



**BASIC ASSESSMENT FOR THE PROPOSED  
REHABILITATION AND UPGRADE OF THE BRIDGE ROAD  
BRIDGE LOCATED IN BUCCLEUCH, WITHIN CITY OF  
JOHANNESBURG, GAUTENG PROVINCE.**

**DRAFT BASIC ASSESSMENT REPORT**

**FOR PUBLIC REVIEW**

**NOVEMBER 2017**

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## **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)**

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### 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.

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### **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

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(For official use only)

<b>NEAS Reference Number:</b>						
<b>File Reference Number:</b>						
<b>Application Number:</b>						
<b>Date Received:</b>						

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.

This is the Draft BAR and application form submission. The Final BAR will be submitted within 90 days of submission of application form.

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.

Decommissioning and closure phase has not been considered as part of this application as the end use of the site and required decommissioning activities are not known at this time. In addition, the current environmental baseline conditions may change overtime; it is therefore not possible to predict the potential environmental impacts. In addition, it is unlikely that decommissioning will be contemplated due to the nature of the development. However, closure and decommissioning would require a separate EIA process. If decommissioning is considered in future, the developer/ license holder will undertake the required actions by applying for decommissioning.

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?  **YES**

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

If no, state reasons for not attaching the list.  
N/A

Have State Departments including the competent authority commented?  **NO**

If no, why?

This is the Draft BAR. The State Departments have been afforded 30 days to review the Draft BAR and provide comments. Their comments will be reflected in the Final BAR.

## PROJECT DETAILS

**Title** : BASIC ASSESSMENT FOR THE PROPOSED  
REHABILITATION AND UPGRADE OF THE BRIDGE  
ROAD BRIDGE LOCATED IN BUCCLEUCH, WITHIN  
CITY OF JOHANNESBURG, GAUTENG PROVINCE.

**Report compiled by** : Envirovolution Consulting (Pty) Ltd

**Client** : Johannesburg Roads Agency

**Report Status** : Draft Basic Assessment Report for Public Review

**Review period:** **24 November 2017 – 16 January 2018**

## DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)

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<b>E-mail:</b>	<a href="mailto:thabang@envirolution.co.za">thabang@envirolution.co.za</a>	Fax:	(086) 162 62 22
<b>EAP Qualifications</b>	BSc (Hons)		
<b>EAP Registrations/Associations</b>	Registered with the South African Council for Natural Scientific Professions (No: 400049/12)		

### Details of the EAP's expertise to carry out Basic Assessment procedures

Envirolution Consulting Pty Ltd was contracted by Ekurhuleni Metropolitan Municipality (EMM) as the independent environmental consultant to undertake the Environmental Basic Assessment process for the proposed project. Envirolution Consulting Pty Ltd is not a subsidiary of, or affiliated to EMM. Furthermore, Envirolution Consulting does not have any interests in secondary developments that may arise out of the authorisation of the proposed project.

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

- Karthigesan Govender – The principle Environmental Assessment Practitioner (EAP) for this project is a registered Professional Natural Scientist and holds an Honours Degree in Botany. He has over 17 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 EIAs for several diverse projects across the country.
- Thabang Sekele, the principle author of this Basic Assessment forms part of the project team and acts as the Project Manager for all phases of the project. Thabang holds a BA (Environmental Management) from the University of South Africa. Thabang has three years' experience as an Environmental Assessment Practitioner and 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; environmental auditing and compliance reporting; the identification of environmental management solution and mitigation/risk minimising measures; environmental auditing, monitoring and reporting compliance. Thabang is currently an Environmental Assessment Practitioner at Envirolution Consulting (Pty) Ltd.



## **ABBREVIATIONS**

<b>BAR</b>	Basic Assessment Report
<b>COJ</b>	City of Johannesburg
<b>EAP</b>	Environmental Assessment Practitioner
<b>EMPr</b>	Environmental Management Programme
<b>EIA</b>	Environmental Impact Assessment
<b>GDARD</b>	Gauteng Department of Agriculture and Rural Development
<b>GN</b>	Government Notice
<b>HIA</b>	Heritage Impact Assessment
<b>I&amp;AP's</b>	Interested and Affected Parties
<b>IDP</b>	Integrated Development Plan
<b>NEMA</b>	National Environmental Management Act (No. 107 of 1998) (as amended)
<b>NHRA</b>	National Heritage Resources Act (No. 25 of 1999)
<b>NWA</b>	National Water Act (No 36 of 1998)
<b>SAHRA</b>	South African Heritage Resources Agency
<b>SDF</b>	Spatial Development Framework
<b>SMP</b>	Stormwater Management Plan
<b>WULA</b>	Water Use License Application



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## SECTION A: ACTIVITY INFORMATION

### 1. PROPOSAL OR DEVELOPMENT DESCRIPTION

#### 1.1 Project Title:

The Proposed Rehabilitation and Upgrade of the Bridge Road Bridge located in Buccleuch, within City of Johannesburg, Gauteng Province.

#### 1.2 Introduction and Background

As mentioned in the of the City of Johannesburg Metropolitan Municipality's IDP 2017/18, part of the enhancement of quality of life and environment for the city is by the improvement of infrastructure services and taking care of the environment. Recognising this, a cornerstone of the City's development plan is to ensure improved access to quality and affordable basic services, safe roads and well-maintained public spaces. The preservation and protection of the natural environment for the health and wellness of current and future generations is also a vital component of this pillar. In addition, the Johannesburg Roads Agency (JRA) is responsible for the design, maintenance, repair and development of Johannesburg's road network and storm water infrastructure, including bridges and culverts, traffic lights and signage. The upgrade of culvert is in line with the City's overall maintenance of the storm water management system. The storm water management system is necessary to keep residences and infrastructure from flooding continually during minor and major storm events, which in turn results in further damage to property and infrastructure.

#### 1.3 Activity description

In order to reach the abovementioned objectives, the JRA proposes to rehabilitate and upgrade the Bridge road culvert/bridge located in Buccleuch, Johannesburg. The bridge is located on Bridge Road in Buccleuch, under Region E of the City of Johannesburg. The central GPS coordinates of the bridge location are 26°03'00.5"S, 28°06'17.0"E. Refer to Figure 1 below for the locality map. This area is within a peri-urban environment and at a natural low point of the river. It is surrounded by private properties. Bridge Road culvert crosses the Jukskei River. The Bridge orientation is East-West between Helen and Muller Streets. The river is densely vegetated with a possibility of alien vegetation upstream. There is no opportunity of any significant raising of the road levels across the structure as this can have a consequence of flooding surrounding properties. Consequently the type of existing structure i.e. causeway is appropriate. The existing structure consists of single lanes in each direction of width 3.4m. There are sidewalks of size 1m on both sides.

The proposed dimensions are as follows:

- Two (2) lanes of width of 3.5m
- Two (2) sidewalks of width of 1.5m

As part of the works, the proposed upgrades and rehabilitation requires the demolition of the existing bridge and the subsequent reconstruction to the specifications of the preferred design. The existing structure is a four cell precast box culvert with reinforced concrete wing walls in need of an upgrade. Upstream of the culvert the gabion walls are in a very poor condition which results in the gabion retaining walls to perform poorly in high flowing waters. The proposed upgrade will have a length of 21.7m and a width of 10.6m and

will be a low level causeway with larger Spans (new structure with three openings). This bridge will be replacing the existing cellular culvert structure. Associated infrastructure includes the rehabilitation of the existing gabion structures to a footprint of approximately 15 square metres.

#### 1.4 Accommodation of traffic during construction

As the river crossing culvert is not the only means to get to the residential area situated on the Eastern and Western side of the bridge, the culvert road can be closed during the construction period. The other side of the bridge can be accessed via Pretoria Main Road and Buccleuch Drive which is a 5km detour. Another alternative to accommodate traffic will be to construct a temporary access in the form of a low level pipe culvert adjacent to the existing structure. Traffic accommodation signage will be used to inform the road users of the construction and travel speeds at the site. Traffic calming measures will be implemented to reduce speeds and pedestrian crossing will also be provided for safety.

#### 1.5 Activities being applied for:

The activities to be undertaken will trigger the need for an application to the Gauteng Department of Agriculture and Rural Development (GDARD) for environmental authorisation. Due to activities impacting on a watercourse, a Water Use License (WUL) application will also be submitted to the Department of Water and Sanitation (DWS). In terms of these Regulations ( Government Notice R. 982, Government Gazette No. 38282 of 04 December 2014, under sections 24(5), and 44, of the National Environmental Management Act, 1998 ; Act No.107 of 1998), as amended; a Basic Assessment is required for this project as per the following listed activities :

<u>Regulation</u>	<u>Activity</u>	<u>Description</u>	<u>Relevance</u>
GN R983	19	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells grit, pebbles or rock of more than 10 cubic metres from a watercourse.	The proposed project will result in infilling or removal of 10m <sup>3</sup> or more of material into/from a watercourse during the upgrade of the culvert bridge and associated gabions.
GN R985	23	The expansion of – (ii) infrastructure or structures where the physical footprint is expanded by 10 square metres or more:– where such development occurs - a) within a watercourse; d) In Gauteng: iv. sites identified as Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) Gauteng Conservation Plan or in bioregional plans; v. sites identified within threatened ecosystems listed in terms of the National	The proposed project will result in the expansion of the bridge and associated gabions where the physical footprint will be expanded by 10 square metres or more within a watercourse on areas identified as Important and Ecological Support Area by the Gauteng Conservation Plan.

		Environmental Management Act: Biodiversity Act (Act No. 10 of 2004)	
<p>The nature and characteristic of the proposed project may not commence without an environmental authorisation from the competent authority, Gauteng Department of Agriculture and Rural Development (GDARD). It is for this reason that a Basic Assessment Process is being conducted and to ensure that:</p> <ul style="list-style-type: none"><li>• The potential environmental impacts associated with the proposed project are taken into consideration;</li><li>• Public Participation Process is conducted i.e. to afford any Interested and/ or Affected Parties (I&amp;APs) sufficient opportunity to provide comments; and</li><li>• Sufficient information is provided to the competent authority for an informed record of decision.</li></ul> <p>The proposed development also requires a Water Use License from the Department of Water and Sanitation in terms of National Water Act No. 36 of 1998 for the following specific water uses:</p> <ul style="list-style-type: none"><li>• <b>Section 21(c):</b> Impeding or diverting the flow of water in a watercourse; and</li><li>• <b>Section 21(i):</b> Altering the bed, banks, course or characteristics of a watercourse.</li></ul>			



Figure 1: Locality Map

Select the appropriate box

The application is for an upgrade of an existing development	<input checked="" type="checkbox"/>	The application is for a new development	<input type="checkbox"/>	Other, specify	
--	-------------------------------------	--	--------------------------	----------------	--

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

YES <input checked="" type="checkbox"/>	<input type="checkbox"/>
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If yes, describe the legislation and the Competent Authority administering such legislation

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.

A Water Use License will be submitted to DWS simultaneously with the FBAR submission to GDARD.

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

YES	NO <input checked="" type="checkbox"/>
YES	NO

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

A Water Use License Application is currently being compiled and will be submitted to the DWS simultaneously with the FBAR submission to GDARD. Impacts on the watercourse have been assessed through the Basic Assessment process (Appendix G1 – Wetland Report). The following reports/ studies as outlined below will be required to be attached to the Water Use License Application forms:

- Basic Assessment Report;
- Wetland Assessment Report;
- Risk Assessment Report;
- General Wetland Rehabilitation and Monitoring Plan;

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

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

<u>Title of legislation, policy or guideline (Promulgation Date)</u>	<u>Applicable Requirements</u>	<u>Administering Authority</u>	<u>Description of compliance</u>
National Environmental Management Act (Act No. 107 of 1998)	<p>NEMA requires, inter alia, that:</p> <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> <p>EIA Regulations have been promulgated in terms of Chapter 5. Activities which may not commence without an environmental authorisation are identified within these Regulations.</p> <p>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.</p>	<ul style="list-style-type: none"> <li>▪ National Department of Environmental Affairs</li> <li>▪ Gauteng Department of Agriculture and Rural Development</li> </ul>	<p>The Basic Assessment is undertaken in accordance with the requirements of Government Notice R982 of December 2014, as required in terms of the National Environmental Management: Waste Act, 2008 (No. 59 of 2008)</p>
National Environmental Management Act (Act No. 107 of 1998)	<p>A project proponent is required to consider a project holistically and to consider the cumulative effect of potential impacts.</p> <p>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</p>	<ul style="list-style-type: none"> <li>▪ National Department of Environmental Affairs</li> <li>▪ Gauteng Department of Agriculture and Rural Development</li> </ul>	<p>While no permitting or licensing requirements arise directly, the holistic consideration of the potential impacts of the proposed project has found application in the EIA Phase.</p> <p>The implementation of mitigation measures is</p>

<u>Title of legislation, policy or guideline (Promulgation Date)</u>	<u>Applicable Requirements</u>	<u>Administering Authority</u>	<u>Description of compliance</u>
	environment associated with a project is avoided, stopped or minimised.		included as part of the Project EMPr and will continue to apply throughout the life cycle of the project.
The National Water Act, 1998 (Act No. 36 of 1998)	The National Water Act aims to provide management of the national water resources to achieve sustainable use of water for the benefit of all water users. This requires that the quality of water resources is protected as well as integrated management of water resources with the delegation of powers to institutions at the regional or catchment level. The purpose of the Act is to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled.	<ul style="list-style-type: none"> <li>▪ Department of Water and Sanitation</li> </ul>	The triggered sections within the NWA for the proposed development are: <ul style="list-style-type: none"> <li>• Section 21(c): impeding or diverting the flow of water in a watercourse.</li> <li>• Section 21(i): altering the bed, banks, course or characteristics of a watercourse.</li> </ul>
National Environmental Management: Biodiversity Act 2004 (Act 10 of 2004)	This Act provides management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act 107 of 1998; the protection of species and ecosystems that warrant national protection and the sustainable use of indigenous biological resources.	<ul style="list-style-type: none"> <li>▪ Department of Environmental Affairs (DEA)</li> <li>▪ GDARD</li> </ul>	While no permitting or licensing requirements arise from this legislation, this Act will find application during the construction phase of the project in proper management of the sensitive area (wetland) identified on site.
National Environmental Management: Waste Act (Act No. 59 of 2008)	The NEMA: WA came into effect on the on 1st July 2009. Section 20 of the Environment Conservation Act 73 of 1989, under which waste management was previously governed, was repealed. In general, the act seeks to ensure that people are aware of the impact of waste on their health wellbeing and the environment, and in the process giving effect to Section 24 of the constitution, in ensuring an environment that is not harmful to health and wellbeing.	<ul style="list-style-type: none"> <li>▪ National Department of Environmental Affairs – lead authority for regulating hazardous waste.</li> <li>▪ Provincial Environmental Department – for</li> </ul>	No waste license activities are applicable to this project. The developer will however be required to store and manage waste in accordance with the requirements of this Act and associated Standards.



<u>Title of legislation, policy or guideline (Promulgation Date)</u>	<u>Applicable Requirements</u>	<u>Administering Authority</u>	<u>Description of compliance</u>
National Environmental Management: Air Quality Act (Act No. 39 of 2004)	S18, S19 and S20 of the Act allow certain areas to be declared and managed as "priority areas". The Act provides that an air quality officer may require any person to submit an atmospheric impact report if there is reasonable suspicion that the person has failed to comply with the Act. Dust Control Regulation Control Regulations, R. No. 827 of 1 November 2013.	regulating general waste  ▪ City of Johannesburg Metropolitan Municipality	While no permitting or licensing requirements arise from this legislation for the site, this Act will find application during the construction phase of the project. The implementation of dust mitigation measures are included as part of the project EMPr and will continue to apply throughout the life cycle of the project. Dust control regulations promulgated in November 2013 may require the implementation of a dust management plan
National Heritage Resource Act, 1999 (Act No. 25 of 1999)	Section 38 states that Heritage Impact Assessments (HIAs) are required for certain kinds of development including the construction of a road, exceeding 300m in length; In accordance with the NHRA, an independent heritage consultant is to conduct a cultural heritage assessment to determine any impact on any sites, features or objects of cultural heritage significance. If none are identified, any archaeological sites or graves to be exposed during construction work must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.	▪ South African Heritage Resources Association (SAHRA) ▪ The Provincial Heritage Resources Authority Gauteng (PHRAG)	No identified heritage sites were reported on site. However, should any heritage sites be unearthed during excavations, a permit would be required to be obtained from SAHRA.
Promotion of Access to Information Act, 2000 (Act No 2 of 2000):	Legislation that allows the public access to information about activities that influence their well-being and to make contributions to decision making	▪ Department of Environmental Affairs ▪ GDARD	No permitting is required. The act finds applicability during the public participation process phase of the Basic Assessment

<u>Title of legislation, policy or guideline (Promulgation Date)</u>	<u>Applicable Requirements</u>	<u>Administering Authority</u>	<u>Description of compliance</u>
			process.
Occupational Health and Safety Act No. 85 of 1993:	The Occupational Health and Safety 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 plant and 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.	<ul style="list-style-type: none"> <li>▪ Department of Labour</li> </ul>	While no permitting or licensing requirements arise from this legislation, this Act will find application during the construction phase of the project. Health and safety precautions measures must be put in place for the construction crew and the general public. E.g. Protection of workers on site through provision of Personal Protective Equipment's; Training and other health and safety amenities.

### 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

#### Site Alternatives

- The nature of the project precludes alternative sites from the assessment. This is because the project is for the reconstruction of an already existing infrastructure at the proposed site.

Thus only one site is available and deemed feasible and practicable for the proposed facility.

#### Design Alternatives

The localised and direct impact of the activity on the specific site does however entail that alternative designs to be considered within the mitigation hierarchy.

The road and its associated storm water infrastructure proposed for upgrade already exist. Therefore the layout and design of the facility is dictated by the existing road infrastructure and the drainage (catchment) characteristic of the area.

Therefore the client offered the following design alternatives :

- Design Alternative 1 (Preferred): Low Level Causeway with Larger Spans (New structure with three openings)
- Design Alternative 2: Low Level Causeway With Larger Spans (New structure – precast beams with two openings)

#### The selection process of the proposed preferred alternatives

Decision on the type of design to use was based on a design that will reduce cost and environmental impact and still serve the purpose. Given the above suggestions, the client and consultant agreed to work with the first 2 options. The design of bridge culvert infrastructure will be based on Sustainable Urban Drainage Systems (SUDS) and Water Sensitive Urban Design approaches (WSUDS) which enhance natural drainage through permeable surfacing and which integrate landscaping with storm water in line with best practice storm water management.

Management of storm water through the culvert will be designed in such a manner as to prevent negative

impacts such as erosion and sedimentation, and to ensure environmental protection of downstream areas. Such plan will be designed to meet the following criteria/standards:

- The culvert will be designed to blend in with the current topology of the area.
- The substructure of a new replacement culvert will consist of reinforced concrete cantilever abutments with splayed wing walls.
- Spread footing to facilitate rock at shallow depths

The design will also take into consideration Section 44 of the City of Johannesburg Storm water By Laws.

