

Proposed Upgrade of Albert Luthuli Drive in eMbalenhle Township, Govan Mbeki Municipality, Mpumalanga

DRAFT BASIC ASSESSMENT REPORT



DEDET REFERENCE NUMBER:17/2/3GS-210

February 2014



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the dedet

Department:
Economic Development, Environment and Tourism
MPUMALANGA PROVINCIAL GOVERNMENT

**Basic assessment report in terms of the
Environmental Impact Assessment Regulations, 2010, promulgated in terms
of the National Environmental Management Act, 1998(Act No. 107 of 1998),
as amended.**

(For applicant / EAP to complete)

File Reference Number:

Project Title:

Name of Responsible Official:

(For official use only)

NEAS Reference Number:

Date Received:

Kindly note that:

- Required information 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. Tables can be extended as each space is filled with typing.
- Where applicable **black out** the boxes that are not applicable in the form.
- An incomplete report may be returned to the applicant for revision.
- 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 rejection of the application as provided for in the regulations.
- All reports (draft and final) must be submitted to the Department at the address of the relevant **DISTRICT OFFICE** given below or by delivery thereof to the relevant **DISTRICT OFFICE**. Should the reports not be submitted at the relevant district office, they will not be considered.
- No faxed or e-mailed reports will be accepted.
- One copy of the draft version of this report must be submitted to the relevant district office. The case officer may request more than one copy in certain circumstances.
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 - Unless protected by law, all information in the report will become public information on receipt by the competent authority. Any interested and affected party should be provided with the information contained in this report on request, during any stage of the application process.
 - All specialist reports must be appended to this document, and all specialists must complete a declaration of independence, which is obtainable from the Department.

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Applications to be sent direct to district office

TITLE AND APPROVAL PAGE

TITLE: Upgrade of Albert Luthuli Drive in eMbalenhle Township,
Mpumalanga

CLIENT: Govan Mbeki Municipality

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05 February 2014

Signature

Date

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1. DOCUMENT ROADMAP

The Basic Assessment (BA) Report for the proposed upgrade of Albert Luthuli Drive in eMbalenhle Township, Mpumalanga aims to satisfy all requirements stipulated in GN.R. 543. of 18 June 2010 (EIA Regulations, 2010). To this end, the following table provides the composition of the BA report together with the requirements from the aforementioned legislation.

Table 1: Document Roadmap

CORRELATION WITH GN No. R. 543 (EIA REGULATIONS)				
Chapter	Title	Section	Description	Included
1	Document Roadmap			
2.1	Project Background and Motivation			
2.1	Project Location	22(c)	A description and a map of the property on which the activity is to be undertaken and the location of the activity on the property, or, if it is— (i) a linear activity, a description of the route of the activity; or (ii) an ocean-based activity, the coordinates within which the activity is to be undertaken.	
2.1	Project Description	22(b)	A description of the proposed activity.	
2.2	Need & Desirability	22(g)	A description of the need and desirability of the proposed activity.	
3	Legislation and Guidelines considered	22(e)	An identification of all legislation and guidelines that have been considered in the preparation of the basic assessment report.	
4	Basic Assessment Process			
5	Assumptions and Limitations	22(m)	A description of any assumptions, uncertainties and gaps in knowledge.	
6	Environmental Assessment Practitioner	22(a)	Details of the EAP who prepared the report; and the expertise of the EAP to carry out basic assessment procedures.	
7	Alternatives	22(h)	A description of any identified alternatives to the proposed activity that are feasible and reasonable, including the advantages and disadvantages that the proposed activity or alternatives will have on the environment and on the community that may be affected by the activity.	
8	Description of the Receiving Environment	22(d)	A description of the environment that may be affected by the proposed activity and the manner in which the geographical, physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed activity.	
9	Summary of Specialist Studies	22(k)	Any inputs and recommendations made by specialists to the extent that may be necessary.	

10	Public Participation	22(f)	Details of the public participation process conducted in terms of regulation 21(2)(a) in connection with the application, including— (i) the steps that were taken to notify potentially interested and affected parties of the proposed application; (ii) proof that notice boards, advertisements and notices notifying potentially interested and affected parties of the proposed application have been displayed, placed or given; (iii) a list of all persons, organisations and organs of state that were registered in terms of regulation 55 as interested and affected parties in relation to the application; and (iv) a summary of the issues raised by interested and affected parties, the date of receipt of and the response of the EAP to those issues;	
11	Methodology used to determine significance of Environmental Impacts			
11	Impact Assessment and Mitigation	22(i)	A description and assessment of the significance of any environmental impacts, including— (i) cumulative impacts, that may occur as a result of the undertaking of the activity or identified alternatives or as a result of any construction, erection or decommissioning associated with the undertaking of the activity; (ii) the nature of the impact; (iii) the extent and duration of the impact; (iv) the probability of the impact occurring; (v) the degree to which the impact can be reversed; (vi) the degree to which the impact may cause irreplaceable loss of resources; and (vii) the degree to which the impact can be mitigated;	
		22(j)	Any environmental management and mitigation measures proposed by the EAP.	
12	Environmental Impact Statement		An environmental impact statement which contains— (i) a summary of the key findings of the environmental impact assessment; and (ii) a comparative assessment of the positive and negative implications of the proposed activity and identified alternatives.	
12	Opinion of the Environmental Assessment Practitioner	22(n)	A reasoned opinion as to whether the activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation.	
13	References			
-		22(r)	Any specific information required by the competent authority.	None
-		22(s)	Any other matters required in terms of sections 24(4)(a) and (b) of the Act.	None
Appendix 7	Environmental Management Programme	22(l)	An environmental management programme containing the aspects contemplated in regulation 33.	

N/A	Comments and Response Report	22(o)	Any representations and comments received in connection with the application or the basic assessment report.	No comments received from I&APs to date. After the review of the Draft BAR and WULA has been completed, the Comments and Response Report will be updated accordingly.
		22(q)	Any responses by the EAP to those representations, comments and views.	
N/A	Meeting Minutes	22(p)	The minutes of any meetings held by the EAP with interested and affected parties and other role players which record the views of the participants.	No correspondence and minutes to date. After the review of the Draft BAR and WULA has been completed, the correspondence and minutes will be updated accordingly.
		22(q)	Any responses by the EAP to those representations, comments and views.	
Appendix5	Specialist Studies report		Copies of any specialist reports and reports on specialised processes complying with regulation 32.	

2. PROJECT BACKGROUND AND MOTIVATION

2.1. Project Background

2.1.1. Background Information

Project applicant:	Govan Mbeki Municipality		
Trading name (if any):	-		
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E-mail:	kristyr@nemai.co.za		
Qualifications:	MSc in Environmental Sciences (Wits 2012-2013)		
Professional affiliations (if any):	Company is IAIA affiliated		

2.1.2. Detailed Description of the Proposed Activity

Describe the activity, which is being applied for, in detail. The description must include the size of the proposed activity (or in the case of linear activities, the length) and the size of the area that will be transformed by the activity.

The current Albert Luthuli Drive provides for poor accessibility within the township and attention is needed to improve the quality of the road. The project will involve the upgrade of Albert Luthuli Drive in eMbalenhle Township as well as a new storm water network system.

The length of the road upgrade is 1.8km. The road is currently identified as a bus route and acts as a local distributor within the township. The upgrade of the first 2km length of the road is already currently under construction (known as Phase 1 and Phase 2) and the remaining 1.8km of road will be upgraded as Phase 3. Phase 3 is defined as the upgrading of 1.8km of Albert Luthuli Drive from the intersection of Albert Luthuli Drive (West – East Bound/End of Phase 2) to and including the intersection with Bhani Drive (R546). The current road reserve is $\pm 20\text{m}$ wide within the township and $\pm 40\text{m}$ on the north eastern boundary and the road reserves will remain unchanged. The upgrade is within an existing road reserve and occurs within 32m of Trichardtspruit and Kleinspruit rivers.

The project will include the provision of public transport facilities:

- Bus embayments
 - On street embayments will be a minimum length of 36m excluding entry and exit tapers.
- Pedestrian walkways
 - A 1.2m wide paved pedestrian walkway (paving block) is proposed on both sides of the road.

Other aspects included in the road development:

- Design of road levels and road embankments- for water draining
- Kerbs to prevent vehicular traffic from cutting corners and to enhance pedestrian safety
- Road signs, markings, and speed limits-enhance road safety

In addition to the upgrade of the existing road, an upgrade of the storm water channel will also be undertaken. Currently, a lined trapezoidal channel intercepts storm water at the intersection of Albert Luthuli Drive (at Albert Luthuli S-N bound and Albert Luthuli W-E bound), it then runs down Albert Luthuli in a north easterly direction where it turns eastward at 5th Street and then discharges into an open channel near the R546. The majority of the channel is silted and filled with debris and rubbish therefore road maintenance is problematic in the area which leads to the storm water systems not operating correctly. In addition to the poor maintenance, the storm water channel has very flat grades. The open channel also poses a safety risk to the community as there are no guard rails or pedestrian fences.

The storm water network will be extended up Albert Luthuli Drive. Failure to do this will result in excessive runoff discharging onto Albert Luthuli Drive which will be difficult to intercept with the new proposed kerb inlets. There are three storm water channels that will be developed for discharging from Albert Luthuli Drive. Channel 1 will be discharged along 5th Street into the existing open channel. Channel 2 will be discharged into the existing Kleinspruit stream. Channel 3 will be discharged along Bhani Drive into the Kleinspruit existing stream.

Nemai Consulting has been appointed by Govan Mbeki Municipality to undertake the requisite Environmental Authorisation Process for the proposed upgrade of Albert Luthuli road and associated storm water infrastructure. The proposed storm water infrastructure development triggers activities listed in Government Notices No. R 544 and hence requires a basic assessment study as per the August 2010 Environmental Impact Assessment (EIA) Regulations promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998). The upgrade of Albert Luthuli road falls within an existing road servitude therefore no Listed Activity is triggered for this development, only for the storm water infrastructure.

2.1.3. Property/Site Description

Provide a full description of the preferred site alternative (farm name and number, portion number, registration division, erf number etc.):

Albert Luthuli Drive is located in the eMbalenhle township approximately 15km south-west of Secunda. The road occurs in an approved road reserve. However, the 21 digit reference numbers for the properties through which the road traverses are provided separately in **Appendix 1**.

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

	Latitude (S):		Longitude (E):	
Storm water Discharge Point 1	26°	33'33.786"S	29°	05'25.678"E
Storm water Discharge Point 2	26°	33'18.919"S	29°	05'19.403"E
Storm water Discharge Point 3	26°	33'10.808"S	29°	04'57.493"E

In the case of linear activities:

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

	Latitude (S):		Longitude (E):	
	26°	34'00.520"S	29°	05'13.330"E
	26°	33'33.767"S	29°	05'21.616"E
	26°	34'01.646"S	29°	05'00.054"E

The Albert Luthuli road upgrade will be located within the existing road servitude located in eMbalenhle Township, Mpumalanga (Figure 1) therefore no listed activities are triggered for this development according to the EIA Regulations of 2010 (GN No. R543 of 18 June 2010) in terms of the National Environmental Management Act (NEMA) of 1998 (Act No. 107 of 1998). The site falls within the Govan Mbeki Local Municipality and Gert Sibande District Municipality (See **Appendix 2A** for locality maps).

The Albert Luthuli storm water infrastructure upgrade development will be located within the existing road servitude but also outside the servitude (Figure 2) therefore triggering Listed Activities 37, 39 and 40 of the EIA Regulations of 2010 in terms of NEMA of 1998. The storm water infrastructure consists of three discharge points which will discharge storm water into existing river channels which triggers Listed Activities 11 and 18 of the EIA Regulations of 2010 in terms of NEMA of 1998 (See **Appendix 2B**). These Listed Activities will be discussed in Section 4.

