements were triggered</li> </ul>

Title of legislation, policy or guideline (Promulgation Date)	Applicable Requirements	Administering Authority	Description of compliance
Protected Areas Act, 2003 (Act No. 57 of 2003).	regulated under the NEM:BA. Activities that fall within the parameters of these areas require specialist assessment to determine the impacts and the residual effects of mitigation measures	Environmental Affairs	by the activities.
Conservation of Agricultural Resources Act (Act No 43 of 1983).	<p>Regulation 15 of GNR1048 provides for the declaration of weeds and invader plants, and these are set out in Table 3 of GNR1048. Declared Weeds and Invaders in South Africa are categorised according to one of the following categories:</p> <ul style="list-style-type: none"> <li>• <u>Category 1 plants</u>: are prohibited and must be controlled.</li> <li>• <u>Category 2 plants</u>: (commercially used plants) may be grown in demarcated areas providing that there is a permit and that steps are taken to prevent their spread.</li> <li>• <u>Category 3 plants</u>: (ornamentally used plants) may no longer be planted; existing plants may remain, as long as all reasonable steps are taken to prevent the spreading thereof, except within the floodline of watercourses and wetlands.</li> </ul>	» Department of Agriculture, Forestry and Fisheries (DAFF)	<ul style="list-style-type: none"> <li>• An alien species management plan to be included in the requirements of the EMPr.</li> </ul>
Occupational Health and Safety Act (No 85 of 1993)	The Act provides for the health and safety of persons at work and for the health and safety of persons in connection with the use of machinery; the protection of persons other than persons at work, against hazards to health and safety arising out of or in connection with the activities of persons at work.	» Department of Labour	<ul style="list-style-type: none"> <li>• The EMPr provides for measures to ensure that objectives of the Act are met on this site</li> </ul>

### 3. ALTERNATIVES

Describe the proposal and alternatives that are considered in this application. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity could be accomplished. The determination of whether the site or activity (including different processes etc.) or both is appropriate needs to be informed by the specific circumstances of the activity and its environment.

The no-go option must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed. **Do not include the no go option into the alternative table below.**

**Note:** After receipt of this report the competent authority may also request the applicant to assess additional alternatives that could possibly accomplish the purpose and need of the proposed activity if it is clear that realistic alternatives have not been considered to a reasonable extent.

Please describe the process followed to reach (decide on) the list of alternatives below

Provide a description of the alternatives considered

**Table 3:** Description of the alternatives considered

Alternative type, either alternative: site on property, properties, activity, design, technology, energy, operational or other(provide details of "other")	Description
<b>SITE ALTERNATIVES</b>	<p>No site alternatives have been investigated for the proposed development for the following reasons:</p> <p>The crossing has been severely affected by flooding in the past which has compromised its functional capabilities. This route is currently not safe as it is a low-lying area and has on occasion flooded with fast moving water streams in some areas. This poses a danger to the community and learners in particular. Hence the JRA has allocated funds for planning, design and construction monitoring of a proposed bridge to cross between Sagewood and Le Roux Street to Noordwyk.</p> <p>Thus the identified site is the <b><u>only one site is deemed feasible</u></b> and practicable for the proposed development</p>

<p><b>ROUTE ALTERNATIVES</b></p>	<p><b>Route alternative 1</b></p> <p>From Noordwyk school travels on and existing servitude between property/parcel 913/405 and 914/405. Extends through 637/405 and turns North East to meet a parallel line extension from Sagewood road. This route is about approx. 620m in length</p> <p><b>Route alternative 2</b></p> <p>From Noordwyk school travels on an existing servitude (between property/parcel 913/405 and 914/405). The route turns North (left) at the boundary of property 913/405 following the division of 637/405 &amp; 913/405. Avoids intrusion in to 637/405 however the edge of the properties will be affected. This route is about approx. 720m in length</p> <p><b>Route alternative 3</b></p> <p>From Noordwyk school travels on an existing servitude between property/parcel 913/405 and 914/405. Extends through 637/405 and follows the natural path created by the current usage. This route is about approx. 530m in length</p> <p><i>From a technical perspective, Route alternative 2 is preferred as discussed in detailed in the Preliminary Design Report (Appendix I2) under the section of “Qualitative Evaluation of Route Alternatives”</i></p> <p>The designs are attached in Appendix C1</p>
<p><b>BRIDGE/CULVERT OPTIONS DESIGN ALTERNATIVES</b></p>	<p><b>Option 1: Precast Portal Culvert</b></p> <p>The substructure will consist of precast portal culvert of 1.5 x 1.5m each, placed over the area required for the preferred route alternative. Depending of the preferred route alternative the number of culverts will be determined.</p> <p><b>Option 2: Ins-situ Reinforced Concrete Superstructure Culvert- Integral bridge</b></p> <p>The proposed culvert will be cast in-situ reinforced concrete and will be supported on the provided foundation. The base, walls and deck will be 500mm thick and will be monolithic with the deck superstructure. The opening will depend on the area required from the chosen route alternative, the width and height of the structure will be calculated afterwards. A concrete apron will be provided on the river bed</p> <p><b>Option 3: Composite precast I-beams with in-situ R.C. slab superstructure bridge</b></p> <p>The piers and abutments of the proposed bridge will be cast in-situ reinforced concrete and will be supported on the provided foundation. The abutments will seats on which bearings will be anchored. Wing walls of 150mm thick will be provided at 45° to the abutments.</p> <p><i>Please refer to section 5.3 of the Preliminary Design Report (Appendix I2) for detailed discussion of the culvert options. Based on the foregoing comparisons in section 6.2 in the Preliminary Design Report (Appendix I2), option 1 is the most favourable and therefore recommended option to implement for the culvert structure. Option 1 was well balanced and consistently scored well across most criteria assessed.</i></p> <p>The designs are attached in Appendix C2</p>

In the event that no alternative(s) has/have been provided, a motivation must be included in the table below.

N/A

#### 4. PHYSICAL SIZE OF THE ACTIVITY

Indicate the total physical size (footprint) of the proposal as well as alternatives. Footprints are to include all new infrastructure (roads, services etc), impermeable surfaces and landscaped areas:

	<b>the activity:</b>
Proposed activity	18 m <sup>2</sup>
Alternatives ( <b>Bridge Option 1</b> )	
Alternative 1 ( <b>Bridge Option 2</b> )	13 m <sup>2</sup>
Alternative 2 ( <b>Bridge Option 3</b> )	11 m <sup>2</sup>
	Ha/ m <sup>2</sup>

or, for linear activities:

	<b>Length of the activity:</b>
<b>Route alternative 1</b>	580m
<b>Route alternative 2</b>	740m
<b>Route alternative 3</b>	570m
	m/km

Indicate the size of the site(s) or servitudes (within which the above footprints will occur):

	<b>Size of the Site/servitude:</b>
<b>Route alternative 1</b>	11080 m <sup>2</sup>
<b>Route alternative 2</b>	16400 m <sup>2</sup>
<b>Route alternative 3</b>	10400m <sup>2</sup>
	Ha/m <sup>2</sup>

## 5. SITE ACCESS

### Route alternative 1

Does ready access to the site exist, or is access directly from an existing road?

YES

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

Describe the type of access road planned:

The site is easily accessible via the local residential roads as shown in Figure 3. The site can be accessed from Sagewood Rd near the Sagewood College or alternatively from Wattle rd near Nordwyk Secondary School.

Include the position of the access road on the site plan (if the access road is to traverse a sensitive feature the impact thereof must be included in the assessment).

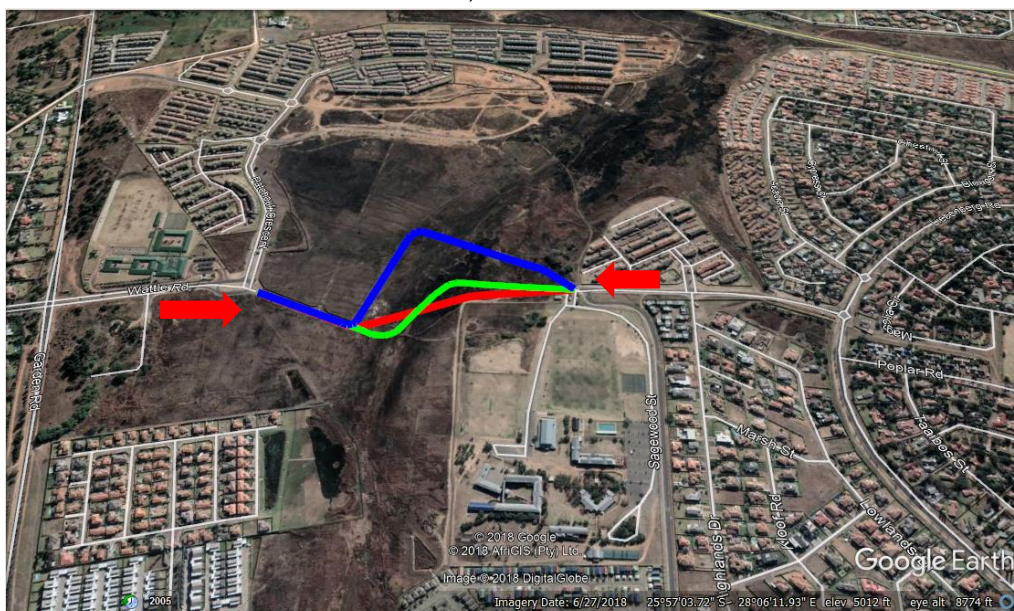


Figure 2: Overview of existing access roads to the site

### Route alternative 2

Does ready access to the site exist, or is access directly from an existing road?

YES

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

m

Describe the type of access road planned:

Same as Route alternative 1 above

Include the position of the access road on the site plan. (if the access road is to traverse a sensitive feature the impact thereof must be included in the assessment).

### Route alternative 3

Does ready access to the site exist, or is access directly from an existing road?

YES

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

m

Describe the type of access road planned:

Same as Route alternative 1 above

Include the position of the access road on the site plan. (if the access road is to traverse a sensitive feature the impact thereof must be included in the assessment).

**PLEASE NOTE: Points 6 to 8 of Section A must be duplicated where relevant for alternatives**

Section A 6-8 has been duplicated  Number of times (only complete when applicable)

**6. LAYOUT OR ROUTE PLAN**

A detailed site or route (for linear activities) plan(s) must be prepared for each alternative site or alternative activity. It must be attached to this document. The site or route plans must indicate the following:

- the layout plan is printed in colour and is overlaid with a sensitivity map (if applicable);
- layout plan is of acceptable paper size and scale, e.g.
  - A4 size for activities with development footprint of 10sqm to 5 hectares;
  - A3 size for activities with development footprint of > 5 hectares to 20 hectares;
  - A2 size for activities with development footprint of >20 hectares to 50 hectares);
  - A1 size for activities with development footprint of >50 hectares);
- The following should serve as a guide for scale issues on the layout plan:
  - A0 = 1: 500
  - A1 = 1: 1000
  - A2 = 1: 2000
  - A3 = 1: 4000
  - A4 = 1: 8000 (±10 000)
- shapefiles of the activity must be included in the electronic submission on the CD's;
- the property boundaries and Surveyor General numbers of all the properties within 50m of the site;
- the exact position of each element of the activity as well as any other structures on the site;
- the position of services, including electricity supply cables (indicate above or underground), water supply pipelines, boreholes, sewage pipelines, septic tanks, storm water infrastructure;
- servitudes indicating the purpose of the servitude;
  - sensitive environmental elements on and within 100m of the site or sites (including the relevant buffers as prescribed by the competent authority) including (but not limited thereto):Rivers and wetlands;
  - the 1:100 and 1:50 year flood line;
  - ridges;
  - cultural and historical features;
  - areas with indigenous vegetation (even if it is degraded or infested with alien species);
- Where a watercourse is located on the site at least one cross section of the water course must be included (to allow the position of the relevant buffer from the bank to be clearly indicated)

The **layout plan** for the proposed development are enclosed within **Appendix A**

**FOR LOCALITY MAP (NOTE THIS IS ALSO INCLUDED IN THE APPLICATION FORM REQUIREMENTS)**

- the scale of locality map must be at least 1:50 000. For linear activities of more than 25 kilometres, a smaller scale e.g. 1:250 000 can be used. The scale must be indicated on the map;

- the locality map and all other maps must be in colour;
- locality map must show property boundaries and numbers within 100m of the site, and for poultry and/or piggery, locality map must show properties within 500m and prevailing or predominant wind direction;
- for gentle slopes the 1m contour intervals must be indicated on the map and whenever the slope of the site exceeds 1:10, the 500mm contours must be indicated on the map;
- areas with indigenous vegetation (even if it is degraded or infested with alien species);
- locality map must show exact position of development site or sites;
- locality map showing and identifying (if possible) public and access roads; and
- the current land use as well as the land use zoning of each of the properties adjoining the site or sites.

The **Locality Map** for the proposed development are enclosed within **Appendix A**

## 7. SITE PHOTOGRAPHS

Colour photographs from the center of the site must be taken in at least the eight major compass directions with a description of each photograph. Photographs must be attached under the appropriate Appendix. It should be supplemented with additional photographs of relevant features on the site, where applicable.

Reference is made to **Appendix B – Site Photographs** included as part of this application

## 8. FACILITY ILLUSTRATION

A detailed illustration of the activity must be provided at a scale of 1:200 for activities that include structures. The illustrations must be to scale and must represent a realistic image of the planned activity. The illustration must give a representative view of the activity to be attached in the appropriate Appendix.

Reference is made to **Appendix C – Facility Illustration** included as part of this application



## SECTION B: DESCRIPTION OF RECEIVING ENVIRONMENT

**Note:** Complete Section B for the proposal and alternative(s) (if necessary)

### Instructions for completion of Section B for linear activities

For linear activities (pipelines etc) it may be necessary to complete Section B for each section of the site that has a significantly different environment.

1. Indicate on a plan(s) the different environments identified
2. Complete Section B for each of the above areas identified
3. Attach to this form in a chronological order
4. Each copy of Section B must clearly indicate the corresponding sections of the route at the top of the next page.

Section B has been duplicated for sections of the route  times

### Instructions for completion of Section B for location/route alternatives

1. For each location/route alternative identified the entire Section B needs to be completed
2. Each alternative location/route needs to be clearly indicated at the top of the next page
3. Attach the above documents in a chronological order

Section B has been duplicated for location/route alternatives  times (complete only when appropriate)

**It is worth noting that the three route alternatives are proposed in the same receiving environment and therefore will be assessed together as impacts will be similar. It is for this reason that the section will not be duplicated.**

### Instructions for completion of Section B when both location/route alternatives and linear activities are applicable for the application

Section B is to be completed and attachments order in the following way

- All significantly different environments identified for Alternative 1 is to be completed and attached in a chronological order; then
- All significantly different environments identified for Alternative 2 is to be completed and attached chronological order, etc.

Section B - Section of Route  (complete only when appropriate for above)

Section B – Location/route Alternative No.  (complete only when appropriate for above)

## 1. PROPERTY DESCRIPTION

**Property description:**  
(Including Physical Address and Farm name, portion etc.)

The road and bridge is partially proposed within Portion 637 of the Farm Randjesfontein 405 JR, the other portion of the development falls within an existing servitude

## 2. ACTIVITY POSITION

Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in decimal degrees. The degrees should have at least six decimals to ensure adequate accuracy. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection.

### Proposed Activity:

Centre point of the activity (**Bridge Option 1**)

#### Latitude (S):

25°57'10.84"S

#### Longitude (E):

28° 6'23.15"E

Centre point of the activity (**Bridge Option 2**)

25°57'13.91"S

28° 6'21.21"E

Centre point of the activity (**Bridge Option 3**)

25°57'15.54"S

28° 6'20.16"E

In the case of linear activities:

### Route alternative 1

#### Latitude (S):

#### Longitude (E):

Starting point of the activity

25°57'14.30"S

28° 6'9.60"E

Middle point of the activity

25°57'15.76"S

28° 6'19.03"E

End point of the activity

25°57'13.77"S

28° 6'28.88"E

### Route alternative 2

#### Latitude (S):

#### Longitude (E):

- Starting point of the activity
- Middle point of the activity
- End point of the activity

25°57'14.30"S

28° 6'9.60"E

25°57'12.48"S

28° 6'19.52"E

25°57'13.77"S

28° 6'28.88"E

### Route alternative 3

#### Latitude (S):

#### Longitude (E):

- Starting point of the activity
- Middle point of the activity
- End point of the activity

25°57'14.30"S

28° 6'9.60"E

25°57'15.35"S

28° 6'19.55"E

25°57'13.77"S

28° 6'28.88"E

For route alternatives that are longer than 500m, please provide co-ordinates taken every 250 meters along the route and attached in the appropriate Appendix.

**Please refer to Appendix D for the co-ordinates taken at every 250 meters**

Addendum of route alternatives attached N/A

The 21 digit Surveyor General code of each cadastral land parcel

TOJR00000000040500673

**3. GRADIENT OF THE SITE**

Indicate the general gradient of the site.

**Proposed Activity**

<b>Flat</b> ✓	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
---------------	-------------	-------------	-------------	--------------	-------------	------------------

**4. LOCATION IN LANDSCAPE**

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

**Proposed Activity**

Ridgeline	Plateau	Side slope of hill/ridge	Valley	<b>Plain</b>	Undulating plain/low hills	River front
-----------	---------	--------------------------	--------	--------------	----------------------------	-------------

**5. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE**

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

	Route Alternative 1:	Route Alternative 2	Route Alternative 3
Shallow water table (less than 1.5m deep)	YES ✓	YES ✓	YES ✓
Dolomite, sinkhole or doline areas			NO ✓
Seasonally wet soils (often close to water bodies)			NO ✓
Unstable rocky slopes or steep slopes with loose soil			NO ✓
Dispersive soils (soils that dissolve in water)			NO ✓
Soils with high clay content (clay fraction more than 40%)			NO ✓
Any other unstable soil or geological feature	YES ✓	YES ✓	YES ✓
An area sensitive to erosion			NO ✓

(Information in respect of the above will often be available at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by Geological Survey may also be used).

b) are any caves located on the site(s)

NO ✓

If yes to above provide location details in terms of latitude and longitude and indicate location on site or route map(s)

Latitude (S):

Longitude (E):

°	°
---	---

c) are any caves located within a 300m radius of the site(s)

NO ✓

If yes to above provide location details in terms of latitude and longitude and indicate location on site or route map(s)

Latitude (S):

Longitude (E):

°	°
---	---

d) are any sinkholes located within a 300m radius of the site(s)

NO ✓

If yes to above provide location details in terms of latitude and longitude and indicate location on site or route map(s)

Latitude (S):

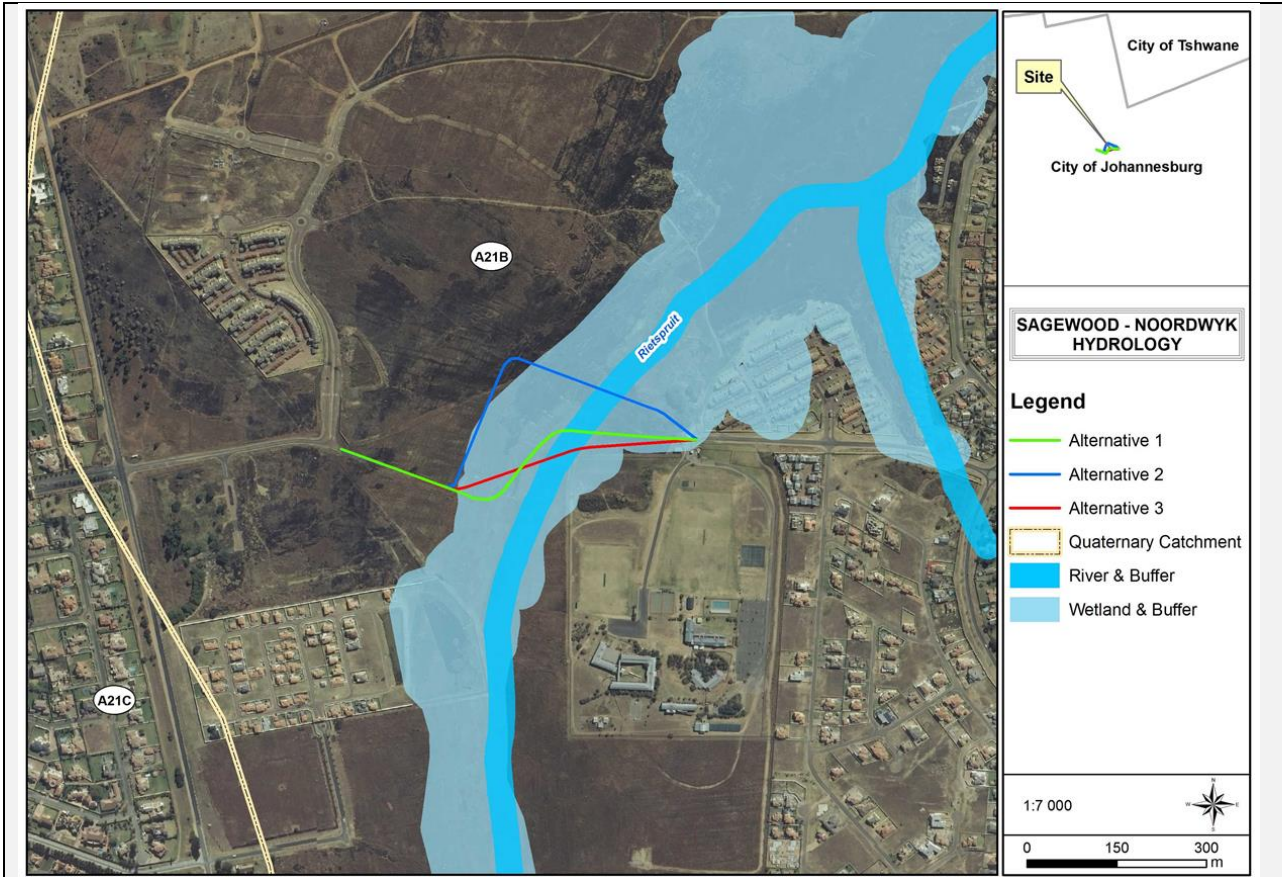
Longitude (E):

°	°
---	---

If any of the answers to the above are "YES" or "unsure", specialist input may be requested by the Department

#### Hydrology

The GDARD (Gauteng Department of Agriculture and Rural Development) spatial layer indicates a watercourse classified as the Rietspruit River and associated wetland area flowing through the study area (**Figure 3**).



**Figure 3:** Regional hydrology

**Geology and Soils**

The site is underlain by the Swazian (GDACE, 2002). The Soils directly related to the wetland is classified as LoA (Figure 4) soil and can be described as Shallow (300-600mm), grey structureless coarse sand/loamy sand on soft plinthite; in association with grey structureless loamy sand/sand (Fey, 2005). Furthermore, Lo, or Longlands soil can be described as a potential seasonal to temporary wetland soil. Manganese may be associated with iron in some plinthic materials in this soil form. An absolute enrichment with iron oxides can occur in situations where intermittent wetness from a fluctuating water table and gives rise to the reduction and mobilization of iron and its migration and reprecipitation as mottles, nodules, concretions and vesicular cement (ferricrete).

On the edges of the proposed road are AvB soils described as Shallow (300-600mm), yellow-brown apedal sandy loam/sandy clay loam, dystrophic, on soft plinthite; in association with yellow-brown/brown weak blocky coarse loamy sand/sandy loam on saprolite. Furthermore, Av soils, or Avalon soils can be described as a potential seasonal to temporary wetland soil. Avalon soils are associated with hard or soft plinthic horizons which dam water within the lower part of the section. The strongest expression occurs in middle to lower slope positions in the landscape. Manganese is associated with iron in some plinthic materials in this soil form.

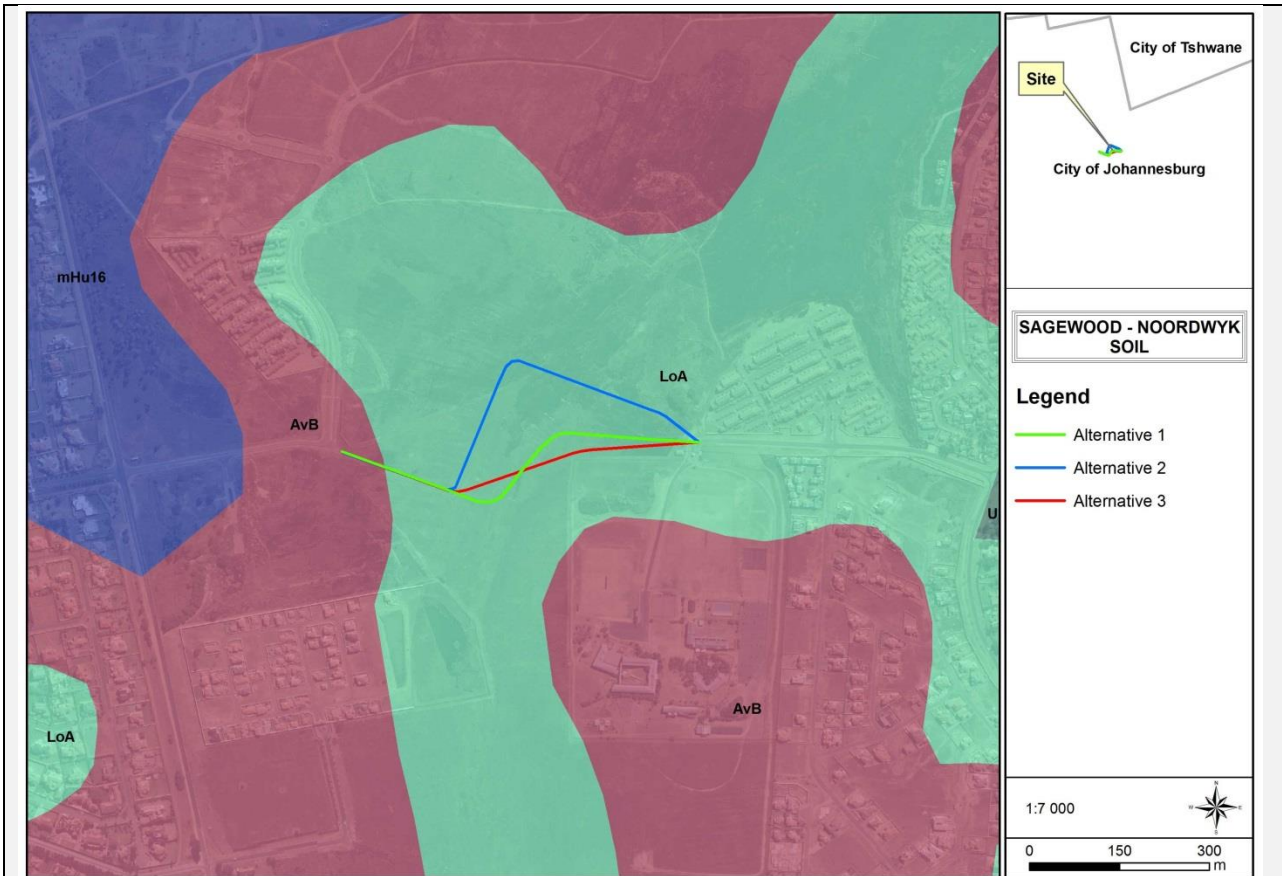


Figure 4: Soils of the study area.

