BASIC ASSESSMENT PROCESS

for

THE PROPOSED REHABILITATION AND UPGRADE OF THE CANTERBURY CRESCENT BRIDGE WITHIN THE CITY OF JOHANNESBURG, GAUTENG PROVINCE

GAUT 002/21-22/E2924

DRAFT BASIC ASSESSMENT REPORT

Public Review Period:

30 June 2021 to 30 July 2021

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

PREPARED FOR:
Johannesburg Roads Agency (JRA)
75 Helen Joseph Street
Johannesburg
2000
Tel: 011 298 5099
Fax: 086 685 2891
E-mail: anel@jra.org.za
Website: www.jra.org.za

GAUTENG PROVINCE
AGRICULTURE AND RURAL DEVELOPMENT
REPUBLIC OF SOUTH AFRICA

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 is not contain a titled and dated full colour large scale layout plan of the proposed activities including a coherent legend, overlain with the sensitivities found on site may lead to an application for environmental authorisation being refused.**

10. The use of "not applicable" in the report must be done with circumspection because if it is used in respect of material information that is required by the competent authority for assessing the application, it may result in the application for environmental authorisation being refused.

11. No faxed or e-mailed reports will be accepted. Only hand delivered or posted applications will be accepted.

12. Unless protected by law, and clearly indicated as such, all information filled in on this application will become public information on receipt by the competent authority. The applicant/EAP must provide any interested and affected party with the information contained in this application on request, during any stage of the application process.

13. Although pre-application meeting with the Competent Authority is optional, applicants are advised to have these meetings prior to submission of application to seek guidance from the Competent Authority.

DEPARTMENTAL DETAILS

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

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

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

(For official use only)

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

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

Not Applicable

Is a closure plan applicable for this application and has it been included in this report? **No**

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

There are currently no plans to decommission

Has a draft report for this application been submitted to a competent authority and all State Departments administering a law relating to a matter likely to be affected as a result of this activity? **No**

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

Refer to Appendix E9 – IAP Register

If no, state reasons for not attaching the list.

Have State Departments including the competent authority commented? **N/A**

If no, why?

This information will be available after DBAR has been reviewed

PROJECT DETAILS

Reference #:		GAUT 002/21-22/E2924
Title:		Basic Assessment Process for: **The Proposed Rehabilitation and Upgrade of the Canterbury Crescent Bridge** within the City of Johannesburg
Report compiled by:		Company Name: Envirolution Consulting Contact person: Ms Sheila Bolingo Postal Address: P.O. Box 1898, Sunninghill, 2157 Telephone Number: 0861 44 44 99 Fax Number: 0861 62 62 22 Email: sheila@envirolution.co.za
Client	:	Johannesburg Road Agency (JRA)
Report Status	:	Draft Basic Assessment Report for Public Review
Review period		**The 30-day period for review is from** **30 June 2021 to 30 July 2021**

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LIST OF APPENDICES:

PUBLIC REVIEW OF THE DRAFT BASIC ASSESSMENT REPORT

The Draft Basic Assessment Report (BAR) has been prepared by Envirolution Consulting (Pty) Ltd in order to assess the potential environmental impacts associated with the proposes **The Proposed Rehabilitation and Upgrade of the Canterbury Crescent Bridge** within the City of Johannesburg. The report is made available for public review for 30-day review period from **30 June 2021 to 30 July 2021** and can be accessed at:

Drobox Link: https://www.dropbox.com/sh/f92ov3az91ym33b/AAC-3nkZf5q0FgOeXwqlJdQka?dl=0

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

Environmental Assessment Practitioner

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

The due date for comments on the Draft Basic Assessment Report is 30 July 2021

EXECUTIVE SUMMARY

According to the City of Johannesburg IDP 2014/2015, the upgrade of roads and bridge infrastructure was identified by Johannesburg Road Agency SOC Limited (hereafter referred to as JRA) as one of the infrastructures that requires attention. The IDP further highlights bridge and stormwater management and associated river catchments as one of the serious constraints in improving the City's infrastructure. As a result of flooding caused by heavy rainfall, many of the city's bridges and associated infrastructure have been severely damaged. The JRA has identified the Canterbury Crescent Bridge amongst the infrastructure affected after functional deficiencies were noted as the structure stands presently. The purpose of the rehabilitation and upgrade is thus to improve the current structure to allow for a safe crossing for pedestrians, motorists, and cyclists over the river.

Based on the environmental assessment presented, it is a conclusion of this Basic Assessment that the proposed project will have relatively low impacts on the environment as the conversion of most of the landscape to a park and residential development has made this landscape to be ecologically poor. Poor availability of expected flora and the introduction of terrestrial vegetation on the stream riparian zones has reduced the sensitivity of this landscape to., this implies that the significance of most impacts on site from an environmental perspective is considered to be of low significance. The only sensitive area in this study is the stream due to the strict law pertaining aquatic habitat. The probability of impact due to the rehabilitation of the bridge is rated as 2 due to the current instream interference. The ecological integrity of this steam is rated as 3.

The mitigation measures proposed in section E (2) of this report are intended to prevent further degradation to watercourses as a result of the proposed replacement of the pipeline within this urbanised area and should be read in conjunction with the accompanying General Rehabilitation and Monitoring report included in Appendix H. The details of the mitigation measures that are finally put in place should ideally be based on these issues, but must necessarily take into consideration the physical and economic feasibility of mitigation. It is important that any mitigation be implemented in the context of an Environmental Management Plan in order to ensure accountability and ultimately the success of the mitigation.

SECTION A: ACTIVITY INFORMATION

1. PROPOSAL OR DEVELOPMENT DESCRIPTION

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

1.1 Project Title

THE PROPOSED REHABILITATION AND UPGRADE OF THE CANTERBURY CRESCENT BRIDGE WITHIN THE CITY OF JOHANNESBURG, GAUTENG PROVINCE

1.2 Background

According to the City of Johannesburg IDP 2014/2015, the upgrade of roads and bridge infrastructure was identified by Johannesburg Road Agency SOC Limited (hereafter referred to as JRA) as one of the infrastructures that requires attention. The IDP further highlights bridge and stormwater management and associated river catchments as one of the serious constraints in improving the City's infrastructure. As a result of flooding caused by heavy rainfall, many of the city's bridges and associated infrastructure have been severely damaged. The JRA has identified the Canterbury Crescent Bridge amongst the infrastructure affected after functional deficiencies were noted as the structure stands presently. The purpose of the rehabilitation and upgrade is thus to improve the current structure to allow for a safe crossing for pedestrians, motorists, and cyclists over the river.

1.3 Locality of study site

The bridge is located along Canterbury Crescent Bridge in Gallo Manor Ext 1, under Region E of the City of Johannesburg in Gauteng Province. The central GPS coordinates of the bridge are Lat: 26° 3'38.50"S; Long: 28° 4'35.70"E. Refer to **Figure 1** below for the locality map.

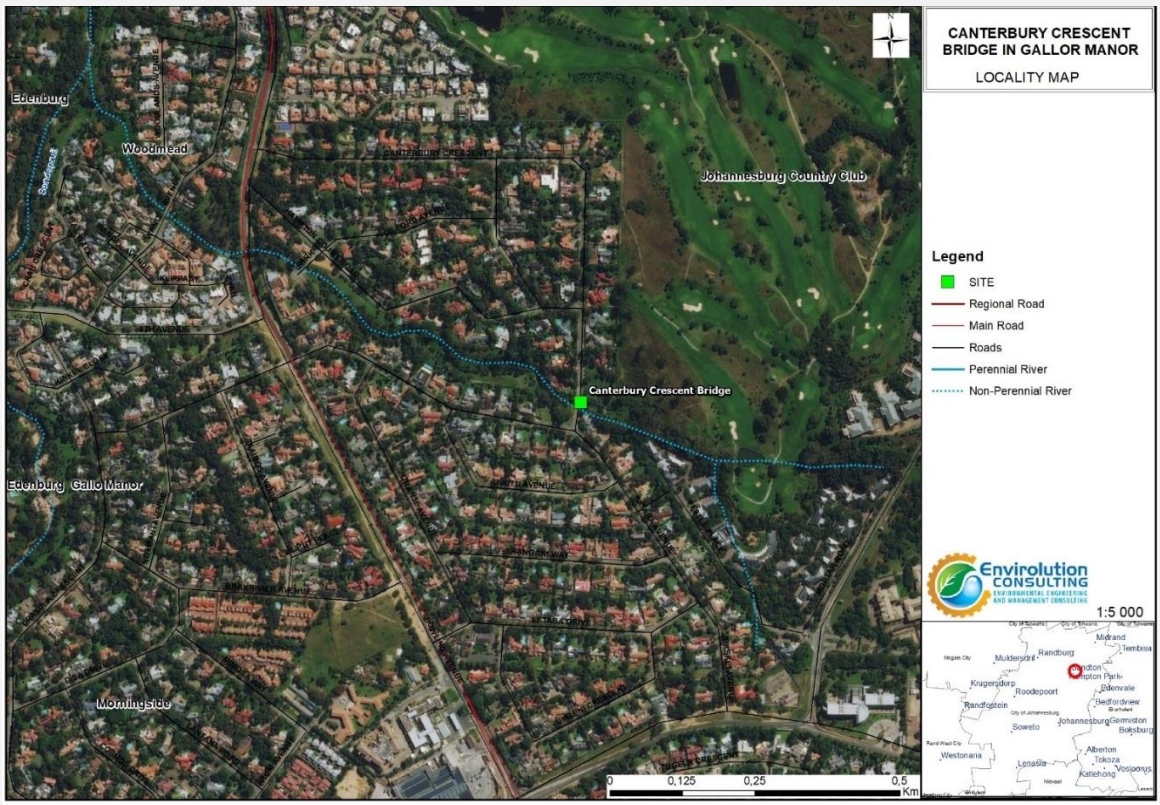

Figure 1: Locality Map

1.4 Project Description

The Canterbury Bridge is the main bridge in the area that connects the main area in Gallo Manor, Woodmead. The stormwater has eroded the embankment of the stream and also the abutment of the bridge. The continuous water flow through the stream will further erode the bridge abutments and the embankments of the stream and this will lead to the bridge getting weaker and suddenly collapse.

Following Jamcorp Distribution CC's appointment on 09 February 2021, representatives visited the site of the existing structure to undertake an independent inspection of the existing structure to assess the current condition. The general high-level assessment of the existing structures condition based on this investigation is as follows:

- The existing culvert inlet is generally intact and in fair condition, however the brick wingwalls have cracked from what appears to be as a result of damage from tree roots in the backfill behind
- The existing road surface over the culvert is in fair condition however evidence of longitudinal rutting and crocodile cracking in the vicinity of the culvert which could be as a result of deterioration of the road pavement layers. In addition, some transverse rutting was also evident on the road surface in the vicinity of the culvert which could indicate potential settlement in the vicinity of the existing culvert
- The existing outlet wingwalls and apron slab have collapsed or near collapsed and the outlet brick headwall has severely cracked and collapse in the near future is deemed likely

Based on the above it is evident that the existing culvert on Canterbury Crescent in Gallo Manor, has over time suffered damage as a result of scour and erosion from the flow of the watercourse which it accommodates. The extensive damage to the outlet in particular is indicative of potential high velocity flows through the culvert.

1.5 The scope of the works entails the following:

The existing culvert will be both rehabilitated and widened. The existing culvert is a single cell, 1.8x1.8 opening size with damage due to scour and erosion at the outlet.

The project will entail the rehabilitation of the existing culvert and the widening to increase and improve the hydraulic capacity to a 3x1.8x1.8. This would enable the majority of the existing 1.8m x 1.8m culvert to be rehabilitated and retained resulting in cost savings to the project.

- It was resolved that Jamcorp would include a drop outlet and energy dissipator blocks to the outlet of the proposed new culvert to reduce future scour potential.
- Gabion mattresses will be placed on embankments adjacent to the structure to ensure that the road is protected in the event of am overtopping occurrence.
- A reno mattress collar will be placed across the road embankment behind the headwalls and wingwalls to protect the road embankment from scour in the event of any potential overtopping in the future.

1.6 Listed Activities:

In terms of sections 24(2) and 24D of the National Environmental Management Act (Act No. 107 of 1998), as read with the Environmental Impact Assessment (EIA) Regulations of GNR 326 EIA Regulations (7 April 2017) a Basic Assessment Process is required in order for Joburg Water to obtain environmental authorisation for the implementation of the Bridge over a wetland and Ecological Support Areas. Table 2 contains the listed activities in terms of the EIA Regulations and includes a description of those

project activities which relate to the applicable listed activities.

Table 2: Listed Activities

Listed activities	Description of project activity that triggers listed activity
Activity 19 of Listing Notice (LN) 1 of GNR 327 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, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse	The proposed project will result in infilling and depositing of more than 10m³ into a watercourse. In addition, the excavation and removal of soil materials of more than 10 m³ from a watercourse will take place during the construction of the pipeline.
Activity 12 of Listing Notice (LN) 3 of GNR 324: The clearance of an area of 300 square metres or more of indigenous vegetation **c) In Gauteng:** ii) Within Critical Biodiversity Areas or Ecological Support Areas identified in the Gauteng Conservation Plan or bioregional plans;	The clearance of an area of 300 square metres or more of indigenous vegetation is required for the proposed bridge within Critical Biodiversity Areas /Ecological Support Areas identified in the Gauteng Conservation Plan.
Activity 14 of Listing Notice (LN) 3 of GNR 324 The development of: – (ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs – a) within a watercourse; **c) In Gauteng**: iv. sites identified as Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) Gauteng Conservation Plan or in bioregional plans;	The proposed bridge will be constructed over an area of 10 square meters or more within a watercourse on areas identified as Important and Ecological Support Area by the Gauteng Conservation Plan.
Activity 23 of Listing Notice (LN) 3 of GNR 324 The expansion of: – (ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such expansion occurs – a) within a watercourse; **c) In Gauteng**: iv. sites identified as Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) Gauteng Conservation Plan or in bioregional plans;	The proposed bridge expansion will be constructed over an area of 10 square meters or more within a watercourse on areas identified as Important and Ecological Support Area by the Gauteng Conservation Plan.

1.7 Details of Environmental Assessment Practitioner and Expertise to conduct the Basic Assessment

Envirolution Consulting was appointed by **Jamcorp Distribution CC** on behalf of **JRA** to undertake a Basic Assessment process and Water Use License for the proposed project. Furthermore, Envirolution Consulting does not have any interests in secondary developments that may arise out of the authorisation of the proposed project. Envirolution Consulting is a specialist environmental consulting company providing holistic environmental management services, including environmental impact assessments and

planning to ensure compliance with environmental legislation and evaluate the risk of development; and the development and implementation of environmental management tools Envirolution Consulting benefits from the pooled resources, diverse skills and experience in environmental field held by its team. We offer solutions to environmental issues that are key during our clients' planning and decision-making processes. The Envirolution Consulting team have considerable experience in environmental impact assessments and environmental management, and have been actively involved in undertaking environmental studies, for a wide variety of projects in South Africa, including those associated with linear developments.