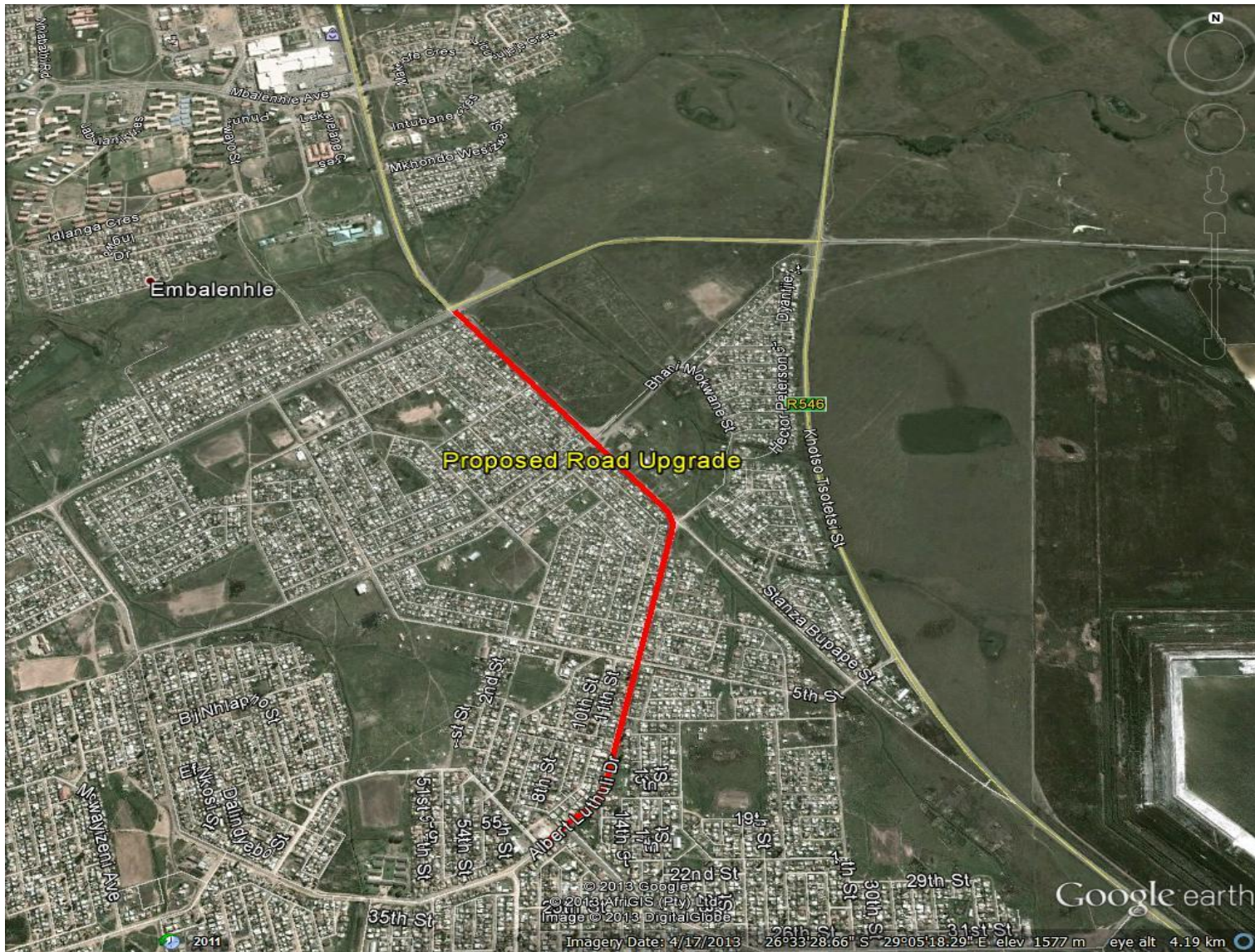


Figure 1: Map showing the proposed road upgrade of Albert Luthuli Drive

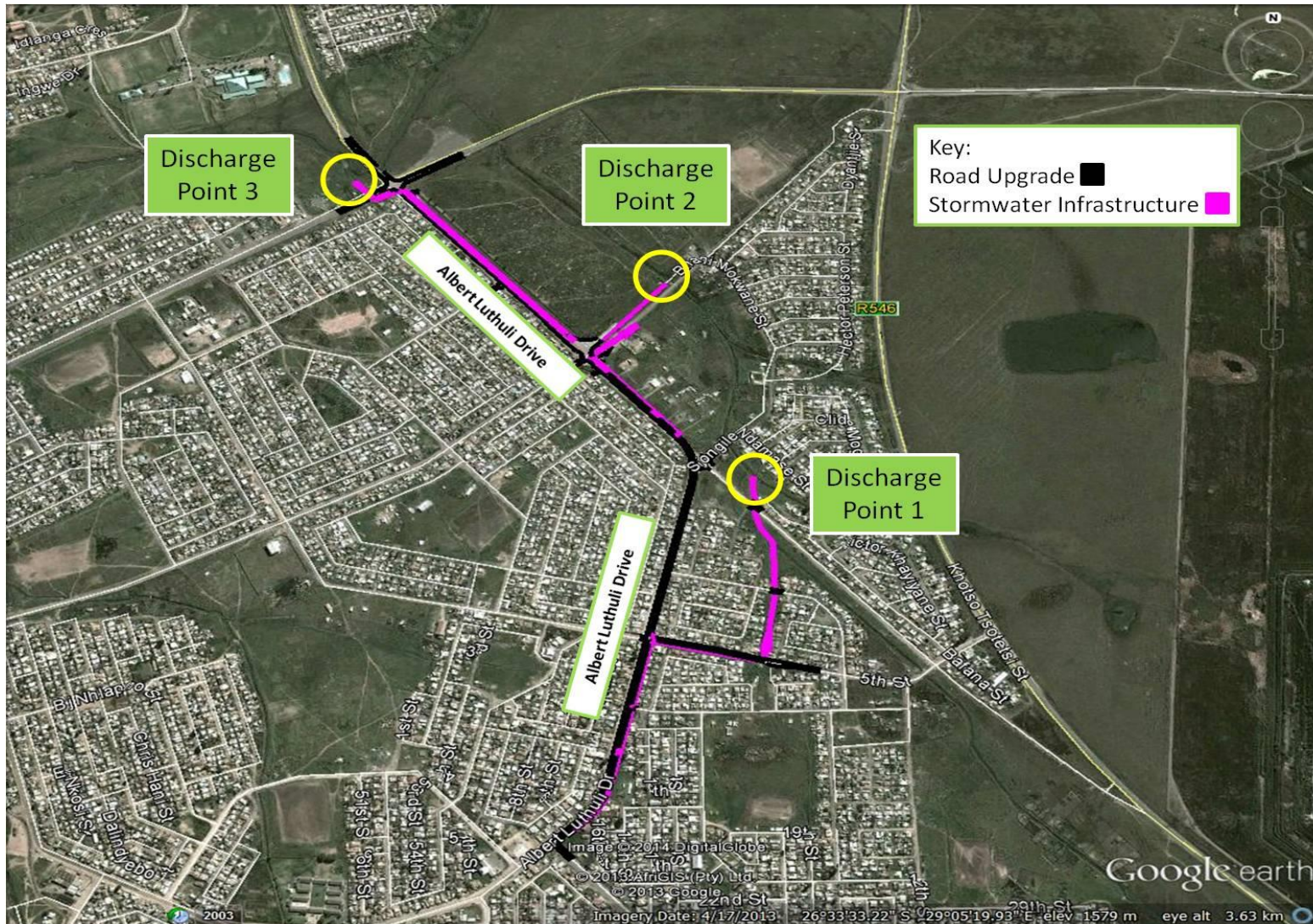


Figure 2: Map showing the proposed storm water infrastructure upgrade of Albert Luthuli Drive

SITE OR ROUTE PLAN

A detailed site or route plan(s) must be prepared for each alternative site or alternative activity. It must be attached as an appendix to this document.

The site or route plans must be at least A3 and must include the following:

- 6.1 a reference no / layout plan no., date, and a legend / land use table
- 6.2 the scale of the plan which must be at least a scale of 1:2000;
- 6.3 the current land use as well as the land use zoning of each of the properties adjoining the site or sites;
- 6.4 the exact position of each element of the application as well as any other structures on the site;
- 6.5 the position of services, including electricity supply cables (indicate above or underground), water supply pipelines, boreholes, street lights, sewage pipelines, storm water infrastructure and telecommunication infrastructure;
- 6.6 all indigenous trees taller than 1.8 metres and all vegetation of conservation concern (protected, endemic and/or red data species);
- 6.8 servitudes indicating the purpose of the servitude;
- 6.9 sensitive environmental elements within 100 metres of the site or sites including (but not limited thereto):
 - watercourses and wetlands;
 - the 1:100 year flood line;
 - ridges;
 - cultural and historical features;
- 6.9 10 metre contour intervals

Please note that the proposed Albert Luthuli road and storm water infrastructure development consists of three discharge points which are the only part of the development that trigger a Basic Assessment Process. Thus the site has been divided into three sections, each at a scale at 1:2 000. The maps for each of the discharge points have been divided into a) Route Plan (please refer to **Appendix 2C**) and b) Sensitivity Route Plan (please refer to **Appendix 2D**) as required by the statement above.

SITE PHOTOGRAPHS

Colour photographs from the centre of the site must be taken in at least the eight major compass directions with a description of each photograph. Photographs must be attached as an appendix to this form.

Please refer to Appendix 3.

FACILITY ILLUSTRATION

A detailed illustration of the activity must be provided at a scale of 1:200 as an appendix 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.

Please refer to Appendix 4.

2.2. Need and Desirability

In terms of Regulation 22(2)(G) of GN No. R543 (18 June 2012), this section discusses the need and desirability of the project. In order to address the need and desirability of the project, the questions raised in the Guideline on Need and Desirability (DEA&DP, 2009) are answered in the table to follow.

Table 2: Need and Desirability of the Project

No.	Question	Response
NEED ('timing')		
1.	Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved Spatial Development Framework (SDF) agreed to by the relevant environmental authority? (i.e. is the proposed development in line with the projects and programmes identified as priorities within the IDP).	Yes, the proposed development is located within the existing road servitude and is therefore in line with the land use designated.
2.	Should development, or if applicable, expansion of the town/area concerned in terms of this land use (associated with the activity being applied for) occur here at this point in time?	No.
3.	Does the community/area need the activity and the associated land use concerned (is it a societal priority)? This refers to the strategic as well as local level (e.g. development is a national priority, but within a specific local context it could be inappropriate)	This project will allow for access to key service facilities which is currently needed by the community as the district is rural by its spatial nature. This will benefit the community in that regard, especially during the operational phase.
4.	Are the necessary services with appropriate capacity currently available (at the time of application), or must additional capacity be created to cater for the development?	All services will be provided by the existing road servitude.
5.	Is this development provided for in the infrastructure planning of the municipality, and if not what will the implication be on the infrastructure planning of the municipality (priority and placement of services)?	Yes. The Govan Mbeki Municipality Integrated Development Plan (IDP) mentions that one of the objectives is to address the provision of efficient transport networks such as roads in order to improve accessibility and safe roads between areas.
6.	Is this project part of a national programme to address an issue of national concern or importance?	No.
DESIRABILITY ('placing')		
7.	Is the development the best practicable environmental option (BPEO) for this land/site?	The upgrade of the Albert Luthuli Road is considered to be the best practicable environmental option. The development is within an existing servitude therefore it has previously been accepted as the best practicable environmental option for this area.
8.	Would the approval of this application compromise the integrity of the existing approved municipal IDP and SDF as agreed to by the relevant authorities?	No, the proposed activity is supported by the Govan Mbeki Municipality IDP.
9.	Would the approval of this application compromise the integrity of the existing environmental management priorities for the area (e.g. as defined in Environmental Management Frameworks), and if so, can it be justified in terms of sustainability considerations?	No, the proposed activity is supported by the Govan Mbeki Municipality IDP.

No.	Question	Response
10.	Do location factors favour this land use (associated with the activity applied for) at this place? (this relates to the contextualisation of the proposed land use on this site within its broader context).	Yes, the site is located within the existing road servitude.
11.	How will the activity or the land use associated with the activity applied for, impact on sensitive natural and cultural areas (built and rural/natural environment)?	There is expected to be minimal impacts as the development is within the existing road servitude.
12.	How will the development impact on people's health and wellbeing (e.g. i.t.o. noise, odours, visual character and sense of place, etc)?	Potential impacts during construction phase to be managed through EMP. The project will however be located within an existing servitude.
13	Will the proposed activity or the land use associated with the activity applied for, result in unacceptable opportunity costs?	No.
14	Will the proposed land use result in unacceptable cumulative impacts?	No.