**Provide a description of the alternatives considered**

No.	Alternative type, either alternative: site on property, properties, activity, design, technology, energy, operational or other(provide details of "other")	Description
1	<b>Design Alternative 1 (Preferred): Low Level Causeway with Larger Spans (New structure with three openings)</b>	<p>With this alternative the deck is constructed using a composite pre-stressed and in-situ concrete deck instead of a reinforced concrete solution and replacing the structure with new larger openings and to provide a more robust system for river protection along with embankment protection. This solution is more attractive because of the possibility of using shallower deck thicknesses. Related works with this alternative involve the embankment protection by way of the rehabilitation of the existing gabion structures.</p> <p>Refer to Appendix C1 for the Alternative 1 ( Preferred Designs )</p>
2	<b>Design Alternative 2: Low Level Causeway With Larger Spans (New structure – precast beams with two openings)</b>	<p>This option entails the construction of an in-situ concrete deck with larger spans. However, the challenge with this alternative is that the current vertical clearance available is shallow and this limits the length of the spans because larger spans require deeper deck thicknesses, which will further reduce the available vertical clearance.</p> <p>Refer to Appendix C2 for the Alternative 2 Designs</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:

Proposed activity (preferred)

Size of the activity:

21.7m length x 10.6 m width =  
(±235m<sup>2</sup>)

**Alternatives:**

Alternative 2

21.7m length x 10.6 m width =  
(±235m<sup>2</sup>)

Ha/ m<sup>2</sup>

or, for linear activities:

Proposed activity Alternative 1 (preferred)

Length of the activity:

Alternative 2

Alternative 3


m/km

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

**Size of the site/servitude:**

Proposed activity Alternative 1 (preferred)

21.7m length x 10.6 m width =  
(±235m<sup>2</sup>)

Alternative 2

21.7m length x 10.6 m width =  
(±235m<sup>2</sup>)

Ha/m<sup>2</sup>

#### 5. SITE ACCESS

##### Proposed Activity

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

YES ✓	NO
-------	----

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

N/A
-----

Describe the type of access road planned:

No additional access road is planned. Maximum use of the existing servitudes and the existing roads shall be made.

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).

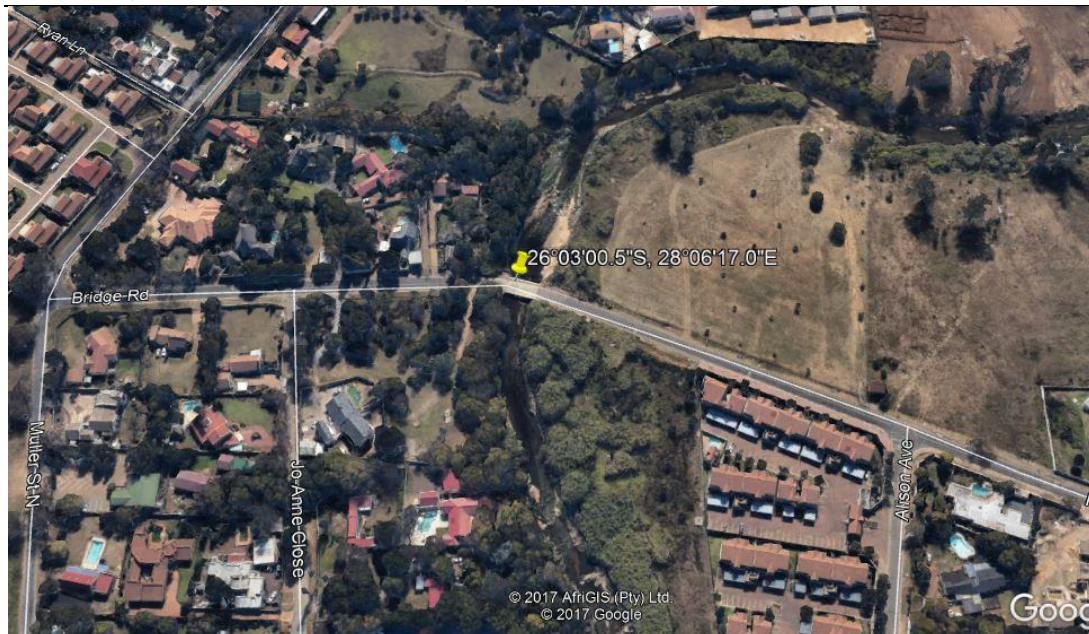


Figure 2: Map indicating access roads in relation to the proposed development site. (Source Google Earth)

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)
- shape files` 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)

#### **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 is 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.

Colour photographs taken on site together with a description of each photograph are attached within **Appendix B**.

#### **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.

Please see facility illustrations attached within **Appendix C**



## 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

- 1) 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.
- 2) Indicate on a plan(s) the different environments identified
- 3) Complete Section B for each of the above areas identified
- 4) Attach to this form in a chronological order
- 5) 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  times route

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)

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)

Please note: Section B has not been duplicated due to the alternatives considered are design alternatives and as such they occur on the same footprint and environmental setting.

## 1. PROPERTY DESCRIPTION

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

The proposed development located along Bridge Road between Jo-Ann Close Avenue and Allison Avenue in Buccleuch, Johannesburg over the Jukskei Rver.

Located within a road reserve on Bridge Road (No specific Farm name and/or portion number).

## 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

Latitude (S):	Longitude (E):
26°03'00.5"S	28°06'17.0"E

Alternative 2

Alternative 3:

**In the case of linear activities:**

**Alternative 1 (preferred):**

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

Latitude (S):	Longitude (E):

**Alternative 2:**

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

Latitude (S):	Longitude (E):

**Alternative 3:**

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

Latitude (S):	Longitude (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.

Addendum of route alternatives attached

**3. GRADIENT OF THE SITE**

Indicate the general gradient of the site.

Flat	1:50 – 1:20 ✓	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
------	---------------	-------------	-------------	--------------	-------------	------------------

**4. LOCATION IN LANDSCAPE**

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

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

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

a) Is the site located on any of the following?

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

### **Geology and Soil**

The geology of the site comprises the Halfway House Granite Dome formation (HHGD) (Van der Waals et al, 2015; Mucina & Rutherford, 2006). The HHGD include highly erodible soils where erosion sets in with runoff increasing by as little as 5%. These soils are dispersive due to dominant clays, sandy with no cohesion between soil particles which is 100 to 500% more erodible once saturated with water (Van der Waals et al, 2015). The watercourse recorded on the study site is classified as a perennial riparian area, the Jukskei River. The riparian area is characterised by large areas of deep alluvial deposits, exotic vegetation and debris. Bedrock and boulders were also recorded within the stream. Due to the urban nature of the area, the natural soil profile is primarily transformed, consistent with the regional classification of Unconsolidated soils. Mottling and gleying is seldom found in the watercourse. Alluvial deposits are found within the riparian zone and adjacent to it. The riparian area is characterised by large areas of exposed bedrock. Large amount of litter and waste was recorded within the soil profile of the river banks.

### **Hydrology**

#### Quaternary Catchments and Water Management Area (WMA):

As per Macfarlane et al, (2009) one of the most important aspects of climate affecting a wetland's vulnerability to altered water inputs is the ratio of Mean Annual Precipitation (MAP) to Potential Evapotranspiration (PET) (i.e. the average rainfall compared to the water lost due to the evapotranspiration that would potentially take place if sufficient water was available). The site is situated in Quaternary Catchment A21C. In this catchment, the precipitation rate is considerably lower than the evaporation rate with a Mean Annual Precipitation (MAP) to Potential Evapotranspiration (PET) of 0.25 for Quaternary Catchment A21C. Consequently, wetlands in this area are sensitive to changes in regional hydrology, particularly where their catchment becomes transformed and the water available to sustain them becomes redirected.

Quaternary Catchment A21C fall within the third WMA, the Crocodile (West) and Marico. The major rivers that are located within this WMA include the Crocodile (West) and Marico River and the Vaal River. The watercourse studied is part of the Jukskei River.

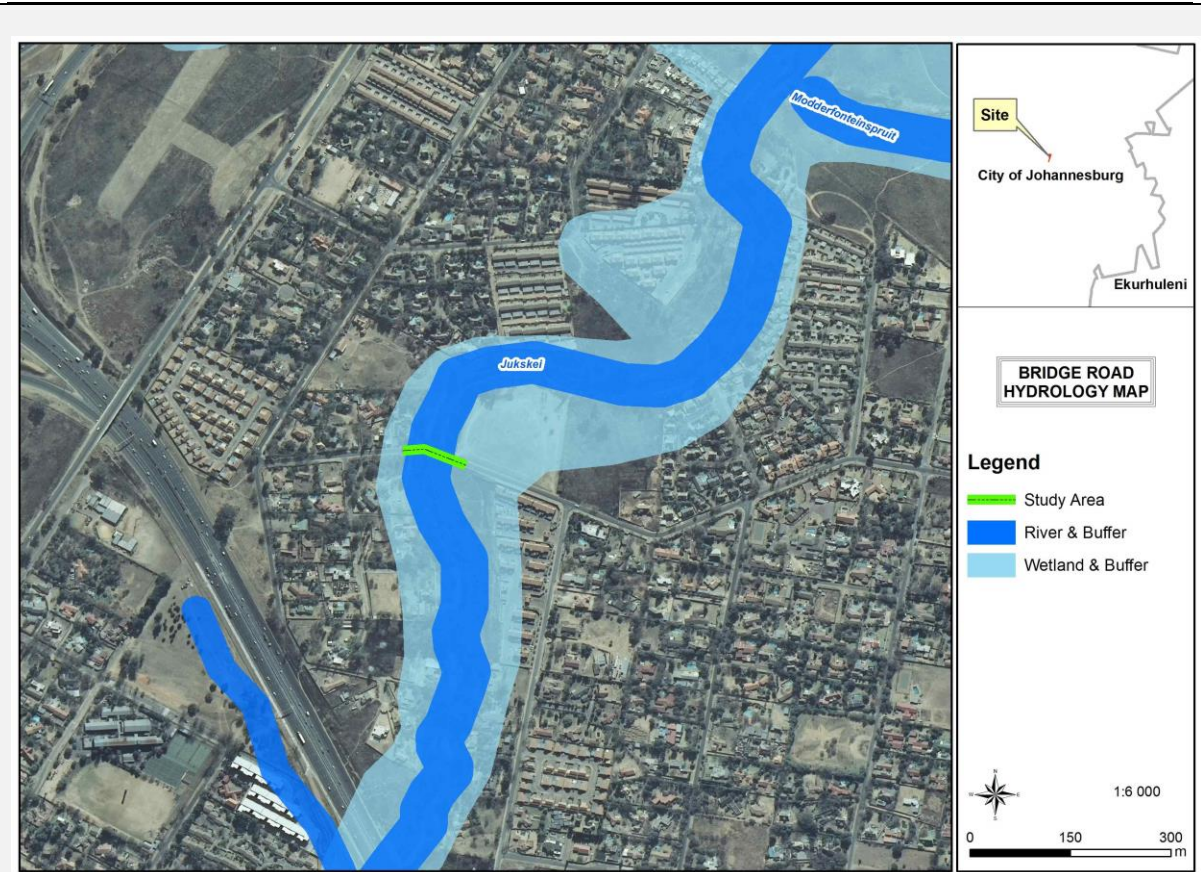


Figure 3: Regional Hydrology of the study area.

### Vegetation Indicators

The vegetation associated with the watercourse is similar to that usually found in the urban parts of Johannesburg in parks and adjacent to streams and wetlands. The watercourse showed characteristics of riparian areas including numerous large trees, mostly exotic, located on the banks of the stream. The dominant woody vegetation in this area was *Salix babylonica*, *Morus alba* and *Eucalyptus* sp. (Figure 13). The banks of the stream were covered Kikuyu grass (*Pennisetum clandestinum*), *Arundo donax*, *Phragmites australis*. Large section of instream habitat was covered in recent alluvial deposits and vegetation has been smothered. Some hardy species remained.

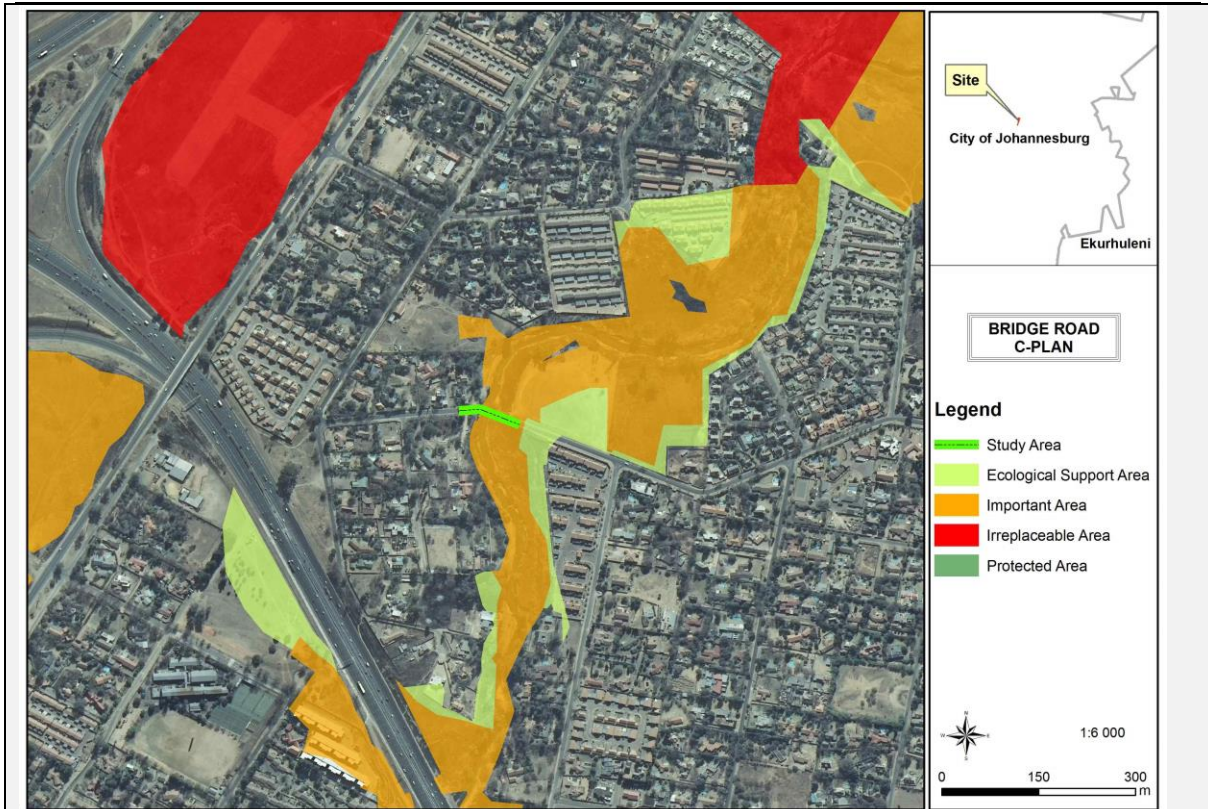


Figure 4: Gauteng Conservation Areas in relation with the study site

For further further in depth details regarding the affected watercourse please refer to the Wetland Specialist report attached within **Appendix G1**.

## 6. AGRICULTURE

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

YES	NO ✓
-----	------

**Please note:** The Department may 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

Please note that the proposed development entails the upgrade and rehabilitation of an existing culvert bridge that crosses the Jukskei River and the majority of the structure crosses over the river.

Natural veld - good condition % =	<b>Natural veld with scattered aliens</b> % = 50	Natural veld with heavy alien infestation % =	<b>Veld dominated by alien species</b> % =30	Landscaped (vegetation) % =
Sport field % =	Cultivated land % =	<b>Paved surface (hard landscaping)</b> % = 5	Building or other structure % = 10	<b>Bare soil</b> % =5

**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.

It must be noted that the majority of the proposed development takes place over the Jukskei River, where minimal impact on ground cover will take place. The likely elements to be impacted on are the watercourse itself and its associated river banks.

On assessment, the wetland specialist found the the banks of the stream were covered *Kikuyu* grass (*Pennisetum clandestinum*), *Arundo donax*, *Phragmites australis*. Large section of instream habitat was covered in recent alluvial deposits and vegetation has been smothered. Some hardy species remained.



**Figure 5:** General characteristics of the Jukskei River at Bridge Road.

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

YES	NO ✓
-----	------

If YES, specify and explain:

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	NO ✓
-----	------

If YES, specify and explain:

--

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

YES ✓	NO
-------	----

If YES, specify and explain:

---



The proposed development takes place over a watercourse (Jukskei River). In terms of legislation, wetlands, riparian zones and watercourses are defined in the National Water Act as sensitive habitats. In addition they are also regarded as sensitive habitats in the National Environmental Management Act, implying that they are afforded a higher level of protection.

### Land Use, Cover and Ecological State

The study site is surrounded by medium density residential areas and open space area.

### Wetland Functional Assessment.

The functionality of the watercourse has been significantly impacted by the increased hardened surfaces in the catchment due to increased development density and development encroachment onto the riparian zones and their buffers. This has led to an increase in sediment loads and a change in geomorphology. The hydrology of the watercourse has been impacted by the input of foreign materials from adjacent roads and industrial areas, inadequate storm water management and run-off from roads and surfaces leading to an increase in hydro-carbon contamination. The geomorphology of the wetlands has been impacted by dumped material including rubble and garden refuse, trenches, gullies and many roads and footpaths traversing the river. Furthermore, Lastly, the vegetation composition has also been impacted as a result of the changes discussed above. The current species composition is dominated by exotic plants with a few hardy indigenous individuals surviving. Other impacts associated with the site include mining and flooding.

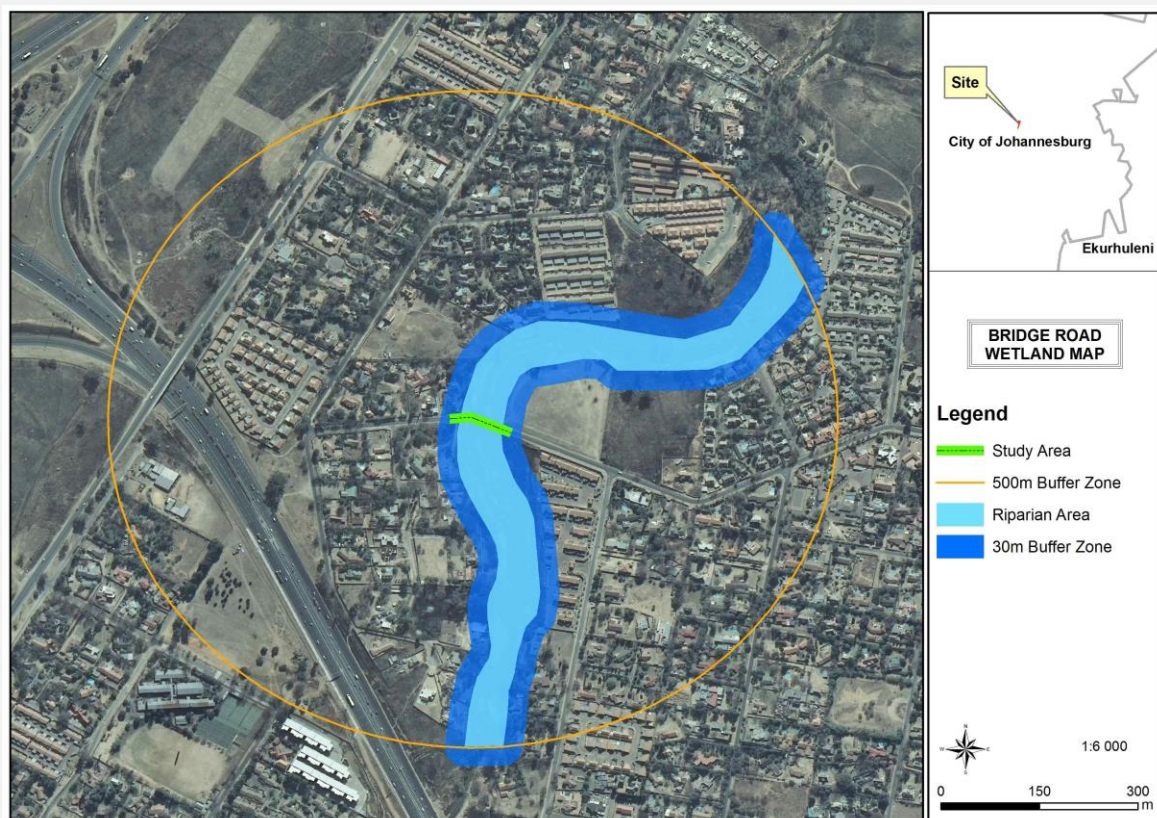


Figure 6: The delineated riparian area and associated buffer zone.