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

- Cheda Sheila Bolingo, the author of this Basic Assessment holds an Msc degree in Environmental Management with 10 years of experience in the consulting field. Her key focus areas are on strategic environmental assessment and advice on environmental impact assessments; public participation; environmental management programmes, and mapping through ArcGIS for variety of environmental projects. She is currently involved in several diverse projects across the country.
- Gesan Govender, the project manager and Environmental Assessment Practitioner (EAP) responsible for this project, is a registered Professional Natural Scientist and holds an Honours degree in Botany. He has over 16 years of experience within the field of environmental management. His key focus is on strategic environmental assessment and advice; management and co-ordination of environmental projects, which includes integration of environmental studies and environmental processes into larger engineering-based projects and ensuring compliance to legislation and guidelines; compliance reporting; the identification of environmental management solutions and mitigation/risk minimising measures; and strategy and guideline development. He is currently responsible for the project management of EIA's for several diverse projects across the country.

Select the appropriate box

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

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

YES	

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

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

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

If yes, have you applied for the authorisation(s)?	YES	
If yes, have you received approval(s)? (attach in appropriate appendix)		NO

The water use license application has been initiated, a pre-application is submitted to the competent authority i.e. Department of Water and Sanitation (refer to correspondence in **Appendix F**)

2. APPLICABLE LEGISLATION, POLICIES AND / OR GUIDELINES

Table 3: List all legislation, policies and/or guidelines of any sphere of government that are applicable to the application as contemplated in the EIA regulations:

Title of legislation, policy or guideline (Promulgation Date)	Applicable Requirements	Administering Authority	Description of compliance
National Environmental Management Act (Act No. 107 of 1998)	• NEMA requires, inter alia, that: ∗ Development must be socially, environmentally, and economically sustainable." ∗ Disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied." ∗ A risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions." • EIA Regulations have been promulgated in terms of Chapter 5. Activities which may not commence without an environmental authorisation are identified within these Regulations. • 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.	Department of Forestry, Fisheries and the Environment (DFFE) Gauteng Department of Agriculture and Resource Development (GDARD)	• In terms of sections 24(2) and 24D of the National Environmental Management Act (No 107 of 1998), as read with the EIA Regulations 2014 of GN R983 and R985; a Basic Assessment process is required to be undertaken for the proposed project.
National Environmental Management: Biodiversity Act (Act 10 of 2004)	• Section 52(1)(a) of the National Environmental Management: Biodiversity Act (Government Gazette 34809, Government Notice 1002, 9 December 2011 provides for listing threatened or protected ecosystems in one of four categories: critically endangered (CR), endangered (EN), Vulnerable (VU) or Protected. These species are commonly referred to as TOPS listed	Department of Forestry, Fisheries and the Environment Gauteng Department of Agriculture and Resource	• No TOPS species are expected to occur on the site as no suitable habitat for these species are present.

Title of legislation, policy or guideline (Promulgation Date)	Applicable Requirements	Administering Authority	Description of compliance
		Development	
National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)	• The Minister may by notice in the Gazette publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment. • In terms of the regulations published in terms of this Act (GN 921 of December 2013), a Basic Assessment or Environmental Impact Assessment is required to be undertaken for identified listed activities. • Any person who stores waste must at least take steps, unless otherwise provided by this Act, to ensure that (a) The containers in which any waste is stored, are intact and not corroded or in any other way rendered unlit for the safe storage of waste; (b) Adequate measures are taken to prevent accidental spillage or leaking; (c) The waste cannot be blown away; (d) Nuisances such as odour, visual impacts and breeding of vectors do not arise; and (e) Pollution of the environment and harm to health are prevented.	Department of Forestry, Fisheries and the Environment (hazardous waste) Gauteng Department of Agriculture and Resource Development (general waste)	• In terms of GNR921, no waste license is required for the project • Waste handling, storage and disposal during construction and operation is required to be undertaken in accordance with the requirements of this Act, as detailed in the applicable EMPr, as well as in accordance with the relevant Norms and Standards.
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". • Dust control regulations promulgated in December 2013 may require the implementation of a dust management plan.	Department of Forestry, Fisheries and the Environment Local Municipality	• Reporting in terms of compliance to GNR831 will be required. • While no permitting or licensing requirements arise from this legislation, this Act will find application during the construction phase of the project. The Air Emissions Authority (AEL) may require the compilation of a dust management plan.
National Water Act (Act No. 36 of 1998)	• Under S21 of the Act, water uses must be licensed unless such water use falls into one of the categories listed in S22 of the Act or falls under the general authorisation. • In terms of S19, the project proponent must ensure that reasonable measures are taken throughout the life cycle of this project to prevent and remedy the effects of pollution to water resources from occurring, continuing, or recurring.	National Department of Water and Sanitation (DWS) Gauteng Department of Agriculture and Resource	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. • Requirements set by S19 will apply throughout the life-

Title of legislation, policy or guideline (Promulgation Date)	Applicable Requirements	Administering Authority	Description of compliance
		Development	cycle of the project.
Environment Conservation Act (Act No. 73 of 1989)	• National Noise Control Regulations (GN R154 dated 10 January 1992)	Department of Forestry, Fisheries and the Environment Gauteng Department of Agriculture and Resource Development Local Authorities	There is no requirement for a noise permit in terms of the legislation.
National Heritage Resources Act (Act No. 25 of 1999)	• S38 states that Heritage Impact Assessments (HIAs) are required for certain kinds of development including: ∗ The construction of a road, powerline, pipeline, canal or other similar linear development or barrier exceeding 300 m in length; ∗ Any development or other activity which will change the character of a site exceeding 5 000 m^2 in extent.	South African Heritage Resources Agency	• The proposed pipeline exceeds 300m in length. • A Heritage Assessment has been undertaken as part of this Basic Assessment • Due to the density of the urban development in the region, it is very unlikely that any sites or features dating to the pre-colonial history of the region would still exist in the study area. However, isolated objects such as Stone Age artefacts might be exposed in areas close to stream beds.
National Environment Management Protected Areas Act, 2003 (Act No. 57 of 2003).	• Wetlands and other critical Biodiversity areas are regulated under the NEM:BA. Activities that fall within the parameters of these areas require specialist assessment to determine the impacts and the residual effects of mitigation measures	Department of Forestry, Fisheries and the Environment	• No permitting requirements were triggered by the activities.
Conservation of Agricultural Resources Act (Act No 43 of 1983).	Regulation 15 of GNR1048 provides for the declaration of weeds and invader plants, and these are set out in Table 3 of GNR1048. Declared Weeds and Invaders in South Africa are categorised according to one of the following categories: • Category 1 plants: are prohibited and must be controlled. • Category 2 plants: (commercially used plants) may be grown in demarcated	Department of Agriculture, Forestry and Fisheries (DAFF)	• An alien species management plan to be included in the requirements of the EMPr.

Title of legislation, policy or guideline (Promulgation Date)	Applicable Requirements	Administering Authority	Description of compliance
	areas providing that there is a permit and that steps are taken to prevent their spread. • Category 3 plants: (ornamentally used plants) may no longer be planted; existing plants may remain, as long as all reasonable steps are taken to prevent the spreading thereof, except within the floodline of watercourses and wetlands.		
Occupational Health and Safety Act (No 85 of 1993)	The Act provides for the health and safety of persons at work and for the health and safety of persons in connection with the use of machinery; the protection of persons other than persons at work, against hazards to health and safety arising out of or in connection with the activities of persons at work.	Department of Labour	• The EMPr provides for measures to ensure that objectives of the Act are met on this site

3. ALTERNATIVES

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

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

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

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

Provide a description of the alternatives considered

Table 3: Description of the alternatives considered

Alternative type, either alternative: site on property, properties, activity, design, technology, energy, operational or other (provide details of "other")	**Description**
Site Alternatives	**No site alternatives** have been investigated for the proposed development for the following reasons: • The Canterbury Bridge is severely impacted by the huge volumes of water passing through the culvert. • The culvert has physical failures due to erosion resulting from heavy rains and re- settlement. • The sinkholes on road next to the bridge were formed due to erosion or improper • compaction. • A cavity caused by the sinkhole is approximately 2m deep and 1m wide on the side of the road. Thus, the identified site is the **only one site is deemed feasible** and practicable for the proposed rehabilitation.
Design Alternative	**Proposal – Adding new box culvert opening** Based on the general approval of the previous Consultant's design by the Johannesburg Roads Agency, it was resolved that Jamcorp would move forward based on the upgrade to a 3-cell 1.8x1.8 Box Culvert solution. This would enable the majority of the existing 1.8m x 1.8m culvert to be rehabilitated and retained resulting in cost savings to the project. The bridge which satisfies the hydraulic requirements as proven by the flood peak determinations as detailed in Appendix I3 – Design report (under the hydraulic section). This bridge gives sufficient freeboard as well as has a low risk of blockage. Therefore; the final solution shall comprise of upgrading the existing single cell 1.8m x 1.8m wide culvert to a three cell 1.8m x 1.8m wide culvert as shown in **Figure 2**. As outlined above, the existing culvert structure shall as far as possible be maintained and where necessary rehabilitated and/or lengthened to form part of the new widened culvert. This will result in substantial material cost and time savings to the project. Due to the space constraints on the south east side of the existing inlet**, *this alternative is the recommended solution.***

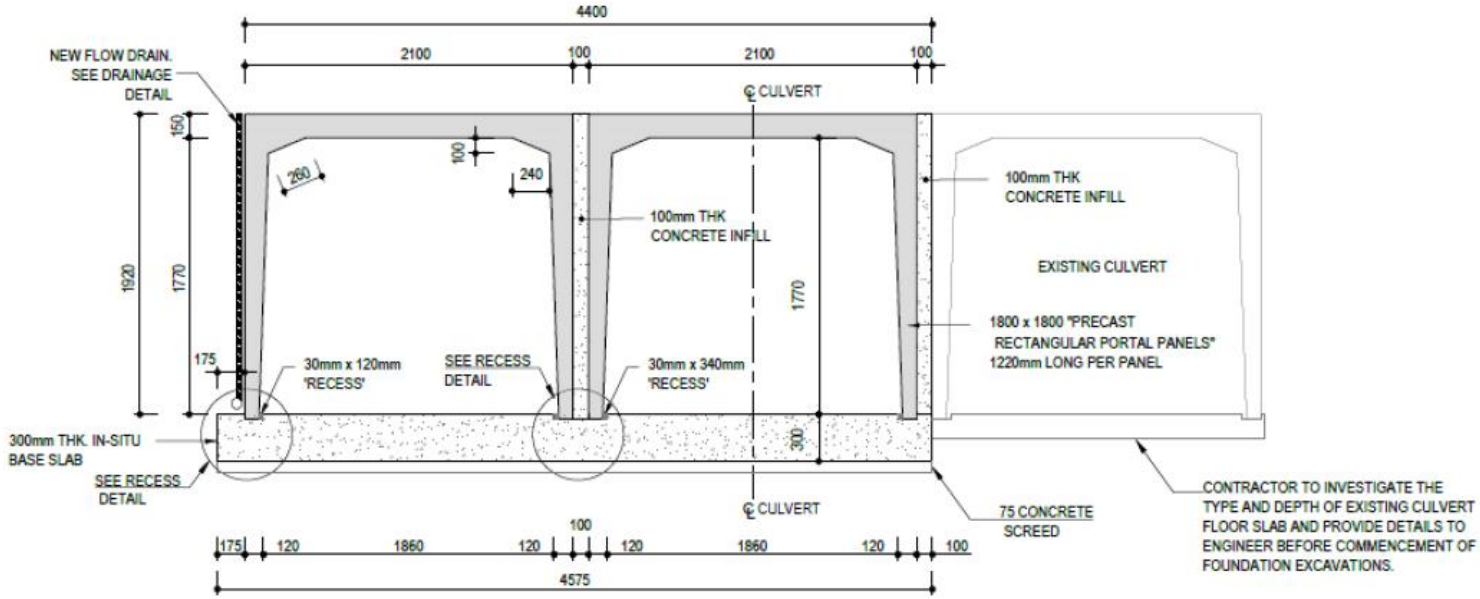

Figure 2: Proposed Culvert Cross Section

Alternative 1 – Demolish existing and replace with additional box culverts

At the time of Jamcorp's assessment on site the condition of the existing culvert inlet appeared in good condition and showed no sign of abnormal deterioration from the photographs indicated in TS Consulting's Design Report dated June 2018. TS Consulting's drawings (See Annexure E of Appendix I3) indicated that the recommendation was to remove the entire existing culvert structure and replace with a new 3-cell culvert. Based on the visual inspection undertaken by Jamcorp in February 2021, the existing culvert structure appeared to be in reasonable condition and functioning sufficiently well at the inlet and throughout the majority of the length of the structure with no signs of settlement or damage until the last panels at the outlet, where the majority of the scour damage has taken place. This approach is costly and **therefore not recommended for implementation**.

Alternative 2 – Retain the status quo and maintain

	As mentioned above, the existing box culvert has structural defects as a result of the danger the existing structure condition poses to the public. These structural defects emanate from bad design and inadequate drainage capacity. This **alternative is not practical** as it provides a short-term solution by just deferring the problem.

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:

	Size of the activity:
Proposed activity (Adding new box culvert opening)	3 x 1.8m x1.8m
Alternatives:	
Alternative 1 (Demolish existing and replace with additional box culverts)	3x 1.8m x1.8m
Alternative 2 (Retain the status quo and maintain)	1.8m x1.8m
	Ha/ m^2

or, for linear activities:

	Length of the activity:
Proposed activity	
Alternatives:	
Alternative 1	
Alternative 2 (if any)	
	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 (Adding new box culvert opening)	3 x 1.8m x1.8m
Alternatives:	
Alternative 1 (Demolish existing and replace with additional box culverts)	3x 1.8m x1.8m
Alternative 2 (Retain the status quo and maintain)	1.8m x1.8m
	Ha/m^2

5. SITE ACCESS

Proposed activity

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

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

Describe the type of access road planned:

The site is easily accessible from the M1 through Woodmead Dr as shown in **Figure 2**.