**Areas sensitive to erosion**

The impacts associated with the wetlands are largely associated with nearby developments. The unchannelled valley bottom has had some rehabilitation with cement gabions in the main channel to protect it from erosion (**Figure 5**). The seepage wetland, although likely always a feature has become larger in recent years due to an increase in water input from a stormwater retention pond created in the headwaters of the wetland, thus proving a constant input of water and potentially foreign materials (**Figure 6**).



**Figure 5:** Indicating the gabion structures within the valley bottom wetland and the artificial stormwater attenuation pond in the seepage wetland.



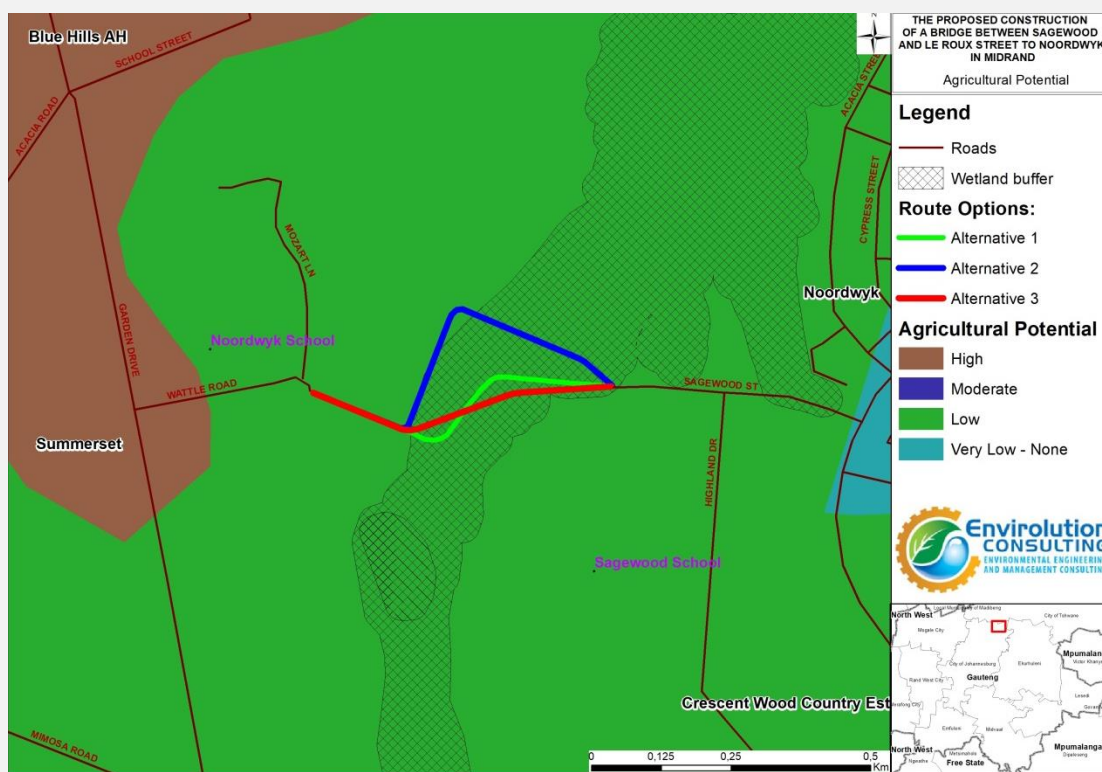
**Figure 6:** Images of impacts recorded within and surrounding the wetland areas including dumping, attenuation ponds, footpaths and diggings.

## 6. AGRICULTURE

Does the site have high potential agriculture as contemplated in the Gauteng Agricultural Potential Atlas (GAPA 4)?

**YES** ✓

According to the Gauteng Agricultural Potential Atlas (GAPA) the site falls within an area of LOW agricultural potential as depicted in **Figure 7** below.



**Figure 7:** Agriculture potential Map for the study area

**Please note:** The Department request specialist input/studies in respect of the above.

## 7. GROUNDCOVER

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

Indicate the types of groundcover present on the site and include the estimated percentage found on site

Natural veld - good	Natural veld	Natural veld with	Veld dominated	Landscaped
---------------------	--------------	-------------------	----------------	------------



condition % = 0	<b>with scattered aliens</b> % = 70	<b>heavy alien infestation</b> % = 30	by alien species % = 0	(vegetation) % = 0
Sport field % = 0	Cultivated land % = 0	Paved surface (hard landscaping) % = 0	Building or other structure % = 0	Bare soil % = 0

**Please note:** The Department may request specialist input/studies depending on the nature of the groundcover and potential impact(s) of the proposed activity/ies.


Are there any rare or endangered flora or fauna species (including red list species) present on the site

YES ✓ 

If YES, specify and explain:

A number of provincially protected plants are listed in the Transvaal Nature Conservation Ordinance Act No. 12 of 1983. These plants are not to be removed, damaged, or destroyed without permit authorisation from Gauteng Department of Agriculture and Rural Development (GDARD). It is likely that *Gladiolus* species may be present within the *Hyparrhenia hirta* grassland, while *Crinum* species (vlei lily) and *Habenaria* species (Orchids), may be present within the moist grassland.

Are there any rare or endangered flora or fauna species (including red list species) present within a 200m (if within urban area as defined in the Regulations) or within 600m (if outside the urban area as defined in the Regulations) radius of the site.

YES ✓ 

If YES, specify and explain:

A list of plants of conservation concern was compiled using information from the South African National Biodiversity Institute's (SANBI) checklist (SANBI, 2009), Raimondo et al, (2009) and information received from the Gauteng Department of Agriculture and Rural Development (GDARD) for the quarter degree square (qds) 2528CC. A list of twenty-four (24) plants of conservation concern that were previously recorded in the quarter degree square (qds) that the project area is situated in or for which suitable habitat is present within the study area is given in the Vegetation assessment (**Appendix G1**).

Are there any special or sensitive habitats or other natural features present on the site?

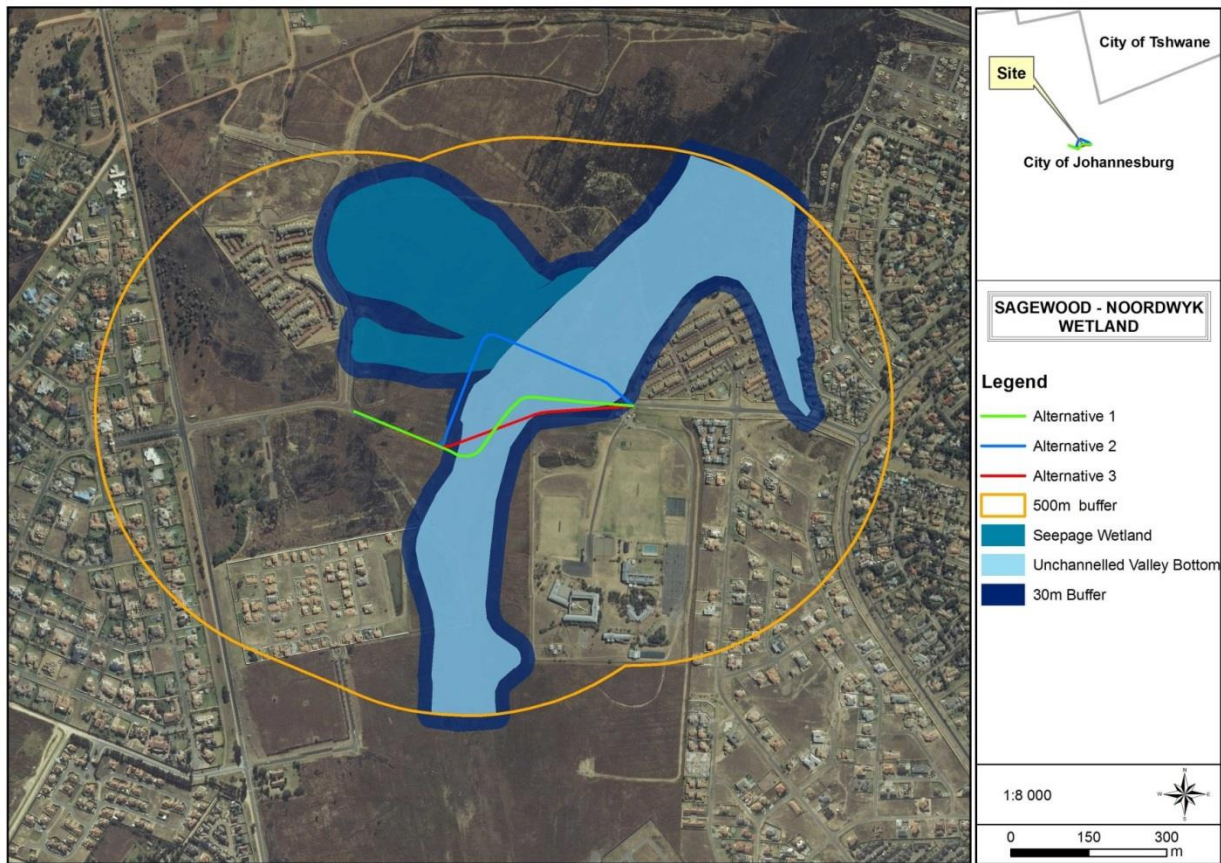
YES ✓ 

If YES, specify and explain:

**Wetland**

Two wetland hydrogeomorphic (HGM) units were identified on the study site. These are an unchannelled valley bottom wetland and a seepage wetlands (**Figure 8**). Only one seepage wetland (southern) and the unchannelled valley bottom are likely to be affected by the proposed development. Three route options for the proposed road and bridge were assessed. Alternative 3 is the preferred route because it follows a straight line through the wetland and will have the least amount of impact on the wetland. A strait line is likely to have a smaller footprint than a line with bends and is likely to cover a shorter distance. The least preferred route is Alternative 2. This is due to it crossing two wetlands; it has a longer stretch the road as well as a bend occurring in the seepage wetland. Alternative 1 is

the second preferred option.



**Figure 8:** Wetland map indicating the wetlands and associated buffer zones of the study site

### Wetland Functionality, Status and Sensitivity

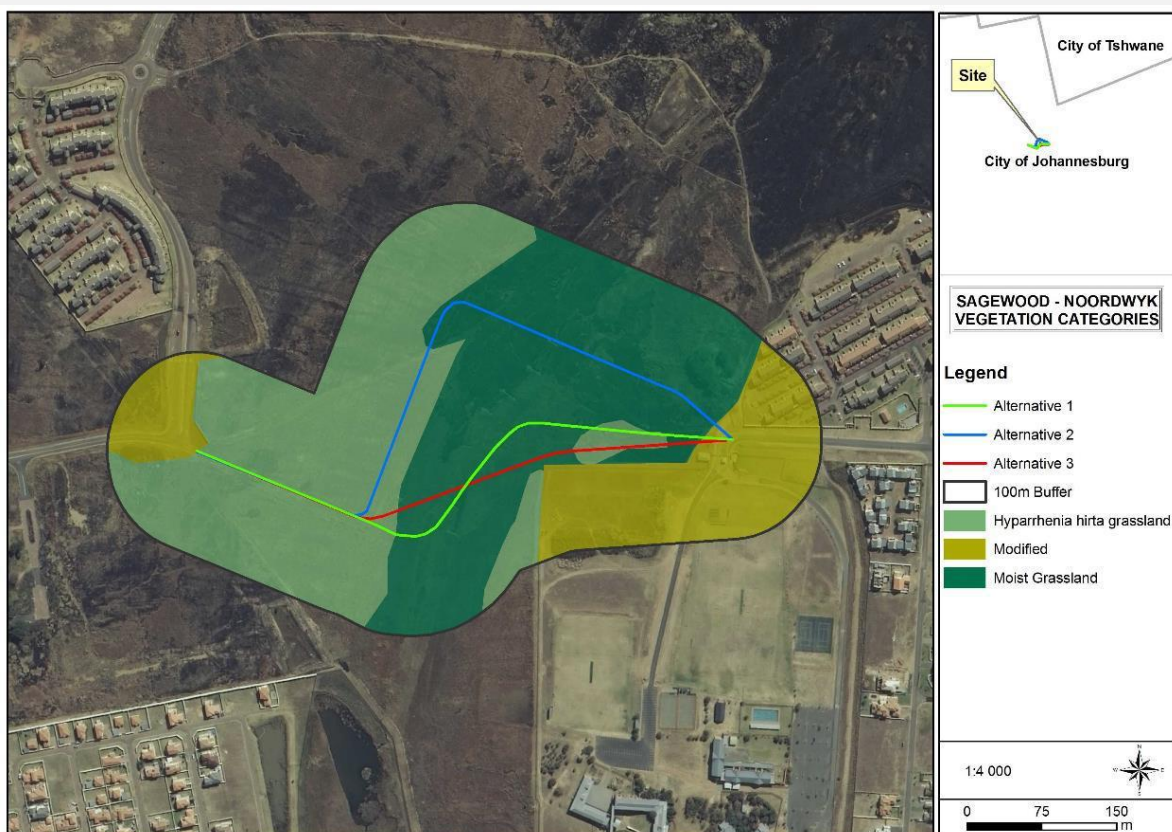
The unchannelled valley bottom wetland scored a PES (present ecological status) of **C - Moderately modified**. A moderate change in ecosystem processes and loss of natural habitats has taken place but the natural habitat remains predominantly intact. The seepage wetland scored a PES of **D - Largely modified**. A large change in ecosystem processes and loss of natural habitat and biota has occurred. Both the wetlands are likely to remain stable over the next 5 years.

In terms of the Ecological Importance and Sensitivity (EIS), the unchannelled valley bottom wetland scored a **2.0** which falls between a **Moderate and High** category. Wetlands that fall into this category are considered to be ecologically important and sensitive on a provincial or local scale. The biodiversity of these wetlands is potentially sensitive to flow and habitat modifications. They play a small to medium role in moderating the quantity and quality of water in major rivers. The Seepage wetland scored a **1.8**. This score falls into a category characterised by **Moderate** ecological importance and sensitivity. Wetlands that fall into this category are considered to be ecologically important and sensitive on a provincial or local scale. The biodiversity of these wetlands is not usually sensitive to flow and habitat modifications. They play a small role in moderating the quantity and quality of water in major rivers (DWAF, 1999)

### Vegetation overview

The site is situated in the Grassland Biome which experience summer rainfall and dry winters with frost (and fire), that are unfavourable to tree growth. Therefore, grasslands comprise mainly of grasses and plants with perennial underground storage organs, for example bulbs, tubers and suffrutex species. In some grassland areas, the surface topography (e.g. rocky hills and protected valleys) creates habitats that are favourable to shrublands and trees (Mucina & Rutherford, 2006).

The vegetation that could be impacted on by the proposed development was grouped in three broad vegetation associations. Each broad vegetation grouping is discussed below and geographically represented in **Figure 9**. The vegetation was mapped within a 100m buffer around the alternatives. Plant species that were recorded within each vegetation group at the time of the site visit are listed in **Appendix G1**. *Note that the species list is limited to what was identifiable at the time of this early spring assessment.*



**Figure 9:**Vegetation associations along and around the route alternatives (mapped to 100m on either side of the alternatives)

1. **Modified:** Modified landscapes are regarded as areas where the vegetation structure and composition have been compromised and are not representative of the reference state of Egoli Granite Grassland (SANBI, 2016). Modified land can range from moderately modified to severely or irreversibly modified. Subsequently, these areas are usually of a poor to fair ecological condition. The area west and east of the proposed alternatives are built up and included residential areas, schools and landscaped gardens, sports fields or degraded veld. Limited to no natural vegetation persist in these areas and it is regarded as being severely modified and in a low ecological condition.

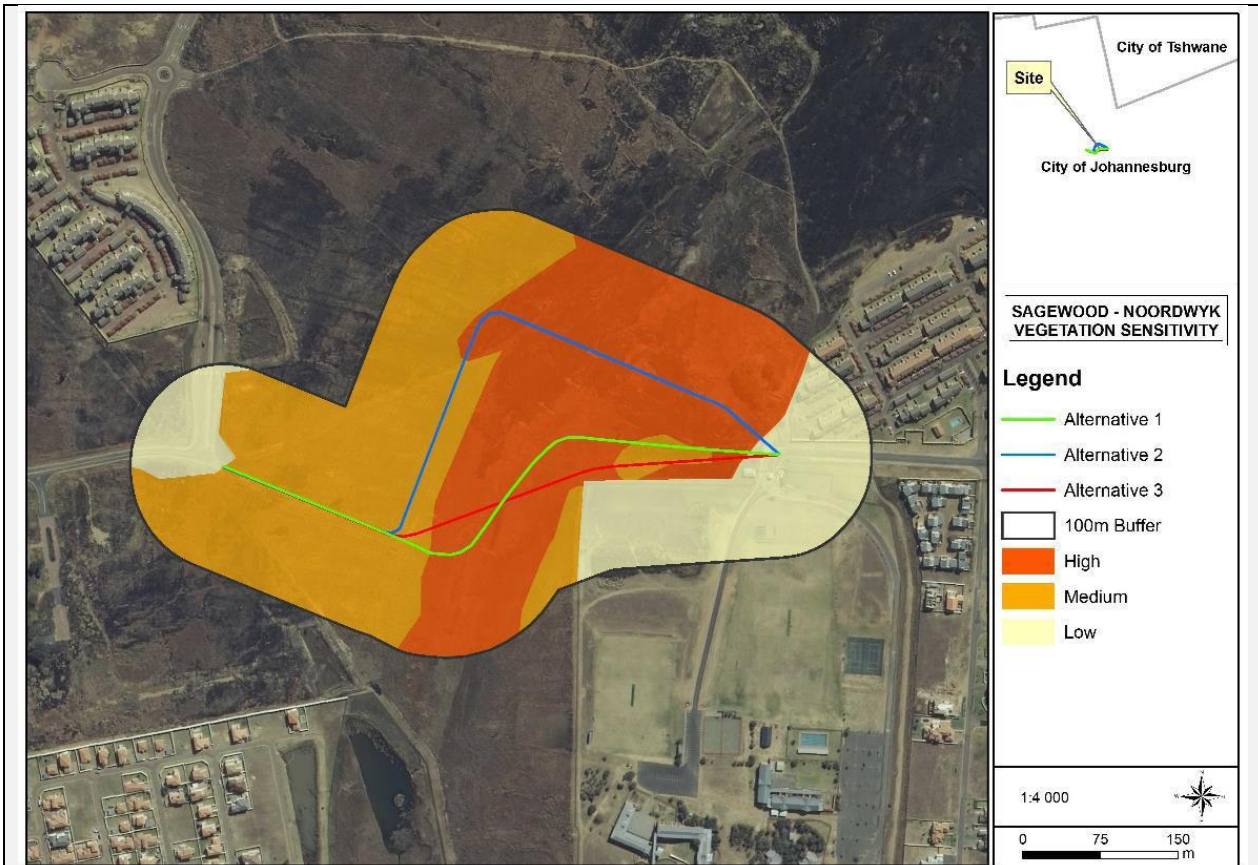
2. **Hyparrhenia hirta grassland:** The majority of grassland surrounding the Rietspruit was classified as anthropogenic *Hyparrhenia hirta* grassland (Bredenkamp, *et al.*, 2006). Other dominant grasses were *Eragrostis curvula*, *E. gummiflua* and *Cynodon dactylon*. The dominant shrub was *Stoebe plumosa* (bankruptbush), which is known to increase in overgrazed or mismanaged veld, as well as disturbed Egoli Granite Grassland. Limited forbs were visible due to the early season; however, the species diversity was much lower than what would be expected in good condition Egoli Granite Grassland. *Hypoxis hemerocallidea* (African potato) was recorded within the *H hirta* grassland. This species was recently reclassified from Declining to Least Concern, however, its numbers are still declining in the wild. Several plant species known to occur in moist or damp grassland were recorded (e.g. *Haplocharpa scaposa* and *Berkheya radula*), mainly in the north-western section of Alternative 2. It is assumed that a seep area is present in this portion of Alternative 2. The *H hirta* grassland is considered semi-natural and in a fair-poor ecological condition.

South-east of the alternatives, but within the mapped 100m buffer, a portion of grassland that was not historically cultivated remain. However, this portion was impacted on by historic disturbances including trampling associated with the construction of the sewerage pipeline and grazing. This grassland patch included slightly higher species diversity at the time of the assessment, with a lower abundance of *Stoebe plumosa*. Species only recorded in this patch included *Hilliardiella oligocephala* (bitterbossie), *Helichrysum coriaceum* (vaalteebossie) and *Senecio inaequidens*. The secondary grasslands are considered to be in a fair to poor ecological condition.

3. **Moist grassland:** The majority of the vegetation that will be affected by the proposed alternatives was classified as moist grassland, dominated by the reed *Typha capensis* (bulrush) and large patches of the grass *Imperata cylindrica* (cotton wool grass) and the forb *Senecio erubescens*. A number of impacts have degraded portions of the wetland, mainly within the eastern extent of the proposed alternatives. Impacts include historic dams and sewerage draining from the east into the Rietspruit. The disturbances resulted in a patchy dominance of various species. Several grass- and forb species were recorded; no threatened or protected species were recorded. The moist grassland was classified as being in a fair ecological condition; however, the wetland assessment will be definitive.

### **Vegetation Sensitivity**

The vegetation units sensitivity analysis results were classified and geographically represented in **Figure 10** and discussed below.



**Figure 10:** Sensitivity Map (mapped to 100m buffer around the alternatives)

The proposed alternatives will all three to some degree traverse *Hyparrhenia hirta* grassland with lower species diversity than sub-climax or primary Egoli Granite Grassland. The *Hyparrhenia hirta* grassland is not sensitive per se, however, these grasslands form part of the remaining open spaces in the fast-developing area and function as catchment for groundwater recharge and prevention of flooding of proximate watercourses and these functions increased its sensitivity rating. The proposed routes are unlikely to impact on the functionality of the majority of grasslands and impacts can be mitigated. In addition, the plant species of conservation concern that have a likelihood of occurring, bar orchid species, could be relocated if found to occur.

Areas where the vegetation no longer represent natural or semi-natural grassland (around infrastructure and invasive vegetation) and which support a high number of weedy and alien invasive plant species were found to be of a low sensitivity to the proposed development. From a vegetation perspective, these areas are developable provided that negative edge effect be mitigated.

The moist grasslands on site has been subjected to several disturbances and it is unlikely that any threatened species occur within the 100m mapped around the route alternatives. The vegetation's sensitivity rating as high is mainly due to its functional role, as well as the statutory protection of wetland areas. The proposed routes are unlikely to impact on the functionality of the majority of *Hyparrhenia hirta* grasslands and impacts can be mitigated.

### Gauteng Conservation Plan

The Gauteng Conservation Plan (Version 3.3) (GDARD, 2011) classified areas within the province based on its

contribution to reach the conservation targets within the province. These areas are grouped as Critical Biodiversity Areas (CBAs) or Ecological Support Corridors (ESAs). The CBAs comprise 'Irreplaceable' areas that must be conserved and areas classified as 'Important' to reach the conservation targets of the Province. ESA's are areas that are not essential for meeting biodiversity representation targets/thresholds but which nevertheless play an important role in supporting the ecological functioning of critical biodiversity areas and/or in delivering ecosystem services that support socio-economic development, such as water provision, flood mitigation or carbon sequestration. (ESAs) to ensure sustainability in the long term. According to the Gauteng Conservation Plan (version 3.3), the majority of the site falls within an Important CBA (Figure 11).

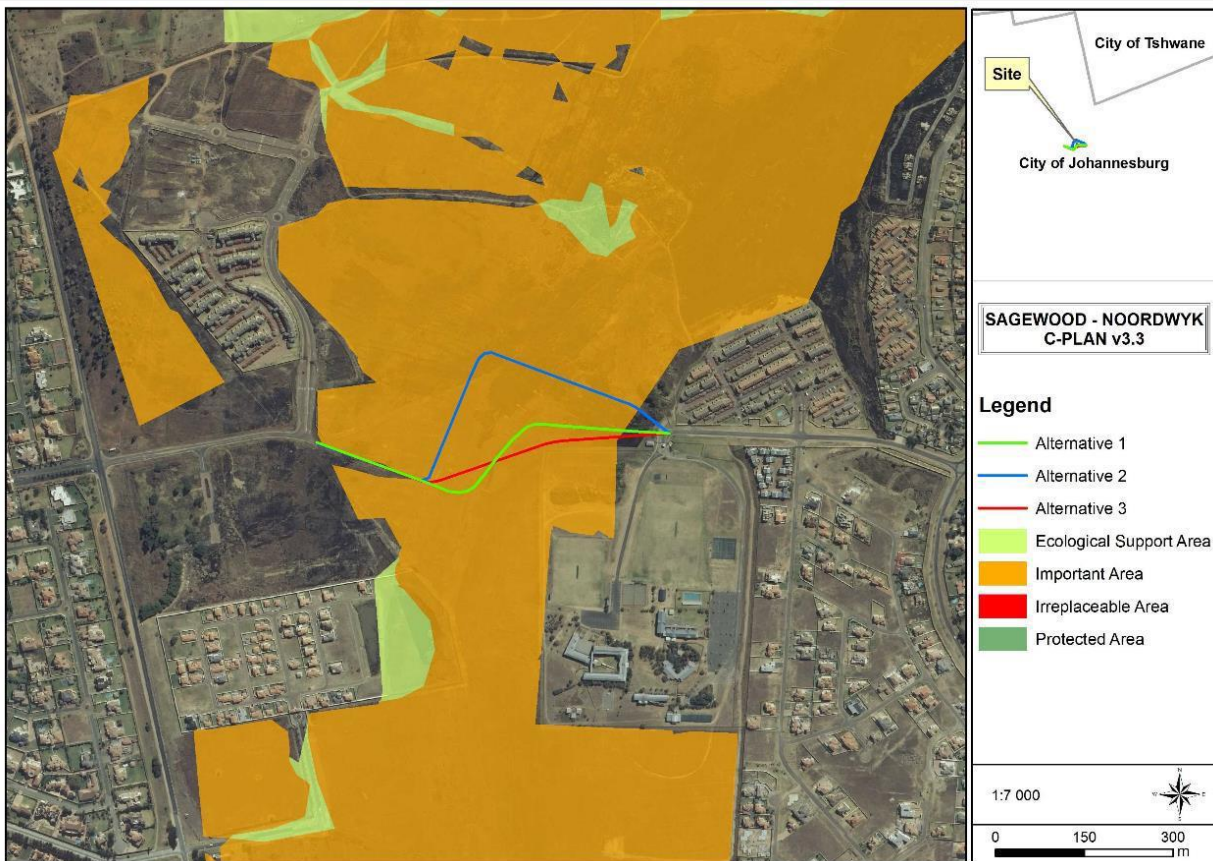


Figure 11: Gauteng Conservation Areas relevant to the study site

Was a specialist consulted to assist with completing this section  
 If yes complete specialist details

YES ✓

1.) Wetland Specialist

Name of the specialist:

Antoinette Bootsma

Qualification(s) of the specialist:

- MSc Ecology, University of South Africa (2017) Awarded with distinction. Project Title: Natural mechanisms of erosion prevention and stabilization in a Marakele peatland; implications for conservation management
- Short course in wetland soils, Terrasoil Science (2009)
- Short course in wetland delineation, legislation and rehabilitation, University of Pretoria (2007)
- B. Sc (Hons) Botany, University of Pretoria (2003-2005). Project Title: A phytosociological Assessment of the Wetland Pans of Lake Chrissie
- B. Sc (Botany & Zoology), University of South Africa (1997 - 2001)

Postal address:

Postal code:

Telephone:

E-mail:

[Redacted]  
[antoinette@limosella.co.za](mailto:antoinette@limosella.co.za)

Cell: +27 83 4545 454

Fax: [Redacted]

**NO** ✓

Are any further specialist studies recommended by the specialist?