3. LEGISLATION AND GUIDELINES CONSIDERED

3.1. Legislation

The legislation that has possible bearing on the proposed project is captured below.

Note: This list does not attempt to provide an exhaustive explanation, but rather an identification of the most appropriate sections from pertinent legislation.

Table 3: Legislation related to the proposed upgrade of Albert Luthuli road.

Legislation	Relevance	
Constitution of the Republic of South Africa (no. 108 of 1996)	<ul style="list-style-type: none"> Chapter 2 – Bill of rights. Section 24 – Environmental rights 	
National Environmental Management Act (no. 107 of 1998)	<ul style="list-style-type: none"> Section 24 - Environmental Authorization (control of activities which may have detrimental effect on the environment). Section 28 – Duty of care and remediation of environmental damage Environmental management Principles 	
Environmental Impact Assessment Regulations, 2010, promulgated in terms of Section 24(5) of NEMA.	11	<ul style="list-style-type: none"> The construction of channels and bulk storm water outlet structures will occur within 32m of a watercourse.
	18	<ul style="list-style-type: none"> The excavation of more than 5 cubic metres of soil for the development of the Albert Luthuli storm water infrastructure will occur within the watercourse.

	37	<ul style="list-style-type: none"> The expansion of infrastructure for storm water will involve the throughput capacity increasing by more than 10%.
	39	<ul style="list-style-type: none"> The expansion of channels and bulk storm water outlet structures will occur within 32m of a watercourse.
	40	<ul style="list-style-type: none"> The expansion of infrastructure by more than 50m² will occur within 32m of a watercourse.
Environmental Conservation Act (No 73 of 1989):		<ul style="list-style-type: none"> Environmental Protection and conservation. Section 25 – Noise regulation Section 20 – Waste Management
National Environmental Management Air Quality Act (no 39 of 2004)		<ul style="list-style-type: none"> Air quality Management. Section 32 – Dust control. Section 34 – Noise Control.
National Environmental Management : Biodiversity Act, 2004 (no. 10 of 2004)		<ul style="list-style-type: none"> Management and conservation of the country's biodiversity. Protection of species and ecosystems.
National Environmental management : Protected Areas Act (No. 57 of 2003)		<ul style="list-style-type: none"> Protection and conservation of ecological viable areas representative of South Africa's biological diversity and natural landscapes
Occupation Health and Safety Act (No.25 of 1999)		<ul style="list-style-type: none"> Provisions for occupational health and Safety Authority – Department of Labour.
National Heritage Resource Act (no 25 of 1999)		<ul style="list-style-type: none"> Section 38 – Heritage Impact Assessment for construction of a road, fences, pipelines, channels, or other similar linear development exceeding 300meters.
Conservation of Agricultural resource Act (no. 43 of 1983)		<ul style="list-style-type: none"> Control measures for erosion. Control measures for alien and invasive plant species. Authority – Department of Agriculture.
National Environmental Management : Waste Management Act (59 of 2008)		<ul style="list-style-type: none"> Authority – Department of Environmental Affairs
National Water Act (No. 36 of 1998)		<ul style="list-style-type: none"> Protection of the water resources Authority – Department of Water Affairs
Mpumalanga Nature Conservation Act (No. 10 of 1998)		<ul style="list-style-type: none"> Protection of fauna and flora in Mpumalanga
Mpumalanga Parks Agency Act (No. 5 of 2005)		<ul style="list-style-type: none"> To provide for the sustainable development and improvement of the tourism industry in Mpumalanga.

	<ul style="list-style-type: none"> • To provide for conservation management of the natural resources of Mpumalanga.
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3.2. Guidelines

The following guidelines were considered in the preparation of the Basic Assessment Report:

- Guideline 3: General Guide to the Environmental Impact Assessment Regulations, 2005. Integrated Environmental Management Guideline Series (DEAT, 2005a);
- Guideline 4: Public Participation, in support of the EIA Regulations. Integrated Environmental Management Guideline Series (DEAT, 2005);
- Guideline on Need and Desirability, NEMA Environmental Impact Assessment Regulations Guideline and Information Document Series. Department of Environmental Affairs and Development Planning (DEADP, 2009); and
- Assessment of alternatives and impacts (Guideline 5) in support of the EIA Regulations, Department of Environmental Affairs and Tourism, Pretoria (DEAT, 2006).

3.3. Environmental Authorisation Required

The following authorization is required for the proposed upgrade of Albert Luthuli road and storm water network:

Approval required from DEDET for listed activities associated with the project. Basic Assessment conducted under NEMA, in accordance with the EIA Regulations (Government Notice No. R544 of 18 June 2010).

3.4. Regional Plans

The following regional plans were considered during the Basic Assessment Process:

- Govan Mbeki Local Municipality integrated development plan 2012.
- Relevant provincial, district and local policies and strategies.
- Gert Sibande District Municipality (GSDM) integrated development plan 2012.

4. EIA – BASIC ASSESSMENT PROCESS

4.1. Environmental Assessment Triggers

As noted in **Section 3**, the project entails certain activities that require authorisation in terms of the National Environmental Management Act (Act No. 107 of 1998) (NEMA).

The EIA – Basic Assessment (BA) Process is being undertaken in accordance with the EIA Regulations of 2010 (GN No. R543 of 18 June 2010). The original Application form has been amended regarding the triggered listed activities for the proposed project. Please see **Appendix 5** for the Amended Application form page consisting of the Listed Activities. **Table 4** lists the associated relevant activities that apply to the proposed project in terms of GN No. R544 of 18 June 2010.

Table 4: Listed Activities Triggered

Listed activity as described in GN R.544, 545 and 546	Description of project activity
<p>GN R.544 Item 11: The construction of: (ii) channels; (vi) bulk storm water outlet structures; and (xi) infrastructure or structures covering 50 square meters or more</p> <p>where such construction occurs within a watercourse or within 32 metres of a watercourse, excluding where such construction will occur behind the development setback line.</p>	<p>The construction of channels (channel 2), bulk storm water outlet structures, and infrastructure will occur within 32m of a watercourse.</p>
<p>GN R.544 Item 18: The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock from - (i) a watercourse</p> <p>but excluding where such infilling, depositing, dredging, excavation, removal or moving a) is for maintenance purposes undertaken in accordance with a management plan agreed to by the relevant environmental authority; or b) occurs behind the development setback line.</p>	<p>The excavation of more than 5 cubic metres of soil for the development of the Albert Luthuli road storm water network which discharges into watercourses.</p>
<p>GN R.544 Item 37: The expansion of facilities or infrastructure for the bulk transportation of water, sewage or storm water where: b) where the throughput capacity of the facility or infrastructure will be increased by 10% or more -</p> <p>excluding where such expansion: (i) relates to transportation of water, sewage or storm water or storm water within a road reserve; or (ii) where such expansion will occur within urban areas but further than 32 metres from a watercourse, measured from the edge of the watercourse.</p>	<p>The expansion of infrastructure for storm water will involve the throughput capacity increasing by more than 10%.</p>
<p>GN R.544 Item 39: The expansion of: (ii) channels; (v) bulk storm water outlet structures; and</p> <p>within a watercourse or within 32 metres of a watercourse, where such expansion will result in an increased development footprint but excluding where such expansion will occur behind the development setback line.</p>	<p>The expansion of channels (channel 1 and 3) and bulk storm water outlet structures will occur within 32m of a watercourse.</p>
<p>GN R.544 Item 40: The expansion of: (iv) infrastructure by more than 50 square metres</p> <p>within a watercourse or within 32 metres of a watercourse, measured from the edge of the watercourse, but excluding where such expansion will occur behind the development setback line.</p>	<p>The expansion of infrastructure (at channel 1 and 3) by more than 50m² will occur within 32m of a watercourse.</p>

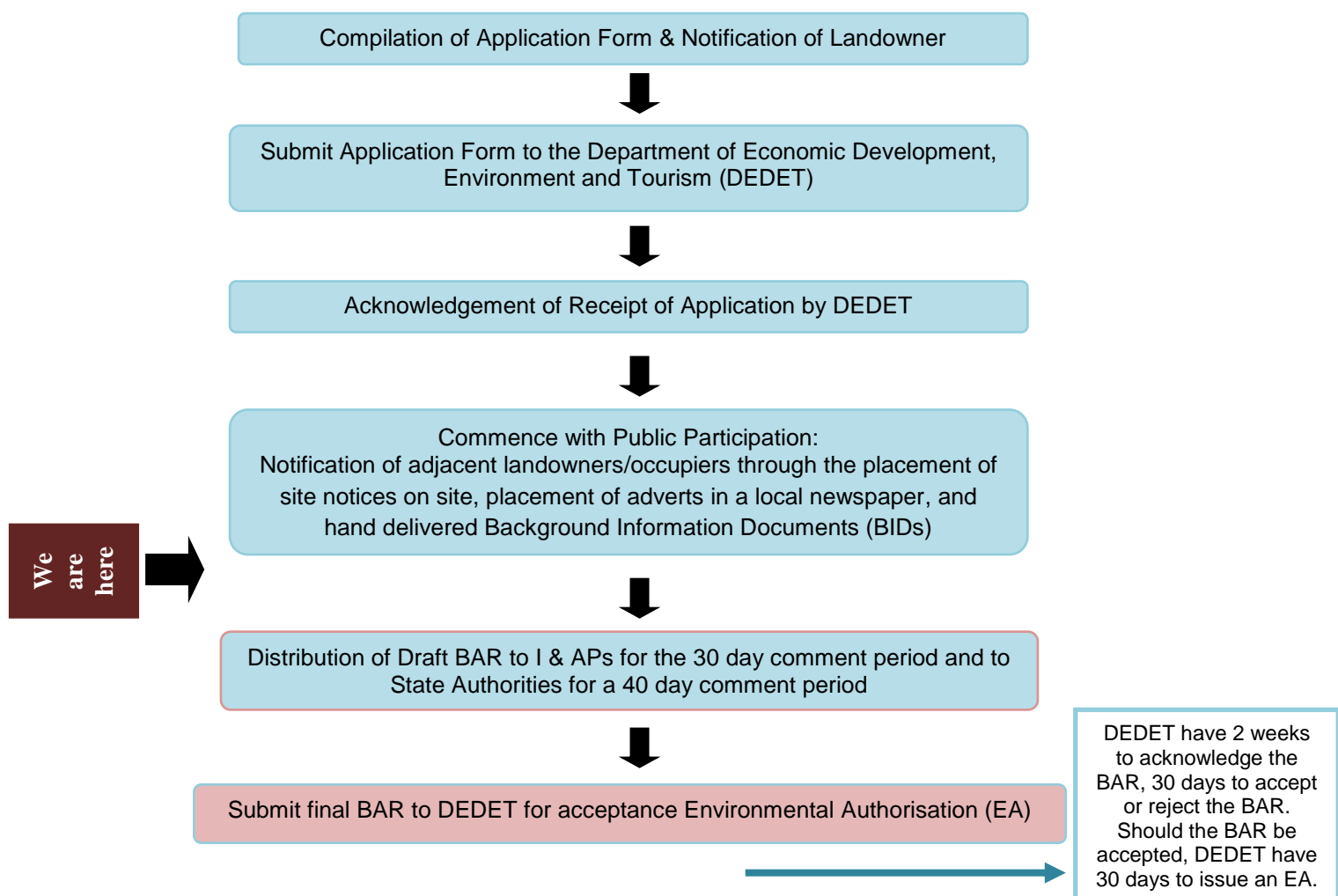
4.2. Environmental Assessment Authorities

The EIA decision-making authority is the Mpumalanga Department of Economic Development, Environment and Tourism (DEDET).

4.3. Basic Assessment Process

The BA process as set out in EIA Regulations of 2010 (GN No. R543 of 18 June 2010) has commenced. The application form was submitted to DEDET on 04 September 2013. Acknowledgement of receipt of the application form was provided on 18 September 2013 (Refer to **Appendix 6**). The following reference number was then allocated to the project: 17/2/3 GS-210.