### Gauteng Conservation Plan

The Gauteng Conservation Plan (Version 3.3) (GDARD, 2011) classified areas within the province on the basis of its contribution to reach the conservation targets within the province. Critical Biodiversity Areas (CBAs) contain irreplaceable, important and protected areas (terms used in C-Plan 2) and are areas needed to reach the conservation targets of the Province. In addition, 'Ecological Support Areas' (ESAs), mainly around riparian areas and other movement corridors were also classified to ensure sustainability in the long term. Landscape features associated with ESAs is essential for the maintenance and generation of biodiversity in sensitive areas and requires sensitive management where incorporated into C-Plan 3.

Was a specialist consulted to assist with completing this section  YES  NO

If yes complete specialist details

Name of the specialist:	Antoinette Bootsma		
Qualification(s) of the specialist:	B. Sc (Botany & Zoology) University of South Africa (1997 - 2001), B. Sc (Hons) Botany University of Pretoria (2003-2005), MSc Ecology, University of South Africa (2010 - ongoing), Short course in wetland delineation, legislation and rehabilitation, University of Pretoria (2007) and Short course in wetland soils, Terrasoil Science (2009).		
Postal address:	P.O. Box 32733, Waverley, Pretoria		
Postal code:	0135		
Telephone:	012 543 9982	Cell:	083 4545 454
E-mail:	<a href="mailto:antoinette@limosella.co.za">antoinette@limosella.co.za</a>	Fax:	

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

If YES, specify:

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

If YES list the specialist reports attached below

Signature of specialist:  Date: November 2017

**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

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	9. Medium to high density residential ✓	10. Informal residential
11. Old age home	12. Retail ✓	13. Offices ✓	14. Commercial & warehousing ✓	15. Light industrial
16. Heavy industrial <sup>AN</sup>	17. Hospitality facility	18. Church	19. Education facilities ✓	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	
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

<b>NORTH</b>					
	9,10	4	2	4	9,10
	9,10	4	2	4	9,10,19,20
<b>WEST</b>	9,10	4		4	9,10,19,20 <b>EAST</b>
	9,10	4	2	4	9,10
	9,10	4	2	4	9,10
<b>SOUTH</b>					

**Note:** 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 ✓	NO
-------	----

- Wetland Assessment Report
- Wetland Rehabilitation and Monitoring Plan
- Heritage Screening Report

The above specialist 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 area where the proposed activities will take place is located in Buccleuch within Region E of City of Johannesburg, Gauteng Province.

### Population:

The population in the region is estimated at just over 198 000 - about 6 percent of the population of greater Johannesburg. This figure is expected to decline as a result of ageing, Aids-related deaths, and a slowdown in migration into the area and an increase in migration out of the area. The region is, however, attracting young adults. Over much of the area the population is stable and economically active, with high levels of education and disposable income. The southern areas, however, are characterised by high unemployment and low income levels. A large segment of the population is school-going age, creating a demand for social services and educational facilities.

### Level Of Unemployment:

The Integrated Development Plan (IDP) states that unemployment in Johannesburg calculated on official figures was approximately 25% in 2011 down from approximately 29.6% in 2001. Approximately 65.8% of the household heads in Johannesburg are unemployed. The significant number of the population not economically active pushes up the dependency ratio. According to the Regional Spatial Development Framework 2010/2011, unemployment in Region E is about 50%.

### Economic Profile of local Municipality:

According to the IDP, Region E is one of the three least densely populated regions in the City contributing only (11.8%), to the City's population with Region D contributing the highest at 24.4%. According to the City's Joburg'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. These sectors also account for the highest levels of formal and informal employment. This state of affairs suggests that the City of Johannesburg's economy is highly concentrated; making it vulnerable to sudden external shocks such as the recession experienced during 2008/09 (IDP 2013 /2016). Every opportunity should therefore be explored to diversify the economy into other sectors in which the City enjoys a comparative advantage.

### Level of Education:

With regard to Education, the City of Johannesburg has low education levels and slow formal sector growths are two of the major causes of youth unemployment. The vast majority of the youthful population in Johannesburg has only a matriculation certificate, preventing access to the labour market.

The construction of the storm water management infrastructure will benefit the community through job creation during construction anticipated to last for a period of 2years, while reducing the risk associated with flooding

during rainy season in the area.

## 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 categorised 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 m<sup>2</sup> 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 m<sup>2</sup> 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?

If YES, explain:

YES	NO ✓
-----	------

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:

A heritage screening assessment was conducted for the proposed development. The screening assessment found that the bridge itself could be older than 60 years, but is not of heritage significance. Furthermore, it was found that due to the lack of intrinsic heritage significance in the bridge itself, as well as the transformed nature of the immediate surrounds and unfossiliferous nature of the underlying geology, it is not anticipated that the limited interventions of an upgrade to the bridge will negatively impact any significant heritage resources.

For further details, please refer to the Heritage Screening report attached with **Appendix G3** of this report.

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

YES

NO ✓

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

YES

NO ✓

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

## **SECTION C: PUBLIC PARTICIPATION (SECTION 41)**

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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 ✓	NO
-------	----

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

YES	NO ✓
-----	------

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

N/A

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

---

As this is the Draft Basic Assessment Report, it will be submitted for comment to the local authority and as well as to other stakeholders. Once comments have been received at the end of the 30-day review period, they will be recorded and reflected in the Final Basic Assessment Report.

Comments are anticipated once the Draft Basic Assessment Report (DBAR) (this report) has been circulated to all stakeholders and I&AP's. The following public participation was conducted for the proposed project:

Identification of stakeholders, including occupiers of the property, owners and occupiers of land adjacent to the site, municipal officials and relevant State Departments as part of the Public Participation Process. All respondents will then be placed on the project database. This database will be supplemented by I&APs the EAP to be included on the database. The database will be used throughout the process to inform the stakeholders of the project.

In order to canvass the issues and concerns of the broader public and to ensure that all IAPs are afforded the opportunity to comment on the proposed development, the proposed project was announced as follows:

- Erection of site notices, size A2) advertising the proposed development and displaying the contact details of the EAP will be prepared and displayed on-site and along the power line routes. The site notices will serve the purpose of informing potential IAPs of the project and therefore afford them the opportunity to comment.
- Distribution of the notification letter with a registration and comment sheet, and the locality map to state departments and other potential stakeholders through emails.
- An advert will be placed in a regional newspaper to notify the public about the Basic Assessment process, invite members of the public to register as I&APs on the project's database and notify the public of the availability of the Draft Basic Assessment Report.
- Communication with local authorities and stakeholders
- The comments received on the application and DBAR, will be included in the response and comment sheet.
- A copy of the Draft Basic Assessment Report will be made available for public review for a 30 day review period.
- Any further comments received during the review period of the draft Basic Assessment as well as responses provided will be captured and recorded within the Comments and Response Report in the final Basic Assessment Report that will be submitted to GDARD.

**Note:** Distributing many knock and drop notification letters (Background Information Documents) proved to be challenging as the majority of the household properties near the study site were locked and had high security features. Also, most residents approached on the street show skepticism and are reluctant to sign the knock and drop register.

Once GDARD has made a decision on Environmental Authorisation: The registered I&APs, stakeholders and organs of state will be notified of the department's decision.

### 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 ✓ NO

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

The majority of comments were stakeholders requesting to be registered on the project's database during the project notification period. Please refer to **Appendix E** for correspondence with stakeholders.

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

N/A

#### 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 authorisation 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 Attached as **Appendix E1**

Appendix 2 – Written notices issued as required in terms of the regulations Attached as **Appendix E2**

Appendix 3 – Proof of newspaper advertisements Attached as **Appendix E3**

Appendix 4 – Communications to and from interested and affected parties Attached as **Appendix E4**

Appendix 5 – Minutes of any public and/or stakeholder meetings **Appendix E5**

Appendix 6 - Comments and Responses Report Attached as **Appendix E6**

Appendix 7 –Comments from I&APs on Basic Assessment (BA) Report - **Appendix E4**

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

Appendix 9 – Copy of the register of I&APs Attached as **Appendix E9**

**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?

YES ✓	NO
-------	----

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

Could not be determined at this stage m3
---

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

Construction rubble/ solid waste will be temporarily stored on site in designated waste skips and then 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. The nearest licensed landfill site shall be utilised. 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?

YES	NO ✓
N/A	

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

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

No solid waste will be produced during the operational phase of the proposed project.

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?

YES	NO ✓
-----	------

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

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 and as foundation for the proposed upgrade processes 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.

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? 

YES	NO ✓
-----	------

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

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

YES	NO ✓
-----	------

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 and disposed at relevant suitably licensed facilities. Waste should be separated into recyclable and non-recyclable materials and distributed for recycling where applicable. During the construction phase, construction waste rubble should be used as fill material and as foundation for the proposed upgrade processes 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.

**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? 

YES	NO ✓
-----	------

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

N/A

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 on-site? 

YES	NO ✓
-----	------

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

N/A

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? 

YES	NO ✓
-----	------

If yes, provide the particulars of the facility:

Facility name:		
Contact person:		
Postal address:		
Postal code:		
Telephone:	Cell:	
E-mail:	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? 

YES ✓	NO
-------	----

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

Unknown at this stage	
-----------------------	--

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 on site? 

YES	NO ✓
-----	------

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

Chemical toilets are going to be used and the sewage waste will be collected by the Waste service provider for treatment at a treatment facility.

**Emissions into the atmosphere**

Will the activity release emissions into the atmosphere? 

YES	NO ✓
-----	------

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

YES	NO
-----	----

  
 If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.  
 If no, describe the emissions in terms of type and concentration:

The activity itself will not contribute directly to emissions released into the atmosphere except possible short-term dust emissions during the construction phase. Emissions generated will be in the form of dust, carbon dioxide and other vehicle emissions generated by diesel powered machinery and trucks during the construction process i.e. tip trucks, TLB's, excavators and dust from the movement of the construction vehicles. These emissions will be composed primarily of CO<sub>2</sub> and will be of a low concentration.

**2. WATER USE**

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

Municipal ✓	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: 

N/A
-----

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? 

YES ✓	NO
-------	----

If yes, list the permits required

A Water Use License Application will be submitted to DWS concurrently with the submission of the Final Basic Assessment Report to GDARD. Section 21 (c) and (i) of the National Water Act are triggered by the activities.

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

YES	NO ✓
-----	------

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

YES	NO
-----	----

A Water Use License Application will be submitted to DWS concurrently with the submission of the Final Basic Assessment Report to GDARD. The DBAR will also be made available to the Department of Water and Sanitation for comment during the DBAR review period.

**3. POWER SUPPLY**

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

The development will not require power supply during its operational 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:

No particular considerations of energy saving/ conservation were deemed applicable for this project. 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 operational 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

Summarise the issues raised by interested and affected parties.

Issue/ Comment/ Concern	Response
No issues of significance were raised by interested and affected parties during the notification period. The majority requested to be registered as interested and affected parties. Please refer to <b>Appendix E</b> for stakeholder correspondence.	

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):

Acknowledgement was sent to the interested and affected parties that requested to be registered. Please refer to <b>Appendix E</b> for stakeholder correspondence.
--

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

Briefly describe the methodology utilised 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 potentially significant 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 planning phase of the development. Risks and key issues were identified and addressed through an internal process based on similar developments, and an environmental evaluation.

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 low and a score of 5 being high).
- 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. where the impact must have an influence on the decision process to develop in the area).



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 phase** for the various alternatives of the proposed development. This must include an assessment of the significance of all impacts.

Please note that due to the proposed development design alternatives (Alternative Design 1 & Alternative Design 2) occurring within the same environment, occupying the same footprint and following the same construction processes, the impacts are likely to be highly similar.

**Alternative Design 1 (Preferred): Low Level Causeway with Larger Spans (New structure with three openings)**

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

A summary and anticipated significance of the potential direct, indirect and cumulative impacts that are likely to occur as a result of the Construction Phase of the proposed Low Level Causeway with Larger Spans (new structure with three openings)

**1. Alternative Design 1 (Preferred): Low Level Causeway with Larger Spans (New structure with three openings)**

**Table 1: Construction Impacts (Alternative Design 1)**

POTENTIAL IMPACTS			PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED																		
<p><b>Nature of Impact:</b> <u>Changes in water flow regime</u></p> <p>Changing the quantity and fluctuation properties of the watercourse by for example restricting water flow.</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>Long term (4)</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)</td> <td>Moderate (6)</td> </tr> <tr> <td><b>Significance</b></td> <td><b>75 (high)</b></td> <td><b>33 (moderate)</b></td> </tr> </tbody> </table>			Description	Without Mitigation	With Mitigation	<b>Probability</b>	Definite (5)	Probable (3)	<b>Duration</b>	Long term (4)	Short term (2)	<b>Extent</b>	Regional (3)	Regional (3)	<b>Magnitude</b>	High (8)	Moderate (6)	<b>Significance</b>	<b>75 (high)</b>	<b>33 (moderate)</b>	<ul style="list-style-type: none"> <li>• Designs should take into account soil properties, slopes and runoff energy.</li> <li>• No activities should take place in the watercourses and associated buffer zone. Where the above is unavoidable, activities should be strictly regulated and monitored as specified in the EMP. This is subjected to authorization by means of a water use license from the DWS</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</li> </ul>	Expected to be high without mitigation
Description	Without Mitigation	With Mitigation																				
<b>Probability</b>	Definite (5)	Probable (3)																				
<b>Duration</b>	Long term (4)	Short term (2)																				
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<b>Significance</b>	<b>75 (high)</b>	<b>33 (moderate)</b>																				

POTENTIAL IMPACTS			PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED
<i>Status (positive or negative)</i>	Negative	Negative	<p>compiling work method statements to prevent access to the adjacent portions of the watercourse.</p> <ul style="list-style-type: none"> <li>Effective storm water management should be a priority during both construction and operational phase. This should be monitored as part of the EMP. High energy storm water 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) on the site above the river area resulting from the proposed storm water upgrade should be taken into account.</li> </ul>	
<p><b>Cumulative impacts:</b> Construction activities may result in cumulative impact to the water courses within the local catchments and beyond. It is very important that 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 from stormwater or sediment input.</p>				
<p><b>Nature of 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 wetland 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</li> </ul>			<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. 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> </ul>	Expected to be high without mitigation

POTENTIAL IMPACTS	PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED																					
<p>seeds from proximate alien invasive trees can spread easily into these eroded soil.</p> <ul style="list-style-type: none"> <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> <p>During the operational phase this impact is expected to be positive if effective bank stabilisation is achieved, since this will prevent further sediment input from this section of the Jukskei River.</p> <table border="1" data-bbox="190 730 813 1066"> <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>Limited to Local Area (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 style="background-color: red;">70 (high)</td> <td style="background-color: yellow;">40 (moderate)</td> </tr> <tr> <td><b>Status (positive or negative)</b></td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table> <p><b>Cumulative impacts:</b> Expected to be high. Should mitigation measure not be implemented and changes made to the bed or banks of watercourse unstable channel conditions may result causing erosion, meandering, increased potential for flooding and movement of bed material, which will result in property damage adjacent to and downstream of the site. Reversing this process is unlikely and should be</p>	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)	Limited to Local Area (2)	<b>Magnitude</b>	High (8)	Moderate (6)	<b>Significance</b>	70 (high)	40 (moderate)	<b>Status (positive or negative)</b>	Negative	Negative	<ul style="list-style-type: none"> <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 and livestock access.</li> <li>• During the construction phase measures must be put in place to control the flow of excess water so that it does not impact on the surface vegetation.</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>• Implementation of best management practices</li> <li>• Source-directed controls</li> <li>• Buffer zones to trap sediments</li> <li>• Monitoring should be done to ensure that sediment pollution is timeously dressed</li> </ul>	
Description	Without Mitigation	With Mitigation																					
<b>Probability</b>	Definite (5)	Highly probable (4)																					
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POTENTIAL IMPACTS	PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED																					
prevented in the first place.																							
<p><b>Nature of Impact:</b> <u>Introduction and spread of alien vegetation</u></p> <p>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 wetland, 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</p> <table border="1" data-bbox="192 890 815 1227"> <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>Short term (2)</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>High (8)</td> <td>Low (4)</td> </tr> <tr> <td><b>Significance</b></td> <td style="background-color: red;">75 (high)</td> <td style="background-color: green;">24 (low)</td> </tr> <tr> <td><b>Status (positive or negative)</b></td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table> <p><b>Cumulative impacts:</b> Expected to be moderate to high. Construction areas within the watercourses associated with the storm water upgrade can</p>	Description	Without Mitigation	With Mitigation	<b>Probability</b>	Definite (5)	Probable (3)	<b>Duration</b>	Long term (4)	Short term (2)	<b>Extent</b>	Regional (3)	Limited to Local Area (2)	<b>Magnitude</b>	High (8)	Low (4)	<b>Significance</b>	75 (high)	24 (low)	<b>Status (positive or negative)</b>	Negative	Negative	<ul style="list-style-type: none"> <li>• Weed control</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</li> </ul>	Expected to be high without mitigation
Description	Without Mitigation	With Mitigation																					
<b>Probability</b>	Definite (5)	Probable (3)																					
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POTENTIAL IMPACTS	PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED																					
<p>experience an increased invasion if mitigation is not implemented or implemented correctly. Regular monitoring should be implemented during construction, rehabilitation including for a period after rehabilitation is completed.</p>																							
<p><b>Nature of impact:</b> <u>Loss and disturbance of watercourse habitat and fringe vegetation impact.</u></p> <p>Direct development within wetland/riparian areas. Loss and disturbance of wetland/riparian habitat and fringe vegetation due to direct development on the wetland as well as changes in management, fire regime and habitat fragmentation.</p> <table border="1" data-bbox="192 847 813 1185"> <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>Short-term (2)</td> <td>Temporary (1)</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>Moderate (6)</td> <td>Low (4)</td> </tr> <tr> <td><b>Significance</b></td> <td><b>50 (moderate)</b></td> <td><b>28 (low)</b></td> </tr> <tr> <td><b>Status (positive or negative)</b></td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table> <p><b>Cumulative impacts:</b> Expected to be moderate. May result in a high degree of irreplaceable loss of resources.</p>	Description	Without Mitigation	With Mitigation	<b>Probability</b>	Definite (5)	Highly Probable (4)	<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>28 (low)</b>	<b>Status (positive or negative)</b>	Negative	Negative	<ul style="list-style-type: none"> <li>• Where construction occurs in the demarcated wetland and buffer, extra precautions should be implemented to so as to minimise wetland loss.</li> <li>• Where wetlands are lost, compensation should be made to protect the remaining wetlands and their catchments, increase their buffers and rehabilitate their condition and functionality.</li> <li>• Other than approved and authorized structure, no other development or maintenance infrastructure is allowed within the delineated watercourse or associated buffer zones.</li> <li>• Demarcate the watercourse areas and buffer zones to limit disturbance, clearly mark these areas as no-go areas</li> <li>• Weed control in buffer zone</li> <li>• Monitor rehabilitation and the occurrence of erosion 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>	<p>Expected to be Moderate without mitigation</p>
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POTENTIAL IMPACTS	PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED																					
<p><b>Nature of the Impact:</b> <u>Changes in water quality due to pollution impact ratings.</u></p> <table border="1" data-bbox="192 419 810 756"> <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>Short term (2)</td> <td>Temporary (1)</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)</td> <td>Low (4)</td> </tr> <tr> <td><b>Significance</b></td> <td><b>60 (High)</b></td> <td><b>21 (low)</b></td> </tr> <tr> <td><b>Status (positive or negative)</b></td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table> <p><b>Cumulative impacts:</b> Expected to be moderate.</p>	Description	Without Mitigation	With Mitigation	<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>	High (8)	Low (4)	<b>Significance</b>	<b>60 (High)</b>	<b>21 (low)</b>	<b>Status (positive or negative)</b>	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>• Maintenance of buffer zones to trap sediments with associated toxins</li> <li>• Ensure that no operational activities impact on the watercourse or buffer area. This includes edge effects.</li> <li>• Regular independent water quality monitoring should form part of operational procedures in order to identify pollution</li> <li>• Treatment of pollution identified should be prioritized accordingly.</li> </ul>	<p>Expected to be Moderate without mitigation.</p>
Description	Without Mitigation	With Mitigation																					
<b>Probability</b>	Definite (5)	Probable (3)																					
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<b>Status (positive or negative)</b>	Negative	Negative																					
<p><b>Nature of the Impact:</b> <u>Visual Impacts</u></p>	<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</li> </ul>	<p>Expected to be Moderate without mitigation</p>																					