If YES, specify:

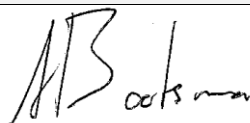
**Yes**

If YES, is such a report(s) attached?

**NO** ✓

If YES list the specialist reports attached below

Signature of specialist:



Date:

**Sept 2018**

## 2.) Heritage Specialist

Name of the specialist:

J van Schalkwyk

Qualification(s) of the specialist:

J A van Schalkwyk, D Litt et Phil, heritage consultant, has been working in the field of heritage management for more than 30 years. Based at the National Museum of Cultural History, Pretoria, he has actively done research in the fields of anthropology, archaeology, museology, tourism and impact assessment. This work was done in Limpopo Province, Gauteng, Mpumalanga, North West Province, Eastern Cape, Northern Cape, Botswana, Zimbabwe, Malawi, Lesotho and Swaziland. Based on this work, he has curated various exhibitions at different museums and has published more than 60 papers, many in scientifically accredited journals.

Postal address:

62 Coetzer Avenue, Monument Park, 0181

Postal code:

2194

Telephone:

[Redacted]  
[jvschalkwyk@mweb.co.za](mailto:jvschalkwyk@mweb.co.za)

Cell: 076 790 6777

Fax: [Redacted]

**NO** ✓

Are any further specialist studies recommended by the specialist?

If YES, specify: N/A

If YES, is such a report(s) attached? NO ✓

If YES list the specialist reports attached below

N/A

Signature of specialist:  Date: November 2018

### 3.) Flora Specialist

Name of the specialist: Antoinette Eyssell-Knox

Qualification(s) of the specialist: 

- M.Sc Environmental Science, University of Pretoria (2010)  
Dissertation: *Land cover change and its effect on future land uses*
- B. Sc (Hons) Horticulture, University of Pretoria (1999-2000)  
Dissertation: *Horticultural uses of the indigenous Barleria species*
- B. Sc (Agriculture) Horticulture, University of Pretoria (1993-1996)

Postal address:  

Postal code:  

Telephone: 082 642 6295 Cell: 082 642 6295

E-mail: [Antoinette@dimela-eco.co.za](mailto:Antoinette@dimela-eco.co.za) Fax:  

Are any further specialist studies recommended by the specialist? NO ✓

If YES, specify: N/A

If YES, is such a report(s) attached? NO ✓

If YES list the specialist reports attached below

N/A

Signature of specialist:  Date: November 2018

### 4.) Fauna Specialist

Name of the specialist: I.L. Rautenbach & J.C.P. van Wyk



Qualification(s) of the specialist:	<b>Qualifications</b> <ul style="list-style-type: none"> <li>B.Sc. (UP) 1966, T.H.E.D (Pta TTC) 1967, M.Sc. (UP) 1971, Ph.D. (Un. Natal) 1971</li> <li>Professional Honours 1. Professional Natural Scientist (Zoology) – S.A Council for Natural Scientific Professions, Registration # 400300/05</li> <li>Fellow of the Photographic Society of South Africa</li> <li>Master photographer at club level</li> <li>Honorary life member of the S.A. Wildlife Management Association.</li> </ul>		
Postal address:	45 Helgaard Street, Kilner Park, Pretoria, RSA 0186		
Postal code:	0186		
Telephone:	012 3334112	Cell:	082 3351288
E-mail:	<a href="mailto:naasrauten@mweb.co.za">naasrauten@mweb.co.za</a>	Fax:	[REDACTED]
Are any further specialist studies recommended by the specialist?			NO ✓
If YES, specify:	N/A		
If YES, is such a report(s) attached?			NO ✓
If YES list the specialist reports attached below			
N/A			

Signature of specialist: 	Date: <span style="border: 1px solid black; padding: 5px; display: inline-block; margin-left: 20px;">September 2018</span>
--	--

**Please note;** if more than one specialist was consulted to assist with the filling in of this section then this table must be appropriately duplicated

## 8. LAND USE CHARACTER OF SURROUNDING AREA

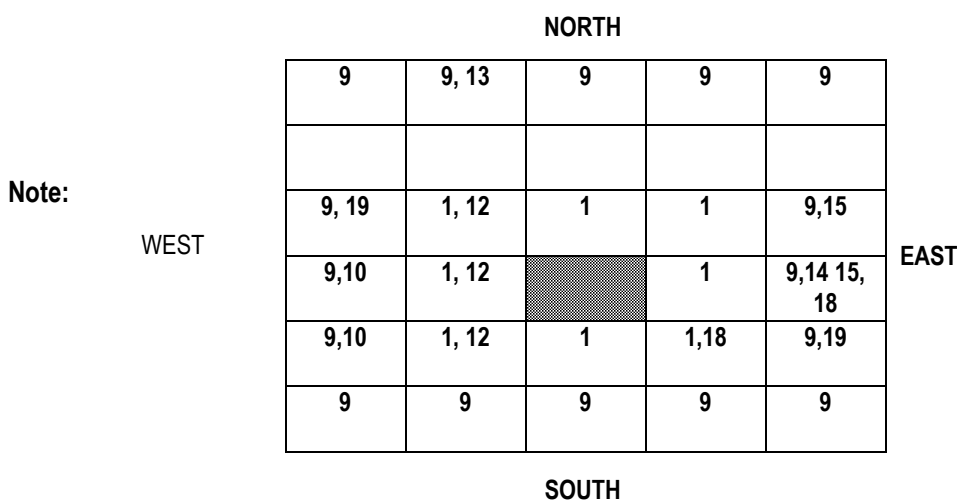
Using the associated number of the relevant current land use or prominent feature from the table below, fill in the position of these land-uses in the vacant blocks below which represent a 500m radius around the site

### Proposed Activity:

1. Vacant land	2. River, stream, wetland	3. Nature conservation area	4. Public open space	5. Koppie or ridge
6. Dam or reservoir	7. Agriculture	8. Low density residential	<b>9. Medium to high density residential</b>	10. Informal residential
11. Old age home	12. Retail	<b>13. Offices</b>	14. Commercial & warehousing	15. Light industrial
16. Heavy industrial <sup>AN</sup>	17. Hospitality facility	<b>18. Church</b>	<b>19. Education facilities</b>	20. Sport facilities
21. Golf course/polo fields	22. Airport <sup>N</sup>	23. Train station or shunting yard <sup>N</sup>	24. Railway line <sup>N</sup>	25. Major road (4 lanes or more) <sup>N</sup>
26. Sewage treatment plant <sup>A</sup>	27. Landfill or waste treatment site <sup>A</sup>	28. Historical building	29. Graveyard	30. Archeological site
31. Open cast mine	32. Underground mine	33. Spoil heap or slimes dam <sup>A</sup>	34. Small Holdings	35 Other land uses (describe):

*NOTE: Each block represents an area of 250m X 250m, if your proposed development is larger than this please use the appropriate number and orientation of hashed blocks*

Site 



*The study area is located in an urban built up area with small open areas, including wetland and riparian areas. Numerous developments have occurred in the immediate area surrounding the wetland. Open areas are an important feature as they form ecological corridors for dispersal and migration of animals. The specialised habitat associated with wetlands and riparian areas also serves as refuge, roosting and breeding*

**areas. During the site visit, dumping, alien invasive plant species, historic cultivation, bad land management practises (e.g. historic overgrazing and sheet erosion) and sewerage draining into the Rietspruit were noted, well-trodden footpath is currently used to cross the Rietspruit. Gabion structures were noted within the Rietspruit.**

More than one (1) Land-use may be indicated in a block

**Please note:** The Department may request specialist input/studies depending on the nature of the land use character of the area and potential impact(s) of the proposed activity/ies. Specialist reports that look at health & air quality and noise impacts may be required for any feature above and in particular those features marked with an "A" and with an "N" respectively

Have specialist reports been attached  
If yes indicate the type of reports below

YES ✓

- Vegetation Assessment
- Fauna Impact Assessment
- Wetland Assessment
- Heritage Assessment

The above specialists reports are attached within **Appendix G** of this report

## 9. SOCIO-ECONOMIC CONTEXT

Describe the existing social and economic characteristics of the area and the community condition as baseline information to assess the potential social, economic and community impacts.

**Introduction:** The City of Johannesburg is divided into seven regions, designated alphabetically from A to G. The project is located within Region A.

**Population:** Understanding both the age as well as anticipated population growth of the city assists in planning for the anticipated demand for services and job opportunities. The City of Johannesburg has a population of approximately 4 million made up primarily of a young population aged between 30 and 39 years. This total population translates into roughly 1.3 million households. The city's population is projected to increase to about 4.1 million in 2015 implying an annual rate of growth of the population of about 1.3% per annum by 2015. Household projections further indicate that the number of households in the City is likely to increase from about 1.3 million in 2010 to about 1.5 million in 2015 with an average household size of about 3 persons. **The region is home to more than 250 000 residents, most of whom are concentrated in Midrand. The western part of the region is scarcely populated, though some 56 000 people reside in the township of Diepsloot alone (CoJ, 2018).**

**Economic Profile of local Municipality:** The City of Johannesburg's economy is driven primarily by four economic sectors which are: (a) finance and business services, (b) community services, (c) manufacturing, and (d) trade. These four economic sectors collectively account for more than 82% of economic activity within the City. **The population in the region is relatively young, with some 24 percent being between the ages of 20 and 29. While the formal residential areas are home to prosperous and well-educated residents, most of the people living in the townships and informal settlements are poor, with low levels of school education (CoJ).**

**Level of Unemployment:** The CoJ had high unemployment levels of 23.1% in 2010/2011. Regions E, B have one of the lowest rates of unemployment at 2.3% and 9.2% respectively. Youth unemployment remains a major challenge both nationally and for the city. Low education levels and slow formal sector growth are two of the major causes of youth unemployment. The vast majority of the youthful population in Johannesburg has only a matric certificate preventing access to the labour market (CoJ IDP 2012/2016). **Unemployment levels in this region stands at over 50 percent and more than 70 percent of the residents live below the poverty line. In the Midrand area, approximately 70 percent of residents earn less than R2 500 a month, while 34 percent earn no income at all (CoJ, 2018).**

**Provision of Basic Service:** The provision of (and access to) basic services such as electricity, water, adequate sanitation, etc. is critical for the pathway to poverty reduction, and to some extent, inequality – as these have an impact on the quality of life. Access to basic services is relatively high in Johannesburg (with over 95% of households enjoying access to piped water, flush toilets, and electricity); however, there is still a significant proportion of the population without the capacity / means to access or optimally benefit from these services. This could be attributed to increasing inward migration, rapid urbanisation, and the associated growth in the number of households which require services. It is also important to bear in mind that chronically poor households find it difficult, and often cannot pay for basic services.

<https://www.joburg.org.za/documents/Issue%20The%20Socio%20Economic%20Status%20of%20the%20City%20of%20Johannesburg.pdf>

## 10. CULTURAL/HISTORICAL FEATURES

Please be advised that if section 38 of the National Heritage Resources Act 25 of 1999 is applicable to your proposal or alternatives, then you are requested to furnish this Department with written comment from the South African Heritage Resource Agency (SAHRA) – Attach comment in appropriate annexure

38. (1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorized as-

- (a) the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
- (b) the construction of a bridge or similar structure exceeding 50m in length;
- (c) any development or other activity which will change the character of a site-
  - (i) exceeding 5 000 m2 in extent; or
  - (ii) involving three or more existing erven or subdivisions thereof; or
  - (iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or
  - (iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
- (d) the re-zoning of a site exceeding 10 000 m2 in extent; or
- (e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

Are there any signs of culturally (aesthetic, social, spiritual, environmental) or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including archaeological or palaeontological sites, on or close (within 20m) to the site?

	<b>NO</b> ✓
--	-------------

If YES, explain:

If uncertain, the Department may request that specialist input be provided to establish whether there is such a feature(s) present on or close to the site.

Briefly explain the findings of the specialist if one was already appointed:

The cultural landscape qualities of the region are made up of a pre-colonial element consisting of very limited Stone Age and Iron Age occupation, as well as a much later colonial (farmer) component, which eventually gave rise to an urban component. Due to the rapid urban development in the area surrounding the study area, it is highly likely that if any sites or features of cultural significance dating to the pre-colonial as well as early historic period existed in the area, it would have been negatively impacted on by the recent process of urbanisation.

As no sites, features or objects of cultural significance are known to exist in the development area, there would be no impact as a result of the proposed development.

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

Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?

	<b>NO</b> ✓
	<b>NO</b> ✓

If yes, please attached the comments from SAHRA in the appropriate Appendix

## SECTION C: PUBLIC PARTICIPATION (SECTION 41)

### 1. THE ENVIRONMENTAL ASSESSMENT PRACTITIONER MUST CONDUCT PUBLIC PARTICIPATION PROCESS IN ACCORDANCE WITH THE REQUIREMENT OF THE EIA REGULATIONS, 2014.

#### 2. LOCAL AUTHORITY PARTICIPATION

Local 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. The planning and the environmental sections of the local authority must be informed of the application at least thirty (30) calendar days before the submission of the application to the competent authority.

Was the draft report submitted to the local authority for comment?

YES ✓

If yes, has any comments been received from the local authority?

NO ✓

If "YES", briefly describe the comment below (also attach any correspondence to and from the local authority to this application):

The Draft Report will be submitted to the City of Johannesburg (CoJ) for comment. If any issues and comments are received, these will be collated and responded to. These responses will be incorporated into the Final BAR.

If "NO" briefly explain why no comments have been received or why the report was not submitted if that is the case.

The Public Participation Process is currently underway. Once concluded, the issues and comments raised by I&AP will be collated and responded to. These responses will be incorporated into the Final BAR.

#### 3. CONSULTATION WITH OTHER STAKEHOLDERS

Any stakeholder that has a direct interest in the activity, site or property, such as servitude holders and service providers, should be informed of the application at least **thirty (30) calendar days** before the submission of the application and be provided with the opportunity to comment.

Has any comment been received from stakeholders?

YES ✓

If "YES", briefly describe the feedback below (also attach copies of any correspondence to and from the stakeholders to this application):

- i. Please note that I object to this as we have been eroding the natural landscape here and the whole idea was to be creating an eco-estate and living. By doing this through fare as a result of this bridge we will be making a lot of noise and air pollution in the area as the road will be used not just for school or residence but as a thoroughfare and the adjoining roads will become a gridlock for us residence. Of what benefit is this to the residence of this area? This certainly will not elevate the traffic flow?
- ii. I think the bridge construction is a great initiative. Currently there is too much of a risky business at the entrance of Sagewood school when I drop-off the kids. Parents from Noordwyk School make U-turns and cause traffic jams in front of Sagewood school gate – which poses a serious safety hazard.
- iii. Please share details on the impact on bullfrogs and birds that breed in the area, as well as vegetation impacts.

If "NO" briefly explain why no comments have been received

#### 4. GENERAL PUBLIC PARTICIPATION REQUIREMENTS

The Environmental Assessment Practitioner must ensure that the public participation process 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 and ratepayers associations. Please note that public concerns that emerge at a later stage that should have been addressed may cause the competent authority to withdraw any authorization it may have issued if it becomes apparent that the public participation process was flawed.

The EAP must record all comments and respond to each comment of the public / interested and affected party before the application report is submitted. The comments and responses must be captured in a Comments and Responses Report as prescribed in the regulations and be attached to this application.

#### 5. APPENDICES FOR PUBLIC PARTICIPATION

All public participation information is to be attached in the appropriate Appendix. The information in this Appendix is to be ordered as detailed below

Appendix 1 – Proof of site notice

Appendix 2 – Written notices to I&APs

Appendix 3 – Proof of newspaper advertisements

Appendix 4 –Correspondences with I&APs

Appendix 5 – Minutes of any public and/or stakeholder meetings – **this is anticipated during the Draft BAR review period**

Appendix 6 - Comments and Responses Report

Appendix 7 –Comments from I&APs on Basic Assessment (BA) Report - **Comments are anticipated during the Draft BAR review period**

Appendix 8 –Comments from I&APs on amendments to the BA Report **N/A**

Appendix 9 – Copy of the register of I&APs

## SECTION D: RESOURCE USE AND PROCESS DETAILS

**Note:** Section D is to be completed for the proposal and alternative(s) (if necessary)

### Instructions for completion of Section D for alternatives

- 1) For each alternative under investigation, where such alternatives will have different resource and process details (e.g. technology alternative), the entire Section D needs to be completed
- 4) Each alternative needs to be clearly indicated in the box below
- 5) Attach the above documents in a chronological order

Section D has been duplicated for alternatives  times

(Complete only when appropriate)

Section D Alternative No.  (complete only when appropriate for above)

### 1. WASTE, EFFLUENT, AND EMISSION MANAGEMENT

#### Solid waste management

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

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

YES ✓	
Could not be determined at this stage	

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

Some construction rubble/ solid waste will arise from demolition of existing building. This solid waste will be temporarily stored on site in designated waste skips or stockpiles and then reused where possible for backfill. Surplus material will be removed by an appropriate waste contractor appointed by the main construction contractor to an approved landfill site. This will be managed through the EMPr.

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

General waste removed from site will be disposed of at a suitably licensed disposal facility.. Safe disposal certificates must be obtained and kept on site for the duration of the construction phase.

Will the activity produce solid waste during its operational phase?

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

YES ✓	
<input style="width: 80%; border: none;" type="text" value=""/> m <sup>3</sup>	

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

Some construction rubble/ solid waste will arise from demolition of existing building. This solid waste will be temporarily stored on site in designated waste skips or stockpiles and then reused where possible for backfill. Surplus material will be removed by an appropriate waste contractor appointed by the main construction contractor to an approved landfill site. This will be managed through the EMPr.

Has the municipality or relevant service provider confirmed that sufficient air space exists for treating/disposing of the solid waste to be generated by this activity?

	NO ✓
--	------

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

During both construction and operation phase a registered landfill sites within the study area can be used as they still have capacity.



Note: If the solid waste (construction or operational phases) will not be disposed of in a registered landfill site or be taken up in a municipal waste stream, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

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

Describe the measures, if any, that will be taken to ensure the optimal reuse or recycling of materials:  
 During Construction, wastes must be separated at source into recyclable and non-recyclable materials and distributed for recycling where applicable. During the construction phase, construction waste rubble should be re-used as fill material, erosion protection and gabion construction where possible. The re-use of construction waste materials will minimize the amount of waste that will need to be disposed of at registered municipal waste facilities. In addition, there will be extensive earthworks, but import and export of material will be minimised by balancing cut and fill requirements as far as possible.

**Liquid effluent (other than domestic sewage)**  
 Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system?  NO ✓  
 If yes, what estimated quantity will be produced per month? N/A m3  
 If yes, has the municipality confirmed that sufficient capacity exist for treating / disposing of the liquid effluent to be generated by this activity(ies)? YES NO

Will the activity produce any effluent that will be treated and/or disposed of onsite?  NO ✓  
 If yes, what estimated quantity will be produced per month? N/A m3

If yes describe the nature of the effluent and how it will be disposed.  
 N/A

Note that if effluent is to be treated or disposed on site the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA

Will the activity produce effluent that will be treated and/or disposed of at another facility?  NO ✓  
 If yes, provide the particulars of the facility:  
 Facility name: N/A  
 Contact person: N/A  
 Postal address: N/A  
 Postal code: N/A  
 Telephone: N/A Cell:  
 E-mail: N/A Fax:

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

**Liquid effluent (domestic sewage)**  
 Will the activity produce domestic effluent that will be disposed of in a municipal sewage system?  NO ✓

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

--

  
 If yes, has the municipality confirmed that sufficient capacity exist for treating / disposing of the domestic effluent to be generated by this activity(ies)? 

YES	NO
-----	----

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

YES ✓	
-------	--

  
 If yes describe how it will be treated and disposed of.  

Chemical toilets are going to be used and the sewage waste will be collected by the Contractor on for treatment at a treatment facility.
--

**Emissions into the atmosphere**

Will the activity release emissions into the atmosphere? 

YES ✓	
-------	--

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

	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 emissions in terms of type and concentration:

During construction, there will be localized liberation of dust due to excavations and the hauling of materials around the site. Localised exhaust emissions will also occur, however a significant increase in concentrations of hydrocarbons, nitrogen oxides and carbon monoxide is not anticipated. During the operation phase there is likely to be localised petrol fumes in the immediate vicinity of the fuel pumps as is characteristic of a typical filling station. Increased emissions may occur due to increased traffic in the vicinity of the filling station
--

**2. WATER USE**

Indicate the source(s) of water that will be used for the activity

<b>Municipal</b> ✓	Directly from water board	groundwater	river, stream, dam or lake	other	the activity process itself 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: 

--

 liters

If Yes, please attach proof of assurance of water supply, e.g. yield of borehole, in the appropriate Appendix  
 Does the activity require a water use permit from the Department of Water Affairs? 

	NO ✓
--	------

  
 If yes, list the permits required

If yes, have you applied for the water use permit(s)? 

--

  
 If yes, have you received approval(s)? (attached in appropriate appendix) 

--

**3. POWER SUPPLY**

Please indicate the source of power supply e.g. Municipality / Eskom / Renewable energy source  

The development will not require power supply during its operation phase. However generators will be used as a source of power if needed during the construction phase.
---

If power supply is not available, where will power be sourced from?  

Please see above.
-------------------

#### 4. ENERGY EFFICIENCY

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

In other activities (construction and operation) the scope of work will be structured in a way that, where possible, the use of labour intensive methods will be employed. Not only will it serve the local community but it also saves the use of Pneumatic Equipment that requires a lot of energy input.

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

- The proposed development is not an energy-intensive development that will require energy/electricity input for its continued operations and will therefore not consume energy during its operation phase.

## SECTION E: IMPACT ASSESSMENT

The assessment of impacts must adhere to the minimum requirements in the EIA Regulations, 2014, 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 as well as the impacts of not implementing the activity (Section 24(4) (b) (i)).

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

Summaries the issues raised by interested and affected parties.

- Please note that I object to this as we have been eroding the natural landscape here and the whole idea was to be creating an eco-estate and living. By doing this through fare as a result of this bridge we will be making a lot of noise and air pollution in the area as the road will be used not just for school or residence but as a thoroughfare and the adjoining roads will become a gridlock for us residence. Of what benefit is this to the residence of this area? This certainly will not elevate the traffic flow?
- I think the bridge construction is a great initiative. Currently there is too much of a risky business at the entrance of Sagewood school when I drop-off the kids. Parents from Noordwyk School make U-turns and cause traffic jams in front of Sagewood school gate – which poses a serious safety hazard.
- Please share details on the impact on bullfrogs and birds that breed in the area, as well as vegetation impacts.

Summary of response from the practitioner to the issues raised by the interested and affected parties (including the manner in which the public comments are incorporated or why they were not included)

(A full response must be provided in the Comments and Response Report that must be attached to this report):

The PPP is currently underway. Once concluded, the issues and comments raised by I&AP throughout the process will be collated and responded to accordingly. These responses will be incorporated into the Final BAR for submission to GDARD for review and decision-making.

### 2. IMPACTS THAT MAY RESULT FROM THE CONSTRUCTION AND OPERATIONAL PHASE

Briefly describe the methodology utilized in the rating of significance of impacts

The purpose of impact assessment is to assign relative significance to predicted impacts associated with the project, and to determine the manner in which impacts are to be avoided, mitigated or managed. The potential environmental impacts were identified based on the nature of the receiving environment, a review of the proposed activities, and the issues raised in the public participation process.

The potential impacts of the proposed development were identified through a site visit, the Environmental Assessment Practitioners experience and expertise in the field and specialist study reports. In the Basic Assessment Report, the potential impacts are broadly identified and outlined. An assessment of the potential impacts is provided, identifying the impacts that are potentially significant and recommending management and mitigation measures to reduce the impacts. In general, it is recognized that every development has the potential to pose various risks to the environment as well as to the residents or businesses in the surrounding area. Therefore, it is important that these possible risks are taken into account during the pre-construction phase of the development.

In accordance with the requirements from the EIA Regulations 2014 GN 982, Regulation 19 (3) and as set out in Appendix 1, the following impacts of the issues identified through the basic assessment phase were assessed in

terms of the following methodology. All impacts are assessed according to the following criteria.

- The **nature**, a description of what causes the effect, what will be affected, and how it will be affected.
  - \* The **extent**, wherein it is indicated whether the impact will be local (limited to the immediate area or site of development), regional, national or international. A score of between 1 and 5 is assigned as appropriate with
    - \* a score of 1 being site specific,
    - \* 2 = local (site + immediate surrounds),
    - \* 3 = regional (the impact could affect the area including the neighbouring farms, the transport routes and the adjoining towns) ,
    - \* 4 = national and
    - \* a score of 5 being international (where the impact has international ramifications that extend beyond the boundaries of South Africa).
- The **duration**, wherein it is indicated whether:
  - \* The lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
  - \* The lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
  - \* Medium-term (5–15 years) – assigned a score of 3;
  - \* Long term (> 15 years) - assigned a score of 4; or;
  - \* Permanent - assigned a score of 5.
- The **magnitude**, quantified on a scale from 0-10, where a score is assigned:
  - \* 0 is small and will have no effect on the environment;
  - \* 2 is minor and will not result in an impact on processes;
  - \* 4 is low and will cause a slight impact on processes;
  - \* 6 is moderate and will result in processes continuing but in a modified way;
  - \* 8 is high (processes are altered to the extent that they temporarily cease); and
  - \* 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- The **probability** of occurrence, which describes the likelihood of the impact actually occurring. Probability is estimated on a scale, and a score assigned:
  - \* Assigned a score of 1–5, where 1 is very improbable (probably will not happen);
  - \* Assigned a score of 2 is improbable (some possibility, but low likelihood);
  - \* Assigned a score of 3 is probable (distinct possibility);
  - \* Assigned a score of 4 is highly probable (most likely); and
  - \* Assigned a score of 5 is definite (impact will occur regardless of any prevention measures).
- The **significance**, which is determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high.
- The **status**, which is described as positive, negative or neutral.
- The degree to which the impact can be reversed.
- The degree to which the impact may cause irreplaceable loss of resources.
- The degree to which the impact can be mitigated.

The **significance** is determined by combining the criteria in the following formula:

$S = (E + D + M) P$ ; where

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

The **significance** weightings for each potential impact are as follows:

- **< 30 points: Low** (i.e. where this impact would not have a direct influence on the decision to develop in the area),
- **30-60 points: Medium** (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- **>60 points: High** (i.e. Impact is significant, mitigation is critical to reduce impact or risk. Resulting impact could influence the decision depending on the possible mitigation. An impact which could influence the decision about whether or not to proceed with the project.).

Briefly describe and compare the potential impacts (as appropriate), significance rating of impacts, proposed mitigation and significance rating of impacts after mitigation that are likely to occur as a result of the **CONSTRUCTION and OPERATION PHASE** for the various alternatives of the proposed development. This must include an assessment of the significance of all impacts.

## 2.1 IMPACTS THAT MAY RESULT FROM THE **CONSTRUCTION PHASE**

**Table 5<sup>1</sup>:** A summary of anticipated significance of the potential direct, indirect and cumulative impacts that is likely to occur as a result of the **CONSTRUCTION PHASE** of the Route **Alternative 1**, **Alternative 2** or **Alternative 3**.