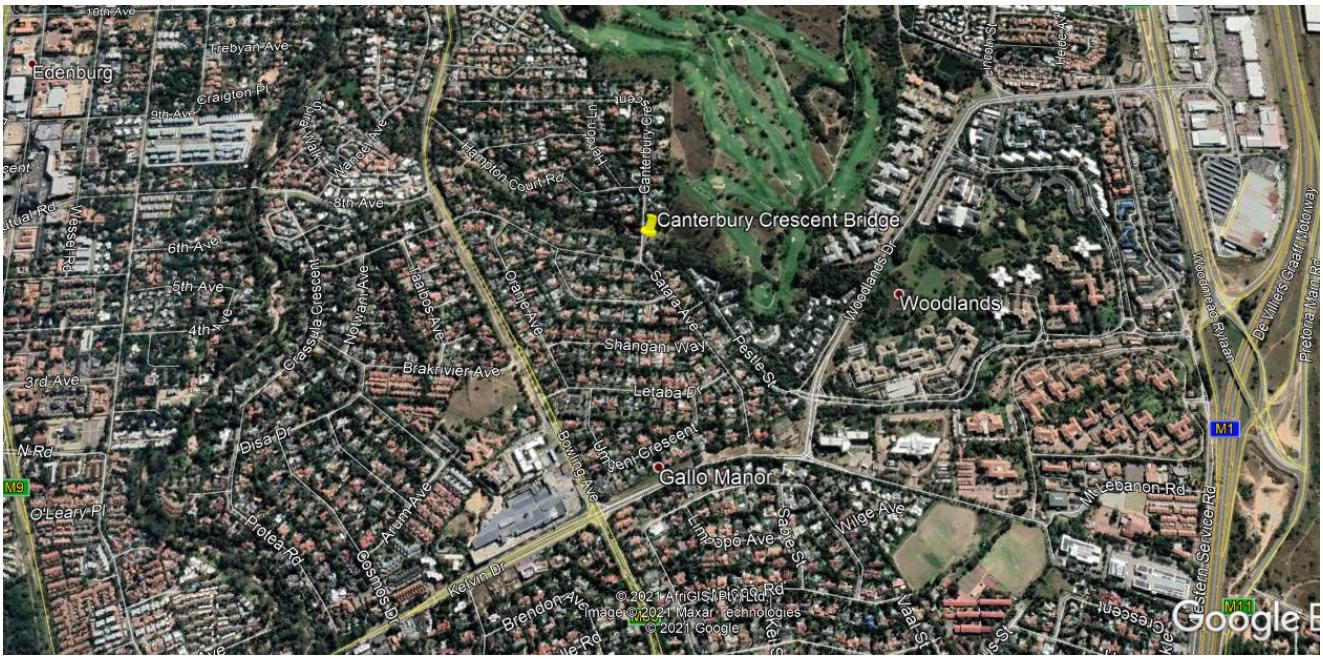

Figure 2: Overview of existing access roads to the site

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).

Alternative 1

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

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

Describe the type of access road planned:

Same as for the Proposed Activity.

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).

Alternative 2 (Not Applicable)

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	m	

Describe the type of access road planned:

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

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

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

6. LAYOUT OR ROUTE PLAN

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

- the layout plan is printed in colour and is overlaid with a sensitivity map (if applicable);
- layout plan is of acceptable paper size and scale, e.g.
  - A4 size for activities with development footprint of 10sqm to 5 hectares;
  - A3 size for activities with development footprint of > 5 hectares to 20 hectares;
  - A2 size for activities with development footprint of >20 hectares to 50 hectares);
  - A1 size for activities with development footprint of >50 hectares);

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

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

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

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

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

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

7. SITE PHOTOGRAPHS

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

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

8. FACILITY ILLUSTRATION

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

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

SECTION B: DESCRIPTION OF RECEIVING ENVIRONMENT

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

Instructions for completion of Section B for linear activities

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

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

Section B has been duplicated for sections of the route	**0**	times

Instructions for completion of Section B for location/route alternatives

1. For each location/route alternative identified the entire Section B needs to be completed
2. Each alterative 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	**0**	times	(complete only when appropriate)

It is worth noting that both <u>design alternatives of culvert</u> as discussed in Section A (3) are proposed in the same receiving environment and therefore will be assessed together as impacts will be similar. It is for this reason that the section will not be duplicated.

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

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

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

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

1. PROPERTY DESCRIPTION

Property description: (Including Physical Address and Farm name, portion etc.)	The proposed bridge is proposed mostly on the JRA road reserve on the following properties: ERF 578 GALLO MANOR EXT.2

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: **River crossing**	**Latitude (S):**	**Longitude (E):**
Centre point of the activity	26° 3'38.50"S	28° 4'35.70"E

In the case of linear activities:

Proposed Activity:	**Latitude (S):**	**Longitude (E):**
▪ Starting point of the activity		
▪ Middle point of the activity		
▪ End point of the activity		

Alternative 1	**Latitude (S):**	**Longitude (E):**
▪ Starting point of the activity		
▪ Middle point of the activity		
▪ End point of the activity		

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 **NO**

The 21-digit Surveyor General code of each cadastral land parcel:

T0IR02600000057800000

3. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Proposed Activity

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.

Proposed Activity

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

5. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

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

	Proposed Activity:		Alternative S2 (if any):		Alternative S3 (if any):	
Shallow water table (less than 1.5m deep)	**YES ✔**		YES	NO	YES	NO
Dolomite, sinkhole or doline areas		**NO✔**	YES	NO	YES	NO
Seasonally wet soils (often close to water bodies)	**YES ✔**		YES	NO	YES	NO
Unstable rocky slopes or steep slopes with loose soil		**NO✔**	YES	NO	YES	NO
Dispersive soils (soils that dissolve in water)	**YES ✔**		YES	NO	YES	NO
Soils with high clay content (clay fraction more than 40%)		**NO✔**	YES	NO	YES	NO
Any other unstable soil or geological feature		**NO✔**	YES	NO	YES	NO
An area sensitive to erosion		**NO✔**	YES	NO	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) NO ✓

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

Latitude (S):	**Longitude (E):**
°	°

c) are any caves located within a 300m radius of the site(s) NO✓

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

Latitude (S):	**Longitude (E):**
°	°

d) are any sinkholes located within a 300m radius of the site(s) **NO✓**

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

Latitude (S):	**Longitude (E):**
°	°

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

Hydrological Settings

The study site falls within Quaternary Catchment A21C which falls in the first WMA, the Limpopo. In this WMA the major rivers include the Limpopo, Matlabas, Mokolo, Lephalale, Mogalakwena, Sand, Nzhelele, Mutale and Luvuvhu. The bridge earmarked for rehabilitation extends across a tributary of the Sandspruit which decants into the Braamfonteinspruit and then into the Jukskei River (**Figure 3**).

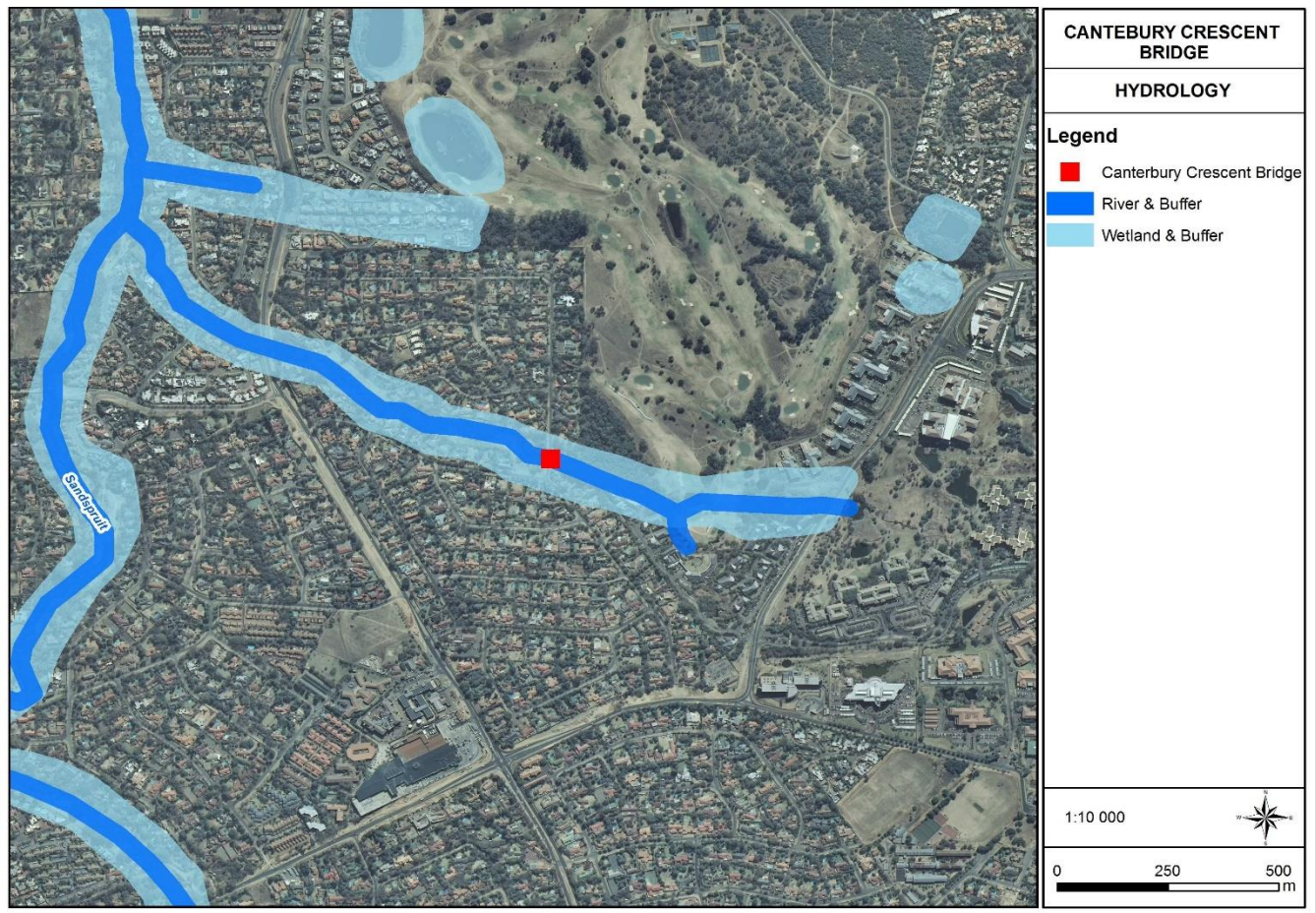

Figure 3: Regional hydrology

Geology

Archaean granite and gneiss, migmatite and granodiorite of the Halfway House Granite Formation underlies the site (GDACE, 2002). This formation dates back to the Basement Complex that was formed close to the origin of the earth (approximately 4,600 to 2,500 million years ago). The basement complex acts as a permeable rock type as water moves easily through these rocks, becoming trapped above the intrusions. This granitic geology of the region supports shallow, coarsely grained, sandy soils poor in nutrients (Mucina & Rutherford, 2006).

Soils

Dominant on the site is Unconsolidated Material - Loosely arranged material (sand, clay, silt or organic matter). In highly transformed areas this characteristic may be the result of anthropogenic activity such as mining, agriculture or engineering projects that have destroyed the upper layers of the soil profile that might have been present in the soils (Fey, 2005).

6. AGRICULTURE

Does the site have high potential agriculture as contemplated in the Gauteng Agricultural Potential Atlas (GAPA 4)? **NO✔**

According to the Gauteng Agricultural Potential Atlas (GAPA) the site falls within an area of a "Moderate to high" agricultural potential "as depicted in Figure 4.

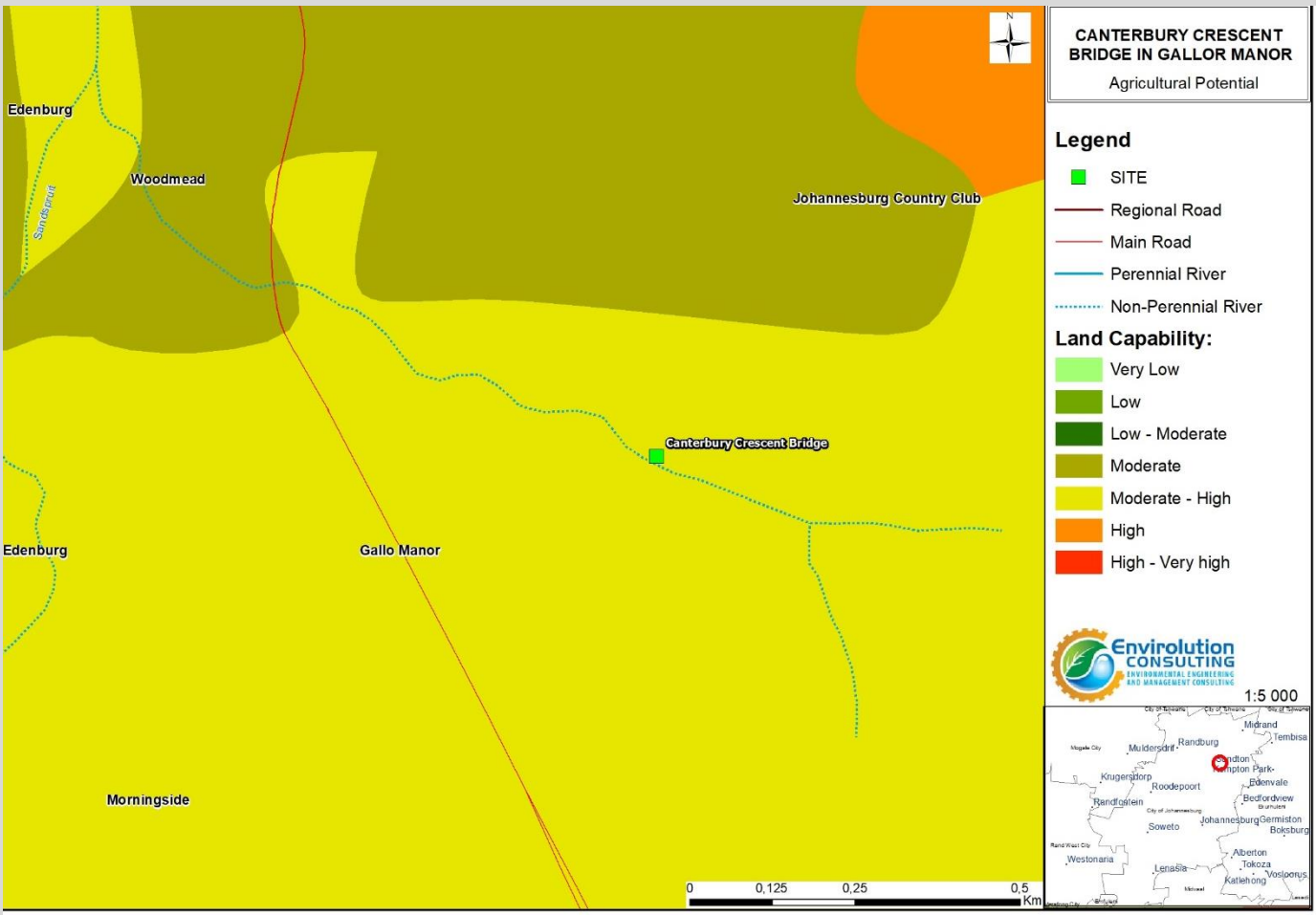

Figure 4: Agriculture potential Map for the study area

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

7. GROUNDCOVER

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

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

Natural veld - good condition % = 0	Natural veld with scattered aliens % = 0	**Natural veld with heavy alien infestation % =5**	**Veld dominated by alien species % =10**	**Landscaped (vegetation) % =20**
Sport field % =0	Cultivated land %=0	**Paved surface (hard landscaping) % =35**	**Building or other structure % =20**	**Bare soil % =10**

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

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

YES✓

If YES, specify and explain:

- **Plant Species of Conservation Concern**
  Only three of these plants were found in the study area and the rest were not. Instead, plants that dominated the study area are for ornamental. Viz *Celtis Africana, Dodonaea viscosa, Hypoxis hemerocallidea, Combretum erythrophyllum and Morus nigra. Non ornamental flora that are not expected at the study area includes Vachellia karroo, Melia azedarach, Eucalyptus gomphocephala (alien invasive), Pinus patula (alien invasive),*

- **Plant Species of Conservation Concern**
  Through the assessment of faunal characteristics of the site (habitat potential, connectivity to surrounding intact habitats, evidence of the presence of faunal species etc.) as well as applying a basic assessment performed in conjunction with the expected fauna, only three fauna were found. The species identified were based on the probability of occurrence (based on habitat potential and historical records) and are *Metisella meninx (Trimen, 1873) (Marsh Sylph); Ploceus cucullatus (Müller, 1776) (Village weaver), Lagonosticta senegala (Linnaeus, 1766) (Red-billed firefinch).*

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

YES✓

If YES, specify and explain:

- **Plant Species of Conservation Concern**

Only three of these plants were found in the study area and the rest were not. Instead, plants that dominated the study area are for ornamental. Viz *Celtis Africana, Dodonaea viscosa, Hypoxis hemerocallidea, Combretum erythrophyllum and Morus nigra. Non ornamental flora that are not expected at the study area includes Vachellia karroo, Melia azedarach, Eucalyptus gomphocephala (alien invasive), Pinus patula (alien invasive),*

- **Plant Species of Conservation Concern**

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

If YES, specify and explain:

Land use and disturbances

The study site is located in a heavily urbanised area and is surrounded by housing infrastructure. The surro properties are located on the macro bank of the riparian area and are thus prone to flooding damage. The surro catchment of the area is also heavily built up. The Johannesburg Country Club lies at the origin of the watercour comprises a highly landscaped open space (**Figure 5**).