POTENTIAL IMPACTS			PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED
<b>Description</b>	<b>Without Mitigation</b>	<b>With Mitigation</b>	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. <ul style="list-style-type: none"> <li>• Supply sufficient garbage bins throughout the site and service regularly.</li> <li>• Ensure good housekeeping is implemented at all times.</li> <li>• Keep the property neat and litter free at all times and maintain the landscaped areas.</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>• Lighting on site is to be sufficient for safety and security purposes, but shall not be intrusive to neighboring residents, disturb wildlife, or interfere with road traffic;</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>	
<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)	Medium (6)		
<b>Significance</b>	<b>30 (Medium)</b>	<b>20 (Low)</b>		
<b>Status (positive or negative)</b>	Negative	Negative		
<b>Nature of the Impact: <u>Loss and disturbance of heritage sites</u> due to the development</b>			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.	Low
<b>Description</b>	<b>Without Mitigation</b>	<b>With Mitigation</b>		
<b>Probability</b>	Probable (3)	Probable (3)		

POTENTIAL IMPACTS			PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED																					
<i>Duration</i>	Permanent(5)	Permanent(5)																							
<i>Extent</i>	Limited to Local Area (1)	Limited to Local Area (1)																							
<i>Magnitude</i>	Minor (1)	Minor (1)																							
<i>Significance</i>	21 (Low)	21 (Low)																							
<i>Status (positive or negative)</i>	Negative	Negative																							
<b>Nature of the Impact: <u>Noise pollution</u></b> <table border="1"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td><i>Probability</i></td> <td>Probable (3)</td> <td>Improbable (2)</td> </tr> <tr> <td><i>Duration</i></td> <td>Short-term (2)</td> <td>Short-term (2)</td> </tr> <tr> <td><i>Extent</i></td> <td>Limited to Local Area (2)</td> <td>Limited to Local Area (2)</td> </tr> <tr> <td><i>Magnitude</i></td> <td>Moderate (6)</td> <td>Moderate (5)</td> </tr> <tr> <td><i>Significance</i></td> <td>30 (Medium)</td> <td>18 (Low)</td> </tr> <tr> <td><i>Status (positive or negative)</i></td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table>			Description	Without Mitigation	With Mitigation	<i>Probability</i>	Probable (3)	Improbable (2)	<i>Duration</i>	Short-term (2)	Short-term (2)	<i>Extent</i>	Limited to Local Area (2)	Limited to Local Area (2)	<i>Magnitude</i>	Moderate (6)	Moderate (5)	<i>Significance</i>	30 (Medium)	18 (Low)	<i>Status (positive or negative)</i>	Negative	Negative	<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>	Moderate
Description	Without Mitigation	With Mitigation																							
<i>Probability</i>	Probable (3)	Improbable (2)																							
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<i>Significance</i>	30 (Medium)	18 (Low)																							
<i>Status (positive or negative)</i>	Negative	Negative																							
<b>Nature of the Impact: <u>Safety and security risk</u></b> <ul style="list-style-type: none"> <li>Influx of people looking for jobs to site</li> <li>Employees using the surrounding environment for ablution</li> <li>Open fires</li> <li>Theft etc.</li> </ul>			<ul style="list-style-type: none"> <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.</li> </ul>	Moderate																					



POTENTIAL IMPACTS			PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED
○ Injuries due to construction hazards			<p>Comply with the requirements of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993).</p> <ul style="list-style-type: none"> <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 ablution facilities must be regularly serviced to reduce the risk of surface or groundwater pollution</li> <li>• Packaging and other waste material may not be burned on site under any circumstances.</li> <li>• The Contractor shall supply fire fighting equipment in proportion to the fire risk presented by the type of construction and other on-site activities and materials used on site. This equipment shall be kept in good operating order. This particularly applies to welding activities.</li> <li>• Smoking is only allowed in designated safe smoking areas.</li> </ul>	
<b>Description</b>	<b>Without Mitigation</b>	<b>With Mitigation</b>		
<b>Probability</b>	Highly Probable (4)	Improbable (2)		
<b>Duration</b>	Short-term (2)	Very short-term (1)		
<b>Extent</b>	Limited to Local Area (2)	Limited to Local Area (1)		
<b>Magnitude</b>	Moderate (6)	Minor (2)		
<b>Significance</b>	<b>40 (Moderate)</b>	<b>8 (Low)</b>		
<b>Status (positive or negative)</b>	Negative	Negative		

POTENTIAL IMPACTS	PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED																					
<p><b>Nature of the Impact:</b> <u>Pollution caused by Inappropriate Management and Handling of Waste</u></p> <ul style="list-style-type: none"> <li>Construction rubble left onsite may attract vermin, encourage the growth of opportunistic alien vegetation and become unsightly</li> <li>Hazardous waste e.g. used oils, offcuts, empty bitumen containers etc., could pollute surface and groundwater resources if not properly contained.</li> </ul> <table border="1" data-bbox="192 708 815 1058"> <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>Probable (3)</td> </tr> <tr> <td>Duration</td> <td>Short-term (2)</td> <td>Very short-term (1)</td> </tr> <tr> <td>Extent</td> <td>Limited to Local Area (2)</td> <td>Limited to Local Area (1)</td> </tr> <tr> <td>Magnitude</td> <td>Moderate (6)</td> <td>Moderate (6)</td> </tr> <tr> <td>Significance</td> <td><b>40 (Moderate)</b></td> <td><b>24 (Low)</b></td> </tr> <tr> <td>Status (positive or negative)</td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table>	Description	Without Mitigation	With Mitigation	Probability	Highly Probable (4)	Probable (3)	Duration	Short-term (2)	Very short-term (1)	Extent	Limited to Local Area (2)	Limited to Local Area (1)	Magnitude	Moderate (6)	Moderate (6)	Significance	<b>40 (Moderate)</b>	<b>24 (Low)</b>	Status (positive or negative)	Negative	Negative	<ul style="list-style-type: none"> <li>Regular litter picking and general waste bins must be readily available for litter disposal and general housekeeping.</li> <li>All solid waste generated during the construction process must be placed in a designated waste collection area within the construction camp and must not be allowed to blow around the site, be accessible to animals, or be placed in piles adjacent the waste skips / bins. All solid waste must then be disposed of at the nearest licensed landfill and safe disposal certificates obtained. Separate waste skips/ bins for the different waste streams must be available on site.</li> <li>The waste containers must be appropriate to the waste type contained therein and where necessary should be lined and covered. This will be managed through the site specific EMP and monitored by the ECO.</li> <li>No waste (hazardous or general) will be disposed of in the trenches around the construction footprint. All hazardous material must be carefully stored and then disposed of offsite at the licensed hazardous landfill site</li> <li>All excess material and rubble must be removed from the site so not to restrict the rehabilitation process.</li> <li>Adequate toilet facilities must be provided for all staff members as standard construction practice. Monitor the sewerage facilities for spillages, and handle any spillages as hazardous waste;</li> <li>Chemical toilets must be placed within the construction camp</li> </ul>	<p>Expected to be moderate without mitigation</p>
Description	Without Mitigation	With Mitigation																					
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Status (positive or negative)	Negative	Negative																					

POTENTIAL IMPACTS	PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED																					
	<p>and not in close proximity to the river/wetlands. The chemical toilets to be provided must be from a registered company and all sewage must be disposed of at an appropriate facility. Safe disposal certificates must be kept on record.</p> <ul style="list-style-type: none"> <li>• Machinery must be properly maintained to keep oil leaks in check</li> </ul>																						
<p><b>Nature of the Impact:</b> <u>Soil and Groundwater Pollution</u></p> <p>Mismanagement, handling and storage of hazardous chemicals and materials may result in spillages causing pollution to soil and groundwater resources</p> <table border="1" data-bbox="192 788 815 1185"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td><i>Probability</i></td> <td>Highly Probable (4)</td> <td>Probable (3)</td> </tr> <tr> <td><i>Duration</i></td> <td>Short-term (2)</td> <td>Very short-term (1)</td> </tr> <tr> <td><i>Extent</i></td> <td>Limited to Local Area (2)</td> <td>Limited to Local Area (1)</td> </tr> <tr> <td><i>Magnitude</i></td> <td>Moderate (6)</td> <td>Moderate (6)</td> </tr> <tr> <td><i>Significance</i></td> <td><b>40 (Moderate)</b></td> <td><b>24 (Low)</b></td> </tr> <tr> <td><i>Status (positive or negative)</i></td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table>	Description	Without Mitigation	With Mitigation	<i>Probability</i>	Highly Probable (4)	Probable (3)	<i>Duration</i>	Short-term (2)	Very short-term (1)	<i>Extent</i>	Limited to Local Area (2)	Limited to Local Area (1)	<i>Magnitude</i>	Moderate (6)	Moderate (6)	<i>Significance</i>	<b>40 (Moderate)</b>	<b>24 (Low)</b>	<i>Status (positive or negative)</i>	Negative	Negative	<ul style="list-style-type: none"> <li>• Any hazardous or dangerous goods utilized during the construction phase must be stored on an impermeable surface that is bunded, fenced, locked and covered.</li> <li>• A spill kits must be clearly marked and visible when utilizing hazardous or dangerous materials to ensure all spills can be immediately cleaned.</li> <li>• Remediation of spillages must be conducted on a continual basis and within 24h of spillage;</li> <li>• Contaminated soil will be considered to be hazardous waste and disposed of accordingly</li> <li>• Any hazardous or dangerous goods utilized during the construction phase must be stored on an impermeable surface that is bunded, fenced, locked and covered.</li> <li>• A spill kits must be clearly marked and visible when utilizing hazardous or dangerous materials to ensure all spills can be immediately cleaned.</li> <li>• Remediation of spillages must be conducted on a continual basis and within 24h of spillage;</li> <li>• Contaminated soil will be considered to be hazardous waste and disposed of accordingly.</li> </ul>	<p>Expected to be moderate without mitigation</p>
Description	Without Mitigation	With Mitigation																					
<i>Probability</i>	Highly Probable (4)	Probable (3)																					
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<i>Status (positive or negative)</i>	Negative	Negative																					

POTENTIAL IMPACTS	PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED
	<ul style="list-style-type: none"> <li>• The contractors must provide and maintain a method statement for mixing of cement and asphalt. The method statement must provide information on proposed location, storage, washing and disposal of cement, packaging, tools and plant storage.</li> <li>• Washing and cleaning of equipment and vehicles should also be done within a bermed area (wash bay area).</li> <li>• The mixing of concrete should only be done at specifically selected sites on mortar boards or similar structures to contain pollution</li> <li>• Materials such as fuel, oil, paint, herbicide and insecticides must be sealed and stored in bunded areas or under lock and key, as appropriate, in well-ventilated areas</li> <li>• Drip trays (minimum of 10cm deep) must be placed under all vehicles suspected of leaking these must not be left unattended, drip trays must be utilized.</li> <li>• Drip trays must be utilized during repairs and maintenance of all machinery. The depth of the drip tray must be determined considering the total amount / volume of oil in the vehicle. The drip tray must be able to contain the volume of oil in the vehicle</li> </ul>	
<p><b>Nature of the Impact:</b> Social-Economic Impact</p> <ul style="list-style-type: none"> <li>○ Temporary job creation and skills development during the construction phase.</li> <li>○ Economic multiplier effects from the use of local contractors and establishment of related businesses.</li> </ul>	<ul style="list-style-type: none"> <li>▪ It is recommended that local employment policy is adopted to maximize the opportunities made available to the local labor 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 programmers should be initiated</li> </ul>	<p>Expected to be moderate without mitigation</p>

POTENTIAL IMPACTS			PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED
<b>Description</b>	<b>Without Enhancement</b>	<b>With Enhancement</b>	<p>prior to the commencement of the construction phase.</p> <ul style="list-style-type: none"> <li>All new laborers recruited from the community must undergo relevant training to reduce hazards that may arise from job responsibilities and improve on job skills.</li> </ul>	
<b>Probability</b>	Probable (3)	Highly Probable (4)		
<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>	Moderate (6)	High (8)		
<b>Significance</b>	<b>30 (moderate)</b>	<b>48 (moderate)</b>		
<b>Status (positive or negative)</b>	Positive	Positive		
<p><b>Nature of Impact: Impact on Air Quality</b></p> <ul style="list-style-type: none"> <li>Dust generated during vegetation clearing</li> <li>Exhaust fumes from construction machinery and vehicles</li> </ul>			<ul style="list-style-type: none"> <li>Appropriate dust suppression measures should be implemented to control dust dust pollution during windy and dry conditions.</li> <li>Speed restriction of 40km/h must be implemented for all construction vehicles.</li> <li>All vehicles transporting friable materials such a sand, rubble etc. must be covered by a tarpaulin or wet down.</li> <li>No burning of refuse or vegetation is permitted on site.</li> </ul>	Expected to be moderate without mitigation
<b>Description</b>	<b>Without Mitigation</b>	<b>With Mitigation</b>		
<b>Probability</b>	Highly Probable (4)	Probable (3)		
<b>Duration</b>	Short-term (2)	Very short-term (1)		
<b>Extent</b>	Limited to Local Area (2)	Limited to Local Area (1)		
<b>Magnitude</b>	High (8)	Medium (6)		
<b>Significance</b>	<b>48 (medium)</b>	<b>24 (Low)</b>		
<b>Status (positive or negative)</b>	Negative	Negative		

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 **operational phase** for the various alternatives of the proposed development. This must include an assessment of the significance of all impacts.

**IMPACTS THAT MAY RESULT FROM THE OPERATIONAL PHASE**

A summary and anticipated significance of the potential direct, indirect and cumulative impacts that are likely to occur as a result of the Operational Phase of the proposed Low Level Causeway with Larger Spans (new structure with three openings)

**2. Alternative Design 1: Low Level Causeway with Larger Spans (New structure with three openings)**

**Table 2: Operational Impacts**

POTENTIAL IMPACTS			PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED																					
<p><b>Nature of Impact:</b> <u>Changes in water flow regime</u></p> <p>Changing the quantity and fluctuation properties of the watercourse by for example restricting water flow.</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>Long term (4)</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)</td> <td>Moderate (6)</td> </tr> <tr> <td><b>Significance</b></td> <td><b>75 (high)</b></td> <td><b>33 (moderate)</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>	Definite (5)	Probable (3)	<b>Duration</b>	Long term (4)	Short term (2)	<b>Extent</b>	Regional (3)	Regional (3)	<b>Magnitude</b>	High (8)	Moderate (6)	<b>Significance</b>	<b>75 (high)</b>	<b>33 (moderate)</b>	<b>Status (positive or negative)</b>	Negative	Negative	<ul style="list-style-type: none"> <li>• Designs should take into account soil properties, slopes and runoff energy.</li> <li>• No activities should take place in the watercourses and associated buffer zone. Where the above is unavoidable, activities should be strictly regulated and monitored as specified in the EMP. This is subjected to authorization by means of a water use license from the DWS</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 storm water management should be a priority during both</li> </ul>	<p>Expected to be High without mitigation</p>
Description	Without Mitigation	With Mitigation																							
<b>Probability</b>	Definite (5)	Probable (3)																							
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<b>Status (positive or negative)</b>	Negative	Negative																							
<p><b>Cumulative impacts:</b> Construction activities may</p>																									

POTENTIAL IMPACTS	PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED
<p>result in cumulative impact to the water courses within the local catchments and beyond. It is very important that 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 from stormwater or sediment input.</p>	<p>construction and operational phase. This should be monitored as part of the EMP. High energy storm water 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) on the site above the river area resulting from the proposed storm water upgrade should be taken into account.</p>	
<p><b>Nature of 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 wetland 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</li> </ul>	<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. 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</li> </ul>	<p>Expected to be High without mitigation</p>

POTENTIAL IMPACTS	PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED																					
<p>and tracks adjacent to the watercourse</p> <ul style="list-style-type: none"> <li>Erosion (e.g. gully formation, bank collapse)</li> </ul> <p>During the operational phase this impact is expected to be positive if effective bank stabilisation is achieved, since this will prevent further sediment input from this section of the Jukskei River.</p> <table border="1" data-bbox="192 571 813 908"> <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>Limited to Local Area (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>70 (high)</b></td> <td><b>40 (moderate)</b></td> </tr> <tr> <td><b>Status (positive or negative)</b></td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table> <p><b>Cumulative impacts:</b> Expected to be high. Should mitigation measure not be implemented and changes made to the bed or banks of watercourse unstable channel conditions may result causing erosion, meandering, increased potential for flooding and movement of bed material, which will result in property damage adjacent to and downstream of the site. Reversing this process is unlikely and should be prevented in the first place.</p>	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)	Limited to Local Area (2)	<b>Magnitude</b>	High (8)	Moderate (6)	<b>Significance</b>	<b>70 (high)</b>	<b>40 (moderate)</b>	<b>Status (positive or negative)</b>	Negative	Negative	<p>construction.</p> <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.</li> <li>During the construction phase measures must be put in place to control the flow of excess water so that it does not impact on the surface vegetation.</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>Implementation of best management practices</li> <li>Source-directed controls</li> <li>Buffer zones to trap sediments</li> <li>Monitoring should be done to ensure that sediment pollution is timeously dressed</li> </ul>	
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<b>Status (positive or negative)</b>	Negative	Negative																					
<p><b>Nature of Impact:</b> <u>Introduction and spread of alien</u></p>	<ul style="list-style-type: none"> <li>Weed control</li> </ul>	<p>Expected to be High</p>																					



POTENTIAL IMPACTS	PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED																					
<p><u>vegetation</u></p> <p>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 wetland, 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</p> <table border="1" data-bbox="192 778 815 1118"> <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>Short term (2)</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>High (8)</td> <td>Low (4)</td> </tr> <tr> <td><b>Significance</b></td> <td><b>75 (high)</b></td> <td><b>24 (low)</b></td> </tr> <tr> <td><b>Status (positive or negative)</b></td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table> <p><b>Cumulative impacts:</b> Expected to be moderate to high. Construction areas within the watercourses associated with the storm water upgrade can experience an increased invasion if mitigation is not implemented or implemented correctly. Regular monitoring should be implemented during</p>	Description	Without Mitigation	With Mitigation	<b>Probability</b>	Definite (5)	Probable (3)	<b>Duration</b>	Long term (4)	Short term (2)	<b>Extent</b>	Regional (3)	Limited to Local Area (2)	<b>Magnitude</b>	High (8)	Low (4)	<b>Significance</b>	<b>75 (high)</b>	<b>24 (low)</b>	<b>Status (positive or negative)</b>	Negative	Negative	<ul style="list-style-type: none"> <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</li> </ul>	
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construction, rehabilitation including for a period after rehabilitation is completed.																							
<p><b>Nature of impact:</b> <u>Loss and disturbance of watercourse habitat and fringe vegetation impact.</u></p> <p>Direct development within wetland/riparian areas. Loss and disturbance of wetland/riparian habitat and fringe vegetation due to direct development on the wetland as well as changes in management, fire regime and habitat fragmentation.</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>Short-term (2)</td> <td>Temporary (1)</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>Moderate (6)</td> <td>Low (4)</td> </tr> <tr> <td><b>Significance</b></td> <td><b>50 (moderate)</b></td> <td><b>28 (low)</b></td> </tr> <tr> <td><b>Status (positive or negative)</b></td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table> <p><b>Cumulative impacts:</b> Expected to be moderate. May result in a high degree of irreplaceable loss of resources.</p>	Description	Without Mitigation	With Mitigation	<b>Probability</b>	Definite (5)	Highly Probable (4)	<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>28 (low)</b>	<b>Status (positive or negative)</b>	Negative	Negative	<ul style="list-style-type: none"> <li>Where construction occurs in the demarcated wetland and buffer, extra precautions should be implemented to so as to minimise wetland loss.</li> <li>Where wetlands are lost, compensation should be made to protect the remaining wetlands and their catchments, increase their buffers and rehabilitate their condition and functionality.</li> <li>Other than approved and authorized structure, no other development or maintenance infrastructure is allowed within the delineated watercourse or associated buffer zones.</li> <li>Demarcate the watercourse areas and buffer zones to limit disturbance, clearly mark these areas as no-go areas</li> <li>Weed control in buffer zone</li> <li>Monitor rehabilitation and the occurrence of erosion 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 medium
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<b>Status (positive or negative)</b>	Negative	Negative																					
<b>Nature of the Impact:</b> <u>Changes in water quality due to pollution impact ratings.</u>	<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> </ul>	Expected to be High without mitigation																					