Potential impacts:	Proposed mitigation:	Risk of the impact and mitigation not being implemented																		
<b>IMPACT ON WATERCOURSES</b>																				
<p><b>Nature of the Impact:</b> <u>Changing the quantity and fluctuation properties of the watercourse by for example restricting water flow or increasing flood flows.</u></p> <ul style="list-style-type: none"> <li>The sources of these impacts include the compaction of soil, the removal of vegetation, surface water redirection of water during construction activities.</li> </ul> <table border="1"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td><b>Probability</b></td> <td>Definite (5)</td> <td>Highly Probable (4)</td> </tr> <tr> <td><b>Duration</b></td> <td>Medium term (3)</td> <td>Short term (2)</td> </tr> <tr> <td><b>Extent</b></td> <td>Regional (3)</td> <td>Regional (3)</td> </tr> <tr> <td><b>Magnitude</b></td> <td>High (8) <b>Alt 2</b> Moderate (6) <b>Alt 1</b> <b>Alt 3</b></td> <td>Moderate (6) <b>Alt 2</b> Low (4) <b>Alt 1</b> <b>Alt 3</b></td> </tr> <tr> <td><b>Significance</b></td> <td><b>70 (high) Alt 2</b> <b>60 (high) Alt 1</b> <b>Alt 3</b></td> <td><b>44 (moderate) Alt 2</b> <b>36 (moderate) Alt</b></td> </tr> </tbody> </table>	Description	Without Mitigation	With Mitigation	<b>Probability</b>	Definite (5)	Highly Probable (4)	<b>Duration</b>	Medium term (3)	Short term (2)	<b>Extent</b>	Regional (3)	Regional (3)	<b>Magnitude</b>	High (8) <b>Alt 2</b> Moderate (6) <b>Alt 1</b> <b>Alt 3</b>	Moderate (6) <b>Alt 2</b> Low (4) <b>Alt 1</b> <b>Alt 3</b>	<b>Significance</b>	<b>70 (high) Alt 2</b> <b>60 (high) Alt 1</b> <b>Alt 3</b>	<b>44 (moderate) Alt 2</b> <b>36 (moderate) Alt</b>	<ul style="list-style-type: none"> <li>Effective bridge design should prevent canalization downstream</li> <li>Designs should take into account soil properties, slopes and runoff energy.</li> <li>Inclusion of attenuation structures with the aim of preventing future flooding and canalisation of the stream</li> <li>Construction must be restricted to the dryer winter months where possible.</li> <li>A temporary fence or demarcation must be erected around No-Go Areas outside the proposed works area prior to any construction taking place as part of the contractor planning phase when compiling work method statements to prevent access to the adjacent portions of the watercourse.</li> <li>Effective stormwater management should be a priority during both construction and operational phase. This should be monitored as part of the EMP. High energy stormwater input into the watercourses should be prevented at all cost.</li> <li>The location of bridge support pillars should be located as far outside the stream channel as the physical constraints of the material/ engineered structure allows (keeping in mind that the maximum span length must be adhered to as per the engineers' specifications).</li> </ul>	Residual risks are associated with ineffective bridge and stormwater design
Description	Without Mitigation	With Mitigation																		
<b>Probability</b>	Definite (5)	Highly Probable (4)																		
<b>Duration</b>	Medium term (3)	Short term (2)																		
<b>Extent</b>	Regional (3)	Regional (3)																		
<b>Magnitude</b>	High (8) <b>Alt 2</b> Moderate (6) <b>Alt 1</b> <b>Alt 3</b>	Moderate (6) <b>Alt 2</b> Low (4) <b>Alt 1</b> <b>Alt 3</b>																		
<b>Significance</b>	<b>70 (high) Alt 2</b> <b>60 (high) Alt 1</b> <b>Alt 3</b>	<b>44 (moderate) Alt 2</b> <b>36 (moderate) Alt</b>																		

<sup>1</sup> **Note:** This table represents the construction impacts for all three alternatives route as their impacts do not differ significantly, where the alternatives differ in impacts, reference is made accordingly.

Potential impacts:			Proposed mitigation:	Risk of the impact and mitigation not being implemented												
	<b>1 Alt 3</b>	<b>1 Alt 3</b>														
<b>Status (positive, negative or neutral)</b>	Negative	Negative														
<p><b>Nature of the Impact:</b> <u>Changes in sediment entering and exiting the system</u></p> <p>Changing the amount of sediment entering water resource and associated change in turbidity (increasing or decreasing the amount). Construction and operational activities will result in earthworks and soil disturbance as well as the removal of natural vegetation. This could result in the loss of topsoil, sedimentation of the watercourse and increase the turbidity of the water.</p> <p>Possible sources of the impacts include:</p> <ul style="list-style-type: none"> <li>• Earthwork activities during construction</li> <li>• Clearing of surface vegetation will expose the soils, which in rainy events would wash through the watercourse, causing sedimentation. In addition, indigenous vegetation communities are unlikely to colonise eroded soils successfully and seeds from proximate alien invasive trees can spread easily into these eroded soil.</li> <li>• Disturbance of soil surface</li> <li>• Disturbance of slopes through creation of roads and tracks adjacent to the watercourse</li> <li>• Erosion (e.g. gully formation, bank collapse)</li> </ul> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td><b>Probability</b></td> <td>Definite (5)</td> <td>Probable (3)</td> </tr> <tr> <td><b>Duration</b></td> <td>Medium term (3)</td> <td>Short term (2)</td> </tr> <tr> <td><b>Extent</b></td> <td>Regional (3)</td> <td>Regional (3)</td> </tr> </tbody> </table>			Description	Without Mitigation	With Mitigation	<b>Probability</b>	Definite (5)	Probable (3)	<b>Duration</b>	Medium term (3)	Short term (2)	<b>Extent</b>	Regional (3)	Regional (3)	<ul style="list-style-type: none"> <li>• Consider the various methods and equipment available and select whichever method(s) that will have the least impact on watercourses.</li> <li>• Water may seep into trenching and earthworks. It is likely that water will be contaminated within these earthworks and should thus be cleaned or dissipated into a structure that allows for additional sediment input and slows down the velocity of the water thus reducing the risk of erosion.</li> <li>• Effective sediment traps should be installed.</li> <li>• Construction in and around watercourses must be restricted to the dryer winter months where possible.</li> <li>• Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction / earthworks in that area (DWAF, 2005).</li> <li>• Remove only the vegetation where essential for construction and do not allow any disturbance to the adjoining natural vegetation cover.</li> <li>• Rehabilitation plans must be submitted and approved for rehabilitation of damage during construction and that plan must be implemented immediately upon completion of construction.</li> <li>• Cordon off areas that are under rehabilitation as no-go areas using danger tape and steel droppers. If necessary, these areas should be fenced off to prevent vehicular, pedestrian access.</li> <li>• Protect all areas susceptible to erosion and ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and work areas.</li> <li>• Runoff from the construction area must be managed to avoid erosion and pollution problems.</li> <li>• Monitoring should be done to ensure that sediment pollution is timeously dressed</li> </ul>	<p>Expected to be limited during the construction activities provided that the mitigation measures are implemented correctly and effective rehabilitation of the site is undertaken where necessary.</p>
Description	Without Mitigation	With Mitigation														
<b>Probability</b>	Definite (5)	Probable (3)														
<b>Duration</b>	Medium term (3)	Short term (2)														
<b>Extent</b>	Regional (3)	Regional (3)														



Potential impacts:			Proposed mitigation:	Risk of the impact and mitigation not being implemented
<b>Magnitude</b>	Moderate (6)	Low (4)		
<b>Significance</b>	<b>60 (moderate)</b>	<b>27 (low)</b>		
<b>Status (positive, negative or neutral)</b>	Negative	Negative		
<p><b>Nature of the Impact:</b> <u>Introduction and spread of alien vegetation.</u></p> <ul style="list-style-type: none"> <li>The moving of soil and vegetation resulting in opportunistic invasions after disturbance and the introduction of seed in building materials and on vehicles. Invasions of alien plants can impact on hydrology, by reducing the quantity of water entering a watercourse, and outcompete natural vegetation, decreasing the natural biodiversity. Once in a system alien invasive plants can spread through the catchment. If allowed to seed before control measures are implemented alien plants can easily colonise and impact on downstream users.</li> </ul>			<ul style="list-style-type: none"> <li>Implement an Alien Plant Control Plan</li> <li>Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction / earthworks in that area and returning it where possible afterwards.</li> <li>Monitor the establishment of alien invasive species within the areas affected by the construction and maintenance and take immediate corrective action where invasive species are observed to establish.</li> <li>Rehabilitate or revegetate disturbed areas and monitor for effective rehabilitation as specified in the rehabilitation plan</li> </ul>	Expected to be limited provided that the mitigation measures are implemented correctly and effective rehabilitation of the site is undertaken where necessary.
<b>Description</b>	<b>Without Mitigation</b>	<b>With Mitigation</b>		
<b>Probability</b>	Highly Probable (4)	Probable (3)		
<b>Duration</b>	Long term (4)	Short term (2)		
<b>Extent</b>	Regional (3)	Limited to Local Area (2)		
<b>Magnitude</b>	Moderate (6)	Low (4)		
<b>Significance</b>	<b>52 (moderate)</b>	<b>24 (low)</b>		
<b>Status (positive, negative or neutral)</b>	Negative	Negative		
<p><b>Nature of the Impact:</b> <u>Changes in water quality due to foreign materials and increased nutrients.</u></p> <ul style="list-style-type: none"> <li>Construction activities may result in the discharge of solvents and other industrial chemicals, leakage of fuel/oil from vehicles and the</li> </ul>			<ul style="list-style-type: none"> <li>Provision of adequate sanitation facilities located outside of the watercourse/riparian area or its associated buffer zone.</li> <li>Implementation of appropriate stormwater management around the excavation to prevent the ingress of run-off into the excavation and to prevent contaminated runoff into the watercourse.</li> </ul>	Expected to be limited provided that the mitigation measures are implemented correctly and effective rehabilitation of the site is undertaken where necessary.

Potential impacts:			Proposed mitigation:	Risk of the impact and mitigation not being implemented
disposal of sewage resulting in the loss of sensitive biota in the wetlands/riparian area and a reduction in watercourse integrity.			<ul style="list-style-type: none"> <li>Provision of adequate sanitation facilities located outside of the wetland/riparian area or its associated buffer zone</li> <li>The development footprint must be fenced off from the watercourse and no related impacts may be allowed into the watercourse e.g. water runoff from cleaning of equipment, vehicle access etc.</li> <li>After construction, the land must be cleared of rubbish, surplus materials, and equipment, and all parts of the land shall be left in a condition as close as possible to that prior to use.</li> <li>Maintenance of construction vehicles / equipment should not take place within the watercourse or watercourse buffer.</li> <li>Control of waste discharges</li> <li>Treatment of pollution identified should be prioritized accordingly.</li> <li>Install litter traps downstream from the bridge</li> </ul>	
<b>Description</b>	<b>Without Mitigation</b>	<b>With Mitigation</b>		
<b>Probability</b>	Definite (5)	Probable (3)		
<b>Duration</b>	Short term (2)	Temporary (1)		
<b>Extent</b>	Limited to Local Area (2)	Limited to Local Area (2)		
<b>Magnitude</b>	Moderate (6)	Low (4)		
<b>Significance</b>	<b>50 (moderate)</b>	<b>21 (low)</b>		
<b>Status (positive, negative or neutral)</b>	Negative	Negative		
<b>Nature of the Impact:</b> <u>Loss and disturbance of wetland habitat and fringe vegetation.</u>			<ul style="list-style-type: none"> <li>Provision of adequate sanitation facilities located outside of the watercourse or its associated buffer zone.</li> <li>Ensure that the footprint of the construction activities is the minimum area required and that unnecessary vegetation clearing does not occur.</li> <li>The works area should be clearly demarcated during the construction phase and no-go areas must be clearly demarcated.</li> <li>Monitor rehabilitation and the occurrence of sedimentation twice during the rainy season for at least two years and take immediate corrective action where needed.</li> <li>Monitor the establishment of alien invasive species within the areas affected by the construction and take immediate corrective action where invasive species are observed to establish</li> <li>Operational activities should not take place within watercourses or buffer zones, nor should edge effects impact on these areas</li> <li>Operational activities should not impact on rehabilitated or naturally vegetated areas</li> </ul>	Expected to be moderate since the wetland is already in a largely transformed state.
<ul style="list-style-type: none"> <li>Construction, maintenance and rehabilitation activities within wetland areas</li> </ul>				
<b>Description</b>	<b>Without Mitigation</b>	<b>With Mitigation</b>		
<b>Probability</b>	Definite (5)	Highly Probable (4)		
<b>Duration</b>	Medium-term (3)	Temporary (1)		
<b>Extent</b>	Limited to Local Area (2)	Limited to Local Area (2)		
<b>Magnitude</b>	Moderate (6)	Low (4)		
<b>Significance</b>	<b>55 (moderate)</b>	<b>28 (low)</b>		
<b>Status (positive, negative or neutral)</b>	Negative	Negative		
<b>IMPACT ON VEGETATION</b>				

Potential impacts:	Proposed mitigation:	Risk of the impact and mitigation not being implemented																					
<p><b>Nature of the Impact:</b> <u>Destruction of <i>Hyparrhenia hirta</i> grassland</u></p> <p>The development will require the removal of the <i>Hyparrhenia hirta</i> grassland which contributes to open space and catchment to the Rietspruit. However, these impacts can be mitigated.</p> <p>The sources of this impact include:</p> <ul style="list-style-type: none"> <li>Clearing of and damage to vegetation in construction footprint, access roads, construction camps, vehicle / machinery traffic and trampling by workers;</li> <li>Illegal disposal and dumping of construction material such as cement or oil, as well as maintenance materials during construction.</li> </ul> <table border="1"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td><b>Probability</b></td> <td>Definite (5)</td> <td>Probable (3)</td> </tr> <tr> <td><b>Duration</b></td> <td>Permanent (5)</td> <td>Permanent (5)</td> </tr> <tr> <td><b>Extent</b></td> <td>Limited to Site (1)</td> <td>Limited to Site (1)</td> </tr> <tr> <td><b>Magnitude</b></td> <td>Low (4) <b>Alt 2</b> Minor (2) <b>Alt 1 Alt 3</b></td> <td>Minor (2)</td> </tr> <tr> <td><b>Significance</b></td> <td><b>50 (medium) Alt 2</b> 40 (moderate) <b>Alt 1 Alt 3</b></td> <td><b>24 (low)</b></td> </tr> <tr> <td><b>Status (positive, negative or neutral)</b></td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table>	Description	Without Mitigation	With Mitigation	<b>Probability</b>	Definite (5)	Probable (3)	<b>Duration</b>	Permanent (5)	Permanent (5)	<b>Extent</b>	Limited to Site (1)	Limited to Site (1)	<b>Magnitude</b>	Low (4) <b>Alt 2</b> Minor (2) <b>Alt 1 Alt 3</b>	Minor (2)	<b>Significance</b>	<b>50 (medium) Alt 2</b> 40 (moderate) <b>Alt 1 Alt 3</b>	<b>24 (low)</b>	<b>Status (positive, negative or neutral)</b>	Negative	Negative	<ul style="list-style-type: none"> <li>An independent Ecological Control Officer (ECO) should be appointed to oversee construction.</li> <li>Construction camps should ideally be placed within modified areas or <i>H hirta</i> grassland that is proposed for future development, as far as possible from the watercourses. Avoid disturbances to <i>H hirta</i> grassland in the eastern extent of the proposed alternatives.</li> <li>A temporary fence or demarcation must be erected around the construction area to prevent access to adjacent grasslands</li> <li>Prohibit vehicular or pedestrian access into natural areas beyond the demarcated boundary of the construction area.</li> <li>No open fires are permitted within naturally vegetated areas.</li> <li>Formalise access roads and make use of existing roads and tracks where feasible, rather than new roads through naturally vegetated areas.</li> <li>Only remove vegetation where absolutely necessary and retain vegetation in place for as long as possible.</li> <li>A vegetation rehabilitation plan should already be implemented during construction and include: <ul style="list-style-type: none"> <li>The grassland can be removed as sods and stored within transformed vegetation or other suitable areas. Sods should preferably be removed during the winter months and be replanted by latest springtime. Sods should be stacked on top of each other. Once construction is completed, these sods should be used to replace the sods where they have been removed. In the absence of timely rainfall, the sods should be watered twice more over the next 2 weeks.</li> <li>Grasses that naturally occur in the area should be sown / hydroseeded in the disturbed areas.</li> </ul> </li> <li>Construction workers may not remove flora and neither may anyone collect seed from the area without the permission of the local authority.</li> <li>No activities should take place during rainy events and at least 2 days afterwards.</li> <li>Where topsoils need to be removed, store such in a separate area where such soils can be used for post-construction rehabilitation where applicable. Never mix topsoils with subsoils or other soils.</li> <li>Maintain site demarcations in position until the cessation of construction work.</li> <li>After construction, the land must be cleared of rubbish, surplus materials, and equipment, and returned to a condition as close as possible to that prior to construction.</li> </ul>	<p>Localised alteration of soil surface characteristics and loss of flora and increased fragmentation of remaining grasslands in the area.</p>
Description	Without Mitigation	With Mitigation																					
<b>Probability</b>	Definite (5)	Probable (3)																					
<b>Duration</b>	Permanent (5)	Permanent (5)																					
<b>Extent</b>	Limited to Site (1)	Limited to Site (1)																					
<b>Magnitude</b>	Low (4) <b>Alt 2</b> Minor (2) <b>Alt 1 Alt 3</b>	Minor (2)																					
<b>Significance</b>	<b>50 (medium) Alt 2</b> 40 (moderate) <b>Alt 1 Alt 3</b>	<b>24 (low)</b>																					
<b>Status (positive, negative or neutral)</b>	Negative	Negative																					
<p><b>Nature of the Impact:</b> <u>Destruction or degradation of moist grassland and pollution of the watercourse</u></p>	<ul style="list-style-type: none"> <li>No activities may proceed within moist grassland without a Water Use License permitting the activity.</li> <li>The final route should impact on as little portion thereof as possible while adhering to</li> </ul>	<p>Erosion, pollution of the watercourse, invasion by alien invasive plant species</p>																					

Potential impacts:			Proposed mitigation:	Risk of the impact and mitigation not being implemented																					
<p>The construction of the road will inevitably require the removal of moist grassland vegetation for the purpose of access roads, servitudes, construction camps and the road footprint. This will impact on the health and functioning of the wetland. Construction could also result in pollution of the watercourse.</p> <table border="1"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td><b>Probability</b></td> <td>Definite (5)</td> <td>Highly probable (4)</td> </tr> <tr> <td><b>Duration</b></td> <td>Medium-term (3)</td> <td>Medium (2)</td> </tr> <tr> <td><b>Extent</b></td> <td>Limited to Local Area (2)</td> <td>Limited to Local Area (2)</td> </tr> <tr> <td><b>Magnitude</b></td> <td>High (8) <b>Alt 2</b> Moderate (6) <b>Alt 1</b> <b>Alt 3</b></td> <td>Moderate (6) <b>Alt 2</b> Low (4) <b>Alt 1</b> <b>Alt 3</b></td> </tr> <tr> <td><b>Significance</b></td> <td>65 (high) <b>Alt 2</b> 55 (High) <b>Alt 1</b> <b>Alt 3</b></td> <td>40 (medium) <b>Alt 2</b> 32 (medium) <b>Alt 1</b> <b>Alt 3</b></td> </tr> <tr> <td><b>Status (positive, negative or neutral)</b></td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table>			Description	Without Mitigation	With Mitigation	<b>Probability</b>	Definite (5)	Highly probable (4)	<b>Duration</b>	Medium-term (3)	Medium (2)	<b>Extent</b>	Limited to Local Area (2)	Limited to Local Area (2)	<b>Magnitude</b>	High (8) <b>Alt 2</b> Moderate (6) <b>Alt 1</b> <b>Alt 3</b>	Moderate (6) <b>Alt 2</b> Low (4) <b>Alt 1</b> <b>Alt 3</b>	<b>Significance</b>	65 (high) <b>Alt 2</b> 55 (High) <b>Alt 1</b> <b>Alt 3</b>	40 (medium) <b>Alt 2</b> 32 (medium) <b>Alt 1</b> <b>Alt 3</b>	<b>Status (positive, negative or neutral)</b>	Negative	Negative	<p>mitigation measures as set out in the wetland assessment.</p> <ul style="list-style-type: none"> <li>The road design should attempt to span the moist grassland / wetland area and associated buffer zone.</li> <li>Mitigation as set out above should be implemented</li> <li>The moist grassland (wetland as delineated by the wetland specialist) and associated buffer zones should be fenced during the construction phase to prevent any human activity from encroaching into these areas, other than that which is essential to the road construction. Monitoring of the fences is important to ensure no infringement of the fences occurs.</li> <li>Construction within moist grassland should preferably take place during the dry winter months.</li> <li>Input of sediment during construction activities should be prevented at all cost. Mitigation for this potential impact includes establishment of vegetation as soon as possible after construction.</li> <li>Pollution of the surface and groundwater. Mitigation for this potential impact includes: <ul style="list-style-type: none"> <li>In the case of pollution of any surface or groundwater, the Regional Representative of the Department of Water Affairs must be informed immediately;</li> <li>Store all litter carefully so it cannot be washed or blown into the water course;</li> <li>Construction vehicles are to be maintained in good working order so as to reduce the probability of leakage of fuels and lubricants;</li> <li>A walled concrete platform, dedicated store with adequate flooring or bermed area should be used to accommodate chemicals such as fuel, oil, paint, herbicide and insecticides, as appropriate, in well-ventilated areas;</li> <li>Storage of potentially hazardous materials should be above any 100-year flood line or the functional wetland boundary (and its associated buffer zone). These materials include fuel, oil, cement, bitumen etc.;</li> <li>Surface water draining off contaminated areas containing oil and petrol would need to be channelled towards a sump which will separate these chemicals and oils;</li> <li>Concrete is to be mixed on mixing trays only, not on exposed soil;</li> <li>Concrete and tar shall be mixed only in areas which have been specially demarcated for this purpose;</li> <li>After all the concrete / tar mixing is complete all waste concrete / tar shall be removed from the batching area and disposed of at an approved dumpsite;</li> </ul> </li> </ul>	
Description	Without Mitigation	With Mitigation																							
<b>Probability</b>	Definite (5)	Highly probable (4)																							
<b>Duration</b>	Medium-term (3)	Medium (2)																							
<b>Extent</b>	Limited to Local Area (2)	Limited to Local Area (2)																							
<b>Magnitude</b>	High (8) <b>Alt 2</b> Moderate (6) <b>Alt 1</b> <b>Alt 3</b>	Moderate (6) <b>Alt 2</b> Low (4) <b>Alt 1</b> <b>Alt 3</b>																							
<b>Significance</b>	65 (high) <b>Alt 2</b> 55 (High) <b>Alt 1</b> <b>Alt 3</b>	40 (medium) <b>Alt 2</b> 32 (medium) <b>Alt 1</b> <b>Alt 3</b>																							
<b>Status (positive, negative or neutral)</b>	Negative	Negative																							

Potential impacts:	Proposed mitigation:	Risk of the impact and mitigation not being implemented																									
	<ul style="list-style-type: none"> <li>All construction materials liable to spillage are to be stored in appropriate structures with impermeable flooring; Portable septic toilets are to be provided and maintained for construction crews. Maintenance must include their removal without sewage spillage;</li> <li>Under no circumstances may ablutions occur outside of the provided facilities; and</li> <li>No uncontrolled discharges from the construction crew camps to any surface water resources shall be permitted. Any discharge points need to be approved by the relevant authority.</li> </ul>																										
<p><b>Nature of the Impact:</b> <u>Destruction of protected plants and plants of conservation concern</u></p> <ul style="list-style-type: none"> <li>Development within the <i>Hyparrhenia hirta</i>-grassland would require the removal of the declining <i>Hypoxis hemerocallidea</i>. Some provincially protected or species of concern may also occur in the moist grassland.</li> </ul> <table border="1"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td><b>Probability</b></td> <td>Probable (3)</td> <td>Improbable (2)</td> </tr> <tr> <td><b>Duration</b></td> <td>Permanent (5)</td> <td>Short-term (2)</td> </tr> <tr> <td><b>Extent</b></td> <td>Local Area (2)</td> <td>Limited to site (1)</td> </tr> <tr> <td rowspan="2"><b>Magnitude</b></td> <td>Moderate (6) <b>Alt 2</b></td> <td>Low (4) <b>Alt 2</b></td> </tr> <tr> <td>Low (4) <b>Alt 1 Alt 3</b></td> <td>Minor (2) <b>Alt 1 Alt 3</b></td> </tr> <tr> <td rowspan="2"><b>Significance</b></td> <td>39 (medium) <b>Alt 2</b></td> <td>14 (low) <b>Alt 2</b></td> </tr> <tr> <td>33 (moderate) <b>Alt 1 Alt 3</b></td> <td>10 (low) <b>Alt 1 Alt 3</b></td> </tr> <tr> <td><b>Status (positive, negative or neutral)</b></td> <td>Negative</td> <td>Positive if species are relocated or avoided and protected</td> </tr> </tbody> </table>	Description	Without Mitigation	With Mitigation	<b>Probability</b>	Probable (3)	Improbable (2)	<b>Duration</b>	Permanent (5)	Short-term (2)	<b>Extent</b>	Local Area (2)	Limited to site (1)	<b>Magnitude</b>	Moderate (6) <b>Alt 2</b>	Low (4) <b>Alt 2</b>	Low (4) <b>Alt 1 Alt 3</b>	Minor (2) <b>Alt 1 Alt 3</b>	<b>Significance</b>	39 (medium) <b>Alt 2</b>	14 (low) <b>Alt 2</b>	33 (moderate) <b>Alt 1 Alt 3</b>	10 (low) <b>Alt 1 Alt 3</b>	<b>Status (positive, negative or neutral)</b>	Negative	Positive if species are relocated or avoided and protected	<ul style="list-style-type: none"> <li>The final route alignment, locality of construction camps and the footprint of other related disturbances should be surveyed by a specialist during the flowering period (November or February) of threatened or provincially protected species that could occur here .</li> <li>If such species are located, the species can only be removed once a permit for the removal or relocation of such species was granted by the GDARD.</li> <li>Protected plants must be removed by a suitably qualified specialist and replanted in suitable habitat such as the buffer areas of the moist grasslands. Their survival must be monitored for at least two growing seasons after relocation.</li> <li>Construction workers may not tamper or remove these plants, and neither may anyone collect seed from the plants without permission from the local authority.</li> </ul>	<p>Species removed and relocated as part of rehabilitation could die due to transplantation shock or damage during replanting.</p>
Description	Without Mitigation	With Mitigation																									
<b>Probability</b>	Probable (3)	Improbable (2)																									
<b>Duration</b>	Permanent (5)	Short-term (2)																									
<b>Extent</b>	Local Area (2)	Limited to site (1)																									
<b>Magnitude</b>	Moderate (6) <b>Alt 2</b>	Low (4) <b>Alt 2</b>																									
	Low (4) <b>Alt 1 Alt 3</b>	Minor (2) <b>Alt 1 Alt 3</b>																									
<b>Significance</b>	39 (medium) <b>Alt 2</b>	14 (low) <b>Alt 2</b>																									
	33 (moderate) <b>Alt 1 Alt 3</b>	10 (low) <b>Alt 1 Alt 3</b>																									
<b>Status (positive, negative or neutral)</b>	Negative	Positive if species are relocated or avoided and protected																									