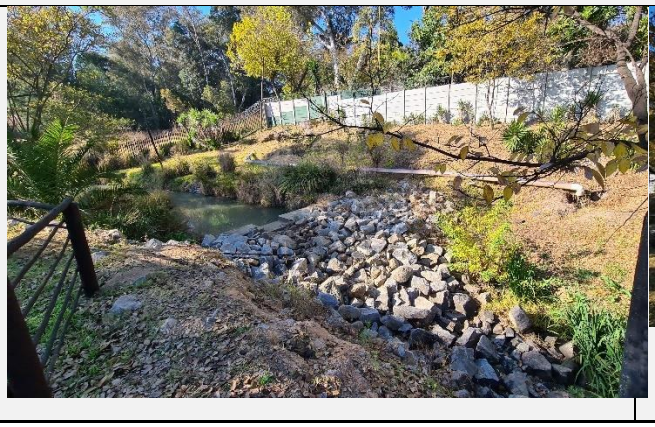


Figure 2: Impoundments, weirs and bank stabilisation recorded within 300m of the bridge

Habitat sensitivity and impact ratings (ecology and wetland)

The conversion of most of the landscape to a park and residential development has made this landscape to be ecologically poor. Poor availability of expected flora and the introduction of terrestrial vegetation on the stream riparian zones has reduced the sensitivity of this landscape to 1 according. The severity of the aftermath of this development is rated as 1 in relation to table 2 whereas the landscape modification is estimated at 1. All this will fortunately not last. Their duration of impact is rated as 1. The only sensitive area in this study is the stream due to the strict law pertaining aquatic habitat. The probability of impact due to the expansion of the bridge is rated as 2 due to the current instream interference. The ecological integrity of this steam is rated as 3. Habitat sensitivity is illustrated in **Figure 6**, the overall sensitivity is defined as highly variable due to the variable ecological conditions prevailing within the site as well as legislative requirements.

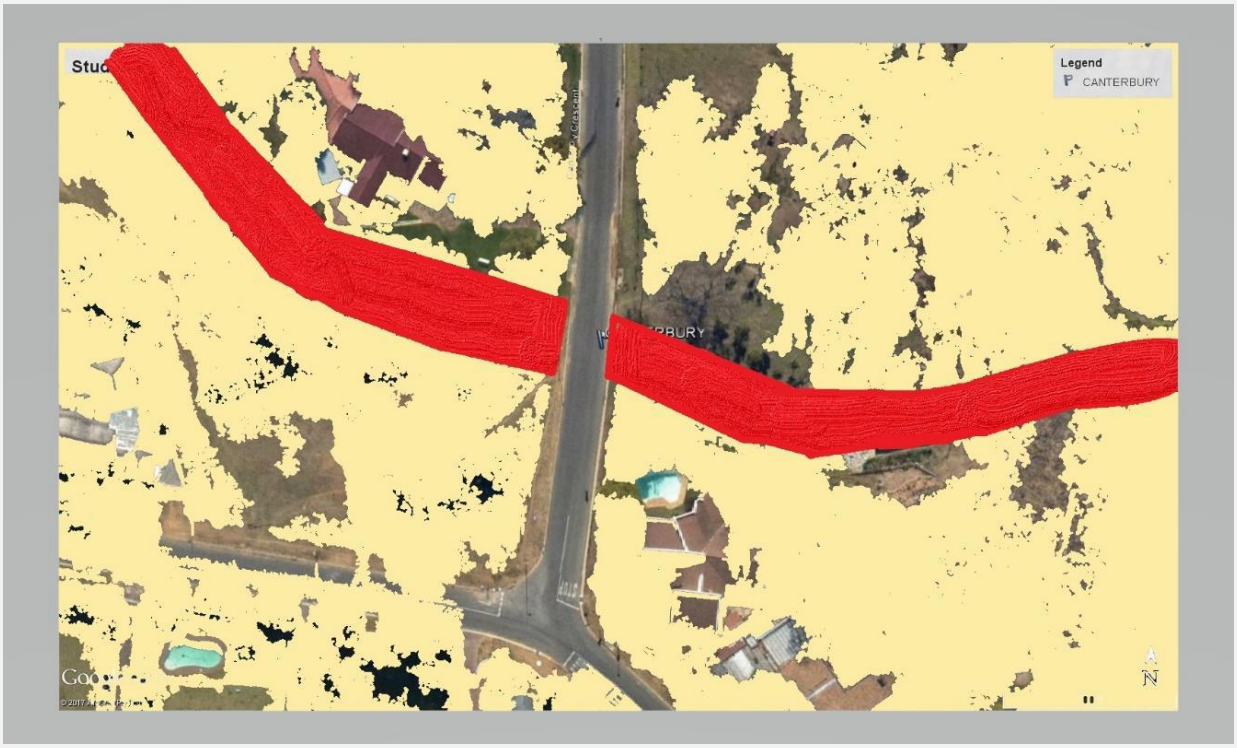


Figure 6: Sensitivity map. (Yellow = low sensitivity and Red = moderate/highly sensitive

Gauteng Conservation Plan

The Gauteng Conservation Plan (Version 3.3) (GDARD, 2011) classified areas within the province based on its contribution to reach the conservation targets within the province. These areas are grouped as Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs). The CBAs comprise 'Irreplaceable' areas that must be conserved and areas classified as 'Important' to reach the conservation targets. ESA's are areas that are not essential for meeting biodiversity representation targets/thresholds but which nevertheless play an important role in supporting the ecological functioning of critical biodiversity areas and/or in delivering ecosystem services. The bridge lies on an area classified as an Ecological Support Area (**Figure 7).**

Figure 7: The project area in relation to the Gauteng Conservation Plan

Wetland

A tributary of the Sandspruit flows from east to west under the Canterbury Crescent Bridge. This watercourse has been significantly altered by stabilised embankments, weirs, impoundments and culverts observed within a short distance of the bridge (**Figure 8**).

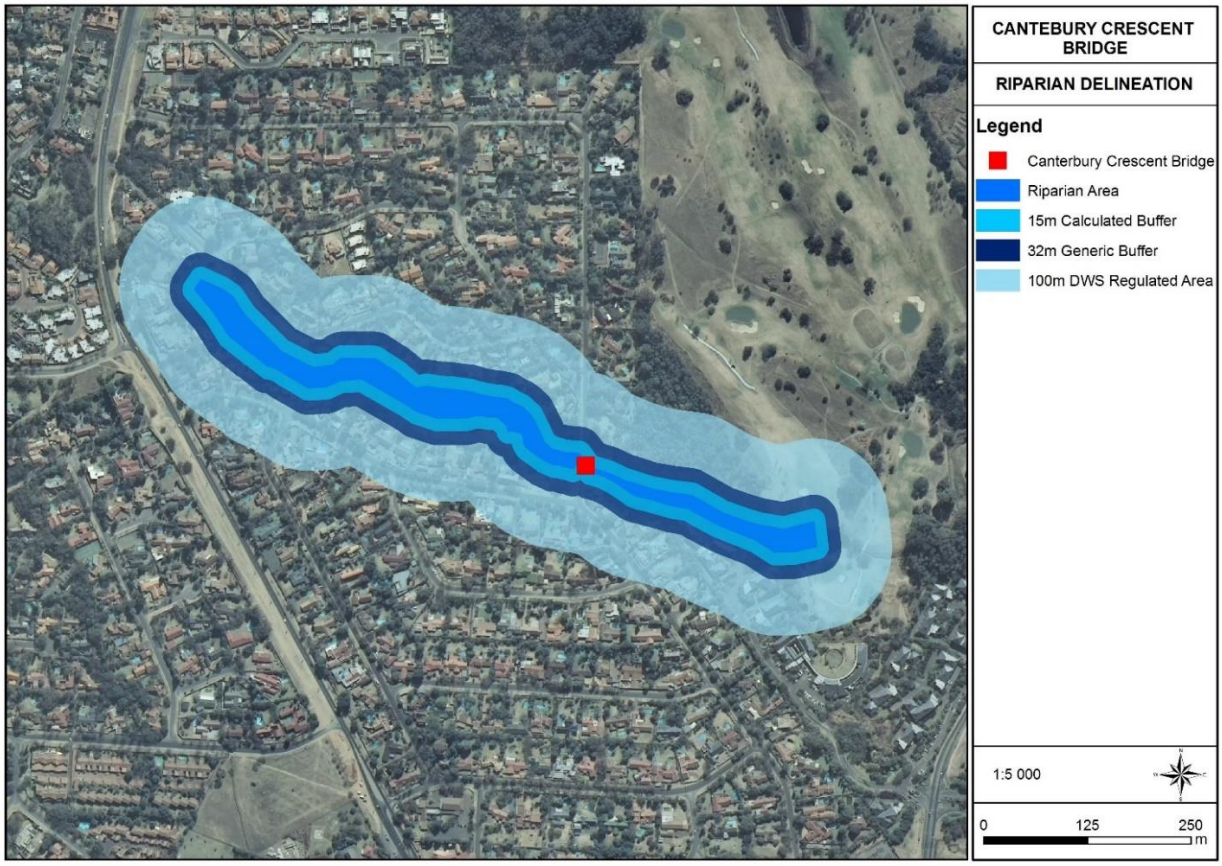


Figure 8: The delineated riparian area, calculated and generic buffer zones

Soil & Vegetation Indicators

Soil: Alluvial soil was found throughout the riparian area especially within the river bends. The main channel of the river consisted mainly of cobble (64-256mm), pebble (4-64mm) and gravel (2-4mm) with boulders (>256mm) present in a few areas of the river. These unconsolidated rocky substrata are characteristic of rivers (Ollis *et al,* 2013). Bedrock was also recorded in some sections of the river. On the steeper banks of the river loam like soil with a high degree of foreign material such as rubble and litter were found **(Figure 9**).

Figure 9: Disturbed nature of the soil profile

Vegetation: The vegetation of the riparian area was characterised by predominantly exotic woody and non-woody vegetation with only a few indigenous plant species recorded onsite. The upper and lower sections of the non-marginal zones of the riparian area was characterised by an increased amount of woody vegetation, while the marginal zone was characterised by medium growth cover of the banks and isles. In the higher areas of the riparian area adjacent to houses some garden plants have colonised the river-banks. The hydrophytic and riparian plant species recorded on site include (**Figure 10**):

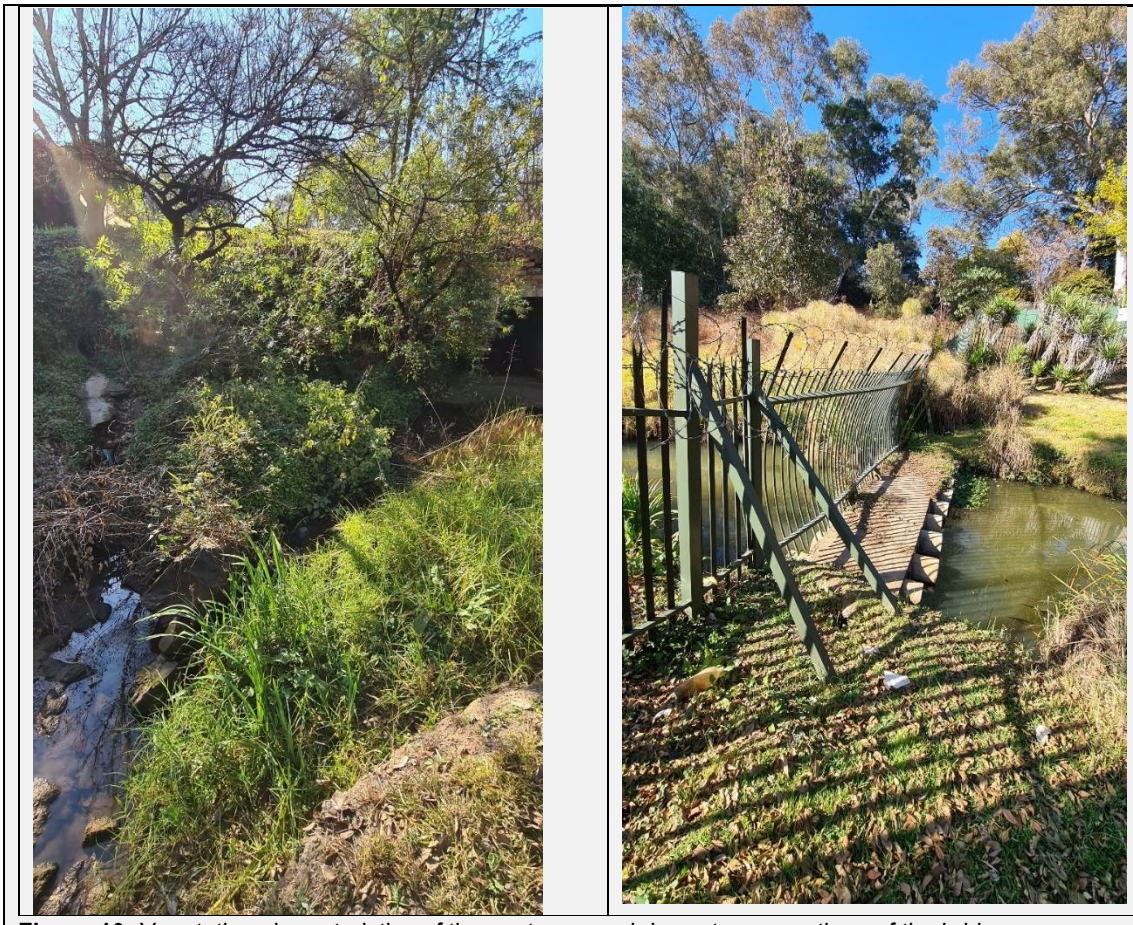


Figure 10: Vegetation characteristics of the upstream and downstream sections of the bridge

Watercourse Functional Assessment

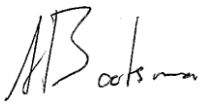
- **Riparian Vegetation Response Assessment Index (VEGRAI) EC** – 25.3%, E/F. Seriously to critically modified. The loss of natural habitat, biota and basic ecosystem functions is extensive.
- **Ecosystem Services (ES):** Generally, Very Low with Low and Very High scores for Streamflow Regulation, Erosion Control and Cultural and Spiritual respectively.
- **Ecological Importance and Sensitivity (EIS):** 0.5 - Low/Marginal. Wetlands in this category are not ecologically important and sensitive at any scale. The biodiversity of these wetlands is ubiquitous and not sensitive to flow and habitat modifications. They play an insignificant role in moderating the quantity and quality of water in major rivers
- **Recommended Ecological Management Category**: D
- **Instream habitat (IHAS):** The river consisted of more pools with runs of water. The flow in the system was low. The system however was not in flood. Habitats consisted mostly of interlinked pools with runs on hard plinthic rocks with gravel. Aquatic vegetation was limited. Fringing vegetation was abundant with various types sampled. The IHAS score was calculated to 78.45% for the upper sample site and 77.35% for the lower sample site. This indicates the habitat that is more than acceptable for supporting a diverse macroinvertebrate community
- **Aquatic macroinvertebrate assemblages**: The SASS 5 Ecological Category was determined to E/F classification. The classification suggests that the system is in poor condition. This assessment is in line with the site observations.