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<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> </tbody> </table>			Description	Without Mitigation	With Mitigation	<b>Probability</b>	Probable (3)	Improbable (2)	<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</li> </ul>	Medium															
Description	Without Mitigation	With Mitigation																							
<b>Probability</b>	Probable (3)	Improbable (2)																							

POTENTIAL IMPACTS			PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED												
<b>Duration</b>	Short-term (2)	Short-term (2)	<p>construction period. All waste/litter/rubbish etc. must be disposed of at an approved dumping site as approved by the Council.</p> <ul style="list-style-type: none"> <li>Supply sufficient garbage bins throughout the site and service regularly.</li> <li>Ensure good housekeeping is implemented at all times.</li> <li>Keep the property neat and litter free at all times and maintain the landscaped areas.</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>Lighting on site is to be sufficient for safety and security purposes, but shall not be intrusive to neighboring residents, disturb wildlife, or interfere with road traffic;</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>													
<b>Extent</b>	Limited to Local Area (2)	Limited to Local Area (2)														
<b>Magnitude</b>	Medium (6)	Medium (6)														
<b>Significance</b>	30 (Medium)	20 (Low)														
<b>Status (positive or negative)</b>	Negative	Negative														
<p><b>Cumulative impacts:</b> Expected to be low.</p>																
<p><b>Nature of the Impact:</b> <u>Loss and disturbance of heritage sites due to the development</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>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 Local Area (1)</td> <td>Limited to Local Area (1)</td> </tr> </tbody> </table>			Description	Without Mitigation	With Mitigation	<b>Probability</b>	Probable (3)	Probable (3)	<b>Duration</b>	Permanent(5)	Permanent(5)	<b>Extent</b>	Limited to Local Area (1)	Limited to Local Area (1)	<ul style="list-style-type: none"> <li>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>	Low
Description	Without Mitigation	With Mitigation														
<b>Probability</b>	Probable (3)	Probable (3)														
<b>Duration</b>	Permanent(5)	Permanent(5)														
<b>Extent</b>	Limited to Local Area (1)	Limited to Local Area (1)														

POTENTIAL IMPACTS			PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED
<i>Magnitude</i>	Minor (1)	Minor (1)		
<i>Significance</i>	21 (Low)	21 (Low)		
<i>Status (positive or negative)</i>	Negative	Negative		
<b>Nature of the Impact: <u>Noise pollution</u></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>	Medium
<b>Description</b>	<b>Without Mitigation</b>	<b>With Mitigation</b>		
<i>Probability</i>	Probable (3)	Improbable (2)		
<i>Duration</i>	Short-term (2)	Short-term (2)		
<i>Extent</i>	Limited to Local Area (2)	Limited to Local Area (2)		
<i>Magnitude</i>	Moderate (6)	Moderate (5)		
<i>Significance</i>	30 (Medium)	18 (Low)		
<i>Status (positive or negative)</i>	Negative	Negative		
<b>Nature of the Impact: <u>Safety and security risk</u></b>			<ul style="list-style-type: none"> <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</li> </ul>	Medium
<ul style="list-style-type: none"> <li>○ Influx of people looking for jobs to site</li> <li>○ Employees using the surrounding environment for ablution</li> <li>○ Open fires</li> <li>○ Theft etc.</li> <li>○ Injuries due to construction hazards</li> </ul>				
<b>Description</b>	<b>Without Mitigation</b>	<b>With Mitigation</b>		
<i>Probability</i>	Highly Probable (4)	Improbable (2)		

POTENTIAL IMPACTS			PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED
<b>Duration</b>	Short-term (2)	Very short-term (1)	<p>areas, materials lay-down areas, stockpile area, and workers rest areas should be clearly demarcated or fenced off before construction commences.</p> <ul style="list-style-type: none"> <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 ablution facilities must be regularly serviced to reduce the risk of surface or groundwater pollution</li> <li>▪ Packaging and other waste material may not be burned on site under any circumstances.</li> <li>▪ The Contractor shall supply fire fighting equipment in proportion to the fire risk presented by the type of construction and other on-site activities and materials used on site. This equipment shall be kept in good operating order. This particularly applies to welding activities.</li> <li>▪ Smoking is only allowed in designated safe smoking areas.</li> </ul>	
<b>Extent</b>	Limited to Local Area (2)	Limited to Local Area (1)		
<b>Magnitude</b>	Moderate (6)	Minor (2)		
<b>Significance</b>	40 (Moderate)	8 (Low)		
<b>Status (positive or negative)</b>	Negative	Negative		
<b>Nature of the Impact:</b> <u>Pollution caused by Inappropriate Management and Handling of Waste</u>			<ul style="list-style-type: none"> <li>▪ Regular litter picking and general waste bins must be readily available for litter disposal and general housekeeping.</li> <li>▪ All solid waste generated during the construction process must be</li> </ul>	Moderate

POTENTIAL IMPACTS			PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED
<ul style="list-style-type: none"> <li>Construction rubble left onsite may attract vermin, encourage the growth of opportunistic alien vegetation and become unsightly</li> <li>Hazardous waste e.g. used oils, offcuts, empty bitumen containers etc., could pollute surface and groundwater resources if not properly contained.</li> </ul>			<p>placed in a designated waste collection area within the construction camp and must not be allowed to blow around the site, be accessible to animals, or be placed in piles adjacent the waste skips / bins. All solid waste must then be disposed of at the nearest licensed landfill and safe disposal certificates obtained. Separate waste skips/ bins for the different waste streams must be available on site.</p> <ul style="list-style-type: none"> <li>The waste containers must be appropriate to the waste type contained therein and where necessary should be lined and covered. This will be managed through the site specific EMP and monitored by the ECO.</li> <li>No waste (hazardous or general) will be disposed of in the trenches around the construction footprint. All hazardous material must be carefully stored and then disposed of offsite at the licensed hazardous landfill site</li> <li>All excess material and rubble must be removed from the site so not to restrict the rehabilitation process.</li> <li>Adequate toilet facilities must be provided for all staff members as standard construction practice. Monitor the sewerage facilities for spillages, and handle any spillages as hazardous waste;</li> <li>Chemical toilets must be placed within the construction camp and not in close proximity to the river/wetlands. The chemical toilets to be provided must be from a registered company and all sewage must be disposed of at an appropriate facility. Safe disposal certificates must be kept on record.</li> <li>Machinery must be properly maintained to keep oil leaks in check</li> <li>Any hazardous or dangerous goods utilized during the construction</li> </ul>	
<b>Description</b>	<b>Without Mitigation</b>	<b>With Mitigation</b>		
Probability	Highly Probable (4)	Probable (3)		
Duration	Short-term (2)	Very short-term (1)		
Extent	Limited to Local Area (2)	Limited to Local Area (1)		
Magnitude	Moderate (6)	Moderate (6)		
Significance	<b>40 (Moderate)</b>	<b>24 (Low)</b>		
Status (positive or negative)	Negative	Negative		
<b>Nature of the Impact:</b> <u>Soil and Groundwater Pollution</u>				Moderate

POTENTIAL IMPACTS			PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED																					
<p>Mismanagement, handling and storage of hazardous chemicals and materials may result in spillages causing pollution to soil and groundwater resources</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>Short-term (2)</td> <td>Very short-term (1)</td> </tr> <tr> <td><b>Extent</b></td> <td>Limited to Local Area (2)</td> <td>Limited to Local Area (1)</td> </tr> <tr> <td><b>Magnitude</b></td> <td>Moderate (6)</td> <td>Moderate (6)</td> </tr> <tr> <td><b>Significance</b></td> <td><b>40 (Moderate)</b></td> <td><b>24 (Low)</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)	Very short-term (1)	<b>Extent</b>	Limited to Local Area (2)	Limited to Local Area (1)	<b>Magnitude</b>	Moderate (6)	Moderate (6)	<b>Significance</b>	<b>40 (Moderate)</b>	<b>24 (Low)</b>	<b>Status (positive or negative)</b>	Negative	Negative	<p>phase must be stored on an impermeable surface that is bunded, fenced, locked and covered.</p> <ul style="list-style-type: none"> <li>▪ A spill kits must be clearly marked and visible when utilizing hazardous or dangerous materials to ensure all spills can be immediately cleaned.</li> <li>▪ Remediation of spillages must be conducted on a continual basis and within 24h of spillage;</li> <li>▪ Contaminated soil will be considered to be hazardous waste and disposed of accordingly</li> <li>▪ Any hazardous or dangerous goods utilized during the construction phase must be stored on an impermeable surface that is bunded, fenced, locked and covered.</li> <li>▪ A spill kits must be clearly marked and visible when utilizing hazardous or dangerous materials to ensure all spills can be immediately cleaned.</li> <li>▪ Remediation of spillages must be conducted on a continual basis and within 24h of spillage;</li> <li>▪ Contaminated soil will be considered to be hazardous waste and disposed of accordingly.</li> <li>▪ The contractors must provide and maintain a method statement for mixing of cement and asphalt. The method statement must provide information on proposed location, storage, washing and disposal of cement, packaging, tools and plant storage.</li> <li>▪ Washing and cleaning of equipment and vehicles should also be done within a bermed area (wash bay area).</li> <li>▪ The mixing of concrete should only be done at specifically selected sites on mortar boards or similar structures to contain pollution</li> </ul>	
Description	Without Mitigation	With Mitigation																							
<b>Probability</b>	Highly Probable (4)	Probable (3)																							
<b>Duration</b>	Short-term (2)	Very short-term (1)																							
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<b>Magnitude</b>	Moderate (6)	Moderate (6)																							
<b>Significance</b>	<b>40 (Moderate)</b>	<b>24 (Low)</b>																							
<b>Status (positive or negative)</b>	Negative	Negative																							



POTENTIAL IMPACTS	PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED																					
	<ul style="list-style-type: none"> <li>▪ Materials such as fuel, oil, paint, herbicide and insecticides must be sealed and stored in bunded areas or under lock and key, as appropriate, in well-ventilated areas</li> <li>▪ Drip trays (minimum of 10cm deep) must be placed under all vehicles suspected of leaking these must not be left unattended, drip trays must be utilized.</li> <li>▪ Drip trays must be utilized during repairs and maintenance of all machinery. The depth of the drip tray must be determined considering the total amount / volume of oil in the vehicle. The drip tray must be able to contain the volume of oil in the vehicle</li> </ul>																						
<p><b>Nature of the Impact:</b> Social-Economic Impact</p> <ul style="list-style-type: none"> <li>○ Temporary job creation and skills development during the construction phase.</li> <li>○ Economic multiplier effects from the use of local contractors and establishment of related businesses.</li> </ul> <table border="1" data-bbox="192 943 815 1334"> <thead> <tr> <th>Description</th> <th>Without Enhancement</th> <th>With Enhancement</th> </tr> </thead> <tbody> <tr> <td><i>Probability</i></td> <td>Probable (3)</td> <td>Highly Probable (4)</td> </tr> <tr> <td><i>Duration</i></td> <td>Short-term (2)</td> <td>Short-term (2)</td> </tr> <tr> <td><i>Extent</i></td> <td>Limited to Local Area (2)</td> <td>Limited to Local Area (2)</td> </tr> <tr> <td><i>Magnitude</i></td> <td>Moderate (6)</td> <td>High (8)</td> </tr> <tr> <td><i>Significance</i></td> <td><b>30 (moderate)</b></td> <td><b>48 (moderate)</b></td> </tr> <tr> <td><i>Status (positive or negative)</i></td> <td>Positive</td> <td>Positive</td> </tr> </tbody> </table>	Description	Without Enhancement	With Enhancement	<i>Probability</i>	Probable (3)	Highly Probable (4)	<i>Duration</i>	Short-term (2)	Short-term (2)	<i>Extent</i>	Limited to Local Area (2)	Limited to Local Area (2)	<i>Magnitude</i>	Moderate (6)	High (8)	<i>Significance</i>	<b>30 (moderate)</b>	<b>48 (moderate)</b>	<i>Status (positive or negative)</i>	Positive	Positive	<ul style="list-style-type: none"> <li>▪ It is recommended that local employment policy is adopted to maximize the opportunities made available to the local labor 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 programmers should be initiated prior to the commencement of the construction phase.</li> <li>▪ All new laborers recruited from the community must undergo relevant training to reduce hazards that may arise from job responsibilities and improve on job skills.</li> </ul>	Moderate
Description	Without Enhancement	With Enhancement																					
<i>Probability</i>	Probable (3)	Highly Probable (4)																					
<i>Duration</i>	Short-term (2)	Short-term (2)																					
<i>Extent</i>	Limited to Local Area (2)	Limited to Local Area (2)																					
<i>Magnitude</i>	Moderate (6)	High (8)																					
<i>Significance</i>	<b>30 (moderate)</b>	<b>48 (moderate)</b>																					
<i>Status (positive or negative)</i>	Positive	Positive																					
	<ul style="list-style-type: none"> <li>▪ Appropriate dust suppression measures should be implemented to</li> </ul>	Moderate																					

POTENTIAL IMPACTS			PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED
<b>Nature of Impact: Impact on Air Quality</b> <ul style="list-style-type: none"> <li>○ Dust generated during vegetation clearing</li> <li>○ Exhaust fumes from construction machinery and vehicles</li> </ul>			control dust dust pollution during windy and dry conditions. <ul style="list-style-type: none"> <li>▪ Speed restriction of 40km/h must be implemented for all construction vehicles.</li> <li>▪ All vehicles transporting friable materials such a sand, rubble etc. must be covered by a tarpaulin or wet down.</li> <li>▪ No burning of refuse or vegetation is permitted on site.</li> </ul>	
<b>Description</b>	<b>Without Mitigation</b>	<b>With Mitigation</b>		
<b>Probability</b>	Highly Probable (4)	Probable (3)		
<b>Duration</b>	Short-term (2)	Very short-term (1)		
<b>Extent</b>	Limited to Local Area (2)	Limited to Local Area (1)		
<b>Magnitude</b>	High (8)	Medium (6)		
<b>Significance</b>	48 (medium)	24 (Low)		
<b>Status (positive or negative)</b>	Negative	Negative		

**Alternative Design 2 (Preferred): Low Level Causeway With Larger Spans (New structure – precast beams with two openings)**

IMPACTS THAT MAY RESULT FROM THE CONSTRUCTION PHASE

A summary and anticipated significance of the potential direct, indirect and cumulative impacts that are likely to occur as a result of the Construction Phase of the proposed Low Level Causeway with Larger Spans (new structure with three openings)

**3. Design Alternative 2: Low Level Causeway With Larger Spans (New structure – precast beams with two openings)**

Table 3: Construction Impacts (Alternative Design 1)

POTENTIAL IMPACTS	PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED
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POTENTIAL IMPACTS	PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED																					
<p><b>Nature of Impact:</b> <u>Changes in water flow regime</u></p> <p>Changing the quantity and fluctuation properties of the watercourse by for example restricting water flow.</p> <table border="1" data-bbox="192 496 810 812"> <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>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)</td> <td>Moderate (6)</td> </tr> <tr> <td><b>Significance</b></td> <td><b>75 (high)</b></td> <td><b>33 (moderate)</b></td> </tr> <tr> <td><b>Status (positive or negative)</b></td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table> <p><b>Cumulative impacts:</b> Construction activities may result in cumulative impact to the water courses within the local catchments and beyond. It is very important that 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 from stormwater or sediment input.</p>	Description	Without Mitigation	With Mitigation	<b>Probability</b>	Definite (5)	Probable (3)	<b>Duration</b>	Long term (4)	Short term (2)	<b>Extent</b>	Regional (3)	Regional (3)	<b>Magnitude</b>	High (8)	Moderate (6)	<b>Significance</b>	<b>75 (high)</b>	<b>33 (moderate)</b>	<b>Status (positive or negative)</b>	Negative	Negative	<ul style="list-style-type: none"> <li>• Designs should take into account soil properties, slopes and runoff energy.</li> <li>• No activities should take place in the watercourses and associated buffer zone. Where the above is unavoidable, activities should be strictly regulated and monitored as specified in the EMP. This is subjected to authorization by means of a water use license from the DWS</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 storm water management should be a priority during both construction and operational phase. This should be monitored as part of the EMP. High energy storm water 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) on the site above the river area resulting from the proposed storm water upgrade should be taken into account.</li> </ul>	<p>Expected to be High without mitigation</p>
Description	Without Mitigation	With Mitigation																					
<b>Probability</b>	Definite (5)	Probable (3)																					
<b>Duration</b>	Long term (4)	Short term (2)																					
<b>Extent</b>	Regional (3)	Regional (3)																					
<b>Magnitude</b>	High (8)	Moderate (6)																					
<b>Significance</b>	<b>75 (high)</b>	<b>33 (moderate)</b>																					
<b>Status (positive or negative)</b>	Negative	Negative																					
<p><b>Nature of 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</p>	<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</li> </ul>	<p>Expected to be High without mitigation</p>																					

POTENTIAL IMPACTS	PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED															
<p>well as the removal of natural vegetation. This could result in the loss of topsoil, sedimentation of the wetland 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> <p>During the operational phase this impact is expected to be positive if effective bank stabilisation is achieved, since this will prevent further sediment input from this section of the Jukskei River.</p> <table border="1" data-bbox="192 1161 815 1385"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td><i>Probability</i></td> <td>Definite (5)</td> <td>Highly probable (4)</td> </tr> <tr> <td><i>Duration</i></td> <td>Medium term (3)</td> <td>Short term (2)</td> </tr> <tr> <td><i>Extent</i></td> <td>Regional (3)</td> <td>Limited to Local Area (2)</td> </tr> <tr> <td><i>Magnitude</i></td> <td>High (8)</td> <td>Moderate (6)</td> </tr> </tbody> </table>	Description	Without Mitigation	With Mitigation	<i>Probability</i>	Definite (5)	Highly probable (4)	<i>Duration</i>	Medium term (3)	Short term (2)	<i>Extent</i>	Regional (3)	Limited to Local Area (2)	<i>Magnitude</i>	High (8)	Moderate (6)	<p>allows for additional sediment input and slows down the velocity of the water thus reducing the risk of erosion. Effective sediment traps should be installed.</p> <ul style="list-style-type: none"> <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 and livestock access.</li> <li>• During the construction phase measures must be put in place to control the flow of excess water so that it does not impact on the surface vegetation.</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</li> </ul>	
Description	Without Mitigation	With Mitigation															
<i>Probability</i>	Definite (5)	Highly probable (4)															
<i>Duration</i>	Medium term (3)	Short term (2)															
<i>Extent</i>	Regional (3)	Limited to Local Area (2)															
<i>Magnitude</i>	High (8)	Moderate (6)															