Potential impacts:	Proposed mitigation:	Risk of the impact and mitigation not being implemented																					
<p><b>Nature of the Impact:</b> <u>Removal of alien invasive vegetation</u></p> <p>Removing of existing invasive alien vegetation could have a positive effect and reduce infestations downstream</p> <table border="1" data-bbox="143 564 768 863"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td>Probability</td> <td>Probable (3)</td> <td>Highly probable (4)</td> </tr> <tr> <td>Duration</td> <td>Short-term (2)</td> <td>Long-term (4)</td> </tr> <tr> <td>Extent</td> <td>Local Area (2)</td> <td>Local Area (2)</td> </tr> <tr> <td>Magnitude</td> <td>Moderate (6)</td> <td>High (8)</td> </tr> <tr> <td>Significance</td> <td><b>30 (Low)</b></td> <td><b>56 (medium)</b></td> </tr> <tr> <td>Status (positive, negative or neutral)</td> <td><b>Positive</b></td> <td><b>Positive</b></td> </tr> </tbody> </table>	Description	Without Mitigation	With Mitigation	Probability	Probable (3)	Highly probable (4)	Duration	Short-term (2)	Long-term (4)	Extent	Local Area (2)	Local Area (2)	Magnitude	Moderate (6)	High (8)	Significance	<b>30 (Low)</b>	<b>56 (medium)</b>	Status (positive, negative or neutral)	<b>Positive</b>	<b>Positive</b>	<ul style="list-style-type: none"> <li>• Compile and implement an alien invasive monitoring plan to remove alien invasive plant species from the site, prior to construction.</li> <li>• Rehabilitate all areas cleared of invasive plants as soon as practically possible, utilising specified methods and species.</li> <li>• Monitor all sites disturbed by construction activities for colonisation by exotics or invasive plants and control these as they emerge. Monitoring should continue for at least two years after construction is complete.</li> <li>• Follow manufacturer's instruction when using chemical methods, especially in terms of quantities, time of application etc.</li> <li>• Ensure that only properly trained people handle and make use of chemicals.</li> <li>• Dispose of the eradicated plant material at an approved solid waste disposal site.</li> <li>• Only indigenous plant species naturally occurring in the area should be used during the rehabilitation of the areas affected by the construction activities.</li> </ul>	<p>If alien invasive species monitoring is not maintained, the cleared areas could become infested again.</p>
Description	Without Mitigation	With Mitigation																					
Probability	Probable (3)	Highly probable (4)																					
Duration	Short-term (2)	Long-term (4)																					
Extent	Local Area (2)	Local Area (2)																					
Magnitude	Moderate (6)	High (8)																					
Significance	<b>30 (Low)</b>	<b>56 (medium)</b>																					
Status (positive, negative or neutral)	<b>Positive</b>	<b>Positive</b>																					
<p><b>Nature of the Impact:</b> <u>Clearing of land for construction camps and potential pollution of the soil and water</u></p> <p>These may be at one or several locations, area will be cleared and levelled where necessary, site offices may be temporary structures, machinery, building supplies and temporary staff facilities (excluding accommodation) will be housed here. The impacts could include:</p> <ul style="list-style-type: none"> <li>• Removal of vegetation</li> <li>• Levelling and compaction of soils</li> <li>• Storage of machinery, supplies and staff facilities</li> </ul> <p>This could lead to the loss of vegetation and/or species of conservation concern, alteration and loss of microhabitats, altered vegetation cover, increased erosion and contamination of soil and groundwater.</p>	<ul style="list-style-type: none"> <li>• Prevent spillage of construction material and other pollutants, contain and treat any spillages immediately, strictly prohibit any pollution/littering according to the relevant EMP</li> <li>• No open fires may be lit for cooking or any other purposes, unless in specifically designated and secured areas</li> <li>• Facilities may not be used as staff accommodation</li> <li>• No vehicles may be washed on the property, except in suitably designed and protected areas</li> <li>• No vehicles may be serviced or repaired on the property, unless it is an emergency situation in which case adequate spillage containment must be implemented</li> </ul>	<p>Compaction on construction camps could result in altered topsoil characteristics and vegetation composition. These areas are also prone to invasion by alien invasive plant species.</p>																					

Potential impacts:			Proposed mitigation:	Risk of the impact and mitigation not being implemented																					
<table border="1"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td>Probability</td> <td>Probable (3)</td> <td>Improbable (2)</td> </tr> <tr> <td>Duration</td> <td>Medium-term (3)</td> <td>Short-term (2)</td> </tr> <tr> <td>Extent</td> <td>Local Area (2)</td> <td>Site bound (1)</td> </tr> <tr> <td>Magnitude</td> <td>Moderate (6)</td> <td>Low (4)</td> </tr> <tr> <td>Significance</td> <td>33 (moderate)</td> <td>14 (low)</td> </tr> <tr> <td>Status (positive, negative or neutral)</td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table>			Description	Without Mitigation	With Mitigation	Probability	Probable (3)	Improbable (2)	Duration	Medium-term (3)	Short-term (2)	Extent	Local Area (2)	Site bound (1)	Magnitude	Moderate (6)	Low (4)	Significance	33 (moderate)	14 (low)	Status (positive, negative or neutral)	Negative	Negative		
Description	Without Mitigation	With Mitigation																							
Probability	Probable (3)	Improbable (2)																							
Duration	Medium-term (3)	Short-term (2)																							
Extent	Local Area (2)	Site bound (1)																							
Magnitude	Moderate (6)	Low (4)																							
Significance	33 (moderate)	14 (low)																							
Status (positive, negative or neutral)	Negative	Negative																							
<p><b>Nature of the Impact:</b> <u>Exposure to erosion and subsequent sedimentation or pollution of proximate watercourses</u></p> <p>The removal of surface vegetation will expose the soils, which in rainy events would wash down into the Rietspruit, causing sedimentation. In addition, indigenous vegetation communities are unlikely to colonise eroded soils successfully and seeds from proximate alien invasive plant species can spread easily into these eroded soils. After construction, a lack of rehabilitation or failed rehabilitation will result in bare soils that are susceptible to erosion. Furthermore, maintenance vehicles could disturb rehabilitated areas which could lead to soil erosion, habitat modification, trampling of vegetation as well as the destruction of protected plants and plants of conservation concern. The sources of this impact include:</p> <ul style="list-style-type: none"> <li>Removal of vegetation in proximity to the moist grassland, without proper rehabilitation or failure of rehabilitation;</li> <li>Access roads, especially on slopes, channels rainfall and causes erosion;</li> <li>Lack of rehabilitation or failed rehabilitation;</li> <li>Maintenance vehicles disturbing rehabilitated areas;</li> </ul>			<ul style="list-style-type: none"> <li>Do not allow erosion to develop on a large scale before taking action.</li> <li>Where possible, no construction / activities should be undertaken within the wetland areas. The extent of wetland conditions should be verified by a wetland specialist and no activities should take place within these areas without that a Water Use License was granted by the Department of Water Affairs (DWA) for these activities.</li> <li>Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction / earthworks in that area (DWA, 2005).</li> <li>Runoff from road must be managed to avoid erosion and pollution problems.</li> <li>Ensure that runoff from compacted or sealed surfaces is slowed down and dispersed sufficiently to prevent accelerated erosion from being initiated (erosion management plan required)</li> <li>Colonisation of the disturbed areas by plants species from the surrounding natural vegetation must be monitored to ensure that indigenous vegetation cover is sufficient within one growing season. Due to the high degree of invasive species in the area, it is active rehabilitation e.g. hydroseeding is recommended, along with an alien invasive management plan.</li> <li>Protect all areas susceptible to erosion and ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and work areas.</li> <li>After construction clear any temporarily impacted areas of all foreign materials, re-apply and/or loosen topsoils and landscape to surrounding level.</li> </ul>	None																					

Potential impacts:			Proposed mitigation:	Risk of the impact and mitigation not being implemented
<ul style="list-style-type: none"> <li>Spillages of construction material and harmful chemicals; and</li> <li>Failure of rehabilitation of the construction footprint.</li> </ul>				
<b>Description</b>	<b>Without Mitigation</b>	<b>With Mitigation</b>		
<b>Probability</b>	Highly Probable (4)	Probable (3)		
<b>Duration</b>	Medium-term (3)	Short-term (2)		
<b>Extent</b>	Local Area (2)	Site bound (1)		
<b>Magnitude</b>	High (8)	Low (4)		
<b>Significance</b>	<b>52 (moderate)</b>	<b>21 (low)</b>		
<b>Status (positive, negative or neutral)</b>	Negative	Negative		
<b>IMPACTS ON FAUNA</b>				
<p><b>Nature of the Impact:</b> <u>Destruction of natural habitat</u></p> <ul style="list-style-type: none"> <li>Due to the nature of construction of such a development, some of the existing natural habitat will be destroyed. Heavy motor vehicle usage along the study site will expose the soils on the site to erosion and compaction.</li> </ul>			<ul style="list-style-type: none"> <li>Restrict construction activities to the smallest possible area of development.</li> <li>Cordon off other parts of the wetland to restrict the movement of construction vehicles and construction personnel.</li> </ul>	Impacts on the natural habitat are likely to be permanent unless mitigation and rehabilitation take place.
<b>Description</b>	<b>Without Mitigation</b>	<b>With Mitigation</b>		
<b>Probability</b>	Definite (5)	Probable (3)		
<b>Duration</b>	Long term (4)	Medium term (3)		
<b>Extent</b>	Regional (3)	Limited to Local Area (2)		
<b>Magnitude</b>	Moderate (6)	Low (4)		
<b>Significance</b>	<b>65 (high)</b>	<b>27 (low)</b>		
<b>Status (positive, negative or neutral)</b>	Negative	Negative		



Potential impacts:	Proposed mitigation:	Risk of the impact and mitigation not being implemented																					
<p><b>Nature of the Impact:</b> <u>Destruction of sensitive vertebrate habitat</u></p> <ul style="list-style-type: none"> <li>Construction will locally damage the wetland, but this will be small and temporary. This leads to certain species becoming proportionally rarer within local context.</li> </ul> <table border="1"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td><b>Probability</b></td> <td>Definite (5)</td> <td>Probable (3)</td> </tr> <tr> <td><b>Duration</b></td> <td>Long term (4)</td> <td>Medium term (3)</td> </tr> <tr> <td><b>Extent</b></td> <td>Regional (3)</td> <td>Limited to Local Area (2)</td> </tr> <tr> <td><b>Magnitude</b></td> <td>Moderate (6)</td> <td>Low (4)</td> </tr> <tr> <td><b>Significance</b></td> <td><b>65 (high)</b></td> <td><b>27 (low)</b></td> </tr> <tr> <td><b>Status (positive, negative or neutral)</b></td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table>	Description	Without Mitigation	With Mitigation	<b>Probability</b>	Definite (5)	Probable (3)	<b>Duration</b>	Long term (4)	Medium term (3)	<b>Extent</b>	Regional (3)	Limited to Local Area (2)	<b>Magnitude</b>	Moderate (6)	Low (4)	<b>Significance</b>	<b>65 (high)</b>	<b>27 (low)</b>	<b>Status (positive, negative or neutral)</b>	Negative	Negative	<ul style="list-style-type: none"> <li>Complete the project in as short a time frame as possible.</li> <li>Sensitive habitat should ideally be cordoned off to prevent access while construction takes place.</li> </ul>	<p>Impacts on sensitive areas are likely to be permanent unless no construction takes place in these areas.</p>
Description	Without Mitigation	With Mitigation																					
<b>Probability</b>	Definite (5)	Probable (3)																					
<b>Duration</b>	Long term (4)	Medium term (3)																					
<b>Extent</b>	Regional (3)	Limited to Local Area (2)																					
<b>Magnitude</b>	Moderate (6)	Low (4)																					
<b>Significance</b>	<b>65 (high)</b>	<b>27 (low)</b>																					
<b>Status (positive, negative or neutral)</b>	Negative	Negative																					
<p><b>Nature of the Impact:</b> <u>Loss of ecosystem function</u></p> <ul style="list-style-type: none"> <li>Construction runs the risk of interfering with ecosystem function, such as reduction in water quality and dispersal, soil pollution or underground water contamination.</li> </ul> <table border="1"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td><b>Probability</b></td> <td>Definite (5)</td> <td>Probable (3)</td> </tr> <tr> <td><b>Duration</b></td> <td>Long term (4)</td> <td>Medium term (3)</td> </tr> <tr> <td><b>Extent</b></td> <td>Regional (3)</td> <td>Limited to Local Area (2)</td> </tr> </tbody> </table>	Description	Without Mitigation	With Mitigation	<b>Probability</b>	Definite (5)	Probable (3)	<b>Duration</b>	Long term (4)	Medium term (3)	<b>Extent</b>	Regional (3)	Limited to Local Area (2)	<ul style="list-style-type: none"> <li>Effective stormwater management should be a priority during both the construction and operational phases. This should be monitored as part of the EMP.</li> <li>Restrict construction activities to minimal areas within development site.</li> <li>An environmentally friendly stormwater design should be formulated based on empirical data showing how a neutral effect on the regional hydrograph will be achieved.</li> <li>High energy stormwater input into the watercourses should be prevented at all cost. Changes to natural flow of water (surface water as well as water flowing within the soil profile) should be taken into account during the design phase and mitigated effectively</li> <li>Monitoring local and downstream impacts during the construction as well as operational phases are imperative and should form part of the EMP</li> </ul>	<p>Impacts to the flow characteristics of this watercourse are likely to be permanent unless rehabilitated.</p>									
Description	Without Mitigation	With Mitigation																					
<b>Probability</b>	Definite (5)	Probable (3)																					
<b>Duration</b>	Long term (4)	Medium term (3)																					
<b>Extent</b>	Regional (3)	Limited to Local Area (2)																					

Potential impacts:			Proposed mitigation:	Risk of the impact and mitigation not being implemented																					
<b>Magnitude</b>	Moderate (6)	Low (4)																							
<b>Significance</b>	65 (high)	27 (low)																							
<b>Status (positive, negative or neutral)</b>	Negative	Negative																							
<p><b>Nature of the Impact:</b> <u>Loss of the ecological function of wetland</u></p> <ul style="list-style-type: none"> <li>At micro-level, the construction will alter the landscape in a miniscule manner but without due care may influence the water drainage processes along the linear development. It could change the quantity and fluctuation properties of the watercourse by for example restricting water flow.</li> </ul> <table border="1"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td><b>Probability</b></td> <td>Definite (5)</td> <td>Probable (3)</td> </tr> <tr> <td><b>Duration</b></td> <td>Long term (4)</td> <td>Medium term (3)</td> </tr> <tr> <td><b>Extent</b></td> <td>Regional (3)</td> <td>Limited to Local Area (2)</td> </tr> <tr> <td><b>Magnitude</b></td> <td>Moderate (6)</td> <td>Low (4)</td> </tr> <tr> <td><b>Significance</b></td> <td>65 (high)</td> <td>27 (low)</td> </tr> <tr> <td><b>Status (positive, negative or neutral)</b></td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table>			Description	Without Mitigation	With Mitigation	<b>Probability</b>	Definite (5)	Probable (3)	<b>Duration</b>	Long term (4)	Medium term (3)	<b>Extent</b>	Regional (3)	Limited to Local Area (2)	<b>Magnitude</b>	Moderate (6)	Low (4)	<b>Significance</b>	65 (high)	27 (low)	<b>Status (positive, negative or neutral)</b>	Negative	Negative	<ul style="list-style-type: none"> <li>Effective stormwater management should be a priority during both the construction and operational phases. This should be monitored as part of the EMP.</li> <li>Restrict construction activities to minimal areas within development site.</li> <li>An environmentally friendly stormwater design should be formulated based on empirical data showing how a neutral effect on the regional hydrograph will be achieved.</li> <li>High energy stormwater input into the watercourses should be prevented at all cost. Changes to natural flow of water (surface water as well as water flowing within the soil profile) should be taken into account during the design phase and mitigated effectively</li> <li>Monitoring local and downstream impacts during the construction as well as operational phases are imperative and should form part of the EMP</li> </ul>	<p>Impacts to the flow characteristics of this watercourse are likely to be permanent unless rehabilitated.</p>
Description	Without Mitigation	With Mitigation																							
<b>Probability</b>	Definite (5)	Probable (3)																							
<b>Duration</b>	Long term (4)	Medium term (3)																							
<b>Extent</b>	Regional (3)	Limited to Local Area (2)																							
<b>Magnitude</b>	Moderate (6)	Low (4)																							
<b>Significance</b>	65 (high)	27 (low)																							
<b>Status (positive, negative or neutral)</b>	Negative	Negative																							
<p><b>Nature of the Impact:</b> <u>Exposure to erosion</u></p> <ul style="list-style-type: none"> <li>Erosion of soil surface due to increased runoff from earthworks, causing exposed soil conditions where rainfall and high wind, can accelerate mechanical erosion. This surface soil can also wash</li> </ul>			<ul style="list-style-type: none"> <li>Use a sequential construction strategy, i.e. phasing the construction and rehabilitating immediately after each phase.</li> <li>Do not leave bare soil surfaces exposed to erosion for lengthy periods.</li> <li>Implement sound storm water interim management measures.</li> <li>If possible, time construction to take place outside of the rainy season, thus reducing</li> </ul>	<p>Impacts to the flow characteristics of this watercourse are likely to be permanent unless rehabilitated.</p>																					

Potential impacts:			Proposed mitigation:	Risk of the impact and mitigation not being implemented
into wetland areas if adequate precautions are not taken.			opportunities for erosion from rainfall events..	
<b>Description</b>	<b>Without Mitigation</b>	<b>With Mitigation</b>		
<b>Probability</b>	Definite (5)	Probable (3)		
<b>Duration</b>	Long term (4)	Medium term (3)		
<b>Extent</b>	Regional (3)	Limited to Local Area (2)		
<b>Magnitude</b>	Moderate (6)	Low (4)		
<b>Significance</b>	<b>65 (high)</b>	<b>27 (low)</b>		
<b>Status (positive, negative or neutral)</b>	Negative	Negative		
<p><b>Nature of the Impact:</b> <u>Poaching of wildlife in the vicinity</u></p> <ul style="list-style-type: none"> <li>The site is vulnerable to hunting/trapping by construction workers. Harassing and hunting by construction workers could be expected.</li> </ul>			<ul style="list-style-type: none"> <li>Education of construction staff about the value of wildlife and environmental sensitivity.</li> <li>Restrict access to the suitable and sensitive habitats of faunal species.</li> <li>The contractor/contractors must ensure that no animals are disturbed, trapped, hunted or killed during the construction phase. Conservation-orientated clauses should be built into contracts for construction personnel, complete with penalty clauses for non-compliance.</li> </ul>	With education, the impact can be kept to a minimum.
<b>Description</b>	<b>Without Mitigation</b>	<b>With Mitigation</b>		
<b>Probability</b>	Definite (5)	Probable (3)		
<b>Duration</b>	Long term (4)	Medium term (3)		
<b>Extent</b>	Regional (3)	Limited to Local Area (2)		
<b>Magnitude</b>	Moderate (6)	Low (4)		
<b>Significance</b>	<b>65 (high)</b>	<b>27 (low)</b>		
<b>Status (positive, negative or neutral)</b>	Negative	Negative		

Potential impacts:	Proposed mitigation:	Risk of the impact and mitigation not being implemented																					
<b>HERITAGE IMPACT</b>																							
<p><b>Nature of the Impact:</b> <u>Loss and disturbance of heritage sites due to the development.</u></p> <p>There are no heritages or archaeological resources identified at the project site. Therefore this impact will not be assessed further in this basic assessment report</p> <table border="1"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td><b>Probability</b></td> <td>Low (1)</td> <td>Low (1)</td> </tr> <tr> <td><b>Duration</b></td> <td>Permanent (5)</td> <td>Permanent (5)</td> </tr> <tr> <td><b>Extent</b></td> <td>Limited to Local Area (1)</td> <td>Limited to Local Area (1)</td> </tr> <tr> <td><b>Magnitude</b></td> <td>Minor (8)</td> <td>Minor (8)</td> </tr> <tr> <td><b>Significance</b></td> <td><b>Low (8)</b></td> <td><b>Low (8)</b></td> </tr> <tr> <td><b>Status (positive, negative or neutral)</b></td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table>	Description	Without Mitigation	With Mitigation	<b>Probability</b>	Low (1)	Low (1)	<b>Duration</b>	Permanent (5)	Permanent (5)	<b>Extent</b>	Limited to Local Area (1)	Limited to Local Area (1)	<b>Magnitude</b>	Minor (8)	Minor (8)	<b>Significance</b>	<b>Low (8)</b>	<b>Low (8)</b>	<b>Status (positive, negative or neutral)</b>	Negative	Negative	<ul style="list-style-type: none"> <li>Nonetheless, should graves, fossils or any archaeological artefacts be identified during construction, work on the area where the artefacts were found, must cease immediately and it should immediately be reported to a heritage practitioner or local museum so that an investigation and evaluation of the finds can be made.</li> </ul>	N/A
Description	Without Mitigation	With Mitigation																					
<b>Probability</b>	Low (1)	Low (1)																					
<b>Duration</b>	Permanent (5)	Permanent (5)																					
<b>Extent</b>	Limited to Local Area (1)	Limited to Local Area (1)																					
<b>Magnitude</b>	Minor (8)	Minor (8)																					
<b>Significance</b>	<b>Low (8)</b>	<b>Low (8)</b>																					
<b>Status (positive, negative or neutral)</b>	Negative	Negative																					
<b>VISUAL IMPACTS</b>																							
<p><b>Nature of the Impact:</b> <u>Visual Impacts</u></p> <table border="1"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td><b>Probability</b></td> <td>Probable (3)</td> <td>Improbable (2)</td> </tr> <tr> <td><b>Duration</b></td> <td>Short-term (2)</td> <td>Short-term (2)</td> </tr> <tr> <td><b>Extent</b></td> <td>Limited to Local Area (2)</td> <td>Limited to Local Area (2)</td> </tr> <tr> <td><b>Magnitude</b></td> <td>Medium (6)</td> <td>Low (4)</td> </tr> <tr> <td><b>Significance</b></td> <td><b>30 (Medium)</b></td> <td><b>20 (Low)</b></td> </tr> <tr> <td><b>Status (positive, negative or neutral)</b></td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table>	Description	Without Mitigation	With Mitigation	<b>Probability</b>	Probable (3)	Improbable (2)	<b>Duration</b>	Short-term (2)	Short-term (2)	<b>Extent</b>	Limited to Local Area (2)	Limited to Local Area (2)	<b>Magnitude</b>	Medium (6)	Low (4)	<b>Significance</b>	<b>30 (Medium)</b>	<b>20 (Low)</b>	<b>Status (positive, negative or neutral)</b>	Negative	Negative	<ul style="list-style-type: none"> <li>Ensure that no litter, refuse, waste, rubbish, rubble, debris and builders wastes generated on the premises be placed, dumped or deposited on adjacent or surrounding properties including road verges, roads or public places and open spaces during or after the construction period. All waste/litter/rubbish etc. must be disposed of at an approved dumping site as approved by the Council.</li> <li>Bare surfaces must be rehabilitated as soon as possible with indigenous vegetation that will be able to grow in the area;</li> <li>The landscape must be rehabilitated in such a way that it corresponds to the surrounding topography;</li> <li>Should overtime/night work be authorized, the Contractor shall be responsible to ensure that lighting does not cause undue disturbance to neighboring residents. In this situation low flux and frequency lighting shall be utilized.</li> </ul>	The risk is low provided the mitigation measures are implemented
Description	Without Mitigation	With Mitigation																					
<b>Probability</b>	Probable (3)	Improbable (2)																					
<b>Duration</b>	Short-term (2)	Short-term (2)																					
<b>Extent</b>	Limited to Local Area (2)	Limited to Local Area (2)																					
<b>Magnitude</b>	Medium (6)	Low (4)																					
<b>Significance</b>	<b>30 (Medium)</b>	<b>20 (Low)</b>																					
<b>Status (positive, negative or neutral)</b>	Negative	Negative																					

Potential impacts:			Proposed mitigation:	Risk of the impact and mitigation not being implemented
<b>NOISE IMPACTS</b>				
<b>Noise Impacts anticipated</b>			<ul style="list-style-type: none"> <li>Construction activities must be limited to normal working hours and according to municipal bylaws, i.e. working hours must be limited to weekdays only.</li> <li>If construction is required on the weekend; permission from adjacent landowners will be required prior to construction.</li> <li>No sound amplification equipment such as sirens, loud hailers or hooters are to be used on site except in emergencies and no amplified music is permitted on site.</li> <li>Equipment that is fitted with noise reduction facilities (e.g. side flaps, silencers etc) must be used as per operating instructions and maintained properly during site operations.</li> </ul>	Noise pollution caused during construction could potentially be a nuisance to neighbouring residential areas. Health risk on the noise recipient if mitigation measures are not implemented.
<b>Description</b>	<b>Without Mitigation</b>	<b>With Mitigation</b>		
<b>Probability</b>	Probable (3)	Improbable (2)		
<b>Duration</b>	Short-term (2)	Short-term (2)		
<b>Extent</b>	Local (2)	Local (2)		
<b>Magnitude</b>	Moderate (6)	Moderate (5)		
<b>Significance</b>	<b>30 (Moderate)</b>	<b>18 (Low)</b>		
<b>Status (positive or negative)</b>	Negative	Negative		
<b>SOCIAL IMPACTS</b>				
<b>Positive Social impacts anticipated during construction</b>			<p>Enhancement:</p> <ul style="list-style-type: none"> <li>It is recommended that local employment policy is adopted to maximise the opportunities made available to the local labour force.</li> <li>Where reasonable and practical JRA should appoint local contractors and implement a (local first) policy especially for semi-skilled and low skilled job categories.</li> <li>Training and skills development programmes should be initiated prior to the commencement of the operation phase</li> </ul>	The impact is positive; the only risk anticipated is not providing job opportunities to local people. Influx of workers looking for employment opportunities to the area.
<ul style="list-style-type: none"> <li>Employment Opportunities</li> <li>Labour will be required for construction activities of the proposed development. It is therefore expected that jobs will be created during the construction period.</li> <li>The construction labour requirements have not been estimated as yet. It is expected that much of the work will require mechanised construction methods because of the bulk of the works. However, there will also be a need for manual labour for construction.</li> </ul>				
<b>Description</b>	<b>Without Enhancement</b>	<b>With Enhancement</b>		
<b>Probability</b>	Probable (3)	Highly Probable (4)		
<b>Duration</b>	Short-term (2)	Short-term (2)		
<b>Extent</b>	Local (2)	Local (2)		
<b>Magnitude</b>	Moderate (6)	High (8)		
<b>Significance</b>	<b>Low (24)</b>	<b>48 (moderate)</b>		
<b>Status (positive, negative or</b>	Positive	Positive		

Potential impacts:			Proposed mitigation:	Risk of the impact and mitigation not being implemented																			
neutral)																							
<p><b>Negative Social impacts anticipated during the construction period</b></p> <ul style="list-style-type: none"> <li>The increased dust resulting from construction activities (vegetation clearing, site preparation, earthworks, uncovered topsoil stockpiles and sand piles and loads on vehicles), vehicles, plant and machinery poses a health hazard to construction staff and people living and working in the vicinity of the site.</li> <li>Safety And Security issues for the residents due to Inflow of Workers in the area</li> <li>Disturbance of daily Living and Movement Patterns</li> <li>Safety and Security Risks</li> </ul>			<ul style="list-style-type: none"> <li>All adjacent landowners must be informed of the construction processes prior to commencement of construction activities. Adjacent land owners must be informed timeously of any service stoppages in their areas.</li> <li>Notification must include possible timeframes for stoppages. Consequences of such stoppages must be clearly indicated to all surrounding/affected land owners.</li> <li>Affected land owners must be timeously informed of any/all maintenance of the bulk water services supply which may result in service stoppages to their properties. Again this must include possible timeframes so alternatives can be provided.</li> <li>All flammable substances must be stored in dry area which do not pose an ignition risk to the said substances</li> <li>Ensure all construction vehicles and machinery is under the control of competent personnel.</li> <li>No open fires will be allowed on site unless in a demarcated area identified by the ECO</li> <li>Limit access to the construction site to the workforce only. Comply with the requirements of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993).</li> <li>Construction footprints, including site offices, excavations, storage areas, materials lay-down areas, stockpile area, and workers rest areas should be clearly demarcated or fenced off before construction commences.</li> <li>All construction activities should be limited to the demarcated areas.</li> <li>Access to these demarcated areas strictly controlled.</li> <li>Entry points and access routes to the sites must be clearly marked and traffic limited to those areas as far as possible.</li> <li>Suitable warning and information signage should be erected before construction commences.</li> <li>Adequate sanitary and ablutions facilities must be provided for construction workers</li> <li>The facilities must be regularly serviced to reduce the risk of surface or groundwater pollution.</li> </ul>	Low risk with mitigations																			
<table border="1"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td><b>Probability</b></td> <td>Highly Probable (4)</td> <td>Probable (3)</td> </tr> <tr> <td><b>Duration</b></td> <td>Short-term (2)</td> <td>Short-term (2)</td> </tr> <tr> <td><b>Extent</b></td> <td>Local (2)</td> <td>Local (2)</td> </tr> <tr> <td><b>Magnitude</b></td> <td>High (8)</td> <td>Moderate (6)</td> </tr> <tr> <td><b>Significance</b></td> <td><b>48 (moderate)</b></td> <td><b>Low (24)</b></td> </tr> <tr> <td><b>Status (positive or negative)</b></td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table>					Description	Without Mitigation	With Mitigation	<b>Probability</b>	Highly Probable (4)	Probable (3)	<b>Duration</b>	Short-term (2)	Short-term (2)	<b>Extent</b>	Local (2)	Local (2)	<b>Magnitude</b>	High (8)	Moderate (6)	<b>Significance</b>	<b>48 (moderate)</b>	<b>Low (24)</b>	<b>Status (positive or negative)</b>
Description	Without Mitigation	With Mitigation																					
<b>Probability</b>	Highly Probable (4)	Probable (3)																					
<b>Duration</b>	Short-term (2)	Short-term (2)																					
<b>Extent</b>	Local (2)	Local (2)																					
<b>Magnitude</b>	High (8)	Moderate (6)																					
<b>Significance</b>	<b>48 (moderate)</b>	<b>Low (24)</b>																					
<b>Status (positive or negative)</b>	Negative	Negative																					

## 2.2 IMPACTS THAT MAY RESULT FROM THE OPERATION PHASE

**Table 6<sup>2</sup>:** A summary of anticipated significance of the potential direct, indirect and cumulative impacts that are likely to occur as a result of the **OPERATION PHASE** for the Route **Alternative 1**, **Alternative 2** or **Alternative 3**.