Was a specialist consulted to assist with completing this section If yes complete specialist details	**YES✓** [redacted]

1.) Wetland Specialist

Name of the specialist:	Antoinette Bootsma
Qualification(s) of the specialist:	▪ MSc Ecology, University of South Africa (2017) Awarded with distinction. Project Title: Natural mechanisms of erosion prevention and stabilization in a Marakele peatland; implications for conservation management ▪ Short course in wetland soils, Terrasoil Science (2009) ▪ Short course in wetland delineation, legislation and rehabilitation, University of Pretoria (2007) ▪ B. Sc (Hons) Botany, University of Pretoria (2003-2005). Project Title: A phytosociological Assessment of the Wetland Pans of Lake Chrissie ▪ B. Sc (Botany & Zoology), University of South Africa (1997 - 2001)
Postal address:	
Postal code:	
Telephone: [redacted]	Cell: +27 83 4545 454
E-mail: antoinette@limosella.co.za	Fax: [redacted]

Are any further specialist studies recommended by the specialist?	[redacted] **NO✓**
If YES, specify:	**Yes**
If YES, is such a report(s) attached?	[redacted]
If YES list the specialist reports attached below	

Signature of specialist:		Date:	**June 2021**

2.) Heritage Specialist

Name of the specialist:	J van Schalkwyk

Qualification(s) of the specialist:	J A van Schalkwyk, D Litt et Phil, heritage consultant, has been working in the field of heritage management for more than 30 years. Based at the National Museum of Cultural History, Pretoria, he has actively done research in the fields of anthropology, archaeology, museology, tourism and impact assessment. This work was done in Limpopo Province, Gauteng, Mpumalanga, North West Province, Eastern Cape, Northern Cape, Botswana, Zimbabwe, Malawi, Lesotho and Swaziland. Based on this work, he has curated various exhibitions at different museums and has published more than 60 papers, many in scientifically accredited journals.
Postal address:	62 Coetzer Avenue, Monument Park, 0181
Postal code:	2194
Telephone:	[redacted]
Cell:	076 790 6777
E-mail:	jvschalkwyk@mweb.co.za
Fax:	[redacted]

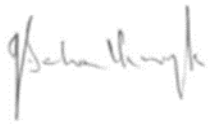
Are any further specialist studies recommended by the specialist? [redacted] **NO ✓**

If YES, specify:	**N/A**

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

If YES list the specialist reports attached below

N/A

Signature of specialist:		Date:	**June 2021**

3.) Ecology Specialist

Name of the specialist:	Rifilwe Modiba, on behalf of Madaleni Environmental Division (Pty) Ltd,
Qualification(s) of the specialist:	I am a qualified Scientist with Masters in Aquatic Entomology and I am a registered candidate scientist with SACNASP: South African Council for Natural Scientific Professions (registration number 100076/15). I am also a member of South African Wetland Association (Membership number BALYJ09V).
Postal address:	P.O Box 3032 Kimberley
Postal code:	8300
Telephone:	073 307 9579
Cell:	073 307 9579
E-mail:	madalenie@gmail.com
Fax:	[redacted]

Are any further specialist studies recommended by the specialist? [redacted] **NO ✓**

If YES, specify:	**N/A**

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

If YES list the specialist reports attached below

N/A

Signature of specialist:		Date:	**April 2018**

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

8. LAND USE CHARACTER OF SURROUNDING AREA

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

Proposed Activity:

1. Vacant land	**2. River, stream, wetland**	3. Nature conservation area	**4. Public open space**	5. Koppie or ridge
6. Dam or reservoir	7. Agriculture	8. Low density residential	**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[AN]	17. Hospitality facility	18. Church	19. Education facilities	20. Sport facilities
21. Golf course/polo fields	22. Airport[N]	23. Train station or shunting yard[N]	24. Railway line[N]	25. Major road (4 lanes or more) [N]
26. Sewage treatment plant[A]	27. Landfill or waste treatment site[A]	28. Historical building	29. Graveyard	30. Archeological site
31. Open cast mine	32. Underground mine	33.Spoil heap or slimes dam[A]	34. Small Holdings	35 Other land uses (describe):

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

Site

Note:

NORTH

9	**9**	**9**	**9**	**9**
9	**9**	**9**	**21**	**9**
9,12	**9**	**9**	**21**	**9**
9	**2**		**2**	**9**
9	**4**	**4**	**4**	**9**
9	**9, 12**	**9, 13**	**9**	**9**

WEST **EAST**

SOUTH

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✓**
• Wetland Assessment & Wetland Rehabilitation Plans • Ecology Report • Heritage Assessment Report	
The above specialists' reports are attached within **Appendix G** of this report	

9. SOCIO-ECONOMIC CONTEXT

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

The project is located in **Region E** of the City of Johannesburg (CoJ) within **Wards 106**, the following socio-economics characteristics are pertinent to the site:

Population: Understanding both the age as well as anticipated population growth of the city assists in planning for the anticipated demand for services and job opportunities. The CoJ has a population of approximately 4 million made up primarily of a young population aged between 30 and 39 years. This total population translates into roughly 1.3 million households. The city's population is projected to increase to about 4.1 million in 2015 implying an annual rate of growth of the population of about 1.3% per annum by 2015. Household projections further indicate that the number of households in the City is likely to increase from about 1.3 million in 2010 to about 1.5 million in 2015 with an average household size of about 3 persons. The region is home to more than 250 000 residents, most of whom are concentrated in Midrand. The western part of the region is scarcely populated, though some 56 000 people reside in the township of Diepsloot alone (CoJ, 2018), ward is made up of 35 205 inhabitants**.**

Economic Profile of local Municipality: The City' of Johannesburg` s economy is driven primarily by four economic sectors which are: (a) finance and business services, (b) community services, (c) manufacturing, and (d) trade. These four economic sectors collectively account for more than 82% of economic activity within the City.

Level of Unemployment: The CoJ had high unemployment levels of 23.1% in 2010/2011. Regions E, B have one of the lowest rates of unemployment at 2.3% and 9.2% respectively. Youth unemployment remains a major challenge both nationally and for the city. Low education levels and slow formal sector growth are two of the major causes of youth unemployment. The vast majority of the youthful population in Johannesburg has only a matric certificate preventing access to the labour market (CoJ IDP 2012/2016).

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

(https://www.joburg.org.za/documents_/Documents/Issue%202_The%20Socio%20Economic%20Status%20of%20the%20City%20of%20Johannesburg.pdf)

10. CULTURAL/HISTORICAL FEATURES

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

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

(a) the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;

(b) the construction of a bridge or similar structure exceeding 50m in length;

(c) any development or other activity which will change the character of a site-

(i) exceeding 5 000 m2 in extent; or

(ii) involving three or more existing erven or subdivisions thereof; or

(iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or

(iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;

(d) the re-zoning of a site exceeding 10 000 m2 in extent; or

(e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

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

Based on the background research that was done as well as the site inspection, the following can be said about the Canterbury Crescent bridge:

- The bridge is less than 60 years old;
- It does not show any interesting or unique features in its construction, nor was any unique materials used for building the bridge;
- No important event or person could be related with the bridge.

Based on the Matrix used for assessing the significance of each identified site/feature as per SAHRA, the overall significance attributed to the structure as a whole is:

Generally protected C: Low significance

- The implication of this is that the structure does not have to be recorded before its destruction/rehabilitation.

From a heritage point of view, it is recommended that the proposed development be allowed to continue on acceptance of the conditions proposed. Should archaeologically sites or graves be exposed in other areas during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.

Will any building or structure older than 60 years be affected in any way?	**NO ✓**
Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)? If yes, please attached the comments from SAHRA in the appropriate Appendix	**NO ✓**

SECTION C: PUBLIC PARTICIPATION (SECTION 41)

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

2. LOCAL AUTHORITY PARTICIPATION

Local authorities are key interested and affected parties in each application and no decision on any application will be made before the relevant local authority is provided with the opportunity to give input. The planning and the environmental sections of the local authority must be informed of the application at least thirty (30) calendar days before the submission of the application to the competent authority.

Was the draft report submitted to the local authority for comment?	**YES✓**	
If yes, has any comments been received from the local authority?		**NO✓**

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

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

The Draft Report has been submitted to the City of Johannesburg (CoJ) for comment. If any issues and comments are received, these will be collated and responded to. These responses will be incorporated into the Final BAR. The Public Participation Process is currently underway. Once concluded, the issues and comments raised by I&AP will be collated and responded to. These responses will be incorporated into the Final BAR.

3. CONSULTATION WITH OTHER STAKEHOLDERS

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

Has any comment been received from stakeholders?		**NO✓**

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

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

The Draft Report has been made available for public review and comments. If any issues and comments are received, these will be collated and responded to. These responses will be incorporated into the Final BAR. The Public Participation Process is currently underway. Once concluded, the issues and comments raised by I&AP will be collated and responded to. These responses will be incorporated into the Final BAR.

4. GENERAL PUBLIC PARTICIPATION REQUIREMENTS

The Environmental Assessment Practitioner must ensure that the public participation process is adequate and must determine whether a public meeting or any other additional measure is appropriate or not based on the particular nature of each case. Special attention should be given to the involvement of local community structures such as Ward Committees and ratepayers associations. Please note that public concerns that emerge at a later stage that

should have been addressed may cause the competent authority to withdraw any authorization it may have issued if it becomes apparent that the public participation process was flawed.

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

5. APPENDICES FOR PUBLIC PARTICIPATION

All public participation information is to be attached in the appropriate Appendix. The information in this Appendix is to be ordered as detailed below
Appendix 1 – Proof of site notice
Appendix 2 – Written notices to I&APs
Appendix 3 – Proof of newspaper advertisements
Appendix 4 –Correspondences with I&APs
Appendix 5 – Minutes of any public and/or stakeholder meetings – **this is anticipated during the Draft BAR review period**
Appendix 6 - Comments and Responses Report
Appendix 7 –Comments from I&APs on Basic Assessment (BA) Report - **Comments are anticipated during the Draft BAR review period**
Appendix 8 –Comments from I&APs on amendments to the BA Report **N/A**
Appendix 9 – Copy of the register of I&APs

SECTION D: RESOURCE USE AND PROCESS DETAILS

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

Instructions for completion of Section D for alternatives

1) For each alternative under investigation, where such alternatives will have different resource and process details (e.g. technology alternative), the entire Section D needs to be completed
4) Each alterative 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 **0** 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✓**

If yes, what estimated quantity will be produced per month? Could not be determined at this stage

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

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

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

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

Will the activity produce solid waste during its operational phase? **YES✓**

If yes, what estimated quantity will be produced per month? `m^3

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

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

Has the municipality or relevant service provider confirmed that sufficient air space exists for treating/disposing of the solid waste to be generated by this activity? **NO ✓**

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

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

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

Can any part of the solid waste be classified as hazardous in terms of the relevant legislation? If yes, inform the competent authority and request a change to an application for scoping and EIA.	**NO ✓**
Is the activity that is being applied for a solid waste handling or treatment facility? 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.	**NO ✓**

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

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

Liquid effluent (other than domestic sewage)

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

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

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

N/A

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

Will the activity produce effluent that will be treated and/or disposed of at another facility?	**NO ✓**

If yes, provide the particulars of the facility:

Facility name:	N/A		
Contact person:	N/A		
Postal address:	N/A		
Postal code:	N/A		
Telephone:	N/A	Cell:	
E-mail:	N/A	Fax:	

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

N/A

Liquid effluent (domestic sewage)

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

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

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

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

Emissions into the atmosphere

Will the activity release emissions into the atmosphere? **YES✓**

If yes, is it controlled by any legislation of any sphere of government? **NO✓**

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

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

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

2. WATER USE

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

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: litters

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✓**

If yes, list the permits required

The culvert structure will be crossing a watercourse. It is for such reasons that a Water Use License application process has been initiated for the development. According to the National Water Act (NWA), 1998 (Act No.36 of 1998), the proposed development requires a Water Use License as per the following regulations:

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

If yes, have you applied for the water use permit(s)? **NO✓**

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

3. POWER SUPPLY

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

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

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

Please see above.

4. ENERGY EFFICIENCY

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

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

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

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

SECTION E: IMPACT ASSESSMENT

The assessment of impacts must adhere to the minimum requirements in the EIA Regulations, 2014, and should take applicable official guidelines into account. The issues raised by interested and affected parties should also be addressed in the assessment of impacts as well as the impacts of not implementing the activity (Section 24(4) (b) (i).

1. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

Summaries the issues raised by interested and affected parties.

The Draft Report has been made available for public review and comments. If any issues and comments are received, these will be collated and responded to. These responses will be incorporated into the Final BAR. The Public Participation Process is currently underway. Once concluded, the issues and comments raised by I&AP will be collated and responded to. These responses will be incorporated into the Final BAR.

Summary of response from the practitioner to the issues raised by the interested and affected parties (including the manner in which the public comments are incorporated or why they were not included)
(A full response must be provided in the Comments and Response Report that must be attached to this report):

The Draft Report has been made available for public review and comments. If any issues and comments are received, these will be collated and responded to. These responses will be incorporated into the Final BAR. The Public Participation Process is currently underway. Once concluded, the issues and comments raised by I&AP will be collated and responded to. These responses will be incorporated into the Final BAR.

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

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

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

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

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

- The **nature**, a description of what causes the effect, what will be affected, and how it will be affected.
  - The **extent**, wherein it is indicated whether the impact will be local (limited to the immediate area or site of

development), regional, national or international. A score of between 1 and 5 is assigned as appropriate with

- a score of 1 being site specific,
- 2 = local (site + immediate surrounds),
- 3 = regional (the impact could affect the area including the neighbouring farms, the transport routes and the adjoining towns) ,
- 4 = national and
- a score of 5 being international (where the impact has international ramifications that extend beyond the boundaries of South Africa).