POTENTIAL IMPACTS			PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED
<i>Significance</i>	70 (high)	40 (moderate)	avoid erosion and pollution problems. <ul style="list-style-type: none"> <li>• Implementation of best management practices</li> <li>• Source-directed controls</li> <li>• Buffer zones to trap sediments</li> <li>• Monitoring should be done to ensure that sediment pollution is timeously dressed</li> </ul>	
<i>Status (positive or negative)</i>	Negative	Negative		
<p><b>Cumulative impacts:</b> Expected to be high. Should mitigation measure not be implemented and changes made to the bed or banks of watercourse unstable channel conditions may result causing erosion, meandering, increased potential for flooding and movement of bed material, which will result in property damage adjacent to and downstream of the site. Reversing this process is unlikely and should be prevented in the first place.</p>				
<p><b>Nature of Impact:</b> <u>Introduction and spread of alien vegetation</u></p> <p>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 wetland, 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 plans can easily colonise and impact on downstream users</p>			<ul style="list-style-type: none"> <li>• Weed control</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</li> </ul>	Expected to be High without mitigation
Description	Without Mitigation	With Mitigation		

POTENTIAL IMPACTS			PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED
<b>Probability</b>	Definite (5)	Probable (3)		
<b>Duration</b>	Long term (4)	Short term (2)		
<b>Extent</b>	Regional (3)	Limited to Local Area (2)		
<b>Magnitude</b>	High (8)	Low (4)		
<b>Significance</b>	75 (high)	24 (low)		
<b>Status (positive or negative)</b>	Negative	Negative		
<p><b>Cumulative impacts:</b> Expected to be moderate to high. Construction areas within the watercourses associated with the storm water upgrade can experience an increased invasion if mitigation is not implemented or implemented correctly. Regular monitoring should be implemented during construction, rehabilitation including for a period after rehabilitation is completed.</p>				
<p><b>Nature of impact:</b> <u>Loss and disturbance of watercourse habitat and fringe vegetation impact.</u></p> <p>Direct development within wetland/riparian areas. Loss and disturbance of wetland/riparian habitat and fringe vegetation due to direct development on the wetland as well as changes in management, fire regime and habitat fragmentation.</p>			<ul style="list-style-type: none"> <li>Where construction occurs in the demarcated wetland and buffer, extra precautions should be implemented to so as to minimise wetland loss.</li> <li>Where wetlands are lost, compensation should be made to protect the remaining wetlands and their catchments, increase their buffers and rehabilitate their condition and functionality.</li> <li>Other than approved and authorized structure, no other development or maintenance infrastructure is allowed within the delineated watercourse or associated buffer zones.</li> <li>Demarcate the watercourse areas and buffer zones to limit</li> </ul>	Expected to be High without mitigation
<b>Description</b>	<b>Without Mitigation</b>	<b>With Mitigation</b>		
<b>Probability</b>	Definite (5)	Highly Probable (4)		

POTENTIAL IMPACTS			PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED																					
<i>Duration</i>	Short-term (2)	Temporary (1)	disturbance, clearly mark these areas as no-go areas <ul style="list-style-type: none"> <li>• Weed control in buffer zone</li> <li>• Monitor rehabilitation and the occurrence of erosion 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>																						
<i>Extent</i>	Limited to Local Area (2)	Limited to Local Area (2)																							
<i>Magnitude</i>	Moderate (6)	Low (4)																							
<i>Significance</i>	50 (moderate)	28 (low)																							
<i>Status (positive or negative)</i>	Negative	Negative																							
<p><b>Cumulative impacts:</b> Expected to be moderate. May result in a high degree of irreplaceable loss of resources.</p>																									
<p><b>Nature of the Impact:</b> <u>Changes in water quality due to pollution impact ratings.</u></p> <table border="1"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td><i>Probability</i></td> <td>Definite (5)</td> <td>Probable (3)</td> </tr> <tr> <td><i>Duration</i></td> <td>Short term (2)</td> <td>Temporary (1)</td> </tr> <tr> <td><i>Extent</i></td> <td>Limited to Local Area (2)</td> <td>Limited to Local Area (2)</td> </tr> <tr> <td><i>Magnitude</i></td> <td>High (8)</td> <td>Low (4)</td> </tr> <tr> <td><i>Significance</i></td> <td>60 (High)</td> <td>21 (low)</td> </tr> <tr> <td><i>Status (positive or negative)</i></td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table> <p><b>Cumulative impacts:</b> Expected to be moderate.</p>			Description	Without Mitigation	With Mitigation	<i>Probability</i>	Definite (5)	Probable (3)	<i>Duration</i>	Short term (2)	Temporary (1)	<i>Extent</i>	Limited to Local Area (2)	Limited to Local Area (2)	<i>Magnitude</i>	High (8)	Low (4)	<i>Significance</i>	60 (High)	21 (low)	<i>Status (positive or negative)</i>	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</li> </ul>	Expected to be High without mitigation
Description	Without Mitigation	With Mitigation																							
<i>Probability</i>	Definite (5)	Probable (3)																							
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POTENTIAL IMPACTS	PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED																					
	<p>place within the watercourse or watercourse buffer.</p> <ul style="list-style-type: none"> <li>• Control of waste discharges</li> <li>• Maintenance of buffer zones to trap sediments with associated toxins</li> <li>• Ensure that no operational activities impact on the watercourse or buffer area. This includes edge effects.</li> <li>• Regular independent water quality monitoring should form part of operational procedures in order to identify pollution</li> <li>• Treatment of pollution identified should be prioritized accordingly.</li> </ul>																						
<p><b>Nature of the Impact: <u>Visual Impacts</u></b></p> <table border="1" data-bbox="192 746 797 1098"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td><i>Probability</i></td> <td>Probable (3)</td> <td>Improbable (2)</td> </tr> <tr> <td><i>Duration</i></td> <td>Short-term (2)</td> <td>Short-term (2)</td> </tr> <tr> <td><i>Extent</i></td> <td>Limited to Local Area (2)</td> <td>Limited to Local Area (2)</td> </tr> <tr> <td><i>Magnitude</i></td> <td>Medium (6)</td> <td>Medium (6)</td> </tr> <tr> <td><i>Significance</i></td> <td><b>30 (Medium)</b></td> <td><b>20 (Low)</b></td> </tr> <tr> <td><i>Status (positive or negative)</i></td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table>	Description	Without Mitigation	With Mitigation	<i>Probability</i>	Probable (3)	Improbable (2)	<i>Duration</i>	Short-term (2)	Short-term (2)	<i>Extent</i>	Limited to Local Area (2)	Limited to Local Area (2)	<i>Magnitude</i>	Medium (6)	Medium (6)	<i>Significance</i>	<b>30 (Medium)</b>	<b>20 (Low)</b>	<i>Status (positive or negative)</i>	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>▪ Supply sufficient garbage bins throughout the site and service regularly.</li> <li>▪ Ensure good housekeeping is implemented at all times.</li> <li>▪ Keep the property neat and litter free at all times and maintain the landscaped areas.</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>▪ Lighting on site is to be sufficient for safety and security purposes, but shall not be intrusive to neighboring residents, disturb wildlife,</li> </ul>	Medium
Description	Without Mitigation	With Mitigation																					
<i>Probability</i>	Probable (3)	Improbable (2)																					
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<i>Status (positive or negative)</i>	Negative	Negative																					



POTENTIAL IMPACTS	PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED																					
	<p>or interfere with road traffic;</p> <ul style="list-style-type: none"> <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>																						
<p><b>Nature of the Impact:</b> <u>Loss and disturbance of heritage sites due to the development</u></p> <table border="1" data-bbox="192 663 815 1015"> <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>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 Local Area (1)</td> <td>Limited to Local Area (1)</td> </tr> <tr> <td><b>Magnitude</b></td> <td>Minor (1)</td> <td>Minor (1)</td> </tr> <tr> <td><b>Significance</b></td> <td><b>21 (Low)</b></td> <td><b>21 (Low)</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>	Probable (3)	Probable (3)	<b>Duration</b>	Permanent(5)	Permanent(5)	<b>Extent</b>	Limited to Local Area (1)	Limited to Local Area (1)	<b>Magnitude</b>	Minor (1)	Minor (1)	<b>Significance</b>	<b>21 (Low)</b>	<b>21 (Low)</b>	<b>Status (positive or negative)</b>	Negative	Negative	<ul style="list-style-type: none"> <li>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>	Low
Description	Without Mitigation	With Mitigation																					
<b>Probability</b>	Probable (3)	Probable (3)																					
<b>Duration</b>	Permanent(5)	Permanent(5)																					
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<b>Significance</b>	<b>21 (Low)</b>	<b>21 (Low)</b>																					
<b>Status (positive or negative)</b>	Negative	Negative																					
<p><b>Nature of the Impact:</b> <u>Noise pollution</u></p> <table border="1" data-bbox="192 1091 815 1382"> <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>Moderate (6)</td> <td>Moderate (5)</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>	Moderate (6)	Moderate (5)	<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</li> </ul>	Moderate						
Description	Without Mitigation	With Mitigation																					
<b>Probability</b>	Probable (3)	Improbable (2)																					
<b>Duration</b>	Short-term (2)	Short-term (2)																					
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<b>Magnitude</b>	Moderate (6)	Moderate (5)																					

POTENTIAL IMPACTS			PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED																					
<b>Significance</b>	<b>30 (Medium)</b>	<b>18 (Low)</b>	flaps, silencers etc.) must be used as per operating instructions and maintained properly during site operations.																						
<b>Status (positive or negative)</b>	Negative	Negative																							
<p><b>Nature of the Impact: <u>Safety and security risk</u></b></p> <ul style="list-style-type: none"> <li>○ Influx of people looking for jobs to site</li> <li>○ Employees using the surrounding environment for ablution</li> <li>○ Open fires</li> <li>○ Theft etc.</li> <li>○ Injuries due to construction hazards</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>Highly Probable (4)</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>Limited to Local Area (2)</td> <td>Limited to Local Area (1)</td> </tr> <tr> <td><b>Magnitude</b></td> <td>Moderate (6)</td> <td>Minor (2)</td> </tr> <tr> <td><b>Significance</b></td> <td><b>40 (Moderate)</b></td> <td><b>8 (Low)</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)	Improbable (2)	<b>Duration</b>	Short-term (2)	Very short-term (1)	<b>Extent</b>	Limited to Local Area (2)	Limited to Local Area (1)	<b>Magnitude</b>	Moderate (6)	Minor (2)	<b>Significance</b>	<b>40 (Moderate)</b>	<b>8 (Low)</b>	<b>Status (positive or negative)</b>	Negative	Negative	<ul style="list-style-type: none"> <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 ablution facilities must be regularly serviced to reduce the risk</li> </ul>	Moderate
Description	Without Mitigation	With Mitigation																							
<b>Probability</b>	Highly Probable (4)	Improbable (2)																							
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<b>Status (positive or negative)</b>	Negative	Negative																							

POTENTIAL IMPACTS	PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED																		
	<p>of surface or groundwater pollution</p> <ul style="list-style-type: none"> <li>▪ Packaging and other waste material may not be burned on site under any circumstances.</li> <li>▪ The Contractor shall supply fire fighting equipment in proportion to the fire risk presented by the type of construction and other on-site activities and materials used on site. This equipment shall be kept in good operating order. This particularly applies to welding activities.</li> <li>▪ Smoking is only allowed in designated safe smoking areas.</li> </ul>																			
<p><b>Nature of the Impact:</b> <u>Pollution caused by Inappropriate Management and Handling of Waste</u></p> <ul style="list-style-type: none"> <li>• Construction rubble left onsite may attract vermin, encourage the growth of opportunistic alien vegetation and become unsightly</li> <li>• Hazardous waste e.ge used oils, offcuts, empty bitumen containers etc., could pollute surface and groundwater resources if not properly contained.</li> </ul> <table border="1" data-bbox="192 1114 815 1391"> <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>Probable (3)</td> </tr> <tr> <td>Duration</td> <td>Short-term (2)</td> <td>Very short-term (1)</td> </tr> <tr> <td>Extent</td> <td>Limited to Local Area (2)</td> <td>Limited to Local Area (1)</td> </tr> <tr> <td>Magnitude</td> <td>Moderate (6)</td> <td>Moderate (6)</td> </tr> <tr> <td>Significance</td> <td><b>40 (Moderate)</b></td> <td><b>24 (Low)</b></td> </tr> </tbody> </table>	Description	Without Mitigation	With Mitigation	Probability	Highly Probable (4)	Probable (3)	Duration	Short-term (2)	Very short-term (1)	Extent	Limited to Local Area (2)	Limited to Local Area (1)	Magnitude	Moderate (6)	Moderate (6)	Significance	<b>40 (Moderate)</b>	<b>24 (Low)</b>	<ul style="list-style-type: none"> <li>▪ Regular litter picking and general waste bins must be readily available for litter disposal and general housekeeping.</li> <li>▪ All solid waste generated during the construction process must be placed in a designated waste collection area within the construction camp and must not be allowed to blow around the site, be accessible to animals, or be placed in piles adjacent the waste skips / bins. All solid waste must then be disposed of at the nearest licensed landfill and safe disposal certificates obtained. Separate waste skips/ bins for the different waste streams must be available on site.</li> <li>▪ The waste containers must be appropriate to the waste type contained therein and where necessary should be lined and covered. This will be managed through the site specific EMP and monitored by the ECO.</li> <li>▪ No waste (hazardous or general) will be disposed of in the trenches around the construction footprint. All hazardous material</li> </ul>	<p>Moderate</p>
Description	Without Mitigation	With Mitigation																		
Probability	Highly Probable (4)	Probable (3)																		
Duration	Short-term (2)	Very short-term (1)																		
Extent	Limited to Local Area (2)	Limited to Local Area (1)																		
Magnitude	Moderate (6)	Moderate (6)																		
Significance	<b>40 (Moderate)</b>	<b>24 (Low)</b>																		

POTENTIAL IMPACTS			PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED																		
Status (positive or negative)	Negative	Negative	<p>must be carefully stored and then disposed of offsite at the licensed hazardous landfill site</p> <ul style="list-style-type: none"> <li>All excess material and rubble must be removed from the site so not to restrict the rehabilitation process.</li> <li>Adequate toilet facilities must be provided for all staff members as standard construction practice. Monitor the sewerage facilities for spillages, and handle any spillages as hazardous waste;</li> <li>Chemical toilets must be placed within the construction camp and not in close proximity to the river/wetlands. The chemical toilets to be provided must be from a registered company and all sewage must be disposed of at an appropriate facility. Safe disposal certificates must be kept on record.</li> <li>Machinery must be properly maintained to keep oil leaks in check</li> </ul>																			
<p><b>Nature of the Impact:</b> <u>Soil and Groundwater Pollution</u></p> <p>Mismanagement, handling and storage of hazardous chemicals and materials may result in spillages causing pollution to soil and groundwater resources</p> <table border="1"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td><i>Probability</i></td> <td>Highly Probable (4)</td> <td>Probable (3)</td> </tr> <tr> <td><i>Duration</i></td> <td>Short-term (2)</td> <td>Very short-term (1)</td> </tr> <tr> <td><i>Extent</i></td> <td>Limited to Local Area (2)</td> <td>Limited to Local Area (1)</td> </tr> <tr> <td><i>Magnitude</i></td> <td>Moderate (6)</td> <td>Moderate (6)</td> </tr> <tr> <td><i>Significance</i></td> <td>40 (Moderate)</td> <td>24 (Low)</td> </tr> </tbody> </table>			Description	Without Mitigation	With Mitigation	<i>Probability</i>	Highly Probable (4)	Probable (3)	<i>Duration</i>	Short-term (2)	Very short-term (1)	<i>Extent</i>	Limited to Local Area (2)	Limited to Local Area (1)	<i>Magnitude</i>	Moderate (6)	Moderate (6)	<i>Significance</i>	40 (Moderate)	24 (Low)	<ul style="list-style-type: none"> <li>Any hazardous or dangerous goods utilized during the construction phase must be stored on an impermeable surface that is bunded, fenced, locked and covered.</li> <li>A spill kits must be clearly marked and visible when utilizing hazardous or dangerous materials to ensure all spills can be immediately cleaned.</li> <li>Remediation of spillages must be conducted on a continual basis and within 24h of spillage;</li> <li>Contaminated soil will be considered to be hazardous waste and disposed of accordingly</li> <li>Any hazardous or dangerous goods utilized during the construction phase must be stored on an impermeable surface that is bunded, fenced, locked and covered.</li> <li>A spill kits must be clearly marked and visible when utilizing</li> </ul>	Moderate
Description	Without Mitigation	With Mitigation																				
<i>Probability</i>	Highly Probable (4)	Probable (3)																				
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<i>Extent</i>	Limited to Local Area (2)	Limited to Local Area (1)																				
<i>Magnitude</i>	Moderate (6)	Moderate (6)																				
<i>Significance</i>	40 (Moderate)	24 (Low)																				

POTENTIAL IMPACTS			PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED
<i>Status (positive or negative)</i>	Negative	Negative	<p>hazardous or dangerous materials to ensure all spills can be immediately cleaned.</p> <ul style="list-style-type: none"> <li>▪ Remediation of spillages must be conducted on a continual basis and within 24h of spillage;</li> <li>▪ Contaminated soil will be considered to be hazardous waste and disposed of accordingly.</li> <li>▪ The contractors must provide and maintain a method statement for mixing of cement and asphalt. The method statement must provide information on proposed location, storage, washing and disposal of cement, packaging, tools and plant storage.</li> <li>▪ Washing and cleaning of equipment and vehicles should also be done within a bermed area (wash bay area).</li> <li>▪ The mixing of concrete should only be done at specifically selected sites on mortar boards or similar structures to contain pollution</li> <li>▪ Materials such as fuel, oil, paint, herbicide and insecticides must be sealed and stored in bunded areas or under lock and key, as appropriate, in well-ventilated areas</li> <li>▪ Drip trays (minimum of 10cm deep) must be placed under all vehicles suspected of leaking these must not be left unattended, drip trays must be utilized.</li> <li>▪ Drip trays must be utilized during repairs and maintenance of all machinery. The depth of the drip tray must be determined considering the total amount / volume of oil in the vehicle. The drip tray must be able to contain the volume of oil in the vehicle</li> </ul>	
<p><b>Nature of the Impact:</b> Social-Economic Impact</p> <ul style="list-style-type: none"> <li>○ Temporary job creation and skills development during the construction phase.</li> </ul>			<ul style="list-style-type: none"> <li>▪ It is recommended that local employment policy is adopted to maximize the opportunities made available to the local labor force.</li> <li>▪ Where reasonable and practical JRA should appoint local</li> </ul>	Moderate

POTENTIAL IMPACTS			PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED
<ul style="list-style-type: none"> <li>Economic multiplier effects from the use of local contractors and establishment of related businesses.</li> </ul>			<p>contractors and implement a (local first) policy especially for semi-skilled and low skilled job categories.</p> <ul style="list-style-type: none"> <li>Training and skills development programmers should be initiated prior to the commencement of the construction phase.</li> <li>All new laborers recruited from the community must undergo relevant training to reduce hazards that may arise from job responsibilities and improve on job skills.</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>	Limited to Local Area (2)	Limited to Local Area (2)		
<b>Magnitude</b>	Moderate (6)	High (8)		
<b>Significance</b>	<b>30 (moderate)</b>	<b>48 (moderate)</b>		
<b>Status (positive or negative)</b>	Positive	Positive		
<p><b>Nature of Impact: Impact on Air Quality</b></p> <ul style="list-style-type: none"> <li>Dust generated during vegetation clearing</li> <li>Exhaust fumes from construction machinery and vehicles</li> </ul>			<ul style="list-style-type: none"> <li>Appropriate dust suppression measures should be implemented to control dust dust pollution during windy and dry conditions.</li> <li>Speed restriction of 40km/h must be implemented for all construction vehicles.</li> <li>All vehicles transporting friable materials such a sand, rubble etc. must be covered by a tarpaulin or wet down.</li> <li>No burning of refuse or vegetation is permitted on site.</li> </ul>	Moderate
<b>Description</b>	<b>Without Mitigation</b>	<b>With Mitigation</b>		
<b>Probability</b>	Highly Probable (4)	Probable (3)		
<b>Duration</b>	Short-term (2)	Very short-term (1)		
<b>Extent</b>	Limited to Local Area (2)	Limited to Local Area (1)		
<b>Magnitude</b>	High (8)	Medium (6)		
<b>Significance</b>	<b>48 (medium)</b>	<b>24 (Low)</b>		
<b>Status (positive)</b>	Negative	Negative		

POTENTIAL IMPACTS			PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED
<i>or negative)</i>				

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 **operational phase** for the various alternatives of the proposed development. This must include an assessment of the significance of all impacts.