The BA process and public participation process then commenced and is outlined below:



Once the Environmental Authorisation (EA) has been issued, the applicant / EAP must notify all registered I & APs of the decision and this must be done within 12 days of receipt of the EA and provide them with the details should they wish to appeal the decision as per the EA.

5. ASSUMPTIONS AND LIMITATIONS

The following assumptions and limitations are made in the BA Report:

- It is assumed that the baseline information scrutinised and used to explain the environmental profile is accurate.
- The locations of camp sites are not known at this stage, and the associated impacts will need to be addressed through suitable mitigation measures in the Environmental Management Programme (EMPr).

6. DETAILS AND EXPERTISE OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

Nemai Consulting was appointed by Govan Mbeki Municipality to undertake the environmental assessment process for the proposed upgrade of the Albert Luthuli road.

In accordance with Regulation 22 (2) a of GN No. R. 543 of 18 June 2012, this section provides an overview of Nemai Consulting and the company's experience with EIAs, as well as the details and experience of the EAPs that form part of the EIA team.

Nemai Consulting is an independent environmental, social development and Occupational Health and Safety (OHS) consultancy, which was founded in December 1999. The company is directed by a team of experienced and capable environmental engineers, scientists, ecologists, sociologists, economists and analysts. The company has offices in Randburg (Gauteng) and Durban (KwaZulu Natal).

Team members of Nemai Consulting that are involved with the Basic Assessment Process for the proposed facility are captured in **Table 5** below, and their respective Curricula Vitae are contained in to **Appendix 7**.

Table 5: Basic Assessment Team Members

Name	Qualifications	Experience	Duties
N. Naidoo	• BSc Eng (Chem)	20 years	Project Manager
V. Stippel	• MSc Ecology	3 years	EAP
K. Robertson	• MSc Ecology	7 Months	EAP

7. ANALYSIS OF ALTERNATIVES

In terms of the NEMA EIA Regulations one of the criteria to be taken into account by the competent authority when considering an application is “*any feasible and reasonable alternatives to the activity which is the subject of the application and any feasible and reasonable modifications or changes to the activity that may minimise harm to the environment*”. Alternatives are defined in the Regulations as “*different means of meeting the general purpose and requirements of the activity*”. It is therefore

necessary to provide a description of the need and desirability of the proposed activity and any identified alternatives to the proposed activity that are feasible and reasonable, including the advantages and disadvantages that the proposed activity or alternatives will have on the environment and on the community that may be affected by the activity.

Site/Route Alternative:

There is no site/route alternative because the development involves the upgrade of an existing road therefore there cannot be any alternative site/route.

Design / Technology Alternative:

Channel and discharge point 1

The existing channel 1 is $\pm 420\text{m}$ long and is currently unlined. The proposed development is to upgrade the channel by constructing a lined trapezoidal channel for a distance of $\pm 190\text{m}$ using Design Alternative 1 or 2 below. The remainder of the channel ($\pm 230\text{m}$) will be an unlined earth trapezoidal channel with gabion cut off walls.

Alternative 1 (preferred alternative): Concrete lined trapezoidal channel

The proposed development is to upgrade the channel by constructing a concrete lined trapezoidal channel for a distance of $\pm 190\text{m}$.

Alternative 2: Gabion mattress channel

The proposed development is to upgrade the channel by constructing a gabion mattress/box lined trapezoidal channel for a distance of $\pm 190\text{m}$.

Channel and discharge point 2

The new proposed channel 2 is $\pm 150\text{m}$ long. The proposed development is to construct a trapezoidal channel consisting of a lined channel for a distance of $\pm 50\text{m}$ using Design Alternative 1 or 2 below. The remainder of the channel ($\pm 100\text{m}$) will be an unlined earth trapezoidal channel.

Alternative 1 (preferred alternative): Concrete lined channel

The proposed development consists of lining the proposed channel with concrete for a distance of $\pm 50\text{m}$.

Alternative 2: Gabion mattress channel

The proposed development consists of lining the proposed channel with gabion mattress/boxes for a distance of $\pm 50\text{m}$.

Channel and discharge point 3

The new proposed channel 3 is $\pm 30\text{m}$ long. The proposed development is to construct a trapezoidal channel consisting of a lined channel for a distance of $\pm 10\text{m}$ using Design Alternative 1 or 2 below.



The remainder of the channel ($\pm 20\text{m}$) will be an unlined earth trapezoidal channel with gabion cut off walls.

Alternative 1 (preferred alternative): Concrete lined channel

The proposed development consists of lining the proposed channel with concrete for a distance of $\pm 10\text{m}$.

Alternative 2: Gabion mattress channel

The proposed development consists of lining the proposed channel with gabion mattress/boxes for a distance of $\pm 10\text{m}$.

The following table discusses the advantages of each alternative:

Table 6: Table showing alternative design options and advantages and disadvantages

	Alternative 1	Alternative 2	No-go Option
Advantage	Jobs will be created for skilled and unskilled workers during the construction and operation phase. The concrete channel is quick to build, the channel is self cleansing and needs little maintenance.	Jobs will be created for skilled and unskilled workers during the construction and operation phase. This option is environmentally friendly, labour intensive and cheaper.	No construction activities will take place. There will be no impact on the environment as a result in terms flora, fauna and watercourses on site.
Disadvantage	There will be a potential impact on the watercourse during the construction phase, however the potential impacts can be mitigated against. This option is more expensive and is less environmentally friendly.	There will be a potential impact on the watercourse during the construction phase, however the potential impacts can be mitigated against. This option requires maintenance and will have a longer construction time period.	The road will not be upgraded and there will be no efficient transport system thus not allowing accessibility through safe roads from the eMbalenhle town and outside areas. The associated storm water infrastructure will then also not be upgraded and result. No jobs will be created during the construction phase.

No-go Option:

If no construction activities take place, Albert Luthuli Drive and the associated storm water infrastructure will not be upgraded. This will have negative economic implications on the eMbalenhle town in terms of access to key service facilities which is currently needed by the community, as the district is rural by its spatial nature. Thus there will be no provision of an efficient transport network system and the community will not benefit because of the lack of accessibility and safe roads between eMbalenhle and other towns.

If Albert Luthuli road is not upgraded, then the associated storm water infrastructure as a result will not be upgraded. The existing channel at the proposed discharge point 1 is silted and filled with debris and rubbish therefore road maintenance appears to be problematic in the area as a result of the storm water systems not operating correctly. The existing channel also has flat grades and poor maintenance resulting in the system not operating correctly. The open channel also poses a safety risk to the community as there are no guard rails or pedestrian fences. The storm water network will need to extend up Albert Luthuli Drive (to proposed discharge point 2 and 3) otherwise excessive runoff will discharge onto the new proposed Albert Luthuli Drive which will be difficult to intercept with the new proposed kerb inlets.

8. DESCRIPTION OF THE RECEIVING ENVIRONMENT

8.1. Climate

The road development is located in Mpumalanga, where the western half of the Province is known as the Highveld and the eastern half is known as the Lowveld. The climate within this province is dependent on the topography across the province. Dry and hot conditions during the summer and colder conditions during winter are typical of the Highveld.

8.2. Rainfall

The average annual rainfall at Langverwacht monitoring station operated by Sasol Synfuels was calculated to be 770.5 mm. The highest average monthly rainfall occurs during January at 166.3 mm. The rainfall season is from October to April; whilst from May to September the conditions are dry. The mean annual precipitation of about 680 mm occurs as showers and thunderstorms and falls mainly in the summer months, from September to April, with a peak in January. Falls of over 100 mm can occur in a single day. Rainstorms are often violent with severe lightning and strong westerly or easterly winds and are sometimes accompanied by hail. The winter months of June, July and August are dry and their combined rainfall comprises only 3.3% of the total annual precipitation.

8.3. Temperature

The average midday temperatures for Secunda range from 16.4°C in June to 25.8°C in January. The region is the coldest during June when the mercury drops to 0°C on average during the night.

8.4. Topography

The regional topography at Secunda consists of flat plains and local shallow drainage valleys. The land has a soft rolling topography and in some areas shorter inter-fluvial areas. These areas lack long gentle slopes with wind deflated pans. The proposed road upgrade will be located on the existing road servitude.

8.5. Geology

Shale, sandstone or mudstone of the Madzaringwe Formation (Karoo Supergroup) or the intrusive Karoo Suite dolerites which feature prominently in the area. In the south, the Volkstrust Formation (Karoo Supergroup) is found and in the West, the rocks of the older Transvaal, Ventersdorp and Witwatersrand Supergroups are most significant. Soils are deep reddish on flat plains and are typically Ea, Ba and Bb land types (Mucina and Rutherford, 2006).

The soil potential varies from a poor suitability for agriculture on the northern border and south western regions. The soil potential in the area is impacted upon by mining activities as well as by unsuitable agricultural activities and the use of pesticides which inflict negative impact on the quality and arability of the soil (Govan Mbeki 2011/ 2012 IDP).

8.6. Watercourses

The proposed development area has an association with small wetland habitat units that are under considerable pressure due to the surrounding land use and the dependency on the resources offered by the wetlands by the surrounding communities. The wetlands within the proposed development site represent channelled valley-bottom wetlands and seep zones, mostly connected to the watercourse. This is influenced by erosion factors within the catchment area. Many of the wetland areas were regarded as being highly modified therefore many of the wetland indicator species were regarded as opportunistic generalist species, especially for exotic species such as *Verbena bonariensis*, *Tagetes minuta*, *Bidens formosa*, as well as indigenous species such as *Helichrysum nudifolium*, which indicate the various wetland zones through changes in density rather than by their presence or absence (Enviross, 2013).



Figure 3: Various views showing typical habitat type features of the proposed development site showing examples of the pressures and drivers within a highly degraded catchment area.

8.7. Vegetation

The study area falls within the Grassland biome (**Figure 4**) and within the Soweto Highveld Grassland vegetation type as indicated in **Figure 5**.

This vegetation unit occurs in Mpumalanga Province. It occurs on a gently to moderately undulating landscape on the Highveld plateau supporting short to medium-high, dense, tufted grassland dominated almost entirely by *Themeda triandra* and accompanied by a variety of other grasses such as *Elionurus muticus*, *Eragrostis racemosa*, *Heteropogon contortus* and *Tristachya leucothrix*. (Mucina and Rutherford, 2006)

This is an *Endangered* vegetation type falling within the Mesic Highveld Grassland bioregion that forms part of the Grassland biome. The wetlands within this vegetation unit area support features typical of an *azonal* freshwater wetlands vegetation type known as *Eastern Temperate Freshwater Wetlands*, a vegetation type that is regarded as being *Least Threatened* (Mucina & Rutherford, 2006). The vegetation units within the catchment area are largely under threat due to transformation for agriculture because of amicable soil types, favourable climate and topographies, which supports large scale commercial agriculture. Almost half of this vegetation type is transformed and erosion is generally very low.