Potential impacts:			Proposed mitigation:	Risk of the impact and mitigation not being implemented
<b>IMPACT ON WATERCOURSES</b>				
<p><b>Nature of the Impact:</b> Changing the quantity and fluctuation properties of the watercourse by for example restricting water flow or increasing flood flows.</p> <ul style="list-style-type: none"> <li>The sources of these impacts include the compaction of soil, the removal of vegetation, surface water redirection of water during construction activities.</li> </ul>			<ul style="list-style-type: none"> <li>Effective bridge design should prevent canalization downstream</li> <li>Designs should take into account soil properties, slopes and runoff energy.</li> <li>Inclusion of attenuation structures with the aim of preventing future flooding and canalisation of the stream</li> <li>Construction must be restricted to the dryer winter months where possible.</li> <li>A temporary fence or demarcation must be erected around No-Go Areas outside the proposed works area prior to any construction taking place as part of the contractor planning phase when compiling work method statements to prevent access to the adjacent portions of the watercourse.</li> <li>Effective stormwater management should be a priority during both construction and operational phase. This should be monitored as part of the EMP. High energy stormwater input into the watercourses should be prevented at all cost.</li> <li>The location of bridge support pillars should be located as far outside the stream channel as the physical constraints of the material/ engineered structure allows (keeping in mind that the maximum span length must be adhered to as per the engineers' specifications).</li> </ul>	Residual risks are associated with ineffective bridge and stormwater design
<b>Description</b>	<b>Without Mitigation</b>	<b>With Mitigation</b>		
<b>Probability</b>	Definite (5)	Probable (3)		
<b>Duration</b>	Long term (4)	Medium term (3)		
<b>Extent</b>	Regional (3)	Regional (3)		
<b>Magnitude</b>	Low (4), <b>Alt 2</b> Minor (2) <b>Alt 1</b> <b>Alt3</b>	Low (4), <b>Alt 2</b> Minor (2) <b>Alt 1</b> <b>Alt3</b>		
<b>Significance</b>	55 (moderate) <b>Alt 2</b> 45 (moderate) <b>Alt 1 &amp; 3</b>	30 (low) <b>Alt 2</b> 24 (low) <b>Alt 1 &amp; 3</b>		
<b>Status (positive, negative or neutral)</b>	Negative	Negative		

<sup>2 2</sup> *Note: This table represents the construction impacts for all three alternatives route as their impacts do not differ significantly, where the alternatives differ in impacts, reference is made accordingly.*

Potential impacts:	Proposed mitigation:	Risk of the impact and mitigation not being implemented																					
<p><b>Nature of the Impact:</b> <u>Changes in sediment entering and exiting the system</u></p> <p>Changing the amount of sediment entering water resource and associated change in turbidity (increasing or decreasing the amount). Construction and operational activities will result in earthworks and soil disturbance as well as the removal of natural vegetation. This could result in the loss of topsoil, sedimentation of the watercourse and increase the turbidity of the water.</p> <table border="1"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td>Probability</td> <td>Possible (2)</td> <td>Probable (3)</td> </tr> <tr> <td>Duration</td> <td>Medium term (3)</td> <td>Medium term (3)</td> </tr> <tr> <td>Extent</td> <td>Regional (3)</td> <td>Limited to the Site (1)</td> </tr> <tr> <td>Magnitude</td> <td>Moderate (6)</td> <td>Low (4)</td> </tr> <tr> <td>Significance</td> <td><b>24 (low)</b></td> <td><b>27 (low)</b></td> </tr> <tr> <td>Status (positive, negative or neutral)</td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table>	Description	Without Mitigation	With Mitigation	Probability	Possible (2)	Probable (3)	Duration	Medium term (3)	Medium term (3)	Extent	Regional (3)	Limited to the Site (1)	Magnitude	Moderate (6)	Low (4)	Significance	<b>24 (low)</b>	<b>27 (low)</b>	Status (positive, negative or neutral)	Negative	Negative	<ul style="list-style-type: none"> <li>• Consider the various methods and equipment available and select whichever method(s) that will have the least impact on watercourses.</li> <li>• Water may seep into trenching and earthworks. It is likely that water will be contaminated within these earthworks and should thus be cleaned or dissipated into a structure that allows for additional sediment input and slows down the velocity of the water thus reducing the risk of erosion.</li> <li>• Effective sediment traps should be installed.</li> <li>• Construction in and around watercourses must be restricted to the dryer winter months where possible.</li> <li>• Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction / earthworks in that area (DWAF, 2005).</li> <li>• Remove only the vegetation where essential for construction and do not allow any disturbance to the adjoining natural vegetation cover.</li> <li>• Rehabilitation plans must be submitted and approved for rehabilitation of damage during construction and that plan must be implemented immediately upon completion of construction.</li> <li>• Cordon off areas that are under rehabilitation as no-go areas using danger tape and steel droppers. If necessary, these areas should be fenced off to prevent vehicular, pedestrian access.</li> <li>• Protect all areas susceptible to erosion and ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and work areas.</li> <li>• Runoff from the construction area must be managed to avoid erosion and pollution problems. <ul style="list-style-type: none"> <li>▪ Monitoring should be done to ensure that sediment pollution is timeously dressed</li> </ul> </li> </ul>	<p>Expected to be limited during the construction activities provided that the mitigation measures are implemented correctly and effective rehabilitation of the site is undertaken where necessary.</p>
Description	Without Mitigation	With Mitigation																					
Probability	Possible (2)	Probable (3)																					
Duration	Medium term (3)	Medium term (3)																					
Extent	Regional (3)	Limited to the Site (1)																					
Magnitude	Moderate (6)	Low (4)																					
Significance	<b>24 (low)</b>	<b>27 (low)</b>																					
Status (positive, negative or neutral)	Negative	Negative																					
<p><b>Nature of the Impact:</b> <u>Introduction and spread of alien vegetation.</u></p> <ul style="list-style-type: none"> <li>• The moving of soil and vegetation resulting in opportunistic invasions after disturbance and the introduction of seed in building materials and on vehicles. Invasions of alien plants can impact on hydrology, by reducing the quantity of water entering a watercourse, and outcompete natural vegetation, decreasing the natural biodiversity. Once in a system alien invasive plants can spread through the catchment. If allowed to seed before control measures are implemented alien plants can easily colonise and</li> </ul>	<ul style="list-style-type: none"> <li>▪ Implement an Alien Plant Control Plan</li> <li>▪ Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction / earthworks in that area and returning it where possible afterwards.</li> <li>▪ Monitor the establishment of alien invasive species within the areas affected by the construction and maintenance and take immediate corrective action where invasive species are observed to establish.</li> <li>▪ Rehabilitate or revegetate disturbed areas and monitor for effective rehabilitation as specified in the rehabilitation plan</li> </ul>	<p>Expected to be limited provided that the mitigation measures are implemented correctly and effective rehabilitation of the site is undertaken where necessary.</p>																					



Potential impacts:			Proposed mitigation:	Risk of the impact and mitigation not being implemented																					
impact on downstream users. <table border="1"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td>Probability</td> <td>Probable (3)</td> <td>Likely (2)</td> </tr> <tr> <td>Duration</td> <td>Medium-term (3)</td> <td>Medium-term (3)</td> </tr> <tr> <td>Extent</td> <td>Regional (3)</td> <td>Limited to Local Area (2)</td> </tr> <tr> <td>Magnitude</td> <td>Low (4)</td> <td>Low (4)</td> </tr> <tr> <td>Significance</td> <td>30 (moderate)</td> <td>18 (low)</td> </tr> <tr> <td>Status (positive, negative or neutral)</td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table>			Description	Without Mitigation	With Mitigation	Probability	Probable (3)	Likely (2)	Duration	Medium-term (3)	Medium-term (3)	Extent	Regional (3)	Limited to Local Area (2)	Magnitude	Low (4)	Low (4)	Significance	30 (moderate)	18 (low)	Status (positive, negative or neutral)	Negative	Negative		
Description	Without Mitigation	With Mitigation																							
Probability	Probable (3)	Likely (2)																							
Duration	Medium-term (3)	Medium-term (3)																							
Extent	Regional (3)	Limited to Local Area (2)																							
Magnitude	Low (4)	Low (4)																							
Significance	30 (moderate)	18 (low)																							
Status (positive, negative or neutral)	Negative	Negative																							
<p><b>Nature of the Impact:</b> <u>Changes in water quality due to foreign materials and increased nutrients.</u></p> <ul style="list-style-type: none"> <li>Construction activities may result in the discharge of solvents and other industrial chemicals, leakage of fuel/oil from vehicles and the disposal of sewage resulting in the loss of sensitive biota in the wetlands/rivers and a reduction in watercourse integrity.</li> </ul> <table border="1"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td>Probability</td> <td>Highly probable (4)</td> <td>Improbable (1)</td> </tr> <tr> <td>Duration</td> <td>Long term (4)</td> <td>Medium term (3)</td> </tr> <tr> <td>Extent</td> <td>Limited to Local Area (2)</td> <td>Limited to the Site (1)</td> </tr> <tr> <td>Magnitude</td> <td>Moderate (6)</td> <td>Low (4)</td> </tr> <tr> <td>Significance</td> <td>48 (moderate)</td> <td>12 (low)</td> </tr> <tr> <td>Status (positive, negative or neutral)</td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table>			Description	Without Mitigation	With Mitigation	Probability	Highly probable (4)	Improbable (1)	Duration	Long term (4)	Medium term (3)	Extent	Limited to Local Area (2)	Limited to the Site (1)	Magnitude	Moderate (6)	Low (4)	Significance	48 (moderate)	12 (low)	Status (positive, negative or neutral)	Negative	Negative	<ul style="list-style-type: none"> <li>Provision of adequate sanitation facilities located outside of the watercourse/riparian area or its associated buffer zone.</li> <li>Implementation of appropriate stormwater management around the excavation to prevent the ingress of run-off into the excavation and to prevent contaminated runoff into the watercourse.</li> <li>Provision of adequate sanitation facilities located outside of the wetland/riparian area or its associated buffer zone</li> <li>The development footprint must be fenced off from the watercourse and no related impacts may be allowed into the watercourse e.g. water runoff from cleaning of equipment, vehicle access etc.</li> <li>After construction, the land must be cleared of rubbish, surplus materials, and equipment, and all parts of the land shall be left in a condition as close as possible to that prior to use.</li> <li>Maintenance of construction vehicles / equipment should not take place within the watercourse or watercourse buffer.</li> <li>Control of waste discharges</li> <li>Treatment of pollution identified should be prioritized accordingly.</li> <li>Install litter traps downstream from the bridge</li> </ul>	Expected to be limited provided that the mitigation measures are implemented correctly and effective rehabilitation of the site is undertaken where necessary.
Description	Without Mitigation	With Mitigation																							
Probability	Highly probable (4)	Improbable (1)																							
Duration	Long term (4)	Medium term (3)																							
Extent	Limited to Local Area (2)	Limited to the Site (1)																							
Magnitude	Moderate (6)	Low (4)																							
Significance	48 (moderate)	12 (low)																							
Status (positive, negative or neutral)	Negative	Negative																							
<p><b>Nature of the Impact:</b> <u>Loss and disturbance of wetland habitat and fringe vegetation.</u></p>			<ul style="list-style-type: none"> <li>Provision of adequate sanitation facilities located outside of the watercourse or its associated buffer zone.</li> <li>Ensure that the footprint of the construction activities is the minimum area required and</li> </ul>	Expected to be moderate since the wetland is already in a largely transformed state.																					

Potential impacts:			Proposed mitigation:	Risk of the impact and mitigation not being implemented
<ul style="list-style-type: none"> <li>Construction, maintenance and rehabilitation activities within wetland areas</li> </ul>			<p>that unnecessary vegetation clearing does not occur.</p> <ul style="list-style-type: none"> <li>The works area should be clearly demarcated during the construction phase and no-go areas must be clearly demarcated.</li> <li>Monitor rehabilitation and the occurrence of sedimentation twice during the rainy season for at least two years and take immediate corrective action where needed.</li> <li>Monitor the establishment of alien invasive species within the areas affected by the construction and take immediate corrective action where invasive species are observed to establish</li> <li>Operational activities should not take place within watercourses or buffer zones, nor should edge effects impact on these areas</li> <li>Operational activities should not impact on rehabilitated or naturally vegetated areas</li> </ul>	
<b>Description</b>	<b>Without Mitigation</b>	<b>With Mitigation</b>		
<b>Probability</b>	Highly Probable (4)	Improbable (1)		
<b>Duration</b>	Long term (4)	Medium term (3)		
<b>Extent</b>	Limited to Local Area (2)	Limited to the Site (1)		
<b>Magnitude</b>	Low (4)	Low (4)		
<b>Significance</b>	<b>40 (moderate)</b>	<b>8 (low)</b>		
<b>Status (positive, negative or neutral)</b>	Negative	Negative		
IMPACT ON VEGETATION				
<p><b>Nature of the Impact:</b> <u>Destruction of <i>Hyparrhenia hirta</i> grassland</u></p> <p>The development will require the removal of the <i>Hyparrhenia hirta</i> grassland which contributes to open space and catchment to the Rietspruit. However, these impacts can be mitigated.</p> <p>The sources of this impact include:</p> <ul style="list-style-type: none"> <li>Clearing of and damage to vegetation in construction footprint, access roads, construction camps, vehicle / machinery traffic and trampling by workers;</li> <li>Illegal disposal and dumping of construction material such as cement or oil, as well as maintenance materials during construction.</li> </ul>			<ul style="list-style-type: none"> <li>Rehabilitate construction camps and any other grassland vegetation that was impacted on by the construction. Use grass sods that were removed prior to construction to rehabilitate the construction footprints. Sods must not be stored for lengthy periods and should not be stacked on top of each other or on top of grazed and moist grasslands. The sods should preferably be removed during the winter months and replanted by springtime latest.</li> <li>Cordon off areas that are under rehabilitation as no-go areas using danger tape and steel droppers. If necessary, these areas should be fenced off to prevent vehicular, pedestrian and livestock access.</li> <li>Ensure that maintenance work does not take place haphazardly, but according to a fixed plan.</li> <li>Maintenance workers may not trample natural vegetation and work should be restricted to previously disturbed footprint. In addition, mitigation measures as set out for the construction phase should be adhered to.</li> <li>Address erosion donga crossings, applying soil erosion control and bank stabilisation procedures as specified by the ECO.</li> </ul>	<p>Localised alteration of soil surface characteristics and loss of flora and increased fragmentation of remaining grasslands in the area.</p>
<b>Description</b>	<b>Without Mitigation</b>	<b>With Mitigation</b>		
<b>Probability</b>	Definite (5)	Probable (3)		
<b>Duration</b>	Permanent (5)	Permanent (5)		

Potential impacts:			Proposed mitigation:	Risk of the impact and mitigation not being implemented																		
<b>Extent</b>	Limited to Site (1)	Limited to Site (1)																				
<b>Magnitude</b>	Low (4) <b>Alt 2</b> Minor (2) <b>Alt 1 Alt 3</b>	Minor (2)																				
<b>Significance</b>	50 (medium) <b>Alt 2</b> 40 (moderate) <b>Alt 1 Alt 3</b>	30 (low) <b>Alt 2</b> 24 (low) <b>Alt 1 Alt 3</b>																				
<b>Status (positive, negative or neutral)</b>	Negative	Negative																				
<p><b>Nature of the Impact:</b> <u>Destruction or degradation of moist grassland and pollution of the watercourse</u></p> <p>The construction of the road will inevitably require the removal of moist grassland vegetation for the purpose of access roads, servitudes, construction camps and the road footprint. This will impact on the health and functioning of the wetland. Construction could also result in pollution of the watercourse.</p> <table border="1"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td><b>Probability</b></td> <td>Highly probable (4)</td> <td>Probable (3)</td> </tr> <tr> <td><b>Duration</b></td> <td>Medium-term (3)</td> <td>Medium (2)</td> </tr> <tr> <td><b>Extent</b></td> <td>Limited to Local Area (2)</td> <td>Limited to the Site (1)</td> </tr> <tr> <td><b>Magnitude</b></td> <td>Moderate (6) <b>Alt 2</b> Low (4) <b>Alt 1 Alt 3</b></td> <td>Moderate (6) <b>Alt 2</b> Low (4) <b>Alt 1 Alt 3</b></td> </tr> <tr> <td><b>Significance</b></td> <td>44 (medium) <b>Alt</b></td> <td>27 (low) <b>Alt 2</b></td> </tr> </tbody> </table>			Description	Without Mitigation	With Mitigation	<b>Probability</b>	Highly probable (4)	Probable (3)	<b>Duration</b>	Medium-term (3)	Medium (2)	<b>Extent</b>	Limited to Local Area (2)	Limited to the Site (1)	<b>Magnitude</b>	Moderate (6) <b>Alt 2</b> Low (4) <b>Alt 1 Alt 3</b>	Moderate (6) <b>Alt 2</b> Low (4) <b>Alt 1 Alt 3</b>	<b>Significance</b>	44 (medium) <b>Alt</b>	27 (low) <b>Alt 2</b>	<ul style="list-style-type: none"> <li>After construction, the land must be cleared of rubbish, surplus materials, and equipment, and all parts of the land must be left in a condition as close as possible to that prior to construction.</li> <li>Ensure that the vegetation disturbed during construction is rehabilitated.</li> <li>Ensure that maintenance work does not take place haphazardly, but according to a fixed plan and only within the dedicated road reserves.</li> <li>Cordon off areas that are under rehabilitation as no-go areas using danger tape and steel droppers. If necessary, these areas should be fenced off to prevent vehicular, pedestrian and livestock access until such time that rehabilitation was successful.</li> <li>Maintenance workers may not trample natural vegetation and work should be restricted to previously disturbed footprint. In addition, mitigation measures as set out for the construction phase should be adhered to.</li> <li>Address erosion donga crossings, applying soil erosion control and bank stabilisation procedures as specified by the ECO.</li> <li>Repair all erosion damage as soon as possible and in any case not later than six months before the termination of the Maintenance Period to allow for sufficient rehabilitation growth.</li> <li>Stormwater drains must be maintained and regularly checked for any blockage.</li> <li>Monitor rehabilitation for at least three years after construction is complete. If monitoring observed failed rehabilitation or erosion, corrective action should be taken immediately to</li> </ul>	Erosion, pollution of the watercourse, invasion by alien invasive plant species
Description	Without Mitigation	With Mitigation																				
<b>Probability</b>	Highly probable (4)	Probable (3)																				
<b>Duration</b>	Medium-term (3)	Medium (2)																				
<b>Extent</b>	Limited to Local Area (2)	Limited to the Site (1)																				
<b>Magnitude</b>	Moderate (6) <b>Alt 2</b> Low (4) <b>Alt 1 Alt 3</b>	Moderate (6) <b>Alt 2</b> Low (4) <b>Alt 1 Alt 3</b>																				
<b>Significance</b>	44 (medium) <b>Alt</b>	27 (low) <b>Alt 2</b>																				

Potential impacts:			Proposed mitigation:	Risk of the impact and mitigation not being implemented																					
	2 36 (medium) Alt 1 Alt 3	21 (low) Alt 1 Alt 3	determine the cause and correct the problem. <ul style="list-style-type: none"> <li>Litter traps should be installed as part of the stormwater system and should be maintained and cleaned monthly during the rainy season.</li> </ul>																						
Status (positive, negative or neutral)	Negative	Negative																							
<p><b>Nature of the Impact:</b> <u>Destruction of protected plants and plants of conservation concern</u></p> <ul style="list-style-type: none"> <li>Development within the <i>Hyparrhenia hirta</i>-grassland would require the removal of the declining <i>Hypoxis hemerocallidea</i>. Some provincially protected or species of concern may also occur in the moist grassland.</li> </ul> <table border="1"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td>Probability</td> <td>Probable (3)</td> <td>Improbable (2)</td> </tr> <tr> <td>Duration</td> <td>Short term (2)</td> <td>Very Short-term (2)</td> </tr> <tr> <td>Extent</td> <td>Local Area (2)</td> <td>Limited to site (1)</td> </tr> <tr> <td>Magnitude</td> <td>Moderate (6)</td> <td>Low (4)</td> </tr> <tr> <td>Significance</td> <td style="background-color: #FFD700;">30 (medium)</td> <td style="background-color: #90EE90;">12 (low)</td> </tr> <tr> <td>Status (positive, negative or neutral)</td> <td>Negative</td> <td>-</td> </tr> </tbody> </table>			Description	Without Mitigation	With Mitigation	Probability	Probable (3)	Improbable (2)	Duration	Short term (2)	Very Short-term (2)	Extent	Local Area (2)	Limited to site (1)	Magnitude	Moderate (6)	Low (4)	Significance	30 (medium)	12 (low)	Status (positive, negative or neutral)	Negative	-	<ul style="list-style-type: none"> <li>The relocated species should be monitored for at least two years post relocation. If die back is noted, a specialist should be consulted and corrective action taken as soon as possible.</li> <li>No operational activities are allowed to impact on the relocated species.</li> </ul>	Species removed and relocated as part of rehabilitation could die due to transplantation shock or damage during replanting.
Description	Without Mitigation	With Mitigation																							
Probability	Probable (3)	Improbable (2)																							
Duration	Short term (2)	Very Short-term (2)																							
Extent	Local Area (2)	Limited to site (1)																							
Magnitude	Moderate (6)	Low (4)																							
Significance	30 (medium)	12 (low)																							
Status (positive, negative or neutral)	Negative	-																							
<p><b>Nature of the Impact:</b> <u>Removal of alien invasive vegetation</u></p> Removing of existing invasive alien vegetation could have a positive			<ul style="list-style-type: none"> <li>Monitor all sites disturbed by construction activities for colonisation by exotics or invasive plants and control these as they emerge. Monitoring should continue for at least two years after construction is complete.</li> </ul>	If alien invasive species monitoring is not maintained, the cleared areas																					

Potential impacts:	Proposed mitigation:	Risk of the impact and mitigation not being implemented																					
<p>effect and reduce infestations downstream</p> <table border="1"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td><b>Probability</b></td> <td>Probable (3)</td> <td>Highly probable (4)</td> </tr> <tr> <td><b>Duration</b></td> <td>Short-term (2)</td> <td>Long-term (4)</td> </tr> <tr> <td><b>Extent</b></td> <td>Local Area (2)</td> <td>Local Area (2)</td> </tr> <tr> <td><b>Magnitude</b></td> <td>Moderate (6)</td> <td>High (8)</td> </tr> <tr> <td><b>Significance</b></td> <td style="background-color: #90EE90;">30 (Low)</td> <td style="background-color: #FFD700;">56 (medium)</td> </tr> <tr> <td><b>Status (positive, negative or neutral)</b></td> <td style="color: red;">Positive</td> <td style="color: red;">Positive</td> </tr> </tbody> </table>	Description	Without Mitigation	With Mitigation	<b>Probability</b>	Probable (3)	Highly probable (4)	<b>Duration</b>	Short-term (2)	Long-term (4)	<b>Extent</b>	Local Area (2)	Local Area (2)	<b>Magnitude</b>	Moderate (6)	High (8)	<b>Significance</b>	30 (Low)	56 (medium)	<b>Status (positive, negative or neutral)</b>	Positive	Positive		could become infested again.
Description	Without Mitigation	With Mitigation																					
<b>Probability</b>	Probable (3)	Highly probable (4)																					
<b>Duration</b>	Short-term (2)	Long-term (4)																					
<b>Extent</b>	Local Area (2)	Local Area (2)																					
<b>Magnitude</b>	Moderate (6)	High (8)																					
<b>Significance</b>	30 (Low)	56 (medium)																					
<b>Status (positive, negative or neutral)</b>	Positive	Positive																					
<p><b>Nature of the Impact:</b> <u>Clearing of land for construction camps and potential pollution of the soil and water</u></p> <p>This could lead to the loss of vegetation and/or species of conservation concern, alteration and loss of microhabitats, altered vegetation cover, increased erosion and contamination of soil and groundwater.</p> <table border="1"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td><b>Probability</b></td> <td>Probable (3)</td> <td>Improbable (2)</td> </tr> <tr> <td><b>Duration</b></td> <td>Short-term (2)</td> <td>Very Short-term (1)</td> </tr> <tr> <td><b>Extent</b></td> <td>Local Area (2)</td> <td>Site bound (1)</td> </tr> <tr> <td><b>Magnitude</b></td> <td>Moderate (6)</td> <td>Low (4)</td> </tr> <tr> <td><b>Significance</b></td> <td style="background-color: #FFD700;">30 (moderate)</td> <td style="background-color: #90EE90;">12 (low)</td> </tr> <tr> <td><b>Status (positive, negative or neutral)</b></td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table>	Description	Without Mitigation	With Mitigation	<b>Probability</b>	Probable (3)	Improbable (2)	<b>Duration</b>	Short-term (2)	Very Short-term (1)	<b>Extent</b>	Local Area (2)	Site bound (1)	<b>Magnitude</b>	Moderate (6)	Low (4)	<b>Significance</b>	30 (moderate)	12 (low)	<b>Status (positive, negative or neutral)</b>	Negative	Negative	<ul style="list-style-type: none"> <li>Monitor all sites disturbed by construction activities for colonisation by exotics or invasive plants and control these as they emerge. Monitoring should continue for at least two years after construction is complete.</li> </ul>	Compaction on construction camps could result in altered topsoil characteristics and vegetation composition. These areas are also prone to invasion by alien invasive plant species.
Description	Without Mitigation	With Mitigation																					
<b>Probability</b>	Probable (3)	Improbable (2)																					
<b>Duration</b>	Short-term (2)	Very Short-term (1)																					
<b>Extent</b>	Local Area (2)	Site bound (1)																					
<b>Magnitude</b>	Moderate (6)	Low (4)																					
<b>Significance</b>	30 (moderate)	12 (low)																					
<b>Status (positive, negative or neutral)</b>	Negative	Negative																					