#### IMPACTS THAT MAY RESULT FROM THE OPERATIONAL PHASE

A summary and anticipated significance of the potential direct, indirect and cumulative impacts that are likely to occur as a result of the Operational Phase of the proposed Low Level Causeway with Larger Spans (new structure with three openings)

#### 4. Design Alternative 2: Low Level Causeway With Larger Spans (New structure – precast beams with two openings)

Table 4: Operational Impacts

POTENTIAL IMPACTS			PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED
<p><b>Nature of Impact:</b> <u>Changes in water flow regime</u></p> <p>Changing the quantity and fluctuation properties of the watercourse by for example restricting water flow.</p>			<ul style="list-style-type: none"> <li>• Designs should take into account soil properties, slopes and runoff energy.</li> <li>• No activities should take place in the watercourses and associated buffer zone. Where the above is unavoidable, activities should be strictly regulated and monitored as specified in the EMP. This is subjected to authorization by means of a water use license from the DWS</li> <li>• Construction must be restricted to the dryer winter months where possible.</li> </ul>	<p>Impacts to the flow characteristics of this watercourse are likely to be permanent unless rehabilitated.</p>
<b>Description</b>	<b>Without Mitigation</b>	<b>With Mitigation</b>		
<b>Probability</b>	Definite (5)	Probable (3)		
<b>Duration</b>	Long term (4)	Short term (2)		
<b>Extent</b>	Regional (3)	Regional (3)		

POTENTIAL IMPACTS			PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED
<i>Magnitude</i>	High (8)	Moderate (6)	<ul style="list-style-type: none"> <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 storm water management should be a priority during both construction and operational phase. This should be monitored as part of the EMP. High energy storm water 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) on the site above the river area resulting from the proposed storm water upgrade should be taken into account.</li> </ul>	
<i>Significance</i>	75 (high)	33 (moderate)		
<i>Status (positive or negative)</i>	Negative	Negative		
<p><b>Cumulative impacts:</b> Construction activities may result in cumulative impact to the water courses within the local catchments and beyond. It is very important that 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 from stormwater or sediment input.</p>				
<p><b>Nature of 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 earthworks activities will result in soil disturbance as well as the removal of natural vegetation. This could result in the loss of topsoil, sedimentation of the wetland 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</li> </ul>			<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. 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> </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 MITIGATION NOT BEING IMPLEMENTED
<p>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.</p> <ul style="list-style-type: none"> <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>			<ul style="list-style-type: none"> <li>Remove only the vegetation where essential for maintenance 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 and livestock access.</li> <li>During the maintenance measures must be put in place to control the flow of excess water so that it does not impact on the surface vegetation.</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>Implementation of best management practices</li> <li>Source-directed controls</li> <li>Buffer zones to trap sediments</li> <li>Monitoring should be done to ensure that sediment pollution is timeously dressed</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)	Short term (2)		
<b>Extent</b>	Regional (3)	Limited to Local Area (2)		
<b>Magnitude</b>	High (8)	Moderate (6)		
<b>Significance</b>	<b>70 (high)</b>	<b>40 (Low)</b>		
<b>Status (positive or negative)</b>	Negative	Negative		
<p><b>Cumulative impacts:</b> Expected to be positive if effective bank stabilization is achieved. Should mitigation measure not be implemented and changes made to the bed or banks of watercourse unstable channel conditions may result causing erosion, meandering, increased potential for flooding and movement of bed material, which will result in property damage adjacent to and downstream of the site. Reversing this process is unlikely and should be prevented in the first place.</p>				

POTENTIAL IMPACTS	PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED																					
<p><b>Nature of Impact:</b> <u>Introduction and spread of alien vegetation</u></p> <p><u>Possible proliferation of alien plants post construction as alien plants tend to multiply faster in disturbed areas</u></p> <table border="1" data-bbox="190 555 815 895"> <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>Short term (2)</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>High (8)</td> <td>Low (4)</td> </tr> <tr> <td><b>Significance</b></td> <td>75 (high)</td> <td>24 (low)</td> </tr> <tr> <td><b>Status (positive or negative)</b></td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table> <p><b>Cumulative impacts:</b> Expected to be moderate to high. Maintenance areas within the watercourses associated with the storm water upgrade can experience an increased invasion if mitigation is not implemented or implemented correctly. Regular monitoring should be implemented during construction, rehabilitation including for a period after rehabilitation is completed.</p>	Description	Without Mitigation	With Mitigation	<b>Probability</b>	Definite (5)	Probable (3)	<b>Duration</b>	Long term (4)	Short term (2)	<b>Extent</b>	Regional (3)	Limited to Local Area (2)	<b>Magnitude</b>	High (8)	Low (4)	<b>Significance</b>	75 (high)	24 (low)	<b>Status (positive or negative)</b>	Negative	Negative	<ul style="list-style-type: none"> <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>	High
Description	Without Mitigation	With Mitigation																					
<b>Probability</b>	Definite (5)	Probable (3)																					
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<b>Status (positive or negative)</b>	Negative	Negative																					
<p><b>Nature of impact:</b> <u>Loss and disturbance of watercourse habitat and fringe vegetation impact.</u></p> <p>Direct maintenance within wetland/riparian areas. Loss</p>	<ul style="list-style-type: none"> <li>Where maintenance occurs in the demarcated wetland and buffer, extra precautions should be implemented to so as to minimise wetland loss.</li> </ul>	Moderate.																					

POTENTIAL IMPACTS			PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED																					
<p>and disturbance of wetland/riparian habitat and fringe vegetation due to direct development on the wetland as well as changes in management, fire regime and habitat fragmentation.</p> <p>The wetland and vegetation on site maybe impacted upon during maintenance activities</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>Short-term (2)</td> <td>Temporary (1)</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>Moderate (6)</td> <td>Low (4)</td> </tr> <tr> <td><b>Significance</b></td> <td><b>50 (moderate)</b></td> <td><b>28 (low)</b></td> </tr> <tr> <td><b>Status (positive or negative)</b></td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table> <p><b>Cumulative impacts:</b> Expected to be moderate. May result in a high degree of irreplaceable loss of resources.</p>			Description	Without Mitigation	With Mitigation	<b>Probability</b>	Definite (5)	Highly Probable (4)	<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>28 (low)</b>	<b>Status (positive or negative)</b>	Negative	Negative	<ul style="list-style-type: none"> <li>Where wetlands are lost, compensation should be made to protect the remaining wetlands and their catchments, increase their buffers and rehabilitate their condition and functionality.</li> <li>Other than approved and authorized structure, no other development or maintenance infrastructure is allowed within the delineated watercourse or associated buffer zones.</li> <li>Demarcate the watercourse areas and buffer zones to limit disturbance, clearly mark these areas as no-go areas</li> <li>Weed control in buffer zone</li> <li>Monitor rehabilitation and the occurrence of erosion 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>	
Description	Without Mitigation	With Mitigation																							
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<p><b>Nature of the Impact:</b> <u>Changes in water quality</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>Definite (5)</td> <td>Probable (3)</td> </tr> <tr> <td><b>Duration</b></td> <td>Long term (4)</td> <td>Temporary (1)</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)</td> <td>Low (4)</td> </tr> </tbody> </table>			Description	Without Mitigation	With Mitigation	<b>Probability</b>	Definite (5)	Probable (3)	<b>Duration</b>	Long term (4)	Temporary (1)	<b>Extent</b>	Limited to Local Area (2)	Limited to Local Area (2)	<b>Magnitude</b>	High (8)	Low (4)	<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>fter 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> </ul>	Expected to be limited provided that the mitigation measures are implemented correctly and effective rehabilitation of the site is undertaken where necessary.						
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POTENTIAL IMPACTS			PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED																					
<b>Significance</b>	<b>60 (High)</b>	<b>21 (low)</b>	<ul style="list-style-type: none"> <li>Maintenance of buffer zones to trap sediments with associated toxins</li> <li>Ensure that no operational activities impact on the watercourse or buffer area. This includes edge effects.</li> <li>Regular independent water quality monitoring should form part of operational procedures in order to identify pollution</li> <li>Treatment of pollution identified should be prioritized accordingly.</li> </ul>																						
<b>Status (positive or negative)</b>	Negative	Negative																							
<p><b>Cumulative impacts:</b> Expected to be moderate.</p>																									
<p><b>Nature of the Impact: <u>Visual Impacts</u></b></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>Medium (6)</td> </tr> <tr> <td><b>Significance</b></td> <td><b>30 (Low)</b></td> <td><b>20 (Low)</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>	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)	Medium (6)	<b>Significance</b>	<b>30 (Low)</b>	<b>20 (Low)</b>	<b>Status (positive or negative)</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>Supply sufficient garbage bins throughout the site and service regularly.</li> <li>Ensure good housekeeping is implemented at all times.</li> <li>Keep the property neat and litter free at all times and maintain the landscaped areas.</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>Lighting on site is to be sufficient for safety and security purposes, but shall not be intrusive to neighboring residents, disturb wildlife, or interfere with road traffic;</li> <li>Should overtime/night work be authorized, the Contractor shall be</li> </ul>	Medium
Description	Without Mitigation	With Mitigation																							
<b>Probability</b>	Probable (3)	Improbable (2)																							
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POTENTIAL IMPACTS			PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED																					
			responsible to ensure that lighting does not cause undue disturbance to neighboring residents. In this situation low flux and frequency lighting shall be utilized.																						
<b>Nature of the Impact: <u>Noise pollution</u></b> <table border="1" data-bbox="190 491 795 949"> <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>Moderate (6)</td> <td>Moderate (5)</td> </tr> <tr> <td><b>Significance</b></td> <td><b>30 (Medium)</b></td> <td><b>18 (Low)</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>	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>	Moderate (6)	Moderate (5)	<b>Significance</b>	<b>30 (Medium)</b>	<b>18 (Low)</b>	<b>Status (positive or negative)</b>	Negative	Negative	<ul style="list-style-type: none"> <li>▪ Maintenance 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>▪ 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>	Moderate
Description	Without Mitigation	With Mitigation																							
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<b>Status (positive or negative)</b>	Negative	Negative																							
<b>Nature of the Impact: <u>Safety and security risk</u></b> <ul style="list-style-type: none"> <li>○ Influx of people looking for jobs to site</li> <li>○ Employees using the surrounding environment for ablution</li> <li>○ Open fires</li> <li>○ Theft etc.</li> <li>○ Injuries due to construction hazards</li> </ul> <table border="1" data-bbox="190 1264 817 1385"> <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>Improbable (2)</td> </tr> <tr> <td><b>Duration</b></td> <td>Short-term (2)</td> <td>Very short-term (1)</td> </tr> </tbody> </table>			Description	Without Mitigation	With Mitigation	<b>Probability</b>	Highly Probable (4)	Improbable (2)	<b>Duration</b>	Short-term (2)	Very short-term (1)	<ul style="list-style-type: none"> <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 maintenance 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>▪ Maintenance footprints, including site offices, excavations, storage areas, materials lay-down areas, stockpile area, and workers rest</li> </ul>	Moderate												
Description	Without Mitigation	With Mitigation																							
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POTENTIAL IMPACTS			PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED
<b>Extent</b>	Limited to Local Area (2)	Limited to Local Area (1)	<p>areas should be clearly demarcated or fenced off before construction commences.</p> <ul style="list-style-type: none"> <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 ablution facilities must be regularly serviced to reduce the risk of surface or groundwater pollution</li> <li>▪ Packaging and other waste material may not be burned on site under any circumstances.</li> <li>▪ The Contractor shall supply fire fighting equipment in proportion to the fire risk presented by the type of construction and other on-site activities and materials used on site. This equipment shall be kept in good operating order. This particularly applies to welding activities.</li> <li>▪ Smoking is only allowed in designated safe smoking areas.</li> </ul>	
<b>Magnitude</b>	Moderate (6)	Minor (2)		
<b>Significance</b>	40 (Moderate)	8 (Low)		
<b>Status (positive or negative)</b>	Negative	Negative		
<p><b>Nature of the Impact:</b> <u>Pollution caused by Inappropriate Management and Handling of Waste</u></p> <ul style="list-style-type: none"> <li>• Construction rubble left onsite may attract vermin,</li> </ul>			<ul style="list-style-type: none"> <li>▪ Regular litter picking and general waste bins must be readily available for litter disposal and general housekeeping.</li> <li>▪ All solid waste generated during the construction process must be placed in a designated waste collection area within the</li> </ul>	<ul style="list-style-type: none"> <li>• Moderate</li> </ul>

POTENTIAL IMPACTS	PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED																					
<p>encourage the growth of opportunistic alien vegetation and become unsightly</p> <ul style="list-style-type: none"> <li>Hazardous waste e.g. used oils, offcuts, empty bitumen containers etc., could pollute surface and groundwater resources if not properly contained.</li> </ul> <table border="1" data-bbox="192 501 810 852"> <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>Probable (3)</td> </tr> <tr> <td>Duration</td> <td>Short-term (2)</td> <td>Very short-term (1)</td> </tr> <tr> <td>Extent</td> <td>Limited to Local Area (2)</td> <td>Limited to Local Area (1)</td> </tr> <tr> <td>Magnitude</td> <td>Moderate (6)</td> <td>Moderate (6)</td> </tr> <tr> <td>Significance</td> <td><b>40 (Moderate)</b></td> <td><b>24 (Low)</b></td> </tr> <tr> <td>Status (positive or negative)</td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table>	Description	Without Mitigation	With Mitigation	Probability	Highly Probable (4)	Probable (3)	Duration	Short-term (2)	Very short-term (1)	Extent	Limited to Local Area (2)	Limited to Local Area (1)	Magnitude	Moderate (6)	Moderate (6)	Significance	<b>40 (Moderate)</b>	<b>24 (Low)</b>	Status (positive or negative)	Negative	Negative	<p>construction camp and must not be allowed to blow around the site, be accessible to animals, or be placed in piles adjacent the waste skips / bins. All solid waste must then be disposed of at the nearest licensed landfill and safe disposal certificates obtained. Separate waste skips/ bins for the different waste streams must be available on site.</p> <ul style="list-style-type: none"> <li>The waste containers must be appropriate to the waste type contained therein and where necessary should be lined and covered. This will be managed through the site specific EMP and monitored by the ECO.</li> <li>No waste (hazardous or general) will be disposed of in the trenches around the construction footprint. All hazardous material must be carefully stored and then disposed of offsite at the licensed hazardous landfill site</li> <li>All excess material and rubble must be removed from the site so not to restrict the rehabilitation process.</li> <li>Adequate toilet facilities must be provided for all staff members as standard construction practice. Monitor the sewerage facilities for spillages, and handle any spillages as hazardous waste;</li> <li>Chemical toilets must be placed within the construction camp and not in close proximity to the river/wetlands. The chemical toilets to be provided must be from a registered company and all sewage must be disposed of at an appropriate facility. Safe disposal certificates must be kept on record.</li> <li>Machinery must be properly maintained to keep oil leaks in check</li> </ul>	
Description	Without Mitigation	With Mitigation																					
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Status (positive or negative)	Negative	Negative																					
<p><b>Nature of the Impact:</b> <u>Soil and Groundwater Pollution</u></p>	<ul style="list-style-type: none"> <li>Any hazardous or dangerous goods utilized during the construction phase must be stored on an impermeable surface that is bunded,</li> </ul>	<p>Moderate</p>																					

POTENTIAL IMPACTS			PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED																					
<p>Mismanagement, handling and storage of hazardous chemicals and materials may result in spillages causing pollution to soil and groundwater resources</p> <table border="1"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td><i>Probability</i></td> <td>Highly Probable (4)</td> <td>Probable (3)</td> </tr> <tr> <td><i>Duration</i></td> <td>Short-term (2)</td> <td>Very short-term (1)</td> </tr> <tr> <td><i>Extent</i></td> <td>Limited to Local Area (2)</td> <td>Limited to Local Area (1)</td> </tr> <tr> <td><i>Magnitude</i></td> <td>Moderate (6)</td> <td>Moderate (6)</td> </tr> <tr> <td><i>Significance</i></td> <td>40 (Moderate)</td> <td>24 (Low)</td> </tr> <tr> <td><i>Status (positive or negative)</i></td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table>			Description	Without Mitigation	With Mitigation	<i>Probability</i>	Highly Probable (4)	Probable (3)	<i>Duration</i>	Short-term (2)	Very short-term (1)	<i>Extent</i>	Limited to Local Area (2)	Limited to Local Area (1)	<i>Magnitude</i>	Moderate (6)	Moderate (6)	<i>Significance</i>	40 (Moderate)	24 (Low)	<i>Status (positive or negative)</i>	Negative	Negative	<p>fenced, locked and covered.</p> <ul style="list-style-type: none"> <li>▪ A spill kits must be clearly marked and visible when utilizing hazardous or dangerous materials to ensure all spills can be immediately cleaned.</li> <li>▪ Remediation of spillages must be conducted on a continual basis and within 24h of spillage;</li> <li>▪ Contaminated soil will be considered to be hazardous waste and disposed of accordingly</li> <li>▪ Any hazardous or dangerous goods utilized during the construction phase must be stored on an impermeable surface that is bunded, fenced, locked and covered.</li> <li>▪ A spill kits must be clearly marked and visible when utilizing hazardous or dangerous materials to ensure all spills can be immediately cleaned.</li> <li>▪ Remediation of spillages must be conducted on a continual basis and within 24h of spillage;</li> <li>▪ Contaminated soil will be considered to be hazardous waste and disposed of accordingly.</li> <li>▪ The contractors must provide and maintain a method statement for mixing of cement and asphalt. The method statement must provide information on proposed location, storage, washing and disposal of cement, packaging, tools and plant storage.</li> <li>▪ Washing and cleaning of equipment and vehicles should also be done within a bermed area (wash bay area).</li> <li>▪ The mixing of concrete should only be done at specifically selected sites on mortar boards or similar structures to contain pollution</li> <li>▪ Materials such as fuel, oil, paint, herbicide and insecticides must</li> </ul>	
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POTENTIAL IMPACTS	PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED																					
	<p>be sealed and stored in bunded areas or under lock and key, as appropriate, in well-ventilated areas</p> <ul style="list-style-type: none"> <li>▪ Drip trays (minimum of 10cm deep) must be placed under all vehicles suspected of leaking these must not be left unattended, drip trays must be utilized.</li> <li>▪ Drip trays must be utilized during repairs and maintenance of all machinery. The depth of the drip tray must be determined considering the total amount / volume of oil in the vehicle. The drip tray must be able to contain the volume of oil in the vehicle</li> </ul>																						
<p><b>Nature of Impact: Impact on Air Quality</b></p> <ul style="list-style-type: none"> <li>○ Dust generated during vegetation clearing</li> <li>○ Exhaust fumes from construction machinery and vehicles</li> </ul> <table border="1" data-bbox="192 898 815 1246"> <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>Very short-term (1)</td> </tr> <tr> <td><b>Extent</b></td> <td>Limited to Local Area (2)</td> <td>Limited to Local Area (1)</td> </tr> <tr> <td><b>Magnitude</b></td> <td>High (8)</td> <td>Medium (6)</td> </tr> <tr> <td><b>Significance</b></td> <td style="background-color: #90EE90;">30(Low)</td> <td style="background-color: #90EE90;">24 (Low)</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)	Very short-term (1)	<b>Extent</b>	Limited to Local Area (2)	Limited to Local Area (1)	<b>Magnitude</b>	High (8)	Medium (6)	<b>Significance</b>	30(Low)	24 (Low)	<b>Status (positive or negative)</b>	Negative	Negative	<ul style="list-style-type: none"> <li>▪ Appropriate dust suppression measures should be implemented to control dust dust pollution during windy and dry conditions.</li> <li>▪ Speed restriction of 40km/h must be implemented for all construction vehicles.</li> <li>▪ All vehicles transporting friable materials such a sand, rubble etc. must be covered by a tarpaulin or wet down.</li> <li>▪ No burning of refuse or vegetation is permitted on site.</li> </ul>	Moderate
Description	Without Mitigation	With Mitigation																					
<b>Probability</b>	Highly Probable (4)	Probable (3)																					
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<b>Status (positive or negative)</b>	Negative	Negative																					

The important factors relevant to the proposed development are summarised in the table below:

	<b>Quaternary Catchment and WMA areas</b>	<b>Important Rivers possibly affected</b>	<b>Buffers</b>
	A21C - Crocodile (West) and Marico WMA.	The majority of the outlets are proposed to drain into the Sandspruit River in the west and the Jukskei River in the east or tributaries of these rivers.	<b>30 m for all the wetlands</b>
<b>Does the EAP support the development?</b>	Yes, the current storm water infrastructure in Johannesburg is in dire need of upgrading. However it should be done in a manner that does not increase flood-peaks in the wetlands and rivers where it discharges, or downstream.		
<b>Major concerns</b>	<ul style="list-style-type: none"> <li>• Increased flood-peaks, particularly during the operational phase</li> <li>• Erosion in the Sandspruit and Jukskei River and downstream wetlands</li> <li>• Water damage and flooding</li> </ul>		
<b>Recommendations</b>	Install structures that allows for a slow release of water into the soil profile instead of directly releasing it into an adjacent watercourse. Include energy dissipating structures based on calculations of post development storm water flows to prevent cumulative downstream impacts		
<b>CBA and other Important areas</b>	Majority of the outlets located in Ecological Support Areas or Important Areas		

## **NO GO**

No go Alternative (compulsory). This is the option of not constructing the proposed rehabilitation and upgrade of the Bridge Road bridge.