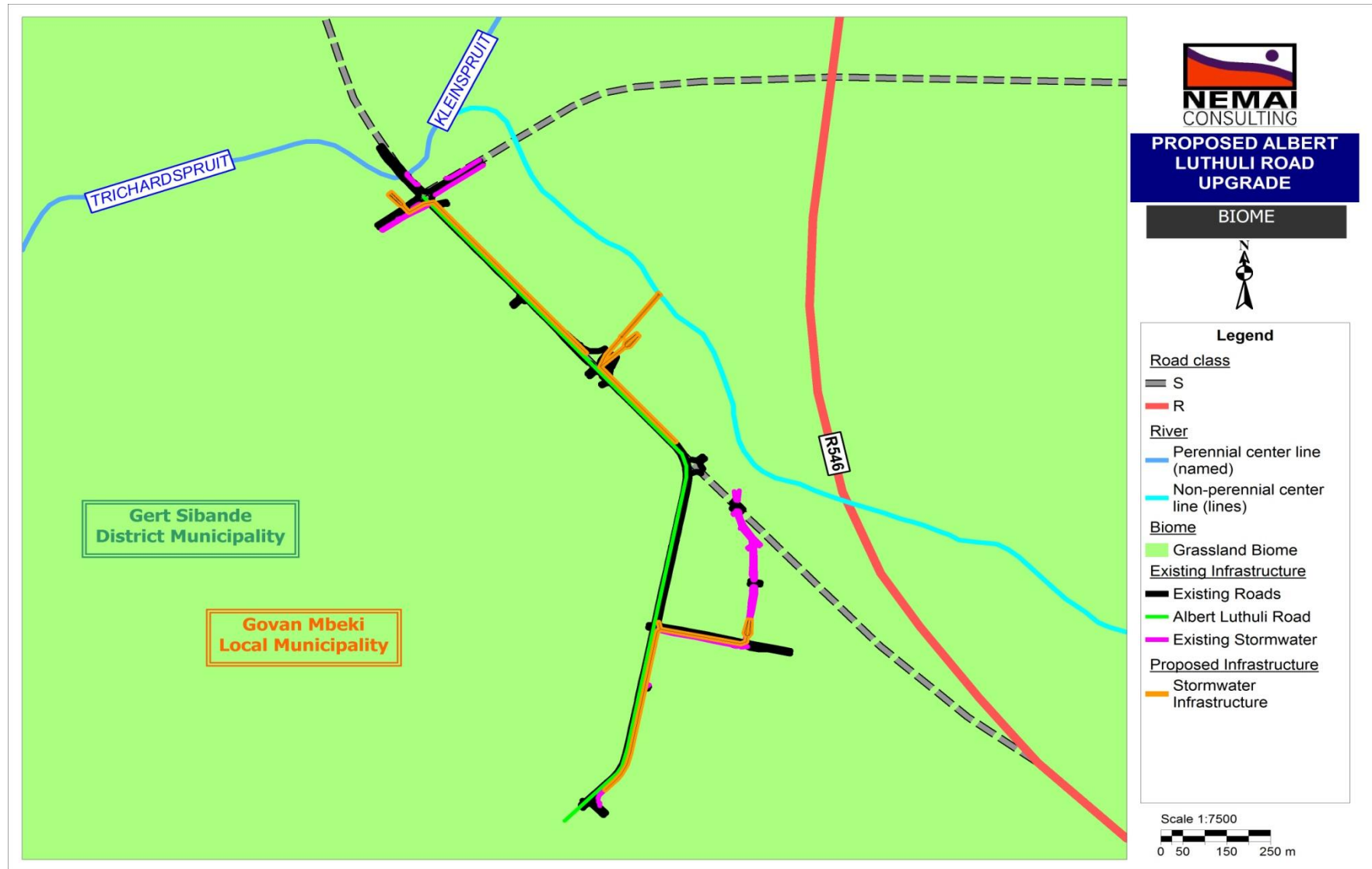


Figure 4: Map showing the type of biome within the study area

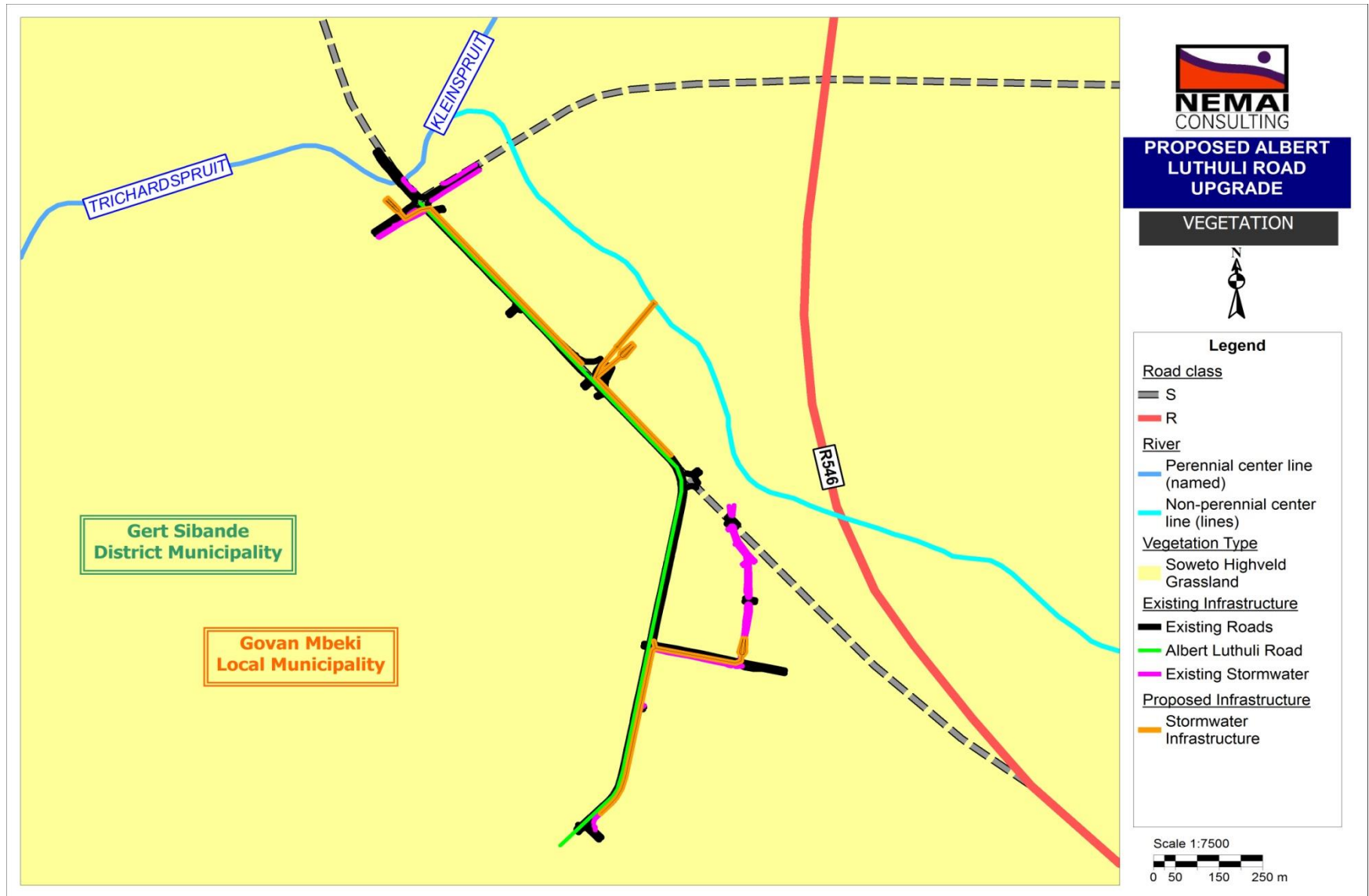


Figure 5: Map showing the vegetation type within the study area

8.8. Land Uses

Govan Mbeki has the largest underground coal mining complex in the world which makes it an important strategic area within the national context. The area can be described as mostly agricultural / rural, with 3 urban conglomerations situated within it, namely Leandra / Lebohang on the western edge, the Greater Secunda (Trichardt, Evander, Kinross and Secunda/eMbalenhle) conurbation in the central part and Bethal / eMzinoni on its eastern edge.

The municipality has major mining (both coal and gold) industries like the Sasol Mines, Sudo-Coal, Isibonelo and others; Sasol and its companies and various production companies. The most prevalent land uses in rural areas are commercial agriculture, coal and gold mining. A number of rural informal settlements occur in the area.

8.9. Socio-Economic

According to the Govan Mbeki IDP (2011/2102), Govan Mbeki has the most diversified economy within the Gert Sibande District, dominated by the petrochemical industry (the SASOL II and III complexes) and coal and gold mining. With the growth of Sasol Synthetic Fuels as the major employer and its increased drive to recruit labour from a field in the late seventies, it became necessary to establish a dormitory town within the Highveld Ridge complex to accommodate the increased workers employed by Sasol Synthetic Fuel. As a result, eMbalenhle was established in 1978 on the farm Langverwacht 282 IS. eMbalenhle has grown significantly from its inception in 1978 and today it has approximately 210 000 inhabitants.

The largest towns in the Govan Mbeki Municipality are Secunda and Bethal. eMbalenhle is one of the several smaller settlements within the municipality. 51,5% of the total population reside in the central Greater Secunda Complex, 21,6% reside in Bethal/eMzinoni, 14,1% reside in Leandra/ Lebohang and 12,8% stay in rural hinterland. There is a huge socio-economic gap between the previous white areas and the previous disadvantaged township areas. The economy of the municipality is dominated by SASOL, coal and gold mining and commercial agriculture. The Johannesburg – Richards Bay freight rail line and National Road N17 traverse the area in an east-west direction and are augmented by a number of provincial roads connecting it to a wider region (Govan Mbeki IDP, 2011/2012).

Secunda / Trichardt are by far the most active business zone in Govan Mbeki. Secunda's regional role is underlined by the fact that 45% of the financial, administrative and professional concerns are situated here. Industrial activity in the area is completely dominated by SASOL, whose site area makes up to 85,7% of the total industrial / commercial land in the study area.

According to the IDP, municipal services infrastructure in the municipality is located mostly within the urban areas. Some infrastructure backlogs exist, especially within the previously disadvantaged township areas. As far as the outlying rural areas are concerned, these rely almost exclusively on borehole water and septic tanks / pit latrines, while electricity is provided by Eskom. There are still a

number of homeless people living in informal settlements throughout the study area. The total housing backlog is estimated at approximately 60 000 units.

The youth within this municipal area (aged between 15 and 34 years) constitute 35.5% while the economically active population (ages of between 15 and 64 years) account for 62.3% of the total population. Another important observation is that the youth account for 56.9% of the economically active.

8.10. Noise

The proposed road upgrade will be located within existing road servitude therefore noise in terms of vehicular traffic is expected to remain the same. Additional noise is anticipated mainly during the construction phase of the new road. The noise produce during the operational phase will be within the regulated limits for the existing Albert Luthuli Drive.

8.11. Visual Quality

The road upgrade will be located within the existing road servitude. The only visual impact on the existing visual disturbance will be during construction activities.

9. SPECIALIST STUDIES

9.1. Wetland Delineation Survey

The proposed Albert Luthuli road and storm water network upgrade has an association with wetland habitat units and therefore Nema Consulting requested EnviRoss CC to undertake the delineation procedures for the wetland habitat units associated with the development site that may be potentially impacted by the proposed development activity. This report details the findings of the wetland delineation survey undertaken during August 2013, indicating the obligatory conservation buffer zones, together with an assessment of the wetlands associated with the proposed development area.

Methods & Materials

The methodologies employed for the wetland delineation were those outlined in the DWA (Department of Water Affairs) (2005) *Guidelines to identifying riparian zones and wetland boundaries*. These guidelines make use of four indicators of wetland habitats that enable the identification of a wetland. This does not necessarily mean that all four indicators are utilised, but rather than there are four indicators available to be utilised. Aspects such as severely degraded vegetation structures often lead to this indicator not being utilised. In this case, more emphasis is then placed on the other indicators. The four available indicators commonly used are:

- Terrain Unit Indicators (TUI)
- Soil Wetness Indicators (SWI)
- Soil Form Indicators (SFI)
- Vegetation Unit Indicators (VUI)

Consultation of topographical maps, aerial photography and available GIS mapping databases (provincial and national) as well as the latest available literature and online databases (from SANBI, DWA, DEAT, ADU, etc) were used to set the baseline data for the proposed development site. The field survey concentrated on identifying the various wetland indicators by making use of samples taken with a soil auger, the digging of inspection pits, wetland floral species identification and the confirmation of topographical features that would support wetland formation and the observations of any saturated soils and surface water.

The outer edges of the temporary zones of the wetlands were then identified and mapped using a handheld GPS (Global Positioning System) unit. These data were then transformed into GIS shapefiles that can be incorporated into the construction and layout plans of the proposed development activities.

Results & Discussions

Wetlands were identified to occur in association with the proposed development area. Therefore a 32m conservation buffer zone has been designated. The main wetland habitat types were channelled valley-bottom wetlands and seep zones. The wetland habitat units were found to be suffering undue

pressure which emanates from poor management of the immediate catchment area. The dumping of urban refuse within the wetland areas and watercourses, together with the obvious contamination of all watercourses by untreated sewerage effluent have had a profound deleterious impact on the present ecological integrity of the wetlands and aquatic environments. It is therefore thought that the proposed development activities would not have any significant impact on the ecological integrity of the surface water resources within the immediate vicinity. Please refer to the Wetland Delineation Survey in **Appendix 8A**.