Potential impacts:	Proposed mitigation:	Risk of the impact and mitigation not being implemented																					
<p><b>Nature of the Impact:</b> <u>Exposure to erosion and subsequent sedimentation or pollution of proximate watercourses</u></p> <p>The removal of surface vegetation will expose the soils, which in rainy events would wash down into the Rietspruit, causing sedimentation. In addition, indigenous vegetation communities are unlikely to colonise eroded soils successfully and seeds from proximate alien invasive plant species can spread easily into these eroded soils. After construction, a lack of rehabilitation or failed rehabilitation will result in bare soils that are susceptible to erosion. Furthermore, maintenance vehicles could disturb rehabilitated areas which could lead to soil erosion, habitat modification, trampling of vegetation as well as the destruction of protected plants and plants of conservation concern. The sources of this impact include:</p> <ul style="list-style-type: none"> <li>• Removal of vegetation in proximity to the moist grassland, without proper rehabilitation or failure of rehabilitation;</li> <li>• Access roads, especially on slopes, channels rainfall and causes erosion;</li> <li>• Lack of rehabilitation or failed rehabilitation;</li> <li>• Maintenance vehicles disturbing rehabilitated areas;</li> <li>• Spillages of construction material and harmful chemicals; and</li> <li>• Failure of rehabilitation of the construction footprint.</li> </ul> <table border="1" data-bbox="143 1118 766 1383"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td><b>Probability</b></td> <td>Highly Probable (4)</td> <td>Probable (3)</td> </tr> <tr> <td><b>Duration</b></td> <td>Medium-term (3)</td> <td>Short-term (2)</td> </tr> <tr> <td><b>Extent</b></td> <td>Local Area (2)</td> <td>Site bound (1)</td> </tr> <tr> <td><b>Magnitude</b></td> <td>Moderate (6)</td> <td>Low (4)</td> </tr> <tr> <td><b>Significance</b></td> <td>33 (moderate)</td> <td>14 (low)</td> </tr> <tr> <td><b>Status (positive, negative or</b></td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table>	Description	Without Mitigation	With Mitigation	<b>Probability</b>	Highly Probable (4)	Probable (3)	<b>Duration</b>	Medium-term (3)	Short-term (2)	<b>Extent</b>	Local Area (2)	Site bound (1)	<b>Magnitude</b>	Moderate (6)	Low (4)	<b>Significance</b>	33 (moderate)	14 (low)	<b>Status (positive, negative or</b>	Negative	Negative	<ul style="list-style-type: none"> <li>• Cordon off areas that are under rehabilitation as no-go areas using danger tape and steel droppers. If necessary, these areas should be fenced off to prevent vehicular, pedestrian and livestock access where needed.</li> <li>• Monitor rehabilitation and ensure that rehabilitated areas do not erode.</li> <li>• If monitoring finds that indigenous vegetation from the surrounding grasslands are not colonising the site, implement a re-vegetation plan to ensure that grass species that naturally occur in the Egoli Granite Grassland, are sowed in order to re-establish indigenous plant cover.</li> <li>• Cumulative impacts: Erosion upslope from the Rietspruit could increase</li> </ul>	<p>None</p>
Description	Without Mitigation	With Mitigation																					
<b>Probability</b>	Highly Probable (4)	Probable (3)																					
<b>Duration</b>	Medium-term (3)	Short-term (2)																					
<b>Extent</b>	Local Area (2)	Site bound (1)																					
<b>Magnitude</b>	Moderate (6)	Low (4)																					
<b>Significance</b>	33 (moderate)	14 (low)																					
<b>Status (positive, negative or</b>	Negative	Negative																					

Potential impacts:			Proposed mitigation:	Risk of the impact and mitigation not being implemented																					
neutral)																									
IMPACTS ON FAUNA																									
<p><b>Nature of the Impact:</b> <u>Reduction of natural migratory and faunal dispersal routes.</u></p> <ul style="list-style-type: none"> <li>Changing the natural and seasonal local movement of mammals and herpetofauna.</li> <li>The source of this impact includes the interruption of breeding and foraging areas for frog species, the compaction of soil for burrowing and the removal of vegetation.</li> </ul>			<ul style="list-style-type: none"> <li>Ensure the maintenance of a proposed 30 metre buffer along drainage lines as primary dispersal corridor.</li> <li>Ensure any crossing opportunities at roads (culverts, pipes and bridges) are designed to also facilitate small animal movements.</li> <li>Keep green belts in the development</li> </ul>	<p>Impacts on migrations are likely to be permanent unless large green belts and buffer areas are implemented.</p>																					
<table border="1"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td><b>Probability</b></td> <td>Definite (5)</td> <td>Probable (3)</td> </tr> <tr> <td><b>Duration</b></td> <td>Medium term (3)</td> <td>Medium term (3)</td> </tr> <tr> <td><b>Extent</b></td> <td>Regional (3)</td> <td>Limited to Local Area (2)</td> </tr> <tr> <td><b>Magnitude</b></td> <td>Moderate (6)</td> <td>Low (4)</td> </tr> <tr> <td><b>Significance</b></td> <td>60(high)</td> <td>27 (low)</td> </tr> <tr> <td><b>Status (positive, negative or neutral)</b></td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table>			Description	Without Mitigation	With Mitigation	<b>Probability</b>	Definite (5)	Probable (3)	<b>Duration</b>	Medium term (3)	Medium term (3)	<b>Extent</b>	Regional (3)	Limited to Local Area (2)	<b>Magnitude</b>	Moderate (6)	Low (4)	<b>Significance</b>	60(high)	27 (low)	<b>Status (positive, negative or neutral)</b>	Negative	Negative		
Description	Without Mitigation	With Mitigation																							
<b>Probability</b>	Definite (5)	Probable (3)																							
<b>Duration</b>	Medium term (3)	Medium term (3)																							
<b>Extent</b>	Regional (3)	Limited to Local Area (2)																							
<b>Magnitude</b>	Moderate (6)	Low (4)																							
<b>Significance</b>	60(high)	27 (low)																							
<b>Status (positive, negative or neutral)</b>	Negative	Negative																							
<p><b>Nature of the Impact:</b> <u>Possible increase in exotic vegetation</u></p> <ul style="list-style-type: none"> <li>The moving of soil and vegetation resulting in opportunistic invasions after disturbance and the introduction of seed in building materials and on vehicles. Invasions of alien plants can affect hydrology by reducing the quantity of water entering a watercourse, and outcompete natural vegetation, decreasing the</li> </ul>			<ul style="list-style-type: none"> <li>Implement an Alien Plant Control Plan</li> <li>Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction / earthworks in that area and returning it where possible afterwards.</li> <li>Monitor the establishment of alien invasive species within the areas affected by the construction and maintenance and take immediate corrective action where invasive species are observed to establish.</li> </ul>	<p>Expected to be limited if the mitigation measures are implemented correctly and effective rehabilitation of the site is undertaken where necessary</p>																					

Potential impacts:	Proposed mitigation:	Risk of the impact and mitigation not being implemented																					
<p>natural biodiversity. Once in a system, alien invasive plants can spread through the catchment area. If allowed to seed before control measures are implemented, alien plants can easily colonise and affect downstream users.</p> <table border="1"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td><b>Probability</b></td> <td>Probable (3)</td> <td>Possible (2)</td> </tr> <tr> <td><b>Duration</b></td> <td>Medium term (3)</td> <td>Medium term (3)</td> </tr> <tr> <td><b>Extent</b></td> <td>Regional (3)</td> <td>Limited to Local Area (2)</td> </tr> <tr> <td><b>Magnitude</b></td> <td>Low (4)</td> <td>Low (4)</td> </tr> <tr> <td><b>Significance</b></td> <td style="background-color: #92d050;">23 (low)</td> <td style="background-color: #92d050;">27 (low)</td> </tr> <tr> <td><b>Status (positive, negative or neutral)</b></td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table>	Description	Without Mitigation	With Mitigation	<b>Probability</b>	Probable (3)	Possible (2)	<b>Duration</b>	Medium term (3)	Medium term (3)	<b>Extent</b>	Regional (3)	Limited to Local Area (2)	<b>Magnitude</b>	Low (4)	Low (4)	<b>Significance</b>	23 (low)	27 (low)	<b>Status (positive, negative or neutral)</b>	Negative	Negative	<ul style="list-style-type: none"> <li>Rehabilitate or revegetate disturbed areas.</li> </ul>	
Description	Without Mitigation	With Mitigation																					
<b>Probability</b>	Probable (3)	Possible (2)																					
<b>Duration</b>	Medium term (3)	Medium term (3)																					
<b>Extent</b>	Regional (3)	Limited to Local Area (2)																					
<b>Magnitude</b>	Low (4)	Low (4)																					
<b>Significance</b>	23 (low)	27 (low)																					
<b>Status (positive, negative or neutral)</b>	Negative	Negative																					
<p><b>Nature of the Impact:</b> <u>Displacement of indigenous mammals &amp; vertebrates</u></p> <ul style="list-style-type: none"> <li>The development will modify the natural habitat of various vertebrates. These species may no longer be able to find suitable habitat. The proposed development may lead to a decline in population numbers, but not to local extinction.</li> <li>The sources of this impact include the compaction of soil, the removal of vegetation and the pollution of wetlands.</li> </ul> <table border="1"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td><b>Probability</b></td> <td>Definite (5)</td> <td>Probable (3)</td> </tr> <tr> <td><b>Duration</b></td> <td>Medium term (3)</td> <td>Medium term (3)</td> </tr> <tr> <td><b>Extent</b></td> <td>Limited to Local Area (2)</td> <td>Limited to Local Area (2)</td> </tr> </tbody> </table>	Description	Without Mitigation	With Mitigation	<b>Probability</b>	Definite (5)	Probable (3)	<b>Duration</b>	Medium term (3)	Medium term (3)	<b>Extent</b>	Limited to Local Area (2)	Limited to Local Area (2)	<ul style="list-style-type: none"> <li>Maintenance of corridors should minimise losses and assist with any subsequent recolonisation of the site.</li> <li>Localised destruction of habitat.</li> </ul>	<p>The biodiversity of species and the number of each species will decrease and that will affect food webs.</p>									
Description	Without Mitigation	With Mitigation																					
<b>Probability</b>	Definite (5)	Probable (3)																					
<b>Duration</b>	Medium term (3)	Medium term (3)																					
<b>Extent</b>	Limited to Local Area (2)	Limited to Local Area (2)																					



Potential impacts:			Proposed mitigation:	Risk of the impact and mitigation not being implemented																					
<b>Magnitude</b>	Moderate (6)	Low (4)																							
<b>Significance</b>	55 (high)	27 (low)																							
<b>Status (positive, negative or neutral)</b>	Negative	Negative																							
<p><b>Nature of the Impact:</b> <u>Increased amounts of surface water runoff</u></p> <ul style="list-style-type: none"> <li>The increased amounts of surface water runoff from hard surfaces along the development will increase the chance of erosion and/or flash floods. With a single rainfall event, many litres of water are released. The displaced grasslands and other vegetation usually absorb these waters.</li> </ul> <table border="1"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td><b>Probability</b></td> <td>Definite (5)</td> <td>Probable (3)</td> </tr> <tr> <td><b>Duration</b></td> <td>Medium term (3)</td> <td>Medium term (3)</td> </tr> <tr> <td><b>Extent</b></td> <td>Regional (3)</td> <td>Limited to Local Area (2)</td> </tr> <tr> <td><b>Magnitude</b></td> <td>Moderate (6)</td> <td>Low (4)</td> </tr> <tr> <td><b>Significance</b></td> <td>60 (high)</td> <td>27 (low)</td> </tr> <tr> <td><b>Status (positive, negative or neutral)</b></td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table>			Description	Without Mitigation	With Mitigation	<b>Probability</b>	Definite (5)	Probable (3)	<b>Duration</b>	Medium term (3)	Medium term (3)	<b>Extent</b>	Regional (3)	Limited to Local Area (2)	<b>Magnitude</b>	Moderate (6)	Low (4)	<b>Significance</b>	60 (high)	27 (low)	<b>Status (positive, negative or neutral)</b>	Negative	Negative	<ul style="list-style-type: none"> <li>Implement an ecologically sound storm water management plan including, where necessary retention ponds and artificial water sponges (wetlands).</li> <li>Effective stormwater management should be a priority during both the construction and operational phases. This should be monitored as part of the EMP.</li> <li>An environmentally friendly stormwater design should be formulated based on empirical data showing how a neutral effect on the regional hydrograph will be achieved.</li> <li>High energy stormwater input into the watercourses should be prevented at all cost. Changes to natural flow of water (surface water as well as water flowing within the soil profile) should be taken into account during the design phase and mitigated effectively</li> <li>Monitoring local and downstream impacts during the construction as well as operational phases are imperative and should form part of the EMP</li> </ul>	<p>Impacts to the flow characteristics of this watercourse are likely to be permanent unless rehabilitated.</p>
Description	Without Mitigation	With Mitigation																							
<b>Probability</b>	Definite (5)	Probable (3)																							
<b>Duration</b>	Medium term (3)	Medium term (3)																							
<b>Extent</b>	Regional (3)	Limited to Local Area (2)																							
<b>Magnitude</b>	Moderate (6)	Low (4)																							
<b>Significance</b>	60 (high)	27 (low)																							
<b>Status (positive, negative or neutral)</b>	Negative	Negative																							
<p><b>Nature of the Impact:</b> <u>Disturbances of fauna in sensitive vegetation</u></p> <ul style="list-style-type: none"> <li>Vehicle activity along the development could disturb faunal species that depend on any natural, sensitive vegetation and the wetlands.</li> <li>the sources of these impacts include the compaction of soil, the</li> </ul>			<ul style="list-style-type: none"> <li>A management plan to discourage maintenance workers from disturbing or harassing any mammal, bird, reptile or frog by burning grass or walking through the grassveld.</li> <li>Implement a monitoring programme to regularly assess the presence of faunal species within the sensitive vegetation, including road verges, in particular the grassland and drainage habitats.</li> </ul>	<p>Some species, especially bird species, will leave the study site.</p>																					

Potential impacts:	Proposed mitigation:	Risk of the impact and mitigation not being implemented																					
<p>removal of vegetation, surface water redirection during construction activities. Permanent changes to water flows during the operational phase are related to changes in stormwater flows</p> <table border="1"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td><b>Probability</b></td> <td>Definite (5)</td> <td>Probable (3)</td> </tr> <tr> <td><b>Duration</b></td> <td>Medium term (3)</td> <td>Medium term (3)</td> </tr> <tr> <td><b>Extent</b></td> <td>Regional (3)</td> <td>Limited to Local Area (2)</td> </tr> <tr> <td><b>Magnitude</b></td> <td>Moderate (6)</td> <td>Low (4)</td> </tr> <tr> <td><b>Significance</b></td> <td style="background-color: red;">60 (high)</td> <td style="background-color: green;">27 (low)</td> </tr> <tr> <td><b>Status (positive, negative or neutral)</b></td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table>	Description	Without Mitigation	With Mitigation	<b>Probability</b>	Definite (5)	Probable (3)	<b>Duration</b>	Medium term (3)	Medium term (3)	<b>Extent</b>	Regional (3)	Limited to Local Area (2)	<b>Magnitude</b>	Moderate (6)	Low (4)	<b>Significance</b>	60 (high)	27 (low)	<b>Status (positive, negative or neutral)</b>	Negative	Negative		
Description	Without Mitigation	With Mitigation																					
<b>Probability</b>	Definite (5)	Probable (3)																					
<b>Duration</b>	Medium term (3)	Medium term (3)																					
<b>Extent</b>	Regional (3)	Limited to Local Area (2)																					
<b>Magnitude</b>	Moderate (6)	Low (4)																					
<b>Significance</b>	60 (high)	27 (low)																					
<b>Status (positive, negative or neutral)</b>	Negative	Negative																					
<p><b>Nature of the Impact:</b> <u>Lighting</u></p> <ul style="list-style-type: none"> <li>During the night, headlights of vehicles and street lights will affect mainly nocturnal species.</li> <li>Some animals may be blinded by the headlights of vehicles and then killed by vehicles.</li> </ul> <table border="1"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td><b>Probability</b></td> <td>Definite (5)</td> <td>Probable (3)</td> </tr> <tr> <td><b>Duration</b></td> <td>Medium term (3)</td> <td>Medium term (3)</td> </tr> <tr> <td><b>Extent</b></td> <td>Regional (3)</td> <td>Limited to Local Area (2)</td> </tr> <tr> <td><b>Magnitude</b></td> <td>Moderate (6)</td> <td>Low (4)</td> </tr> <tr> <td><b>Significance</b></td> <td style="background-color: red;">60 (high)</td> <td style="background-color: green;">27 (low)</td> </tr> <tr> <td><b>Status (positive, negative or neutral)</b></td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table>	Description	Without Mitigation	With Mitigation	<b>Probability</b>	Definite (5)	Probable (3)	<b>Duration</b>	Medium term (3)	Medium term (3)	<b>Extent</b>	Regional (3)	Limited to Local Area (2)	<b>Magnitude</b>	Moderate (6)	Low (4)	<b>Significance</b>	60 (high)	27 (low)	<b>Status (positive, negative or neutral)</b>	Negative	Negative	<ul style="list-style-type: none"> <li>Motor headlight effects seem unavoidable.</li> <li>Any outside lighting, such as at junctions, should be designed to minimise impacts on fauna. All outside lighting should ideally be directed away from sensitive surrounding areas. Fluorescent and mercury vapour lighting should be avoided and sodium vapour (yellow) lights should be used wherever possible.</li> </ul>	<p>Impacts of lighting are likely to be permanent.</p>
Description	Without Mitigation	With Mitigation																					
<b>Probability</b>	Definite (5)	Probable (3)																					
<b>Duration</b>	Medium term (3)	Medium term (3)																					
<b>Extent</b>	Regional (3)	Limited to Local Area (2)																					
<b>Magnitude</b>	Moderate (6)	Low (4)																					
<b>Significance</b>	60 (high)	27 (low)																					
<b>Status (positive, negative or neutral)</b>	Negative	Negative																					

Potential impacts:			Proposed mitigation:	Risk of the impact and mitigation not being implemented																					
neutral)																									
<p><b>Nature of the Impact:</b> <u>Removal of exotic species, declared weeds and invader plants</u></p> <ul style="list-style-type: none"> <li>Invader plant species influence the availability of habitat, food and water for vertebrates.</li> <li>By removing invasive plant species there should theoretically more habitat and food available for vertebrates, but in the process, vertebrates should not be disturbed.</li> </ul>			<ul style="list-style-type: none"> <li>Exotic species, weeds and invaders were observed on site, but their control should fall under that of alien species (see above).</li> </ul>	Impacts of the removal of invasive plants are likely to be permanent unless rehabilitated.																					
<table border="1"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td>Probability</td> <td>Definite (5)</td> <td>Probable (3)</td> </tr> <tr> <td>Duration</td> <td>Medium term (3)</td> <td>Medium term (3)</td> </tr> <tr> <td>Extent</td> <td>Regional (3)</td> <td>Limited to Local Area (2)</td> </tr> <tr> <td>Magnitude</td> <td>Moderate (6)</td> <td>Low (4)</td> </tr> <tr> <td>Significance</td> <td>60 (high)</td> <td>27 (low)</td> </tr> <tr> <td>Status (positive, negative or neutral)</td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table>			Description	Without Mitigation	With Mitigation	Probability	Definite (5)	Probable (3)	Duration	Medium term (3)	Medium term (3)	Extent	Regional (3)	Limited to Local Area (2)	Magnitude	Moderate (6)	Low (4)	Significance	60 (high)	27 (low)	Status (positive, negative or neutral)	Negative	Negative		
Description	Without Mitigation	With Mitigation																							
Probability	Definite (5)	Probable (3)																							
Duration	Medium term (3)	Medium term (3)																							
Extent	Regional (3)	Limited to Local Area (2)																							
Magnitude	Moderate (6)	Low (4)																							
Significance	60 (high)	27 (low)																							
Status (positive, negative or neutral)	Negative	Negative																							
<p><b>Nature of the Impact:</b> <u>Management of waste products.</u></p> <ul style="list-style-type: none"> <li>The spilling of waste products can be catastrophic for the area, especially the aquatic habitat.</li> <li>The spilling of waste products will kill animals directly or make it impossible for them to survive by reducing their prey items.</li> </ul>			<ul style="list-style-type: none"> <li>Given the nature of the development, special caution should be taken to manage any risks arising from unexpected spills of potentially toxic chemicals and prevent them from reaching surrounding habitats.</li> </ul>	Impacts to the water quality of this watercourse are likely to be long term unless rehabilitated.																					
<table border="1"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> </table>			Description	Without Mitigation	With Mitigation																				
Description	Without Mitigation	With Mitigation																							

Potential impacts:			Proposed mitigation:	Risk of the impact and mitigation not being implemented																					
<b>Probability</b>	Definite (5)	Probable (3)																							
<b>Duration</b>	Medium term (3)	Medium term (3)																							
<b>Extent</b>	Regional (3)	Limited to Local Area (2)																							
<b>Magnitude</b>	Moderate (6)	Low (4)																							
<b>Significance</b>	60 (high)	27 (low)																							
<b>Status (positive, negative or neutral)</b>	Negative	Negative																							
HERITAGE IMPACT																									
<p><b>Nature of the Impact:</b> <u>Loss and disturbance of heritage sites due to the development.</u></p> <p>There are no heritages or archeological resources identified at the project site. Therefore this impact will not be assessed further in this basic assessment report</p> <table border="1"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td><b>Probability</b></td> <td>Low (1)</td> <td>Low (1)</td> </tr> <tr> <td><b>Duration</b></td> <td>Permanent (5)</td> <td>Permanent (5)</td> </tr> <tr> <td><b>Extent</b></td> <td>Limited to Local Area (1)</td> <td>Limited to Local Area (1)</td> </tr> <tr> <td><b>Magnitude</b></td> <td>Minor (8)</td> <td>Minor (8)</td> </tr> <tr> <td><b>Significance</b></td> <td>Low (8)</td> <td>Low (8)</td> </tr> <tr> <td><b>Status (positive, negative or neutral)</b></td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table>			Description	Without Mitigation	With Mitigation	<b>Probability</b>	Low (1)	Low (1)	<b>Duration</b>	Permanent (5)	Permanent (5)	<b>Extent</b>	Limited to Local Area (1)	Limited to Local Area (1)	<b>Magnitude</b>	Minor (8)	Minor (8)	<b>Significance</b>	Low (8)	Low (8)	<b>Status (positive, negative or neutral)</b>	Negative	Negative	<ul style="list-style-type: none"> <li>Nonetheless, should graves, fossils or any archaeological artefacts be identified during construction, work on the area where the artefacts were found, must cease immediately and it should immediately be reported to a heritage practitioner or local museum so that an investigation and evaluation of the finds can be made.</li> </ul>	N/A
Description	Without Mitigation	With Mitigation																							
<b>Probability</b>	Low (1)	Low (1)																							
<b>Duration</b>	Permanent (5)	Permanent (5)																							
<b>Extent</b>	Limited to Local Area (1)	Limited to Local Area (1)																							
<b>Magnitude</b>	Minor (8)	Minor (8)																							
<b>Significance</b>	Low (8)	Low (8)																							
<b>Status (positive, negative or neutral)</b>	Negative	Negative																							

Potential impacts:			Proposed mitigation:	Risk of the impact and mitigation not being implemented																					
<b>VISUAL IMPACTS</b>																									
<b>Nature of the Impact:</b> <u>Visual Impacts</u> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td><b>Probability</b></td> <td>Probable (3)</td> <td>Improbable (2)</td> </tr> <tr> <td><b>Duration</b></td> <td>Short-term (2)</td> <td>Short-term (2)</td> </tr> <tr> <td><b>Extent</b></td> <td>Limited to Local Area (2)</td> <td>Limited to Local Area (2)</td> </tr> <tr> <td><b>Magnitude</b></td> <td>Medium (6)</td> <td>Low (4)</td> </tr> <tr> <td><b>Significance</b></td> <td style="background-color: #FFD700;"><b>30 (Medium)</b></td> <td style="background-color: #90EE90;"><b>20 (Low)</b></td> </tr> <tr> <td><b>Status (positive, negative or neutral)</b></td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table>			Description	Without Mitigation	With Mitigation	<b>Probability</b>	Probable (3)	Improbable (2)	<b>Duration</b>	Short-term (2)	Short-term (2)	<b>Extent</b>	Limited to Local Area (2)	Limited to Local Area (2)	<b>Magnitude</b>	Medium (6)	Low (4)	<b>Significance</b>	<b>30 (Medium)</b>	<b>20 (Low)</b>	<b>Status (positive, negative or neutral)</b>	Negative	Negative	<ul style="list-style-type: none"> <li>▪ Ensure that no litter, refuse, waste, rubbish, rubble, debris and builders wastes generated on the premises be placed, dumped or deposited on adjacent or surrounding properties including road verges, roads or public places and open spaces during or after the construction period. All waste/litter/rubbish etc. must be disposed of at an approved dumping site as approved by the Council.</li> <li>▪ Bare surfaces must be rehabilitated as soon as possible with indigenous vegetation that will be able to grow in the area;</li> <li>▪ The landscape must be rehabilitated in such a way that it corresponds to the surrounding topography;</li> <li>▪ Should overtime/night work be authorized, the Contractor shall be responsible to ensure that lighting does not cause undue disturbance to neighboring residents. In this situation low flux and frequency lighting shall be utilized.</li> </ul>	The risk is low provided the mitigation measures are implemented
Description	Without Mitigation	With Mitigation																							
<b>Probability</b>	Probable (3)	Improbable (2)																							
<b>Duration</b>	Short-term (2)	Short-term (2)																							
<b>Extent</b>	Limited to Local Area (2)	Limited to Local Area (2)																							
<b>Magnitude</b>	Medium (6)	Low (4)																							
<b>Significance</b>	<b>30 (Medium)</b>	<b>20 (Low)</b>																							
<b>Status (positive, negative or neutral)</b>	Negative	Negative																							
<b>Nature of the Impact:</b> <u>Livelihoods improved (Positive)</u> <ul style="list-style-type: none"> <li>• Project is meant to address the current situation of the crossing has been severely affected by flooding in the past which has compromised its functional capabilities.</li> <li>• This route is currently not safe as it is a low-lying area and has on occasion flooded with fast moving water streams in some areas. This poses a danger to the community and learners in particular.</li> </ul> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Description</th> <th>Without Enhancement</th> <th>With Enhancement</th> </tr> </thead> <tbody> <tr> <td><b>Probability</b></td> <td>Probable (3)</td> <td>Probable (3)</td> </tr> <tr> <td><b>Duration</b></td> <td>Short-term (2)</td> <td>Short-term (2)</td> </tr> </tbody> </table>			Description	Without Enhancement	With Enhancement	<b>Probability</b>	Probable (3)	Probable (3)	<b>Duration</b>	Short-term (2)	Short-term (2)	None required	none												
Description	Without Enhancement	With Enhancement																							
<b>Probability</b>	Probable (3)	Probable (3)																							
<b>Duration</b>	Short-term (2)	Short-term (2)																							
<b>SOCIAL IMPACTS</b>																									

Potential impacts:			Proposed mitigation:	Risk of the impact and mitigation not being implemented
<b>Extent</b>	Limited to Local Area (2)	Limited to Local Area (2)		
<b>Magnitude</b>	Medium (6)	Medium (6)		
<b>Significance</b>	<b>30 (Medium)</b>	<b>30 (Medium)</b>		
<b>Status (positive, negative or neutral)</b>	Positive	Positive		

## 2.3 NO GO OPTION

This is the option of not constructing the bridge, this option will result in no impacts occurring on the biophysical environment (i.e. biodiversity, soils), and will result in no visual or social impact hence the project site status quo remains such as that the community will be forced to the current crossing that been severely affected by flooding in the past which has compromised its functional capabilities. This route is currently not safe as it is a low-lying area and has on occasion flooded with fast moving water streams in some areas. This poses a danger to the community and learners in particular. **The no go option is therefore not preferred**

**Table 7:** Potential impacts should the development not be Approved “No-Go” Alternative

Potential impacts:	Significance rating of impacts (positive or negative):	Proposed mitigation:	Significance rating of impacts after mitigation:	Risk of the impact and mitigation not being implemented
Impact on wetland	Low	There are no mitigation measures	Negligible	<b>No risk</b>
Impact on vegetation	Low	There are no mitigation measures	Negligible	No risk
Sedimentation	Negligible	There are no mitigation measures	Negligible	No risk
Establishment of alien plants	<b>N – Very High</b>	There are no mitigation measures	<b>N – Low</b>	<b>Very Low risk</b>
Loss of wetland habitat	Negligible	There are no mitigation measures	Negligible	No risk
Pollution of watercourses	Negligible	There are no mitigation measures	Negligible	No risk
Destruction of protected plants and plants of conservation concern	Negligible	There are no mitigation measures	Negligible	No risk
Visual Impacts	Negligible	There are no mitigation measures	Negligible	No risk
Noise Impacts anticipated	Negligible	There are no mitigation measure	Negligible	
Loss and disturbance of heritage sites due to the development.	Negligible	There are no mitigation measures	Negligible	No risk
Social impacts anticipated during the construction period (Positive)	<b>N – Very High</b>	There are no mitigation measures	Negligible	No risk
Social impacts anticipated during the construction	Negligible	There are no mitigation measures	Negligible	No risk

---

period (Negative)				
-------------------	--	--	--	--



List any specialist reports that were used to fill in the above tables. Such reports are to be attached in the appropriate Appendix.