- The **duration**, wherein it is indicated whether:
  - The lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
  - The lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
  - Medium-term (5–15 years) – assigned a score of 3;
  - Long term (> 15 years) - assigned a score of 4; or;
  - Permanent - assigned a score of 5.

- The **magnitude**, quantified on a scale from 0-10, where a score is assigned:
  - 0 is small and will have no effect on the environment;
  - 2 is minor and will not result in an impact on processes;
  - 4 is low and will cause a slight impact on processes;
  - 6 is moderate and will result in processes continuing but in a modified way;
  - 8 is high (processes are altered to the extent that they temporarily cease); and
  - 10 is very high and results in complete destruction of patterns and permanent cessation of processes.

- The **probability** of occurrence, which describes the likelihood of the impact actually occurring. Probability is estimated on a scale, and a score assigned:
  - Assigned a score of 1–5, where 1 is very improbable (probably will not happen);
  - Assigned a score of 2 is improbable (some possibility, but low likelihood);
  - Assigned a score of 3 is probable (distinct possibility);
  - Assigned a score of 4 is highly probable (most likely); and
  - Assigned a score of 5 is definite (impact will occur regardless of any prevention measures).

- The **significance**, which is determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high.
- The **status**, which is described as positive, negative or neutral.
- The degree to which the impact can be reversed.
- The degree to which the impact may cause irreplaceable loss of resources.
- The degree to which the impact can be mitigated.

The **significance** is determined by combining the criteria in the following formula:
S= (E+D+M) P; where

S = Significance weighting

E = Extent
D = Duration
M = Magnitude
P = Probability

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

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

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

2.1 PROPOSAL (Adding new box culvert opening)[1]

IMPACTS ON THE AQUATIC BIODIVERSITY

ACTIVITY/SOURCES	NATURE OF POTENTIAL IMPACT/RISK	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)	RISK OF THE IMPACT AND MITIGATION NOT BEING IMPLEMENTED
CONSTRUCTION PHASE IMPACTS					
The sources of this impact include the compaction of soil, the removal of vegetation, surface water redirection including temporary diversion during construction, changes to water flow associated with new bridge design	**Direct Impacts:** Changes in water flow regime Impacts on hydrological functioning at a landscape level and across the site which can arise from changes to flood regimes (e.g. suppression of floods, loss of flood attenuation capacity, unseasonal flooding or destruction of floodplain processes) as well as the extent of the modification in relation to the overall aquatic ecosystem (i.e. at the source, upstream or downstream portion, in the temporary, seasonal, permanent zone of a wetland, in the riparian zone or within the channel of a watercourse, etc.). Changes to base flow and hydroperiod **Indirect Impacts:** • Construction within the wetland will affect hydrology during the construction phase when temporary stream diversions are likely to be necessary. **Cumulative Impacts:** 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.	**MODERATE**	• Designs should take into account soil properties, slopes and runoff energy with the aim of having a neural effect on the regional hydrograph and prevent scouring, erosion or sedimentation. • Use of SANRAL road standards in terms of drainage and stormwater where practical and possible within project agreements • 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. • Effective stormwater management should be a priority during the construction phase. This should be monitored as part of the EMP. High energy stormwater input into the watercourses should be prevented at all cost. Changes to natural flow of water (surface water as well as water flowing within the soil profile) should be taken into account. • Ensure that the activity does not result in downstream erosion or sedimentation	**LOW**	Impacts to the flow characteristics of watercourses are likely to be very significant unless effective mitigation is applied during the construction phase

[1] The potential impacts discussed below are relevant for all three identified alternatives for the Culvert Box

ACTIVITY/SOURCES	NATURE OF POTENTIAL IMPACT/RISK	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)	RISK OF THE IMPACT AND MITIGATION NOT BEING IMPLEMENTED
Possible sources of the impacts include: o Earthwork activities during construction o Clearing of surface vegetation o Disturbance of soil surface o Disturbance of slopes through creation of roads and tracks adjacent to the watercourse o Erosion (e.g. gully formation, bank collapse	**Direct Impacts:** Changes in sediment entering and exiting the system Changes in sediment regimes of the aquatic ecosystem and its sub -catchment by for example sand movement, meandering river mouth /estuary, changing flooding or sedimentation patterns **Indirect Impacts:** • Disturbance of soil surface • Disturbance of slopes through creation of roads and tracks adjacent to the watercourse • Erosion (e.g. gully formation, bank collapse **Cumulative Impacts:** Expected to be **hig**h. Should mitigation measure not be implemented and changes made to the bed or banks of watercourse unstable channel conditions may result in unintended changes to downstream hydrology. Reversing this process is unlikely and should be prevented in the first place.	**MODERATE**	• Use of SANRAL road standards in terms of drainage and stormwater where practical and possible within project agreements • Consider the various methods and equipment available and select whichever method(s) that will have the least impact on watercourses. • Construction in and around watercourses must be restricted to the dryer winter months where possible. • Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction / earthworks in that area. • Where sedimentation has been observed, effective rehabilitation with a focus on the long term control of alien invasive plants should be done. • Monitoring should target the culverts and with outlets in the riparian zone to ensure that no habitat degradation results from these structures during the operational phase. • Remove only the vegetation where essential for construction and do not allow any disturbance to the adjoining natural vegetation cover. • Rehabilitation plans must be submitted and approved for rehabilitation of damage during construction and that plan must be implemented immediately upon completion of construction. • 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. • 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. • 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. • Runoff from the construction area must be managed to avoid erosion and pollution problems. • Monitoring should be done to ensure that sediment pollution is timeously dressed	**LOW**	**Expected to be limited** provided that the mitigation measures are implemented correctly and effective rehabilitation of the site is undertaken where necessary.
The moving of soil and vegetation resulting in opportunistic invasions after	**Direct Impacts:** Introduction and spread of alien vegetation. Invasions of alien plants can impact on hydrology, by reducing the quantity of water entering a watercourse, and outcompete natural vegetation, decreasing the natural biodiversity. Once in a system alien	**MODERATE**	• Undertake an Alien Plant Control Plan which specifies actions and measurable targets • Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction / earthworks in that area and returning it	**LOW**	Expected to be limited provided that alien plants are effectively controlled

ACTIVITY/SOURCES	NATURE OF POTENTIAL IMPACT/RISK	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)	RISK OF THE IMPACT AND MITIGATION NOT BEING IMPLEMENTED
disturbance and the introduction of seed in building materials and on vehicles. Invasions	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. **Indirect Impacts:** 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. **Cumulative Impacts:** Cumulative impacts include further infestation of alien plants. Regular monitoring should be implemented during construction, rehabilitation including for a period after rehabilitation is completed.		where possible afterwards. • Long-term monitoring for 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, as specified in the Alien Vegetation Management Pan • Rehabilitate or revegetate disturbed areas		
Earthworks within the watercourse areas	**Direct Impacts**: Loss and disturbance of watercourse habitat and fringe vegetation Loss and disturbance of watercourse habitat and fringe vegetation including impact on fixed and dynamic ecological processes and impact on key ecosystem regulating and supporting services **Indirect Impacts:** Assuming that earthworks will remain confined to road reserves vegetation clearing will likely not destroy wetland habitat. **Cumulative Impacts:** **Expected to be Low**. Should degradation occur, it may result in a high degree of irreplaceable loss of resources.	**MODERATE**	• Where construction occurs in the demarcated watercourse and buffer, extra precautions should be implemented to so as to minimise watercourse loss. • Other than approved and authorized structure, no other development or maintenance infrastructure is allowed within the delineated watercourse or associated buffer zones. • Demarcate the watercourse areas and buffer zones to limit disturbance, clearly mark these areas as no-go areas • Where sedimentation has been observed, effective rehabilitation with a focus on the long-term control of alien invasive plants should be done. • Ensure that movement corridors enable fauna to migrate through the system	**LOW**	Expected to be limited provided that the mitigation measures are implemented correctly and effective rehabilitation of the site is undertaken where necessary
Construction and operational activities may result in the discharge of solvents and other industrial chemicals	**Direct Impacts:** Changes in water quality due to foreign materials and increased nutrients Construction activities may result in the discharge of solvents and other industrial chemicals, leakage of fuel/oil from vehicles and the disposal of sewage **Indirect Impacts:** resulting in the loss of sensitive biota in the wetlands/rivers and a reduction in watercourse function	**MODERATE**	• Locate the infrastructure outside the calculated buffer zone • 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. • Provision of adequate sanitation facilities located outside of the watercourse area or its associated buffer zone • The development footprint must be fenced off from the watercourses and no related impacts may be allowed into the watercourse e.g. water runoff from cleaning of equipment, vehicle access etc.	**LOW**	

ACTIVITY/SOURCES	NATURE OF POTENTIAL IMPACT/RISK	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)	RISK OF THE IMPACT AND MITIGATION NOT BEING IMPLEMENTED
	Cumulative Impacts: Expected to be low given that standard best practice is followed during construction				
	OPERATIONAL PHASE IMPACTS				
	Direct Impacts Changes in water flow regime • Impacts on hydrological functioning at a landscape level and across the site which can arise from changes to flood regimes (e.g. suppression of floods, loss of flood attenuation capacity, unseasonal flooding or destruction of floodplain processes) as well as the extent of the modification in relation to the overall aquatic ecosystem (i.e. at the source, upstream or downstream portion, in the temporary, seasonal, permanent zone of a wetland, in the riparian zone or within the channel of a watercourse, etc.). Changes to base flow and hydroperiod. **Indirect Impacts:** During the operational phase, the trench and new pipe may create a barrier to natural flow leading to damming up of water behind the new structures, or release of water into preferential flowpaths that lead to erosion downstream. **Cumulative Impacts:** 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.	**MODERATE**	• Effective stormwater management should be a priority during the construction phase. This should be monitored as part of the EMP. High energy stormwater input into the watercourses should be prevented at all cost. Changes to natural flow of water (surface water as well as water flowing within the soil profile) should be taken into account. • Ensure that the activity does not result in downstream erosion or sedimentation	**LOW**	Impacts to the flow characteristics of watercourses are likely to be very significant unless effective mitigation is applied during the construction phase.
Possible sources of the impacts include: ○ Earthwork activities during construction ○ Clearing of surface vegetation ○ Disturbance of soil surface ○ Disturbance of	**Direct Impacts:** Changes in sediment entering and exiting the system Changing the amount of sediment entering water resource and associated change in turbidity (increasing or decreasing the amount). Construction and maintenance activities will result in earthworks and soil disturbance as well as the disturbance of natural vegetation **Indirect Impacts:** • Disturbance of soil surface • Disturbance of slopes through creation of roads and tracks	**LOW**	• Implementation of best management practices • Maintain buffer zones to trap sediments • Monitoring should be done to ensure that sediment pollution is timeously dressed	**LOW**	**Expected to be limited** provided that the mitigation measures are

ACTIVITY/SOURCES	NATURE OF POTENTIAL IMPACT/RISK	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)	RISK OF THE IMPACT AND MITIGATION NOT BEING IMPLEMENTED
slopes through creation of roads and tracks adjacent to the watercourse ○ Erosion (e.g. gully formation, bank collapse	adjacent to the watercourse • Erosion (e.g. gully formation, bank collapse **Cumulative Impacts:** **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 in unintended changes to downstream hydrology. Reversing this process is unlikely and should be prevented in the first place.				implemented correctly and effective rehabilitation of the site is undertaken where necessary.
The moving of soil and vegetation resulting in opportunistic invasions after disturbance and the introduction of seed in building materials and on vehicles. Invasions	**Direct Impacts:** Introduction and spread of alien vegetation. Invasions of alien plants can impact on hydrology, by reducing the quantity of water entering a watercourse, and outcompete natural vegetation, decreasing the natural biodiversity. Once in a system alien invasive plants can spread through the catchment. If allowed to seed before control measures are implemented alien plans can easily colonise and impact on downstream users. **Indirect Impacts:** 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. **Cumulative Impacts:** Since alien vegetation is already present in the catchment, cumulative impacts can be **Moderate to High**. Regular monitoring should be implemented during construction, rehabilitation including for a period after rehabilitation is completed.	**MODERATE**	• 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. • Rehabilitate or revegetate disturbed areas	**LOW**	**Expected to be limited** provided that alien plants are effectively controlled
Earthworks within the watercourse areas	**Direct Impacts:** Loss and disturbance of watercourse habitat and fringe vegetation Loss and disturbance of watercourse habitat and fringe vegetation including impact on fixed and dynamic ecological processes and impact on key ecosystem regulating and supporting services **Indirect Impacts:** Assuming that earthworks will remain confined to road reserves vegetation clearing will likely not destroy wetland habitat.	**LOW**	• Monitoring should target the two minor culverts with outlets in the riparian zone to ensure that no habitat degradation results from these structures during the operational phase. • Monitor rehabilitation and the occurrence of erosion twice during the rainy season for at least two years and take immediate corrective action where needed. • 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	**LOW**	**Expected to be limited** provided that the mitigation measures are implemented

ACTIVITY/SOURCES	NATURE OF POTENTIAL IMPACT/RISK	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)	RISK OF THE IMPACT AND MITIGATION NOT BEING IMPLEMENTED
	Cumulative Impacts: **Expected to be Low.** Should degradation occur, it may result in a high degree of irreplaceable loss of resources		• Operational activities should not impact on rehabilitated or naturally vegetated areas		correctly and effective rehabilitation of the site is undertaken where necessary.
Construction and operational activities may result in the discharge of solvents and other industrial chemicals, leakage of fuel/oil from vehicles and the disposal of sewage	**Direct Impacts:** Changes in water quality due to foreign materials and increased nutrients Operational activities may result in the discharge of solvents and other industrial chemicals, leakage of fuel/oil from vehicles and the disposal of sewage **Indirect Impacts:** resulting in the loss of sensitive biota in the wetlands/rivers and a reduction in watercourse function **Cumulative Impacts:** Decreased water quality from spills of contaminants will contribute to regional water quality decrease, therefore should be considered a significant cumulative impact	**LOW**	• 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. • Maintenance of construction vehicles / equipment should not take place within the watercourse • Measures should be put in place to prevent spills or water contaminated by waste material by for example constructing sumps or drains which can contain any spills in order for contaminated water to be isolated from the watercourse and removed from the site for appropriate disposal • A lined holding tank must have sufficient pumps and other measures to ensure that any spills are contained and can be safely removed without impact to the watercourse. • The design of the holding tank must accommodate 1:50 year flood lines to ensure that realistic flooding does not result in the release of contaminants downstream. • A warning system, for example a float switch with alarm should ensure that any spills are timeously identified. • Any spills should be cleared by effective methods to ensure no release occurs into the watercourse. • Standard Operating procedures, training drills and audits should be put in place and revised annually. • A detailed rehabilitation plan should be drawn up with the input from a water quality, soil contamination assessment and ecologist should any spills occur. • Independent water quality analyses should be undertaken annually, or as specified by an aquatic specialist, to demonstrate and audit compliance of effective pollution control measures	**LOW**	Although it may be controlled and largely prevented, the impact of a single spill will have a significant residual effect on the local watercourse integrity. Residual risks should therefore be considered significant