The No-go option implies that the Project does not proceed, and will thus comprise of JRA not going ahead with the proposed rehabilitation and upgrade of the Bridge Road bridge. Ideally, this would be the preferred alternative as the status quo of the environment remains unchanged, however due to the growing need for improved storm water infrastructure, this alternative is not preferred. In terms of the **“No-Go” Alternative**, if the activity is refused an approval there will be no impacts as a result of construction activities. If the no-go alternative is pursued, then the operational-related positive impacts will not be, no job creation, no improvement of the storm water infrastructure. This alternative will not be feasible as the applicant is providing a crucial service to the local community. This is an undesirable option for the project as it will pose negative impacts on the social and economic perspective. The negative impacts of the no-go option alternative are considered to outweigh the positive impacts of this alternative. The no-go option is therefore not preferred.

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

- G1: Wetland Assessment Report
- G2: Wetland Rehabilitation and Monitoring Plan
- G3: Heritage Screening Report

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

No gaps in knowledge have been identified at this stage.

The following assumptions are made:

- The information on which the report is based (i.e. project information) is correct.
- The construction, operation and management of this proposed development will be in line with the recommendations in this report, which will be enforced by the implementation of a detailed Environmental Management Programme. Much of the long-term success lies in the effective implementation of the measures prescribed in the Environmental Management Programme.

### 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.

#### Design Alternative 1 (Preferred) and Design Alternative 2

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
Decommissioning and closure phase has not been considered as part of this application as the end use of the site and required decommissioning activities are not known at this time. It is therefore not possible to predict the potential environmental impacts. In addition, it is unlikely that decommissioning will be contemplated due to the nature of the development. Instead upgrade will be preferred. If decommissioning phase is considered in future, the developer will undertake the required actions as prescribed by the legislation at the time and comply with all relevant requirements administered by any relevant authority and competent authority at that time.				

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

N/A

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

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

### 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 actions which may not be significant on their own but which are significant when added to the impact of other similar actions. The anticipated cumulative impacts of this development (for both alternatives) includes the following:

#### Impacts on the Wetland

Impacts associated with construction could increase the significance of existing impacts as a result of other activities in the area. The high density of the urban development in the local catchment and adjacent to the watercourse is largely responsible for the impacts to the river. Inappropriate stormwater management in the catchment, failing infrastructure all contribute to a highly polluted aquatic environment. Urbanisation and associated hard surface development has also contributed to the increase in run off into the Jukse river.

#### Increased socio-economic upliftment as a result of the proposed development

Constructing the proposed development will result in direct jobs being created during the construction of the road and bridge.

Responsible environmental management will be required during the entire project life cycle. These management measures should be guided by the Environmental Management Programme (EMPr), 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 impacts 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.

### Comparison of Alternatives:

This section provides a summary of the environmental assessment and conclusions drawn for the PROPOSED REHABILITATION AND UPGRADE OF THE BRIDGE ROAD BRIDGE LOCATED IN BUCCLEUCH, WITHIN CITY OF JOHANNESBURG, GAUTENG PROVINCE. This can be achieved either via the Design Alternative 1. The two design Options will be compared. In doing so, it draws on the information gathered as part of the Basic Assessment process and the knowledge gained by the environmental consultant during the course of the process and presents an informed opinion of the environmental impacts associated with the proposed project.

### Alternative 1 (Preferred), and Alternative 2:

The proposed activities assessed within this Basic Assessment Report are required to provide essential infrastructure in the study area "Proposed Rehabilitation and Upgrade of the Bridge Road Bridge located in Buccleuch, within City of Johannesburg, Gauteng Province". In summary, the Basic Assessment has assessed potential impacts and identified appropriate management and mitigation measures. No environmental fatal flows and no significant negative impacts have been identified to be associated with the proposed project (**for both the preferred Design Alternative 1 and Design Alternative 2 during construction after management and mitigation of impacts.**) The impacts will be similar with the same level of significance and of short term duration and localised. The Impact Assessment section of this report indicates that the identified environmental impacts associated can be effectively mitigated to have a Medium - low significance impact rating provided the recommended mitigation and management measures are implemented.

Similar environmental impacts for both alternatives include:

- Wetland will be disrupted.
- Access to private properties may be restricted.
- Construction Impacts (noise, dust, visual etc.).

Benefits of the proposed development include the following:

- The proposed development will result in important economic benefits at a local and regional scale through job creation, procurement of materials for construction and

provision of services and other associated downstream economic development.

- A contribution of improved storm water infrastructure across the city
- Reduction in debris blockage on the culvert during high rainfall events.
- Improved vehicle mobility during high rainfall events.
- Improved safety and reliability when crossing of the Klein Jukskei River.
- The occurrence of the flooding and overtopping of the bridge will decrease

The benefits of the project are expected to outweigh the costs.

A number of mitigation and monitoring measures have been identified which would allow for the minimisation and management of potential environmental impacts associated with the proposed development, which have been incorporated into the EMPr (Appendix G) for the project, which will be further developed during the detailed planning and construction phase of the project.

The Impact Assessment section of this report indicates that the identified environmental impacts associated can be effectively mitigated to have a Medium - Low significance impact rating provided the recommended mitigation and management measures are implemented.

It is the opinion of this basic assessment that the proposed development will not have a significant environmental impact and therefore the preferred Design Alternative 1 is considered to be sustainable from an environmental perspective.

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

The **'do nothing alternative'** is the option of not constructing Bridge Road upgrade and rehabilitation. This alternative would result in no additional environmental impacts on the site or its surrounding areas. Due to the transformed nature of the area as a result of historic anthropogenic activities, the potential for impact is considered low with development, and therefore the do nothing alternative has little benefit to the current development as per below:

- Should the facility not be constructed, this will limit the JRA's potential to provide the required storm water infrastructure maintenance service in the area and cumulatively in the broader region of Johannesburg.
- The JRA will be failing to carry out their legislative mandate towards the realisation of provision of aforementioned services where required. .
- No anticipated job opportunities from the development will be created.
- The occurrence of the flooding and overtopping of the bridge will remain unchanged
- Blockage of the openings due to debris will continue and further restrict the flow during high rainfall, resulting in damage to the approaches.
- The associated gabion walls will remain in a very poor condition due to the gabion retaining walls performing poorly during high flowing waters.

In summary, the situation on the ground will remain the same and the **`do nothing alternative`** will not assist JRA in addressing issues that require quick response as detailed above. The cost of the **`do nothing alternative`** are expected to outweigh the benefits and therefore this alternative is not a preferred alternative.

## 6. IMPACT SUMMARY OF THE PROPOSAL OR PREFERRED ALTERNATIVE

For Design **Alternative 1 (Preferred)** and **Design Alternative 2:**



**Table 4: Impact Summary table: Design Alternative 1 (preferred) and Design Alternative 2**

<b>Table 5: Impact Summary table :Proposed Design and Alternative Design 1- Construction impacts</b>				
<b>Negative Environmental Impacts</b>	<b>Design Alternative 1 (Preferred): Low Level Causeway with Larger Spans (New structure with three openings)</b>		<b>Design Alternative 2: Low Level Causeway With Larger Spans (New structure – precast beams with two openings)</b>	
	<b>Without Mitigation</b>	<b>With Mitigation</b>	<b>Without Mitigation</b>	<b>With Mitigation</b>
Changes in water flow regime	<b>High (75)</b>	<b>Medium (33)</b>	<b>High (75)</b>	<b>Medium (33)</b>
Changing the amount of sediment entering wetlands	<b>High (70)</b>	<b>Medium (40)</b>	<b>High (70)</b>	<b>Medium (40)</b>
Alteration of water quality	<b>High (60)</b>	<b>Low (21)</b>	<b>High (60)</b>	<b>Low (21)</b>
Spread of Exotic Plant Species	<b>High (75)</b>	<b>Low (24)</b>	<b>High (75)</b>	<b>Low (24)</b>
Loss and disturbance of watercourse habitat and fringe vegetation impact.	<b>Medium (50)</b>	<b>Low (28)</b>	<b>Medium (50)</b>	<b>Low (28)</b>
Visual Impacts expected on the construction site	<b>Medium (30)</b>	<b>Low (20)</b>	<b>Medium (30)</b>	<b>Low (20)</b>
Noise Impacts anticipated	<b>Medium (30)</b>	<b>Low (18)</b>	<b>Medium (30)</b>	<b>Low (18)</b>
Heritage Impacts and Probability of artifacts present on site	<b>Low (21)</b>	<b>Very Low (21)</b>	<b>Low (21)</b>	<b>Very Low (21)</b>
Safety and security on the site	<b>Medium (40)</b>	<b>Low (8)</b>	<b>Medium (40)</b>	<b>Low (8)</b>
Pollution from Inappropriate Management and handling of waste on the construction site	<b>Medium (40)</b>	<b>Low (24)</b>	<b>Medium (40)</b>	<b>Low (24)</b>
Soil and Groundwater Contamination	<b>Medium (40)</b>	<b>Low (24)</b>	<b>Medium (40)</b>	<b>Low (24)</b>
Air Quality Impacts	<b>Medium (48)</b>	<b>Low (24)</b>	<b>Medium (48)</b>	<b>Low (24)</b>
<b>Positive Environmental Impacts</b>	<b>Without Enhancement</b>	<b>With Enhancement</b>	<b>Without Enhancement</b>	<b>With Enhancement</b>

Social Economic impacts anticipated during the construction period	Medium +	Medium ++	Medium +	Medium ++
<b>Table 2 : Impact Summary table : Design Alternative 1 (Preferred) and Design Alternative 2</b>				
<b>Operation Phase</b>				
Nature of Impact	Design Alternative 1 (Preferred): Low Level Causeway with Larger Spans (New structure with three openings)		Design Alternative 2: Low Level Causeway With Larger Spans (New structure – precast beams with two openings)	
	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
Changes in water flow regime	High (75)	Medium (33)	High (75)	Medium (33)
Changing the amount of sediment entering wetlands	High (70)	Medium (30)	High (70)	Medium (40)
Alteration of water quality	High (60)	Low (21)	High (60)	Low (21)
Spread of Exotic Plant Species	High (75)	Low (24)	High (75)	Low (24)
Loss and disturbance of watercourse habitat and fringe vegetation impact.	Medium (50)	Low (28)	Medium (50)	Low (28)
Visual Impacts expected on the construction site	Medium (30)	Low (20)	Medium (30)	Low (20)
Noise Impacts anticipated	Medium (30)	Low (18)	Medium (30)	Low (18)
Heritage Impacts and Probability of artifacts present on site	Low (21)	Very Low (21)	Low (21)	Very Low (21)
Safety and security on the site	Medium (40)	Low (8)	Medium (40)	Low (8)
Pollution from Inappropriate	Medium (40)	Low (24)	Medium (40)	Low (24)

Management and handling of waste on the construction site				
Soil and Groundwater Contamination	<b>Medium (40)</b>	<b>Low (24)</b>	<b>Medium (40)</b>	<b>Low (24)</b>
Air Quality Impacts	<b>Medium (48)</b>	<b>Low (24)</b>	<b>Medium (48)</b>	<b>Low (24)</b>

**Table 6: Impact Summary table: Design Alternative 1 (Preferred) and Design Alternative 2**

For alternative:

The above assessment tables are applicable for both the Design Alternative 1 and Design Alternative 2.

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.

Comparison of Alternatives (Design Alternative 1 (preferred) and Design Alternative 2).

Two Design alternatives have been proposed with respect to the upgrading and rehabilitation of the bridge structure, which could be implemented on site. This can be either the Design Alternative 1 (Preferred): Low Level Causeway with Larger Spans (New structure with three openings) or Design Alternative 2: Low Level Causeway With Larger Spans (New structure – precast beams with two openings).

### **Construction Phase**

Having assessed the impacts of both the Design Alternative 1 and Design Alternative 2, the identified impacts were the same for both Design options during construction. The recorded impacts before mitigation were High-Medium and with mitigation, impacts can be reduced to Medium-Low. The environmental cost are expected to occur at local and site level and are considered acceptable provided the mitigation measures as outlined in this Basic Assessment Report and EMP are implemented.

### **Operation phase**

As summarised in the Environmental Impact Statement section, Design Alternative 1 will have fractionally lower impacts in the operational phase when compared to the Design Alternative 2 in terms of the following factors:

- The sediment entering the watercourse will be slightly less than Design Alternative 2 due to the deck is constructed using a composite pre-stressed and in-situ concrete deck instead of a reinforced concrete solution and replacing the structure with new larger openings and to provide a more robust system for river protection along with embankment protection. This solution is more attractive because of the possibility of using shallower deck thicknesses. Related works with this alternative involve the embankment protection by way of the rehabilitation of the existing gabion structures.
- Design Alternative 1 is a more cost effective design and will be cheaper to construct.
- Design Alternative 1's associated embankment protection will assist in erosion protection and subsequent sedimentation of the Jukskei River.
- The Design Alternative 1 uses the precast beam solution at a higher soffit level as compared to Design Alternative 2 and has three openings and therefore will allow for more water flow during storm events.

Furthermore, The benefits of the proposed development Design Alternative 1 include the following:

- The proposed development will result in important economic benefits at a local and regional scale through job creation, procurement of materials for construction and provision of services and other associated downstream economic development.
- A contribution of improved storm water infrastructure across the city.
- Reduction in debris blockage on the culvert during high rainfall events.
- Improved vehicle mobility during high rainfall events.
- Improved safety and reliability when crossing of the Jukskei River.
- The benefits of the project are expected to outweigh the costs.

- The occurrence of the flooding and overtopping of the bridge will improve

Having assessed the impacts of both alternatives, the proposed development has been carefully planned to reduce significant negative environmental impacts. Both alternatives will cross the Jukskei River, thus requiring a Water Use License. The Water Use License Application will be submitted to DWS in this regard.

The reasons stated above give an indication of the selection process undertaken in reaching the decision for selecting the preferred Design Alternative 1.

## 7. SPATIAL DEVELOPMENT TOOLS

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

<b>Provincial Spatial Development Framework (PSDF)</b>
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 own set of drivers with long term-programmes. Pillar 1 highlights the job creation by expanding and maintaining road infrastructure. The proposed development will create job 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.
<b>Integrated Development Plan (IDP) and Spatial Development Framework (SDF) of the Local Municipality</b> (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 E. 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 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 infrastructure and quality environment. Furthermore the Municipality aims to achieve inclusivity which aims to improve human settlements.

## 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

YES ✓	NO
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and the code of conduct of EAPASA).

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

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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:

This basic assessment recommends that the proposed project be considered for approval subject to the following conditions:

- EMPr for this application be made a binding document for the contractors and managers on site.
- An independent ECO should be present during construction to monitor the implementation of the EMPr and the Environmental Authorisation once issued.
- Compliance with the mitigation measures outlined in this BA report and EMPr.
- Continued consultation and engagement with all relevant stakeholders – especially neighbouring property owners and local communities, and respective municipalities during labour recruitment and procurement for services and supplies during construction phase.
- Clearance of the area should be as minimal as possible and construction activities be confined to areas where construction will take place (development footprint) to prevent negative impacts to the surrounding environment.
- Avoid, as far as reasonably possible, disturbing wetlands within the study area and downslope environments. 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.
- Servicing/ maintenance/ washing of vehicles must not be carried out on the construction site and only emergency repairs can be done on site.
- All relevant legislation and requirements of other government departments (National, Provincial), in particular of Section 28 (duty of care) of NEMA, must be complied with.
- The JRA storm water and road maintenance plan for management of roads and stormwater features (e.g. silt, sand and litter traps, etc.) must be complied with during operation and maintenance of the development.
- 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.
- Water Use License: It is probable that a Water Use License or exemption thereof will be required in terms of Section 21 (c) and (i) of the National Water Act in areas where water resources are impacted (streams and wetland crossing). The relevant authorisations and water use licenses must be obtained from the Department of Water and Sanitation prior to the commencement of construction activities.
- 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)

According to the Johannesburg Roads Agency officials, the bridge has experienced severe flooding in the past and the frequency of the flooding has increased dramatically. Coupled with the flooding, there has been several incidents of drowning during severe rains. In addition, blockage of the openings due to debris is a major concern and this restricts the flow, resulting in damage to the approaches. One of the openings is blocked to a very high extent. The reason for the debris build-up is the small openings of the culvert and the dense vegetation found upstream. Furthermore, upstream of the culvert, the gabion walls are in a very poor condition due to the gabion retaining walls performing poorly during high flowing waters. There are also incidences of overtopping during rain storm events.

**10. THE PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED** (*CONSIDER WHEN THE ACTIVITY IS EXPECTED TO BE CONCLUDED*)

**Duration and Validity:** The Environmental Authorisation 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. 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 EMPr 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)*

- A1: Locality Map
- A2: Wetland Sensitivity Map
- A3: Hydrology sensitivity Map
- A4: Gauteng C – Plan Map

**Appendix B: Photographs**

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

**Appendix D: Route information (not applicable)**

**Appendix E: Public participation information**

- E1: Proof of Site Notices
- E2: IAP Correspondence
- E3: Proof of Advertisement
- E4: Authority consultation
- E5: Meeting Minutes
- E6: Comments and Response Report
- E7: Comments from I&APs on Draft Basic Assessment (BA) Report
- E8: Comments from I&APs on amendments to the BA Report
- E9: IAP Database

**Appendix F: Water use license(s) authorisation, SAHRA information**

**Appendix G: Specialist Reports**

**Appendix H: EMPr**

**Appendix I: Other information**

- I1: EAP's expertise
- I2: Specialists Expertise
- I3: EAP Affirmation
- I4: Location coordinates and property details

## **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.