There are three storm water outfall (discharge) points proposed along the road alignment that will discharge water directly into the wetland habitat units and existing storm water channels. These proposed sites do not coincide with areas of particular ecological sensitivity (bearing in mind that wetland habitat units are inherently ecologically sensitive features) and therefore are not perceived to create any undue impacts to the receiving environment. It is recommended, however, that velocity baffles (attenuating features) are provided for at the discharge points and that these discharge points are stabilised to where naturally stable soil features are encountered. This will ensure that erosion gully formation does not occur. With regards to the storm water channel options (concrete and gabion lined channel), from the wetland specialist's point of view, it is recommended that Option 2 (Gabion-lined channel) be utilised as a construction method.

The proposed development site also falls within the 500 m wetland regulatory zones (as stipulated by the Department of Water Affairs) and storm water will be discharged into existing streams therefore the applicant will have to seek water use authorisation from the Department of Water Affairs (DWA), as required in terms of Section 21 of the National Water Act (Act No. 36 of 1998), for permission for any development within the confines of this regulatory zone by submitting a Water Use License Application (WULA) to DWA (refer to **Appendix 13**).

9.2. Ecological Assessment

Nemai Consulting was appointed by SMEC to obtain Environmental Authorization for the proposed upgrade of Albert Luthuli Drive in eMbalenhle, Mpumalanga Province. A 1.8 km section of road in Embalenhle in Secunda (Mpumalanga) has been proposed and this proposed road alignment coincides with an existing road. The objective of this study was to identify sensitive species and their habitats in the proposed development footprint. The current ecological status and conservation priority of vegetation on the site were assessed. Potential faunal habitats were investigated in the study area and all mammals, birds, and reptiles known to occur on site or seen on site were recorded. Red data species (both fauna and flora) that are known to occur on site were investigated.

Methods & Materials

A desktop analysis of the flora, mammals, avifauna and reptiles in the development area was done using literature review, topographical maps, Google Earth imagery and available GIS mapping

databases. A site visit was also conducted in August 2013 to record the presence of any Medicinal or Red Data species.

Results & Discussions

No Red Data species or significant species from a conservation perspective were recorded on site and the probability of such species occurring on site is considered to be “low” on account of the high level of disturbance and habitat degradation. The only sensitive features or habitats identified were rivers and associated wetlands. Due to human settlements, the proposed road upgrade is highly degraded. Some sections of the road are now used for illegal dumping. From a broad and preliminary evaluation of the site in question, it is evident that the proposed development will have minimal impacts on the ecological integrity of the study area. From an ecological perspective, the proposed development should proceed subject to the above, and mitigation measures (such as delineated buffer zone) must be employed to minimise potential impacts from the project. It was recommended by the Ecological Specialist that the Gabion Mattresses lining alternative should be preferred as it is a more environmentally friendly option. Please refer to the Ecological Survey in **Appendix 8B**.

9.3. Heritage Impact Assessment

SMEC has appointed Nema Consulting to conduct an Environmental Assessment for the proposed upgrade of Albert Luthuli Drive in eMbalenhle, Mpumalanga Province. The proposed upgrade is a 1.8 km section of road and its alignment coincides with an existing road. Part of the environmental assessment includes Phase 1 of Heritage Impact Assessment (HIA), which serves to identify any cultural heritage resources occurring on sites which may be impacted upon by the proposed construction. The objective of the study was to identify any cultural heritage resources occurring on sites which may be impacted upon by the proposed construction. If any resources are found, mitigation measures and recommendations for the protection of such resources will be provided. This report was prepared according to the National Heritage Resources Act 1999 (Act No. 25 of 1999).

Methods & Materials

Background research of the study area was conducted prior to the site visit. The purpose of the research was to acquire information as to what to expect in the study area. A site visit was conducted in August 2013. This was to identify heritage resources that may be impacted on due to the proposed construction. The survey was conducted on foot in order to locate any heritage resources within the proposed sites. A Garmin Global Positioning System (GPS) was in place to record coordinates of any findings, and a digital camera to take photographs.

Results & Discussions

A formal graveyard of less than 60 years old was found in close proximity of the proposed site. It is therefore recommended that based on the findings of the survey the construction may proceed following the mitigation measures provided to protect the graves during construction phase. The existing fence can be used as a buffer and it should be noted that no construction is allowed beyond

the allocated buffer. The Heritage Specialist confirmed that either lining alternative can be used for the storm water channels (concrete or gabion mattresses) as this will not have an impact from a Heritage perspective. Please refer to the Heritage Impact Assessment in **Appendix 8C**.

10. PUBLIC PARTICIPATION

The public participation process that was followed for the proposed Albert Luthuli road and storm water network upgrade is governed by GN. R. 543 of 18 June 2010.

The purpose of public participation includes:

1. Providing I&APs with an opportunity to obtain information about the project;
2. Allowing I&APs to present their views, issues and concerns with regard to the project;
3. Granting I&APs an opportunity to recommend measures to avoid or reduce adverse impacts and enhance positive impacts associated with the project; and
4. Enabling the project team to incorporate the needs, concerns and recommendations of I&APs into the project.

10.1. Notification of I & APs

Notification of I&APs was undertaken in the following ways:

- A database of I&APs, which contained authorities, stakeholders, landowners and members of the general public, was prepared for the project (**Appendix 10E**).
- A Background Information Document which included notification of the BA Process, invitations to a Public Meeting, and a reply form was delivered to all adjacent property owners/ occupiers as well as to general public facilities in the area via email or by hand on the 13 February 2014 (see attached notice – **Appendix 10B**). This was made available for review in English and Zulu.
- Newspaper advertisements were placed in the following newspaper:
 - The Ridge Times Newspaper – 12 February 2014
 - The newspaper advertisement had details of the proposed project, contact details of the Environmental Assessment practitioner and an invitation for any interested or affected party to comment or register as an I&AP for the proposed project. The advertisement invited I&APs to the Public Meeting on the 11 March 2014 at Sasol Embalenhle Recreation Centre.
- Onsite notices of regulated size, regarding the commencement of the EIA process were placed along the proposed Albert Luthuli site route (see coordinates and proof of site notices in **Appendix 10A**) on 14 February 2014.
- Copies of the draft BA Report were placed at the following locations to provide I&APs with the opportunity to review and comment on the draft BA report. A 30 day public review period will be granted to I & APs from **17 February 2014 to 18 March 2014**. And a 40 day Authority comment and review period will be given to state departments from **17 February 2014 to 31 March 2014**.

Copy No.	Location	Address	Telephone Number
1	Secunda Public Library	Laurence Mulla Street, Secunda	017 620 6183
1	Govan Mbeki Local Municipal Offices	Howard Street, CBA, Secunda	017 620 6211

10.2. Distribution of BAR

Copies of the Draft BAR were distributed to the following authorities:

- Department of Economic Development, Environment and Tourism (DEDET);
- Mpumalanga Department of Water Affairs (DWA);
- Mpumalanga Department of Agriculture Forestry and Fisheries (DAFF);
- South African Heritage Resource Agency (SAHRA);
- Gert Sibande District Municipality; and
- Govan Mbeki Local Municipality (including affected Ward Councillors).

11. IMPACT ASSESSMENT AND MITIGATION

11.1. Overview

This section focuses on the pertinent environmental impacts that could potentially be caused by the proposed road and storm water network upgrade during the pre-construction, construction and operation phases of the project.

The impacts to the environmental features are linked to the project activities, which in broad terms relate to the physical infrastructure (emphasis on construction and operation stages). Impacts were identified as follows:

- An appraisal of the project description and the receiving environment;
- Impacts associated with listed activities contained in GN No. R544;
- Issues highlighted by environmental authorities;
- Findings from specialist studies; and
- Comments received during public participation.

11.2. Impacts associated with Listed Activities

As mentioned, the project requires authorisation for certain activities listed in the EIA Regulations (2010), which serves as triggers for the environmental assessment process. The impacts associated with the key listed activities follows. The potential impacts linked to the listed activities are then addressed in the subsequent sections.

Table 7: Impacts associated with the key listed activities

GN No.	Activity	Description	Potential Impact Overview
544	11	<p>The construction of: (vi) bulk storm water outlet structures; and (xi) infrastructure or structures covering 50 square metres or more</p> <p>where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.</p>	<p>A portion of the new storm water infrastructure for Channel 2 (including discharge point 2) will be constructed within 32m of a watercourse. This may have a potential impact on the watercourse. A wetland impact assessment was undertaken and the potential impacts are discussed in the impact assessment section.</p>
	18	<p>The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from: (i) a watercourse</p> <p>but excluding where such infilling, depositing, dredging, excavation, removal or moving; (a) is for maintenance purposes undertaken in accordance with a management plan agreed to by the relevant environmental authority; or (b) occurs behind the development setback line.</p>	<p>The stormwater discharge channels and discharge points for the development of the Albert Luthuli road storm water network will be constructed within 32m of the watercourses where the removal of soil or excavation activities will occur. This may have a potential impact on the watercourses. A wetland impact assessment was undertaken and the potential impacts are discussed in the impact assessment section.</p>
	37	<p>The expansion of facilities or infrastructure for the bulk transportation of water, sewage or storm water where: b) where the throughput capacity of the facility or infrastructure will be increased by 10% or more -</p> <p>excluding where such expansion: (i) relates to transportation of water, sewage or storm water or storm water within a road reserve; or (ii) where such expansion will occur within urban areas but further than 32 metres from a watercourse, measured from the edge of the watercourse.</p>	<p>A portion of infrastructure for storm water will be expanded outside the road reserve. This may have a potential impact on flora and fauna. An Ecological Survey was undertaken and the potential impacts are discussed the impact assessment section.</p>
	39	<p>The expansion of (v) bulk storm water outlet structures</p> <p>within a watercourse or within 32m of a watercourse, measured from the edge of a watercourse, but excluding where such expansion will occur behind the development setback line.</p>	<p>A portion of the new storm water infrastructure for Channel 1 and 3 (including discharge point 1 and 3) will be expanded within 32m of a watercourse. This may have a potential impact on the watercourse. A wetland impact assessment was undertaken and the potential impacts</p>

GN No.	Activity	Description	Potential Impact Overview
			are discussed in the impact assessment section.
	40	The expansion of (iv) infrastructure by more than 50 square meters within a watercourse or within 32m of a watercourse, measured from the edge of a watercourse, but excluding where such expansion will occur behind the development setback line.	A portion of the new storm water infrastructure for Channel 1 and 3 (including discharge point 1 and 3) will be expanded within 32m of a watercourse. This may have a potential impact on the watercourse. A wetland impact assessment was undertaken and the potential impacts are discussed in the impact assessment section.

11.3. Issues raised by Environmental Authorities and I & APs

Any issues raised by authorities and I & APs will be included in the final BAR for review.

11.4. Project Activities and Environmental Aspects

The main project components include the following:

- The upgrade and operation of Albert Luthuli Drive; and
- The upgrade, construction, and operation of the associated storm water infrastructure.

This section identifies any potential impact, either positive or negative that may occur as a result of the undertaking of the proposed activity or alternatives or as a result of any construction, erection or decommission associated with the undertaking of the activity. All impacts identified must be then prevented, mitigated against or managed. The Environmental Management Programme (EMPr) strives to provide a comprehensive list of mitigation measures associated with the overall project-related negative aspects and impacts for the entire project life-cycle (i.e. pre-construction, construction, operation and decommissioning). Please refer to the attached EMPr in **Appendix 11**.