IMPACTS ON VEGETATION

ACTIVITY/SOURCES	POTENTIAL IMPACTS:	SIGNIFICANCE RATING OF IMPACTS	PROPOSED MITIGATION:	SIGNIFICANCE RATING OF IMPACTS (WITH MITIGATIONS)	RISK OF THE IMPACT AND MITIGATION NOT BEING IMPLEMENTED
CONSTRUCTION PHASE IMPACTS					
Vegetation clearing	**Direct Impacts:** Loss destruction and/or eradication of threatened, near-threatened and declining plant species. These open spaces supported irreversibly modified vegetation in which the ecosystem has been modified completely, with a complete loss of composition and structure. Most of the ecosystem function has been destroyed and the changes are irreversible **Indirect Impacts:** Alien plants are likely to invade the site as a result of the disturbance created during construction **Cumulative Impacts:** Loss of grassland and open space within Gauteng, loss of suitable habitat to plant species of conservation concern and an increase in invasive plant species.	**LOW**	• Prevent spillage of construction material, oils, or other chemicals, strictly prohibit other pollution. Ensure there is a method statement in place to remedy any accidental spillages immediately. • Erosion from the development footprint could increase sedimentation in already degraded watercourses. Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction / earthworks in that area (DWAF, 2005). • Stabilise the riverbank and ensure that no debris, soil or plant material end up in the river west of the site. • Prohibit vehicular or pedestrian access into natural areas beyond the demarcated boundary of the construction area. • Construction camps must be placed outside of the riparian area. • No vehicles may be washed on site. • No vehicles may be serviced or repaired on the property, unless it is an emergency situation in which case adequate spillage containment must be implemented	**LOW**	**Low**
Vegetation clearing	**Direct Impacts** Destruction or degradation of watercourse vegetation The watercourse vegetation was degraded from the natural state and although the vegetation composition and structure has been compromised, the exotic vegetation does play a role in stabilising the soils and limiting flooding. No plant species of conservation concern was recorded, and none were expected to persist in the modified vegetation. **Indirect Impacts:** This will impact on the health and functioning of the vegetation within the watercourse. Construction could also result in pollution of the watercourse.	**LOW**	• The extent of the construction area should be demarcated on site layout plans (restricted to areas identified with low ecological sensitivity), and no vehicles may enter the stream as that will alter the flow regime. • Where active rehabilitation/restoration is mandatory, it should make use of indigenous plant species, and preferably of species native to the study area. The species selected should strive to represent habitat types typical of the ecological landscape prior to construction. • A pre- and post-construction alien and invasive plant eradication and burn control programme must be implemented along with a follow-up programme. The programme must be compiled by a qualified botanist/ecologist and the implementation thereof should be supervised by a qualified botanist/ecologist.	**LOW**	**Low**

ACTIVITY/SOURCES	POTENTIAL IMPACTS:	SIGNIFICANCE RATING OF IMPACTS	PROPOSED MITIGATION:	SIGNIFICANCE RATING OF IMPACTS (WITH MITIGATIONS)	RISK OF THE IMPACT AND MITIGATION NOT BEING IMPLEMENTED
	Cumulative Impacts: Loss of functionality of the vegetation within the watercourse, as well as erosion due to edge effects.		• Limit construction activities to daytime. • No foreign material should be left in the stream. • Construction machinery should be free of leaking oil or nay solvent that will destroy the instream habitat integrity.		
OPERATIONAL PHASE IMPACTS					
Vegetation clearing	**Direct Impacts** Destruction or degradation of watercourse vegetation Threat to the ecological functioning of natural plant communities due to: • Fragmentation of plant communities by destruction of habitat • Reduction in the effective size of habitat/community • Physical destruction of the habitat	**LOW**	• Where active rehabilitation/restoration is mandatory, it should make use of indigenous plant species, and preferably of species native to the study area • The species selected should strive to represent habitat types typical of the ecological landscape prior to construction.	**VERY LOW**	**Low**
	Indirect Impacts: Reduction of indigenous species. Alien plants are likely to invade the site as a result of the disturbance created during construction				
	Cumulative Impacts: Loss of open space within Gauteng				

IMPACTS ON FAUNA

ACTIVITY/SOURCES	POTENTIAL IMPACTS:	SIGNIFICANCE RATING OF IMPACTS	PROPOSED MITIGATION:	SIGNIFICANCE RATING OF IMPACTS (WITH MITIGATIONS)	RISK OF THE IMPACT AND MITIGATION NOT BEING IMPLEMENTED
CONSTRUCTION PHASE IMPACTS					
Vegetation clearing	**Direct Impacts** Destruction of fauna habitat and ecological connectivity **Indirect Impacts:** • Loss and/or displacement of threatened and near-threatened animal species • Impact on natural communities of particular scientific, conservation or educational value • Impact on natural movement of species (dispersal corridors) **Cumulative Impacts:** Indiscriminate and uncontrolled activities within the CBAs could cause sedimentation of the downstream rivers and dams, alter the aquatic environment and impact on downstream environments.	**LOW**	• Intentional killing of any faunal species (in particular invertebrates and snakes) should be avoided by means of awareness programmes presented to the contractor. The contractor should be made aware of the conservation issues pertaining to the taxa occurring on the study area. Any person found deliberately harassing any animal in any way should face disciplinary measures, following the possible dismissal from the site. • Any animal taxa exposed during the construction activities should be captured for later release or translocation to adjacent suitable habitat (along with consultation from the local conservation authorities). This must be done by a suitable environmental officer.	**LOW**	**None**

Vegetation clearing	**Direct Impacts** Disturbance to fauna through noise, vibration and dust
	
	Indirect Impacts:
	• Decrease in biodiversity of natural animal communities
	• Decrease in availability and reliability of food sources for animal communities
	• Threat to the ecological functioning of natural terrestrial communities due to:
	  o Isolation of animal communities by destruction of habitat
	  o Physical destruction of the habitat
		LOW	• Select and utilise quieter equipment where feasible.
			• Ensure dust suppression, through water sprinkling, is applied at time of high dust generation.
			• Any noisy point-sources utilised on site should be enclosed, and all equipment / machinery fitted with silencers where applicable.
			• All equipment / machinery will be serviced and maintained within operating specifications to prevent excessive noise.
				LOW	**None**

ACTIVITY/SOURCES	POTENTIAL IMPACTS:	SIGNIFICANCE RATING OF IMPACTS	PROPOSED MITIGATION:	SIGNIFICANCE RATING OF IMPACTS (WITH MITIGATIONS)	RISK OF THE IMPACT AND MITIGATION NOT BEING IMPLEMENTED
	Cumulative Impacts: None				
OPERATIONAL PHASE IMPACTS					
Vegetation clearing	**Direct Impacts** Destruction of fauna habitat and ecological connectivity	**LOW**	• If maintenance activities are conducted in the area the above management measures are applicable	**VERY LOW**	None
	Indirect Impacts: The limited on-site ESA provides the most significant natural habitat and very limited ecological corridor to fauna in the area but will only be partially affected by the pipeline replacement				
	Cumulative Impacts: Indiscriminate and uncontrolled activities within the CBAs could cause sedimentation of the downstream rivers and dams, alter the aquatic environment and impact on downstream environments.				

IMPACTS ON THE HERITAGE FEATURES

ACTIVITY/SOURCES	POTENTIAL IMPACTS:	SIGNIFICANCE RATING OF IMPACTS	PROPOSED MITIGATION:	SIGNIFICANCE RATING OF IMPACTS (WITH MITIGATIONS)	RISK OF THE IMPACT AND MITIGATION NOT BEING IMPLEMENTED
CONSTRUCTION PHASE IMPACTS					

ACTIVITY/SOURCES	POTENTIAL IMPACTS:	SIGNIFICANCE RATING OF IMPACTS	PROPOSED MITIGATION:	SIGNIFICANCE RATING OF IMPACTS (WITH MITIGATIONS)	RISK OF THE IMPACT AND MITIGATION NOT BEING IMPLEMENTED
Vegetation clearing	**Direct Impacts:** Direct or physical impacts, implying alteration or destruction of heritage features As no sites, features or objects of cultural heritage significance were identified on the project area, there would be no impact as a result of the proposed development.	**LOW**	Nonetheless, some of the heritage resources tend to occur below ground, therefore should graves, fossils or any archaeological artefacts be exhumed during construction, work on the area where the artefacts were found must cease immediately and it should immediately be reported to the police, ECO and heritage practitioner or local museum so that an investigation and evaluation of the finds can be made.	**LOW**	**None**
	Indirect impacts: Impact of cultural heritage resources under threat of the proposed development, is				
	Cumulative impacts: The loss of a number of archaeological sites				
OPERATIONAL PHASE IMPACTS					
No impacts					

OTHER POTENTIAL IMPACTS

ACTIVITY/SOURCES	POTENTIAL IMPACTS:	SIGNIFICANCE RATING OF IMPACTS	PROPOSED MITIGATION:	SIGNIFICANCE RATING OF IMPACTS (WITH MITIGATIONS)	RISK OF THE IMPACT AND MITIGATION NOT BEING IMPLEMENTED
CONSTRUCTION PHASE IMPACTS					

ACTIVITY/SOURCES	POTENTIAL IMPACTS:	SIGNIFICANCE RATING OF IMPACTS	PROPOSED MITIGATION:	SIGNIFICANCE RATING OF IMPACTS (WITH MITIGATIONS)	RISK OF THE IMPACT AND MITIGATION NOT BEING IMPLEMENTED
Vegetation clearing	**Direct Impacts: Visual Impacts** • Pollution may occur due to the llittering and illegal dumping on the site and surrounding areas which can affect the visual character of the site. **Indirect impacts:** None **Cumulative impacts:** As more development establish in the area there will be a change in the visual character of the area from agriculture use to mixed land use.	**LOW**	• 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. • Bare surfaces must be rehabilitated as soon as possible with indigenous vegetation that will be able to grow in the area; • The landscape must be rehabilitated in such a way that it corresponds to the surrounding topography; • Manage construction activities in accordance with the accepted/ approved construction EMPr. • Screen Construction site from neighbouring area by means of a fence and opaque cover/sheeting • Ensure appropriate housekeeping • No construction rubble, construction material, refuse, litter or any other material not found naturally in the surroundings should be allowed at any time to be lying around on the construction site	**LOW**	**None**
	Direct Impacts: Noise Impacts • Increase in noise pollution due to, among others, excavations and site clearing, noise from construction vehicles and construction staff and or drilling activities. • Noise pollution caused during construction could potentially be a nuisance to neighbouring residential areas. **Indirect impacts:** None **Cumulative impacts:** As more development establish in the area there is a possibility that the	**LOW**	• Construction activities must be limited to normal working hours and according to municipal bylaws, i.e. working hours must be limited to weekdays only. • If construction is required on the weekend; permission from adjacent landowners will be required prior to construction. • 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. • 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. • Construction activities must abide by the national noise laws and the municipal noise by-laws with regard to the abatement of noise caused by mechanical equipment. • Introduce a formal recording system/grievance mechanism to capture public	**LOW**	**None**

ACTIVITY/SOURCES	POTENTIAL IMPACTS:	SIGNIFICANCE RATING OF IMPACTS	PROPOSED MITIGATION:	SIGNIFICANCE RATING OF IMPACTS (WITH MITIGATIONS)	RISK OF THE IMPACT AND MITIGATION NOT BEING IMPLEMENTED
	ambient noise levels may change from that of agriculture/residential area to mixed use developed area.		perceptions and complaints with regard to noise impact.		
	Direct Impacts: Air Quality Construction activities have the potential to be sources of fugitive dust on site. These include: • Dust from access roads. • Dust from area cleared for construction. • Emissions from construction machinery and equipment. Trucks transporting spoil and fill material. **Indirect impacts:** None **Cumulative impacts:** None	**LOW**	• Dust suppression measures must be implemented on access roads and working areas during dry periods. • Water used for this purpose must be in quantities that do not result in the generation of run-off. • Adherence to speed limits on site roads to prevent the liberation of dust into the atmosphere must be enforced • All site workers will need to wear the appropriate PPE • Transported material that can be blown off as dust must • Contractor to provide method statement of site-specific dust control measures • A speed limit of 40km/h to be maintained on all dirt roads. • Dust suppression by means of either water or biodegradable chemical agent is required.	**VERY LOW**	None
	Direct Impacts: Traffic Impacts • Anticipated impact on traffic owing to construction vehicles and heavy vehicles delivering materials to the site. • Traffic congestion in and around the area may offend neighbouring property owners during the construction phase. **Indirect impacts:** None **Cumulative impacts:** Possible traffic congestion or delays if no mitigation measures are implemented	**LOW**	The approval is subject to the following: • Construction vehicles are not to be parked on the roads thereby blocking the way to the neighbouring properties. • Clear signs should be displayed and entrance to the site indicating a construction site and turning construction vehicles. • Construction vehicles are to avoid main roads during peak traffic hours and mitigation measures outlined in the EMPr are to be implemented. • Ensure an appropriate access procedure to avoid backlog of traffic at the entry point to the site	**VERY LOW**	None
	Direct Impacts: Employment Opportunities In terms of employment opportunities, the following should be	**LOW**	**Enhancement:** • It is recommended that local employment policy is adopted to maximize the	**LOW**	None

ACTIVITY/SOURCES	POTENTIAL IMPACTS:	SIGNIFICANCE RATING OF IMPACTS	PROPOSED MITIGATION:	SIGNIFICANCE RATING OF IMPACTS (WITH MITIGATIONS)	RISK OF THE IMPACT AND MITIGATION NOT BEING IMPLEMENTED
	considered: • The number of jobs that would be created during the construction and operational phase of the proposed project; and • The extent to which certain groups such as the unemployed, disadvantaged and minority groups could be employed. • Typical of a project of this nature, some specialised skills are required although some opportunities for local labour in the unskilled and semi-skilled categories would be available even if only of a limited nature. At this stage the extent of labour required is not finalised.		opportunities made available to the local labour force. • Training and skills development programmes should be provided to all employees. • The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.		
	Indirect impacts: Economic multiplier effects from the use of local contractors such as (waste transporters and security personnel used to provide services on site)				
	Cumulative impacts: Possible economic boost				

2.2 ALTERNATIVES

It is worth noting that both design alternatives of culvert as discussed in Section A (3) are proposed in the same receiving environment and therefore will be assessed together in section 2.1 above as impacts will be similar. It is for this reason that the section will not be duplicated.