- Wetland Assessment
- Vegetation Assessment
- Fauna Impact Assessment
- Heritage Assessment

Describe any gaps in knowledge or assumptions made in the assessment of the environment and the impacts associated with the proposed development.

Vegetation studies should be conducted during the growing season of all plant species that may potentially occur. Threatened species are usually also cryptic species that are easily overlooked when not in flower. This assessment relied on a site visit undertaken on the 26th of September 2018, when some species may still have been dormant. However, the potential occurrence of such species was assessed based on the availability of suitable habitat.

### 3. IMPACTS THAT MAY RESULT FROM THE DECOMMISSIONING AND CLOSURE PHASE

Briefly describe and compare the potential impacts (as appropriate), +significance rating of impacts, proposed mitigation and significance rating of impacts after mitigation that are likely to occur as a result of the decommissioning and closure phase for the various alternatives of the proposed development. This must include an assessment of the significance of all impacts.

#### Proposed and Alternative Designs

Potential impacts:	Significance rating of impacts (positive, negative or neutral):	Proposed mitigation:	Significance rating of impacts after mitigation:	Risk of the impact and mitigation not being implemented
Considering the strategic importance of this infrastructure, it is unlikely that it will be decommissioned in the foreseeable future. The infrastructure may however require maintenance and repairs during the life of its operation, whereby the similar impacts might be experienced as during construction phase of the project. Should the infrastructure need maintenance or repairs, the mitigation and management measures provided for during the construction phase will be implemented.				

List any specialist reports that were used to fill in the above tables. Such reports are to be attached in the appropriate Appendix.

Specialist studies for decommissioning and closure phase will be undertaken at the time when decommissioning is contemplated by the developer.

Where applicable indicate the detailed financial provisions for rehabilitation, closure and ongoing post decommissioning management for the negative environmental impacts.

Ongoing post decommissioning management cost will not be determined at this stage as this phase of the development is not yet contemplated.

#### 4. CUMULATIVE IMPACTS

Describe potential impacts that, on their own may not be significant, but is significant when added to the impact of other activities or existing impacts in the environment. Substantiate response:

Cumulative impacts can result from an effect which in itself may not be significant but may become significant if added to other existing or potential impacts that may result from activities associated with the proposed development. The anticipated cumulative impacts of this development includes the following:

##### **Impacts on the Wetland**

- Construction and operational activities may result in cumulative impact to the water courses within the local catchments and beyond. It is imperative that effective protective measures should be put into place and monitored. A rehabilitation plan should be put into action should any degradation be observed as a result of stormwater or sediment input. Increases in stormwater flows will definitely cause permanent degradation downstream unless mitigated at the design level.

##### **Destruction or degradation of moist grassland and pollution of the watercourse**

- Loss of functionality of the vegetation within the course due to edge effects of the road. The road will increase traffic over the Rietspruit and increase runoff and pollution.

##### **Destruction of protected plants and plants of conservation concern**

- Can lead to the fragmentation of remaining open spaces within Gauteng. If mitigation measures are adequately implemented, no cumulative impacts are expected

##### **Direct impact on species richness and loss of habitat (fauna)**

- Construction and operational activities may result in cumulative impact to the traditional migration routes of mammals, reptiles and especially frogs on the study site and on adjacent properties. It is imperative that effective protective measures should be put into place to protect wetlands and their buffer areas. The increased roads and traffic will definitely cause permanent disruption of migration routes unless mitigation takes place.

##### **Increased socio-economic upliftment as a result of the proposed development (Positive Impact)**

- Constructing the proposed development will result in additional jobs being created in the area and skills development during the construction phase. Due to the high unemployment rate in the study area. The positive impact will be very low positive but with enhancement it can be low positive.

##### **Removal of alien invasive vegetation**

- The removal and sustained low or no infestation with alien invasive species will have a positive cumulative impact as the seed source of these species within the area will be reduced.

Generally, the cumulative impact is rated as **Low** for the project with proper mitigation measures in place. These management measures should be guided by the Environmental Management Plan, attached as **Appendix H**

## 5. ENVIRONMENTAL IMPACT STATEMENT

Taking the assessment of potential impacts into account, please provide an environmental impact statement that sums up the impact that the proposal 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 following conclusions were drawn from the specialist studies undertaken within this Basic Assessment:

### **Wetland Assessment:**

Two wetland hydrogeomorphic (HGM) units were identified within 500m of the proposed road and bridge. These are an unchannelled valley bottom wetland and a seepage wetland.

Three route options for the proposed road were assessed. **Alternative 3 is the preferred route** in terms of wetlands due to it following, for the most part, an existing footpath and only crossing one wetland. This route is thus the most disturbed and also the shortest and will thus have the least amount of impact on the wetland. The least preferred route is Alternative 2. This is due to it crossing two wetlands, longer length of the road as well as a bend occurring in the seepage wetland. The second preferred route is Alternative 1.

The wetlands scored low with regards to subsistence benefits and cultural benefits, with the exception of a potential for a tourism area. The area is located in an area with a low number of subsistence farmers. The remaining ecoservices varied from low to medium depending on the wetland type and size. The impacts associated with the wetlands are predominantly caused by nearby developments. The unchannelled valley bottom has had some rehabilitation with cement gabions in the main channel to protect it from erosion. The seepage wetland, although likely always a feature has become more larger in recent years due to an increase in water input from a stormwater retention pond created in the headwaters of this wetland, thus proving a constant input of water and potential foreign materials.

### **Vegetation Assessment**

The proposed alternatives will all three to some degree traverse *Hyparrhenia hirta* grassland with lower species diversity than sub-climax or primary Egoli Granite Grassland. The *Hyparrhenia hirta* grassland is not sensitive per se, however, these grasslands form part of the remaining open spaces in the fast-developing area and function as catchment for groundwater recharge and prevention of flooding of proximate watercourses and these functions increased its sensitivity rating. The proposed routes are unlikely to impact on the functionality of the majority of grasslands and impacts can be mitigated. In addition, the plant species of conservation concern that have a likelihood of occurring, bar orchid species, could be relocated if found to occur.

Areas where the vegetation no longer represent natural or semi-natural grassland (around infrastructure and invasive vegetation) and which support a high number of weedy and alien invasive plant species were found to be of a low sensitivity to the proposed development. From a vegetation perspective, these areas are developable provided that negative edge effect is mitigated. The moist grasslands on site have been subjected

to several disturbances and it is unlikely that any threatened species occur within the 100m mapped around the route alternatives. The vegetation's sensitivity rating as high is mainly due to its functional role, as well as the statutory protection of wetland areas. The proposed routes are unlikely to impact on the functionality of the majority of *Hyparrhenia hirta* grasslands and impacts can be mitigated.

#### **Fauna assessment:**

Construction of the bridge and road is essential considering the safety of learners and other pedestrians daily reliant on crossing the Rietspuit. From the perspective of vertebrates, the environmental cost of the proposed development is deemed low, particularly if the current connectivity via the riparian zones is maintained. This opinion is based on the fact that the development is within an urban setting. There is a very small possibility that grass-owls may use some areas of the study site for breeding. There is a very good chance that the giant bullfrog could occur in the study area.

The wetland and its buffer areas (**Figure 10**) are sensitive vertebrate habitats, but from the perspective of vertebrate species richness, their national conservation rankings and population dynamics, no reasonable objection can be raised should construction of a bridge and road at any of the three routes is to be implemented. Any one of the three alternatives is suitable but the shortest (Alternative 3) is preferable from a vertebrate perspective.

#### **Heritage assessment:**

As no sites, features or objects of cultural significance are known to exist in the development area, there would be no impact as a result of the proposed development. From a heritage point of view, it is recommended that the proposed development be allowed to continue on acceptance of the proposed conditions. Should archaeological sites or graves be exposed in other areas during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.

#### **Conclusion:**

Most of the study site consists of transformed grassland. The natural grasslands were first transformed for agricultural purposes and later by anthropogenic influences such as footpaths, veld fires, excessive dumping, invasive plants and gravel roads. The study site is thus ecologically disturbed in many parts. A new road will indeed be constructed, and it is anticipated that the route for the permanent road will also be utilised as an access road during construction. Although the environmental impact may be of high significance in some cases as discussed above, it will be of a limited duration. Once the road and bridge have been completed the environmental impact is considered to be moderate-low risk. The identified impacts are generally envisaged to be the same for all three alternative routes during construction/operation for the most part. Any one of the three alternatives is suitable but the slightly shortest (Alternative 3) is preferable from an ecological perspective.

#### **Alternative 2 & 3**

See above, the impacts are similar to those of Route Alternative 1 therefore are not compared collectively.

#### **No-go (compulsory)**

This is the option of not constructing the bridge, this option will result in no impacts occurring on the biophysical

environment (i.e. biodiversity, soils), and will result in no visual or social impact hence the project site status quo remains such as that the community will be forced to the current crossing that been severely affected by flooding in the past which has compromised its functional capabilities. This route is currently not safe as it is a low-lying area and has on occasion flooded with fast moving water streams in some areas. This poses a danger to the community and learners in particular.

**The no go option is therefore not preferred**

## 6. IMPACT SUMMARY OF THE PROPOSAL AND ALTERNATIVE

A summary of the impact assessments is presented in **Table 8 and 9**; the tables cover the construction and operational impacts. An overall weighted score is provided in each case. Thus far each of the environmental issues are assigned equal weighting (i.e. the weighted score is the average of each of the individual scores. The impact scores are also colour coded according to the following:

< 30	Low significance
30 to 60	Moderate significance
>60	High significance

It must be noted that the impact scores in **Table 8** below are not intended to be definitive measures of environmental impact, but they are a useful guide to evaluating the overall environmental performance of a new development and they assist in interpreting key influences of a development

Environmental Aspect	Construction	
	Without Mitigation	With Mitigation
Changes to flow dynamics	High (70) Alt 2	Medium (44) Alt 2
	High (60) Alt 1 Alt 3	Medium (36) Alt 1 Alt 3
Sedimentation	Medium	Low
Establishment of alien plants	Medium	Low
Pollution of watercourses	Medium	Low
Loss of fringe vegetation and habitat	Medium	Low
Destruction of <i>Hyparrhenia hirta</i> grassland	Medium (50) Alt 2	Low
	Medium (40) Alt 1 Alt 3	Low
Destruction or degradation of moist grassland and pollution of the watercourse	High (65) Alt 2	Medium (40) Alt 2
	High (55) Alt 1 Alt 3	Medium (32) Alt 1 Alt 3
Destruction of protected plants and plants of conservation concern	Medium (39) Alt 2	Low
	Medium (33) Alt 1 Alt 3	Low
Removal of alien invasive vegetation (Positive)	Low	Medium
Clearing of land for construction camps and potential pollution	Medium	Low

of the soil and water		
Exposure to erosion and subsequent sedimentation or pollution of proximate watercourses	Medium	Low
Destruction of natural habitat	High	Low
Destruction of sensitive vertebrate habitat	High	Low
Loss of ecosystem function	High	Low
Loss of the ecological function of wetland	High	Low
Exposure to erosion	High	Low
Poaching of wildlife in the vicinity	High	Low
Loss and disturbance of heritage sites due to the development.	Low	Low
Visual Impacts	Medium	Low
Noise Impacts anticipated	Medium	Low
Positive Social impacts	Low	Medium
Negative Social impacts	Medium	Low

**Table 9** : Impact Summary table: Operation Phase

Environmental Aspect	Operation	
	Without Mitigation	With Mitigation
Changes to flow dynamics	Medium (55) Alt 2	Low
	Medium (45) Alt 1 Alt 3	Low
Sedimentation	Low	Low
Establishment of alien plants	Medium	Low
Pollution of watercourses	Medium	Low
Loss of fringe vegetation and habitat	Medium	Low
Destruction of <i>Hyparrhenia hirta</i> grassland	Medium (50) Alt 2	Low
	Medium (40) Alt 1 Alt 3	Low
Destruction or degradation of moist grassland and pollution of the watercourse	Medium (44) Alt 2	Low
	Medium (36) Alt 1 Alt 3	Low
Destruction of protected plants and plants of conservation concern	Medium	Low
Removal of alien invasive vegetation (Positive)	Low	Medium
Clearing of land for construction camps and potential pollution of the soil and water	Medium	Low
Exposure to erosion and subsequent sedimentation or pollution of proximate watercourses	Medium	Low
Reduction of natural migratory and faunal dispersal routes.	High	Low
Possible increase in exotic vegetation	Low	Low
Displacement of indigenous mammals & vertebrates	Medium	Low
Disturbances of fauna in sensitive vegetation	High	Low
Lighting	High	Low
Removal of exotic species, declared weeds and invader plants	High	Low
Management of waste products.	High	Low

Loss and disturbance of heritage sites due to the development.	Low	Low
Visual Impacts	Medium	Low
Positive Social impacts	Medium	Medium

For alternative:

Please refer to **Table 8 & 9**

Having assessed the significance of impacts of the proposal and alternative(s), please provide an overall summary and reasons for selecting the proposal or preferred alternative.

Based on the findings of this Basic Assessment Report (summarised in Table 8 & 9), no environmental fatal flaws were identified to be associated with either of the three alternative routes proposed **for the construction of a bridge and road**. **Table 10** below gives an overall summary of comparative assessment undertaken for the alternative routes in order of preference.

**Table 10<sup>3</sup>**: Summary of the comparative assessment

Aspect	Route Alternative 1	Route Alternative 2	Route Alternative 3
Wetland	2	3	1
Vegetation	2	3	1
Fauna	2	3	1
Heritage	1	1	1
Visual	2	1	2
Social	2	1	2

According to **Table 10** above, **Alternative 3** would be more **favourable environmentally** as this will have the least impact on the ecology in terms of wetland and vegetation with the least distance through the Rietspruit and associated moist grasslands, while also following the current compacted footpaths through the Rietspruit. It is assumed that the shorter the distance of the route, the shorter the time frame that construction related impacts will last. However from a **technical and social** perspective **Alternative 2** is the **preferred** option as, this will run parallel to the property boundary avoiding cutting the affected property into two pieces, which would not be acceptable by the landowner and following the property boundary is negotiable.

Based on the above, the types of impacts that should be avoided would be those that cannot be mitigated with good result. Usually this would be the visual impacts and the heritage. Sensitive ecological features such as vegetation and fauna habitats could be avoided during the detail design phase of the project, by careful placing of footprints and following the measures contained in the EMPr. Environmentally, Alternative 3 is preferred however technically Alternative 2 is preferred (the technical viability of Alternative 2 is further discussed in detailed in the Preliminary Design Report (**Appendix I2**) under the section of “Qualitative Evaluation of Route Alternatives”). For this reason it is believed that the alternative with the least impacts socially would be the best option, in this case **Alternative 2 is therefore the best option**, carefully design of the alignment and the bridge with special precautions as recommended by the various specialists is required. It is noted, **however, that the selection of the technically preferred route and bridge/culvert design alternative will be incumbent on JRA.**

<sup>3</sup> Any” in this table refers to any of the proposed alternatives.

Cognisant of the above-mentioned conclusions established through the basic assessment investigation, there were areas of environmental sensitivity identified along the recommended route. These include areas such as sensitive vegetation (i.e. protected plants) & watercourses, these are shown in the environmental sensitivity map (refer to **appendix A**). The significance levels of the majority of identified negative impacts for all alternatives investigated can generally be reduced to acceptable levels thus, the proposed developments could proceed provided that the mitigation measures set out in this report and in the EMPr are diligently implemented to limit the potential impacts on vegetation, watercourses and social during construction and operation of the developments.

Through the implementation of the EMPr (**Appendix H**) and the Rehabilitation Plans (**Appendix G4**), impacts on these sensitive areas can be mitigated to acceptable levels.

## 7. SPATIAL DEVELOPMENT TOOLS

Indicate the application of any spatial development tool protocols on the proposed development and the outcome thereof.

### **Provincial Spatial Development Framework (PSDF)**

The Gauteng PSDF is a provincial and strategic planning policy that responds to and complies with in particular the National Development Plan vision 2030 and the National Spatial Development Perspective (NSDP). This framework promotes a developmental state in accordance to the principals of global sustainability as is stated by among others, the South African constitution and enabling legislation. The Gauteng PSDF is based on six growth and development pillars, each of which has its onset of drivers with long term-programmes. Pillar 1 highlights the job creation. The proposed development will create jobs opportunities during the construction phase, these employment opportunities will target local community members that are usually excluded from mainstream economic and formal employment. Therefore, the development is in line with the Gauteng PSDF.

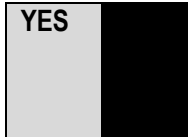
**Integrated Development Plan (IDP) and Spatial Development Framework (SDF) of the Local Municipality** (e.g. would the approval of this application compromise the integrity of the existing approved and credible municipal IDP and SDF?).

The study area falls within the City of Johannesburg Metropolitan Municipality Region A. The project will not compromise the IDP objectives but would rather assist the Local Municipality in achieving the performance areas as identified by the Local Municipality, namely growth in the region and creation of more employment opportunities as well as through the improvement of public services and broadening access to communities and thereby improving quality of living which is further aligned with achieving the goal of opportunity in terms of economic growth and employment which also entails access to basic services, social infrastructure and quality environment. Furthermore the Municipality aims to achieve inclusivity which aims to integrate communities and improve transport corridors and human settlements. One such priority for the Municipality is the improvement of mobility corridors with specific reference to proposed development (road infrastructure). The Municipality seeks to address past spatial planning imbalances by bringing services and economic opportunities close to previously disadvantaged areas. This initiative is supported by the proposed access road. The project will not require any capacity for services such as water and sanitation nor storm water management from the relevant Municipalities.



## 8. RECOMMENDATION OF THE 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 as bound by professional ethical standards and the code of conduct of EAPASA).



If "NO", indicate the aspects that require further assessment before a decision can be made (list the aspects that require further assessment):

--

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:

The construction of this new road forms a strategic function in providing access between Sagewood and Le Roux Street to Noordwyk. This Draft BAR has provided a comprehensive assessment of the potential environmental impacts associated with the proposed bridge and road construction. These impacts have been identified by the EIA team (including specialists). There are no environmental or social impacts of high significance that would prevent the establishment of the proposed project. Generally, the proposed development will have an impact of low significance provided that there is effective application of the mitigation measures proposed in this BAR and the EMPr. **From the evaluation of different route alternatives and culvert structure options, it is recommended that [Route Alternative 2](#) for the road crossing with [Option 1](#) for the culvert structure be authorised for implementation subject to the following conditions:**

- A final detailed layout must be submitted to the relevant authority for approval prior to commencement with the project;
- The Environmental Management Programme (EMPr) as contained within Appendix H of this report should form part of the contract with the Contractors appointed to construct and maintain the proposed power line, and will be used to ensure compliance with environmental specifications and management measures. The implementation of this EMPr for all life cycle phases of the project is considered to be key in achieving the appropriate environmental management standards as detailed for this project.
- An independent Environmental Control Officer (ECO) should be appointed to monitor compliance with the specifications of the EMPr for the duration of the construction period.
- Implementation of the Wetland Rehabilitation Plan (Appendix G4)
- An appropriate stormwater management plan must be developed and implemented to the site.
- Development should be done in a manner that does not further alter the natural watercourses (rivers and wetlands) and their catchments. This includes protecting and improving current eroded wetlands before additional water inputs can be implemented.
- Construction camps should ideally be placed within modified areas or *H hirta* grassland that is proposed for future development, as far as possible from the watercourses. Avoid disturbances to *H hirta* grassland in the eastern extent of the proposed alternatives.
- Avoid, as far as reasonably possible, disturbing wetlands within the study area. Similarly, restore wetlands that will remain intact if they have been affected by construction activity;
- Adequate measures must be put in place to prevent polluted runoff water from entering the, wetland and soil, thus preventing surface and groundwater pollution;
- The relevant authorisations and water use licenses must be obtained from Department of Water Affairs prior to the commencement of construction activities.
- No activities may proceed within moist grassland without a Water Use License permitting the activity.

- The final route alignment, locality of construction camps and the footprint of other related disturbances should be surveyed by a specialist during the flowering period (November or February) of threatened or provincially protected species that could occur here (Appendix G1).
- If such species are located, the species can only be removed once a permit for the removal or relocation of such species was granted by the GDARD.
- Protected plants must be removed by a suitably qualified specialist and replanted in suitable habitat such as the buffer areas of the moist grasslands. Their survival must be monitored for at least two growing seasons after relocation.
- Should heritage features, archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.
- All relevant legislation and requirement of other government departments (National, Provincial), in particular of Section 28 (duty of care) of NEMA, must be complied with
- The developer must appoint an independent external auditor to monitor the development during construction for environmental compliance. Monitoring must be carried out on a monthly basis (or as specified in the environmental authorisation once issued), and compile an audit report for submission to the authorities. The audit report must cover compliance with any specific environmental authorisation conditions and requirements of the project EMPr.
- In the event of a major incident (e.g. fire causing damage to property and environment, major spill or leak of contaminants), the relevant authorities should be notified as per the notification of emergencies/ incidents, as per the requirements of NEMA.
- Compliance with all legal requirements in relation to environmental management and conditions of the authorisation issued by GDARD.

**9. THE NEEDS AND DESIREBILITY OF THE PROPOSED DEVELOPMENT** *(as per notice 792 of 2012, or the updated version of this guideline)*

The Johannesburg Roads Agency (JRA) has allocated funds for planning, design and construction monitoring of a proposed route to cross between Sagewood and Le Roux Street to Noordwyk. There is currently no existing road or bridge along the proposed route, which is currently used as a pedestrian access route by the community and a majority of learners from Noordwyk Secondary and Sagewood College. This route is currently not safe as it is a low-lying area and has on occasion flooded with fast moving water streams in some areas. Construction of the new bridge/ road has been considered essential based mainly on the following factors among others:

- i. The current route is in a low-lying area and has on occasion flooded with fast flowing water streams which pose danger to the communities and learners who cross the streams.
- ii. The Sagewood to Noordwyk route plays a strategic function in the road network of Midrand.
- iii. Provision of a safe road crossing will enable the community and the learners to travel safely.

**10. THE PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED** *(Consider when the activity is expected to be concluded)*

Duration and Validity: The environmental authorization is required for a period of 10 years from the date of issue. Should a longer period be required, the applicant/EAP will be required to provide a detailed motivation on what the period of validity should be

**11. THE PERIOD ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR)**

(must include post construction monitoring requirements and when these will be concluded.)

If the EAP answers “Yes” to Point 7 above then an EMP is to be attached to this report as an Appendix

EMPr attached

**YES**

## **SECTION F: APPENDIXES**

---

The following appendixes must be attached as appropriate (this list is inclusive, but not exhaustive):

It is required that if more than one item is enclosed that a table of contents is included in the appendix

*Appendix A: Site plan(s) – (must include a scaled layout plan of the proposed activities overlain on the site sensitivities indicating areas to be avoided including buffers)*

Appendix A: Site plan(s)

Appendix B: Photographs

Appendix C: Facility illustration(s)

Appendix D: Route position information (N/A)

Appendix E: Public participation information

Appendix F: Water use license(s) authorisation, SAHRA information, service letters from municipalities, water supply information

Appendix G: Specialist reports

Appendix H: EMPr

Appendix I: Other information

## **CHECKLIST**

To ensure that all information that the Department needs to be able to process this application, please check that:

- Where requested, supporting documentation has been attached;
- All relevant sections of the form have been completed.