In order to understand the impacts related to the project it is necessary to unpack the activities associated with the project life-cycle, as shown below:

Table 8: Activities associated with the Project Life-Cycle

Pre-construction	
Project Activities	<ul style="list-style-type: none"> • Detailed engineering design • Survey of the site (Aquatic, Ecological, and Heritage Studies) • Approval of methods and construction plans

	<ul style="list-style-type: none"> • Construction site planning, access and layout • Arrangements with individual landowners and/or land users • Procurement process for Contractors
Construction	
Project Activities	<ul style="list-style-type: none"> • Environmental awareness creation • Vegetation clearance • Site establishment • Fencing of construction site • Establish construction camps • Construction employment • Delivery of construction material • Storage and handling of material • Transportation of equipment, materials and personnel • Topsoil clearance • Fencing of site camp • Grading of site (where necessary) • Storm water management • Traffic Control • Waste Management • Wetland rehabilitation • Crossing sensitive areas • Managing construction sites • Reinstatement and rehabilitation
Operation	
Project Activities	<ul style="list-style-type: none"> • Access arrangements and requirements • Routine maintenance inspections • Management of vegetation clearance and the wetlands • Repair and maintenance works

Environmental aspects are regarded as those components of an organisation's activities, products and services that are likely to interact with the environment. The following environmental aspects have been identified for the proposed road upgrade:

Table 9: Possible environmental aspects associated with the Albert Luthuli road and stormwater upgrade

Pre-construction	
Environmental Aspects	<ul style="list-style-type: none"> • Insufficient Planning
Construction	
Environmental Aspects	<ul style="list-style-type: none"> • Lack of environmental awareness creation • Poor consultation with affected parties • Indiscriminate site clearing • Poor site establishment • Poor management of access and use of access roads • Poor transportation practices • Poor fencing arrangements

	<ul style="list-style-type: none"> • Erosion • Disruptions to existing services • Disturbance of topsoil • Poor management of excavations • Inadequate storage and handling of material • Inadequate storage and handling of hazardous material • Lack of equipment maintenance • Poor management of labour force • Pollution from ablution facilities • Inadequate management of construction camp • Poor waste management practices • Wastage of water • Disturbance to landowners and surrounding neighbours • Poor management of pollution generation potential • Damage to significant fauna and flora • Environmental damage at crossings of inaccessible sites • Environmental damage at crossings of sensitive areas • Disruption of any archaeological and cultural features • Poor reinstatement and rehabilitation
Operation	
Environmental Aspects	<ul style="list-style-type: none"> • Lack of on-going storm water management • Inadequate management of access, routine maintenance and maintenance works • Inadequate management of wetlands and associated vegetation • Inadequate litter control • Increased traffic on surrounding roads

11.5. Significant Environmental Impacts

Environmental impacts are the change to the environment resulting from an environmental aspect, whether desirable or undesirable. Note that it is not the intention of the impact assessment to evaluate all potential environmental impacts associated by the project's environmental aspects, but rather to focus on the potentially **significant** direct and indirect impacts identified. The significant negative environmental impacts are listed in **Table 10**.

The EMPr strives to provide a comprehensive list of mitigation measures associated with the overall project-related aspects and impacts for the entire project life-cycle (i.e. pre-construction, construction, operation and decommissioning).

The cumulative impacts are discussed in **Section 11.8**.

Table 10: Significant environmental impacts associated with the project

Construction and Operation Phase	
Feature	Impact
Soil	<ul style="list-style-type: none"> • Impacts associated with the sourcing of construction material • Soil erosion (land clearance, construction activities on steep slopes)
Water Resource Quality - <i>Aquatic Biota</i>	<ul style="list-style-type: none"> • Alteration of habitat
Water Resource Quality – <i>Flow Regime</i>	<ul style="list-style-type: none"> • Alteration of flow
Water Resource Quality – <i>Water Quality</i>	<ul style="list-style-type: none"> • Silt laden runoff and pollutants (e.g. hydrocarbons) entering the watercourse
Water Resource Quality – <i>Riparian habitat</i>	<ul style="list-style-type: none"> • Erosion and destabilisation of river bank
Flora	<ul style="list-style-type: none"> • Damage and loss of vegetation of conservation significance • Proliferation of exotic vegetation in disturbed areas • Loss of Red Data listed / medicinal plants
Fauna	<ul style="list-style-type: none"> • Damage / clearance of habitat of conservation importance • Loss of fauna species of conservation significance • Obstruction to animal movement corridors • Danger to faunal species due to increased road traffic
Air Quality	<ul style="list-style-type: none"> • Dust generation and emissions
Noise	<ul style="list-style-type: none"> • Noise nuisance
Aesthetics	<ul style="list-style-type: none"> • Reduction in visual quality of area
Safety & Security	<ul style="list-style-type: none"> • Safety risk to local community
Waste Management	<ul style="list-style-type: none"> • Impacts associated with the use of veld for ablution purposes. • Land, air and water pollution through poor waste management practices
Socio – Economic Environment	<ul style="list-style-type: none"> • Generation of employment opportunities for local community. • Contribution to local economy
Construction Camp Site	<ul style="list-style-type: none"> • Impacts associated with the siting of construction camp – visually obtrusive, vegetation clearing, poaching, security • Impacts associated with the improper storage of material
Heritage	<ul style="list-style-type: none"> • Damage to heritage resources
Traffic Flow	<ul style="list-style-type: none"> • Disruption of traffic flow

11.6. Impact Mitigation

Impacts are to be managed by assigning suitable mitigation measures. According to DEAT (2006), the objectives of mitigation are to:

- Find more environmentally sound ways of doing things;
- Enhance the environmental benefits of a proposed activity;
- Avoid, minimise or remedy negative impacts; and
- Ensure that residual negative impacts are within acceptable levels.

Mitigation should strive to abide by the following hierarchy – (1) prevent; (2) reduce; (3) rehabilitate; and/or (4) compensate for the environmental impacts.

The proposed mitigation of the impacts includes specific measures identified by the technical team (including engineering solutions) and environmental specialists, stipulations of environmental authorities and environmental best practices. The mitigation measures that follow in the subsequent sections are not intended to be exhaustive, but rather focus on the significant impacts identified.



Figure 6: Mitigation Hierarchy

Mitigation Hierarchy

The EMPr (refer to **Appendix 11**) provides a comprehensive list of mitigation measures for the entire project, which extends beyond the impacts evaluated in the body of the BA Report.

Overview of the EMPr	
	<p>The scope of the Albert Luthuli road and storm water EMPr is as follows:</p> <ul style="list-style-type: none"> • Establish management objectives during the project life-cycle in order to enhance benefits and minimise adverse environmental impacts; • Provide targets for management objectives, in terms of desired performance; • Describe actions required to achieve management objectives; • Outline institutional structures and roles required to implement the EMPr; • Provide legislative framework; and • Description of requirements for record keeping, reporting, review, auditing and updating of the EMPr. <p>All liability for the implementation of the EMPr (as well as the BA findings and environmental authorisation) lies with the project proponent.</p>

11.7. Impact Assessment and Methodology

The impacts and the proposed management thereof are assessed by using the methodology provided in the Impact Assessment in **Appendix 12**.

In the case of the specialist studies (Wetland Delineation Survey and Ecological Survey), the impact assessment methodologies deviated from the approach used by the EAP. However, the quantitative basis for these specialist evaluations of the impacts to specific environmental features still satisfied the intention of EIA. Please refer to Section 11.7.1 below for the Wetland Impact Assessment and Methodology, and Section 11.7.2 below for the Ecological Impact Assessment and Methodology.

11.7.1. Impact Assessment and Methodology – Wetland Delineation Survey

For the discussion to follow watercourses are considered as rivers, streams, natural channels (perennial and seasonal), wetlands and dams. The Albert Luthuli storm water infrastructure will

discharge into several watercourses. Construction activities could cause impacts to the “resource quality” of the affected watercourses, which is defined by the National Water Act (Act No. 36 of 1998) as the following:

- Quantity, pattern, timing, water level and assurance of instream **flow**;
- **Water quality**, including physical, chemical and biological characteristics of the water;
- Character and condition of the instream and riparian **habitat**; and
- Characteristics, condition and distribution of the **aquatic biota**.

Impacts to the resource quality of the affected watercourses could include:

- Damage to / loss or habitat (both instream and riparian zone) within the works area;
- Destabilisation of morphology (i.e. river structure);
- Reduction of water quality through sedimentation and poor construction practices;
- Alteration of the flow regime caused by temporary diversions; and
- Reduction in biodiversity of aquatic biota.

Should construction activities encroach upon the regulated area of a watercourse (i.e. 1:100 year floodline / delineated riparian or wetland habitats) water use authorisation will be required in terms of Section 21 of the National Water Act (Act No. 36 of 1998). Please refer to **Appendix 13** for the Water Use License Application (WULA). In accordance with Section 27 of this Act, the following factors need to be taken into consideration by DWA before an authorisation may be issued:

Existing lawful water uses;

- The need to redress the results of past racial and gender discrimination;
- Efficient and beneficial use of water in the public interest;
- The socio-economic impact of the water use or uses if authorised; or of the failure to authorise the water use or uses;
- Any catchment management strategy applicable to the relevant water resource;
- The likely effect of the water use to be authorised on the water resource and on other water users;
- The class and the resource quality objectives of the water resource;
- Investments already made and to be made by the water user in respect of the water use in question;
- The strategic importance of the water use to be authorised;
- The quality of water in the water resource which may be required for the Reserve and for meeting international obligations; and
- The probable duration of any undertaking for which a water use is to be authorised.

A Wetland Delineation Survey was conducted therefore there is no impact assessment for the wetland in the proposed development but is supplemented by the following recommendations conducted as part of the Wetland Delineation Survey (Enviross, 2013):

- The construction footprint as well as the footprint of the construction supporting areas should be limited as far as possible to areas outside of the proposed buffer zones;
- Undue destruction of habitat should be avoided, not only limited to wetland areas, but including terrestrial areas as well;
- Soil erosion should be avoided. This includes the protection of stockpiled soils and aggregates from the erosive forces of rain and surface water runoff to inhibit the transport of sediments into the wetland and aquatic areas;
- Culverts should be designed to allow the free flow of surface waters and not create restricted flows that will enhance soil erosion at the outfall;
- No dumping of any excess building material or other wastes or litter should be allowed within any wetland and buffer areas.
- It is recommended that the Gabion-lined channels be utilised for the storm water infrastructure as opposed to the use of concrete linings.

It should be noted that, in order to conserve the ecological structures within the region, a holistic habitat conservation approach should be adopted. This includes keeping general habitat destruction and construction footprints to an absolute minimum within the terrestrial habitat as well. Conserving the habitat units will ultimately conserve the species communities that depend on it for survival. This can only be achieved by the efforts of the contractor during the various processes of the construction phase.

11.7.2. Impact Assessment and Methodology - Fauna and Flora

Methodology Used:

Nature (/Status)

The project could have a positive, negative or neutral impact on the environment.

Extent

- Local – extend to the site and its immediate surroundings.
- Regional – impact on the region but within the province.
- National – impact on an interprovincial scale.
- International – impact outside of South Africa.

Magnitude

Degree to which impact may cause irreplaceable loss of resources.

- Low – natural and social functions and processes are not affected or minimally affected.
- Medium – affected environment is notably altered; natural and social functions and processes continue albeit in a modified way.
- High – natural or social functions or processes could be substantially affected or altered to the extent that they could temporarily or permanently cease.

Duration

- Short term – 0-5 years.
- Medium term – 5-11 years.

- Long term – impact ceases after the operational life cycle of the activity either because of natural processes or by human intervention.
- Permanent – mitigation either by natural process or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient.

Probability

- Almost certain – the event is expected to occur in most circumstances.
- Likely – the event will probably occur in most circumstances.
- Moderate – the event should occur at some time.
- Unlikely – the event could occur at some time.
- Rare/Remote – the event may occur only in exceptional circumstances.

Significance

Provides an overall impression of an impact's importance, and the degree to which it can be mitigated. The range for significance ratings is as follows-

0 – Impact will not affect the environment. No mitigation necessary.
 1 – No impact after mitigation.
 2 – Residual impact after mitigation.
 3 – Impact cannot be mitigated.