2.3 NO GO OPTION

Table 6: Potential impacts should the development not be Approved "**No-Go" Alternative**

Potential impacts:	**Significance rating of impacts (positive or negative):**	**Proposed mitigation:**	**Significance rating of impacts after mitigation:**	**Risk of the impact** and **mitigation not being implemented**
Impact on Aquatic Biodiversity	Low (+ve)	There are no mitigation measures	Negligible	**No risk**
Impact on Fauna and flora	Low (+ve)	There are no mitigation measures	Negligible	No risk
Visual Impacts	Low (+ve)	There are no mitigation measures	Negligible	No risk
Noise Impacts anticipated	Low (+ve)	No noise disturbance to neighboring residential estate	Negligible	Low
Loss and disturbance of heritage sites due to the development.	Low (-ve)	There are no mitigation measures	Negligible	No risk
Social impacts	Low (-ve)	There would have to be alternative employment opportunities	Negligible	No risk

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

- Aquatic Biodiversity and Wetland Assessment
- Ecology (Fauna & Flora) Assessment
- Heritage Assessment

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

- The information provided by the client forms the basis of the planning and layouts discussed.
- All wetlands within 500 m of any developmental activities should be identified as per the DWS Water Use Licence application regulations. Wetlands within the study sites were delineated on a fine scale based on detailed soil and vegetation sampling. Wetlands that fall outside of the site, but that fall within 500 m of the proposed activities were delineated based on desktop analysis of vegetation gradients visible from aerial imagery.
- The detailed field study was conducted from a once off field trip and thus would not depict any seasonal variation in the wetland plant species composition and richness.
- Description of the depth of the regional water table and geohydrological and hydropedological processes falls outside the scope of the current assessment
- Floodline calculations fall outside the scope of the current assessment
- A Red Data scan, fauna and flora, and aquatic assessments were not included in the current study

3. IMPACTS THAT MAY RESULT FROM THE DECOMISSIONING AND CLOSURE PHASE

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

Proposed and Alternative Designs

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

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

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

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

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

4. CUMULATIVE IMPACTS

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

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

- Changes in water flow: 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.
- Changes in sediment entering and exiting the system **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 in unintended changes to downstream hydrology. Reversing this process is unlikely and should be prevented in the first place.
- Introduction and spread: Since alien vegetation are already present in the catchment, cumulative impacts can be **Moderate to High**. Regular monitoring should be implemented during construction, rehabilitation including for a period after rehabilitation is completed.
- Changes in water quality: Decreased water quality from spills of contaminants will contribute to regional water quality decrease, therefore should be considered a significant cumulative impact
- Loss of functionality of the vegetation Loss of functionality of the vegetation within the watercourse, as well as erosion due to edge effects is expected to be low
- Cumulative Impacts on the socio-economic up-liftment as a result of the proposed development (Positive Impact), cconstructing the proposed development will result in additional jobs being created in the area and skills development during the construction phase. Due to the high unemployment rate in the study area. The positive impact will be very low positive but with enhancement it can be low positive.

*Generally, the **cumulative impact** is rated as **Low** fort the larger part of the project as it falls within developed areas, however the cumulative impacts on the wetland area could be medium significance should mitigation measure not be implemented as changes made to the bed or banks of watercourse and 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.*

5. ENVIRONMENTAL IMPACT STATEMENT

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

Proposal

The following **conclusions were drawn from the specialist studies** undertaken within this Basic Assessment:

Aquatic Biodiversity & Wetland Assessment:

The bridge earmarked for rehabilitation extends across a tributary of the Sandspruit located in an urbanized area is significantly impacted by alien vegetation, impoundments, bank stabilization and other structures. The rehabilitation of the current bridge in Canterbury Crescent could potentially impact the watercourse during the construction phase by temporary changes to aquatic and riparian habitat. Effective design and rehabilitation will be required to ensure that operational phase impacts are limited to the low category.

Terrestrial ecology (Flora & Fauna assessment)

It was evident from the ground-truthing that the study site has been fully modified due to the nature of the property, which is a manor. The habitat present is only a stream and the rest are a recreational park. As such the riparian zones of the stream was cleared to create this park. The instream habitat has been modified by the construction of gabions to channel water to the flow modification structure in a form of a low bridge. The stream is flowing below the bridge concrete. At the marginal zone of the upper stream ornamental plants have been planted whereas down steam lower riparian zone is boarded by a property fence. The latter is true for the other side of the upper stream. Downstream the stream flows into pond in a golf course. The stream is not part of NFEPA and is not a tributary of any NFEPA. There was no odonates flying by the stream but birds with nest. The aquatic vegetation present is Phragmites australis with ornamental grass invading the marginal zone of the stream. This altering of the landscape had made delineation of the wetland difficult since it is just water flowing on an island. The terrestrial insect seen was only an unidentified beetle.

Heritage assessment:

The cultural landscape qualities of the region are made up of a pre-colonial element consisting of limited Stone Age occupation and much more densely Iron Age occupation, as well as a much later colonial (farmer) component, which eventually gave rise to an urban component. During the physical survey, no sites, features or objects of cultural significance were identified. From a heritage point of view, it is recommended that the proposed development be allowed to continue on acceptance of the conditions proposed below.

Should archaeologically sites or graves be exposed in other areas during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.

Overall Conclusion:

Based on the environmental assessment presented, it is a conclusion of this Basic Assessment that the proposed project will have relatively low impacts on the environment as the conversion of most of the landscape to a park and residential development has made this landscape to be ecologically poor. Poor availability of

expected flora and the introduction of terrestrial vegetation on the stream riparian zones has reduced the sensitivity of this landscape to., this implies that the significance of most impacts on site from an environmental perspective is considered to be of low significance. The only sensitive area in this study is the stream due to the strict law pertaining aquatic habitat. The probability of impact due to the rehabilitation of the bridge is rated as 2 due to the current instream interference. The ecological integrity of this steam is rated as 3.

The mitigation measures proposed in section E (2) of this report are intended to prevent further degradation to watercourses as a result of the proposed replacement of the pipeline within this urbanised area and should be read in conjunction with the accompanying General Rehabilitation and Monitoring report included in Appendix H. The details of the mitigation measures that are finally put in place should ideally be based on these issues, but must necessarily take into consideration the physical and economic feasibility of mitigation. It is important that any mitigation be implemented in the context of an Environmental Management Plan in order to ensure accountability and ultimately the success of the mitigation.

Alternative 1

See above, the impacts of alternatives are similar and therefore are not comparatively assessed.

Alternative 2

See above, the impacts of alternatives are similar and therefore are not comparatively assessed.

6. IMPACT SUMMARY OF THE PROPOSAL AND ALTERNATIVE

For Proposal

A summary of the impact assessments is presented in **Table 7 and 8**; the tables cover the construction and operational impacts. An overall weighted score is provided in each case. Thus far each of the environmental issues are assigned equal weighting (I.e. the weighted score is the average of each of the individual scores. The impact scores are also colour coded according to the following:

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

It must be noted that the impact scores in **Table 7 & 8** below are not intended to be definitive measures of environmental impact, but they are a useful guide to evaluating the overall environmental performance of a new development and they assist in interpreting key influences of a development

Table 7: Impact Summary table**: CONSTRUCTION PHASE**

Environmental Aspect	Without Mitigation	With Mitigation

IMPACT ON THE AQUATIC BIODIVERSITY		
Changes in water flow regime	Medium	Low
Changes in sediment entering and exiting the system	Medium	Low
Introduction and spread of alien vegetation.	Medium	Low
Loss and disturbance of wetland habitat and fringe vegetation.	Medium	Low
Changes in water quality due to foreign materials and increased nutrients.	Medium	Low
IMPACT ON VEGETATION		
Loss destruction and/or eradication of threatened, near-threatened and declining plant species.	Low	Low
Destruction or degradation of vegetation associated with watercourses	Low	Low
IMPACTS ON FAUNA		
Destruction of fauna habitat and ecological connectivity	Low	Low
Disturbance to fauna through noise, vibration and dust	Low	Low
HERITAGE IMPACT		
Loss and disturbance of heritage sites due to the development.	Low	Low
OTHER POTENTIAL IMPACTS		
Visual Impacts	Low	Low
Noise Impacts anticipated	Low	Low
Air Quality impacts	Low	Low
Traffic impacts	Low	Low
Employment Opportunities	Low	Low

Table 8: Impact Summary table**: OPERATIONAL PHASE**

Environmental Aspect	Without Mitigation	With Mitigation
IMPACT ON THE AQUATIC BIODIVERSITY		
Changes in water flow regime.	Medium	Low
Changes in sediment entering and exiting the system	Low	Low
Introduction and spread of alien vegetation.	Medium	Low
Loss and disturbance of wetland habitat and fringe vegetation.	Low	Low
Changes in water quality due to foreign materials and increased nutrients.	Low	Low
IMPACT ON VEGETATION		
Loss destruction and/or eradication of threatened, near-threatened and declining plant species.	Low	Low
Destruction or degradation of vegetation associated with watercourses	Low	Low
IMPACTS ON FAUNA (Terrestrial)		
Destruction of fauna habitat and ecological connectivity	Low	Low
Disturbance to fauna through noise, vibration and dust	Low	Low
Hindrance, trapping, killing of fauna	Low	Low

For alternative:

Please refer to **Table 7 & 8**

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.

Having assessed the impacts of all three culvert methods to be employed for the bridge, in all cases, the recorded impacts before mitigation were Medium-Low and without mitigation, impacts can be reduced to Low with the recommended mitigation measures. Cognisant of the above-mentioned conclusions established through the basic assessment investigation, there were areas of environmental sensitivity identified on the project site i.e. watercourses and wetlands these are shown in the environmental sensitivity map (refer to Appendix A).

The significance levels of the majority of identified negative impacts for all alternatives investigated can generally be reduced to acceptable **low significance** levels thus, the proposed developments (i.e. Proposal – Adding new box culvert opening) could proceed provided that the mitigation measures set out in this report and in the EMPr and the Rehabilitation Plan (Appendix H) are diligently implemented to limit the potential impacts on vegetation, watercourses and social during construction and operation of the developments.

7. SPATIAL DEVELOPMENT TOOLS

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

Provincial Spatial Development Framework (PSDF)
The Gauteng PSDF is a provincial and strategic planning policy that responds to and complies with in particular the National Development Plan vision 2030 and the National Spatial Development Perspective (NSDP). This framework promotes a developmental state in accordance to the principals of global sustainability as is stated by among others, the South African constitution and enabling legislation. The Gauteng PSDF is based on six growth and development pillars, each of which has its onset of drivers with long term-programmes. Pillar 1 highlights the job creation. The proposed development will create jobs opportunities during the construction phase, these employment opportunities will target local community members that are usually excluded from mainstream economic and formal employment. Therefore, the development is in line with the Gauteng PSDF.
Integrated Development Plan (IDP) and Spatial Development Framework (SDF) of the Local Municipality (e.g. would the approval of this application compromise the integrity of the existing approved and credible municipal IDP and SDF?).
The study area falls within the **City of Johannesburg Metropolitan Municipality Region E**. According to the CoJ

IDP 2018/19 *The city's total infrastructure backlog stands at R170 billion composed of collapsing bridges, city pavements that are in a poor condition, potholes, burst water pipes and ailing substations. Finding effective solutions to these basic infrastructural problems is crucial, particularly if the City is show increased economic growth and cater to the needs of its poorest and most vulnerable citizens. Despite a requirement to renew approximately 2% of the water network per year, the City has historically renewed only about 0.2% thereof. This decay is reflected in available data from 2016/17 which shows that the water network suffered 45 000 bursts for the year have reached 31% and there are currently 371 leaks per kilometre of water pipes. This is despite the fact we know that water will be one of the greatest challenges in our future".*

The proposed development will therefore not compromise the IDP objectives but would rather assist the Local Municipality in achieving the performance areas as identified by the Local Municipality, namely growth in the region and creation of more employment opportunities as well as through the improvement of public services and broadening access to communities and thereby improving quality of living which is further aligned with achieving the goal of opportunity in terms of economic growth and employment which also entails access to basic services, social infrastructure and quality environment. Furthermore, the Municipality aims to achieve inclusivity which aims to integrate communities and improve transport corridors and human settlements. One such priority for the Municipality is the improvement of mobility corridors with specific reference to proposed development (road infrastructure). The Municipality seeks to address past spatial planning imbalances by bringing services and economic opportunities close to previously disadvantaged areas.

8. RECOMMENDATION OF THE PRACTITIONER

Is the information contained in this report and the documentation attached hereto sufficient to make a decision in respect of the activity applied for (in the view of the Environmental Assessment Practitioner as bound by professional ethical standards and the code of conduct of EAPASA).	**YES**

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

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

This Draft BAR has provided a comprehensive assessment of the potential environmental impacts associated with Proposed Rehabilitation and Upgrade of the Canterbury Crescent Bridge in Gallo Manor Ext 1. It is the opinion of the EAP and various specialists that there are no environmental or social impacts of high significance that would prevent the establishment of the proposed project, **it is therefore recommended that the project propopal should be authorised for implementation.** The authorisation must be subjected to the following conditions:

- A final detailed layout must be submitted to the relevant authority for approval prior to commencement with the project;
- The Environmental Management Programme (EMPr) as contained within **Appendix H** of this report should form part of the contract with the Contractors appointed to construct and maintain the proposed power line, and will be used to ensure compliance with environmental specifications and management measures. The implementation of this EMPr for all life cycle phases of the project is considered to be key in achieving the appropriate environmental management standards as detailed for this project.
- An independent Environmental Control Officer (ECO) should be appointed to monitor compliance with the

specifications of the EMPr for the duration of the construction period.

- Implementation of the Wetland Rehabilitation Plan
- An appropriate stormwater management plan must be developed and implemented to the site. Adequate measures must be put in place to prevent polluted runoff water from entering the, wetland and soil, thus preventing surface and groundwater pollution;
- The relevant authorisations and water use licenses must be obtained from Department of Water Affairs prior to the commencement of construction activities. No activities may proceed within or in proximity to watercourses without a Water Use License permitting the activity.
- The protected species found onsite can only be removed once a permit for the removal or relocation of such species were granted by the GDARD.
- All relevant legislation and requirement of other government departments (National, Provincial), in particular of Section 28 (duty of care) of NEMA, must be complied with
- In the event of a major incident (e.g. fire causing damage to property and environment, major spill or leak of contaminants), the relevant authorities should be notified as per the notification of emergencies/ incidents, as per the requirements of NEMA.
- Compliance with all legal requirements in relation to environmental management and conditions of the authorisation issued by GDARD.

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

According to the City of Johannesburg IDP 2014/2015, the upgrade of roads and bridge infrastructure was identified by Johannesburg Road Agency SOC Limited (hereafter referred to as JRA) as one of the infrastructures that requires attention. The IDP further highlights bridge and stormwater management and associated river catchments as one of the serious constraints in improving the City's infrastructure. As a result of flooding caused by heavy rainfall, many of the city's bridges and associated infrastructure have been severely damaged. The JRA has identified the Canterbury Crescent Bridge amongst the infrastructure affected after functional deficiencies were noted as the structure stands presently.

The purpose of the rehabilitation and upgrade is thus to improve the current structure to allow for a safe crossing for pedestrians, motorists, and cyclists over the river.

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

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

11. THE PERIOD ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR)

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

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

EMPr attached	**YES**

SECTION F: APPENDICES

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

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

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

Appendix A: Site plan(s)
Appendix B: Photographs
Appendix C: Facility illustration(s)
Appendix D: Route position information
Appendix E: Public participation information
Appendix F: Water use license(s) authorisation, SAHRA information, service letters from municipalities, water supply information
Appendix G: Specialist reports
Appendix H: EMPr
Appendix I: Other information

CHECKLIST

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

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