FLORA - PRE – CONSTRUCTION PHASE					
Impact	Nature	Description		Mitigation	
Direct	Positive	Search and Rescue		A qualified and / or appropriately experienced Botanist or an experienced person who knows plant species and specific vegetation types well should search any species of conservation importance when the route is pegged. Should these species be found, a permit for either removing or transplanting these plants will be required from MTPA before any construction commences.	
Without Mitigation	Extent	Magnitude	Duration	Probability	Significance
	Local	Medium	Medium-term	Almost certain	2
With Mitigation	Extent	Magnitude	Duration	Probability	Significance
	Local	Low	Short-term	Likely	1

FLORA - PRE – CONSTRUCTION PHASE			
Impact	Nature	Description	Mitigation
Direct	Negative	Site preparation	During site preparation, topsoil and subsoil are stripped separately from each other and must be stored separately from spoil material for use in the rehabilitation phase. It should be protected from wind and rain, as well as contamination from diesel, concrete or wastewater. Records of all environmental incidents must be maintained and a copy of these records must be made available to authorities

FLORA - PRE – CONSTRUCTION PHASE					
Impact	Nature	Description		Mitigation	
				on request throughout the project execution. Sensitive features on site should be barricaded.	
Without Mitigation	Extent	Magnitude	Duration	Probability	Significance
	Local	High	Medium-term	Likely	2
With Mitigation	Extent	Magnitude	Duration	Probability	Significance
	Local	Medium	Short-term	Likely	1

FAUNA - PRE – CONSTRUCTION PHASE					
Impact	Nature	Description		Mitigation	
Direct	Positive	Search and Rescue		A qualified and / or appropriately experienced Zoologist or an experienced person who knows the animals in the region well will identify any possible Red Data fauna on site and the necessary permits to relocate fauna will be obtained if avoidance is not possible. Training of construction workers to recognise threatened animal species will reduce the probability of fauna being harmed unnecessarily. Posters should be displayed on sight to sensitise workers to fauna in the region.	
Without Mitigation	Extent	Magnitude	Duration	Probability	Significance
	Local	Medium	Medium-term	Unlikely	2
With Mitigation	Extent	Magnitude	Duration	Probability	Significance
	Local	Low	Medium-term	Unlikely	1

FAUNA - PRE – CONSTRUCTION PHASE					
Impact	Nature	Description		Mitigation	
Direct	Negative	Site preparation		During site preparation special care must be taken during the clearing of the works area to minimise damage or disturbance of roosting and nesting sites. Before construction commences, all sensitive habitats, such as rivers and wetlands must be clearly demarcated with fencing or orange mesh netting. Barricading measures to be utilised should not restrict the movement of the fauna in the area.	
Without Mitigation	Extent	Magnitude	Duration	Probability	Significance
	Local	High	Medium-term	Likely	2

FAUNA - PRE – CONSTRUCTION PHASE					
Impact	Nature	Description		Mitigation	
With Mitigation	Extent	Magnitude	Duration	Probability	Significance
	Local	Medium	Medium-term	Likely	1

FLORA - CONSTRUCTION PHASE					
Impact	Nature	Description		Mitigation	
Direct	Negative	Soil contamination, vegetation loss and vegetation disturbance due to fuel and chemical spills.		Employ on site personnel responsible for preventing and controlling potential soil pollution through fuel and oil leaks and spills. Make sure construction vehicles are maintained and serviced to prevent oil and fuel leaks. Emergency on-site maintenance should be done over appropriate drip trays and all oil or fuel must be disposed of according to waste regulations. Drip-trays must be placed under vehicles and equipment when not in use.	
Without Mitigation	Extent	Magnitude	Duration	Probability	Significance
	Local	High	Medium-term	Likely	2
With Mitigation	Extent	Magnitude	Duration	Probability	Significance
	Local	Medium	Medium-term	Likely	1

FLORA - CONSTRUCTION PHASE					
Impact	Nature	Description		Mitigation	
Direct	Negative	Vegetation and habitat disturbance due to the accidental introduction of alien species.		Promote awareness of all personnel. After construction programme, monitoring and control of alien weeds and invaders through hand removal; slashing (annuals) or chemical control (perennials). Chemical control may only be done upon approval from the ECO.	
Without Mitigation	Extent	Magnitude	Duration	Probability	Significance
	Local	High	Medium-term	Likely	2
With Mitigation	Extent	Magnitude	Duration	Probability	Significance
	Local	Medium	Medium-term	Likely	1

FLORA - CONSTRUCTION PHASE					
Impact	Nature	Description		Mitigation	
Direct	Negative	Vegetation and habitat disturbance due to pollution and littering during construction phase.		Employ personnel on site responsible for preventing and controlling of litter. Promote housekeeping with daily clean-ups on site. Before construction commences, construction workers should be	

FLORA - CONSTRUCTION PHASE					
Impact	Nature	Description		Mitigation	
				educated with regards to littering, <i>ad hoc</i> veld fires, and dumping. Culverts should be designed to allow the free flow of surface waters and not create restricted flows that will enhance soil erosion at the outfall. No fires to be allowed on site.	
Without Mitigation	Extent	Magnitude	Duration	Probability	Significance
	Local	Medium	Medium-term	Likely	2
With Mitigation	Extent	Magnitude	Duration	Probability	Significance
	Local	Medium	Medium-term	Likely	1

FLORA - CONSTRUCTION PHASE					
Impact	Nature	Description		Mitigation	
Direct	Negative	Damage to plant life outside of the proposed development area		Construction activities should be restricted to the footprint area. All workers must be trained before construction commences.	
Without Mitigation	Extent	Magnitude	Duration	Probability	Significance
	Local	Medium	Medium-term	Likely	2
With Mitigation	Extent	Magnitude	Duration	Probability	Significance
	Local	Medium	Medium-term	Likely	1

FAUNA - CONSTRUCTION PHASE					
Impact	Nature	Description		Mitigation	
Direct	Negative	Disturbance to animals		Animals residing within the designated area (e.g. Common Duiker) shall not be unnecessarily disturbed. Before construction starts, construction workers must be educated with regards to littering and poaching. The Contractor and his/her employees shall not bring any domestic animals onto site. Toolbox talks should be provided to contractors regarding disturbance to animals. Particular emphasis should be placed on talks regarding snakes.	
Without Mitigation	Extent	Magnitude	Duration	Probability	Significance
	Local	Medium	Medium-term	Unlikely	2
With Mitigation	Extent	Magnitude	Duration	Probability	Significance
	Local	Medium	Medium-term	Unlikely	1

FAUNA - CONSTRUCTION PHASE					
Impact	Nature	Description		Mitigation	
Direct	Negative	Allow for safe animal passage through and specifically out of the construction		Construction areas must be demarcated but should allow for	

FAUNA - CONSTRUCTION PHASE					
Impact	Nature	Description		Mitigation	
		site.		the migration of small faunal species out of the construction zone.	
Without Mitigation	Extent	Magnitude	Duration	Probability	Significance
	Local	Medium	Medium-term	Unlikely	2
With Mitigation	Extent	Magnitude	Duration	Probability	Significance
	Local	Medium	Medium-term	Unlikely	1

FLORA- OPERATIONAL PHASE					
Impact	Nature	Description		Mitigation	
Direct	Negative	The proposed road upgrade may affect biodiversity through the encroachment of exotic vegetation following soil disturbance, in addition the maintenance of the area would disturb naturalised species within the area.		Encroachment of alien vegetation should be monitored regularly and controlled; the area must be kept clear of all invader plants as per the Conservation of Agricultural Resources Act, 1983 (Act No 43 of 1983). Rehabilitation measures must be employed until such a time as indigenous species are established.	
Without Mitigation	Extent	Magnitude	Duration	Probability	Significance
	Local	Medium	Medium-term	Likely	2
With Mitigation	Extent	Magnitude	Duration	Probability	Significance
	Local	Medium	Medium-term	Unlikely	1

11.8. Cumulative Impacts

What is a "Cumulative Impact"?
According to GN No. R. 385 (2006), " cumulative impact ", in relation to an activity, means the impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

Cumulative impacts can be identified by combining the potential environmental implications of the project with the impacts of projects that have occurred in the past, are currently occurring, or are proposed in the future within the site and surrounding area.

The following cumulative impacts can be anticipated:

- Damage to wetland habitats and water resources; and
- Encroachment of alien vegetation.

Cumulative Impacts	
Nature of Impact (potential)	Damage to wetlands habitats and water resources
Direct, Indirect or cumulative	Cumulative
Level & duration of impact	Long term
Can impact be prevented/reversed or managed?	Yes the impact can be prevented / mitigated
Possibility of impact before Mitigation	Likely
Possibility of impact after mitigation	Unlikely
Possible Mitigation measure	<ul style="list-style-type: none"> • Keep all demarcated sensitive zones outside of the construction area off limits during the construction and rehabilitation phases of the development. • Monitor all systems for erosion and incision. • Re-vegetate all disturbed areas with indigenous wetland or riparian species. • All conditions of the EMPr must be adhered to.
Significance before mitigation	2
Significance after mitigation	1
Nature of Impact (potential)	Encroachment of alien vegetation
Direct, Indirect or cumulative	Cumulative
Level & duration of impact	Long term
Can impact be prevented/reversed or managed?	Yes the impact can be prevented / mitigated
Possibility of impact before Mitigation	Likely
Possibility of impact after mitigation	Unlikely
Possible Mitigation measure	Rehabilitation measures must be implemented once construction activities are complete to ensure that. Alien vegetation must be controlled during the construction and operational phases. All conditions of the EMPr must be adhered to.
Significance before mitigation	2
Significance after mitigation	1

12. CONCLUSION AND RECOMMENDATIONS

12.1. Environmental Impact Statement

Based on the recommendations of the specialists and the impact assessment associated with the various alternatives, the following alternative is considered to be the Best Practicable Environmental Option (BPEO).

Site/Route Alternative:

There is no site/route alternative because the development involves the upgrade of an existing road therefore there cannot be any alternative site/route. Most of the proposed construction work will take place in the existing road servitude. As a result, limited impacts are envisaged to the surrounding environment since existing access to the road exists and construction work can be confined to the existing disturbed area.

Part of the storm water infrastructure network will be developed outside of the road reserve. This development includes the discharge of storm water into existing watercourses. However, the Applicant (the Govan Mbeki municipality) is the landowner of the servitude as well as the area outside the servitude to be developed on.

Two positive impacts have been identified for this project. The first positive impact is improved road accessibility and storm water network to the Embhalenhle area. The second positive indirect impact is the socio-economic effects resulting from job creation. Temporary jobs will be created for the local community as required in the tender document for contractors. All negative impacts identified for the construction phase of the proposed development can be minimized provided that the proposed mitigation measures provided in this Basic Assessment Report, the Environmental Management Programme (please refer to **Appendix 11**), the Ecological Study and the Wetland Assessment and Delineation (please refer to **Appendix 8**) are adequately implemented during the construction and operation phases of the project.

The wetland and riparian vegetation as well as terrestrial vegetation will however be negatively impacted on although such impacts are manageable and restricted to the construction phase. The EMP must be strictly enforced for the project in order to mitigate the identified possible impacts associated to it. The environmental consequences associated with the project's potential impacts are not considered significant if appropriately managed during the construction and operation phases of the project.

Design/Technology Alternative:

There are two proposed lining alternatives for the three storm water channels: Concrete and Gabion Mattress/boxes.

Concrete lined channels involve the use of a cement mix during the construction phase of the project which has impacts on the biophysical environment such as CO₂ emissions, humidity and temperature. However, cement coating is an inert material therefore there are minimal

impacts on the environment during the operation and decommissioning stage of the project. This lining option is less environmentally friendly as it results in more negative impacts on the environment. However, this alternative is quick to build, the channel is self cleansing and requires little maintenance. This alternative is the more expensive option but the construction phase is a much quicker process.

Gabion lined channels are filled with rock at the proposed site and form flexible, permeable structures which also promote growth of vegetation. This is an environmentally friendly alternative. This option is also more labour intensive during the construction phase and is the cheaper option for lining. However, this alternative requires high maintenance and will have a much longer construction time period.

The preferred alternative was selected by assessing the impacts of each development of the environment. The environment can be defined into four factors: Biophysical, Social, Economic, and Technical/Engineering).

From a biophysical perspective, gabion mattress/box lining is the preferred alternative as it is a more bio-friendly option. It should be noted that both alternatives are mostly associated with existing storm water infrastructure of equal stature, only a small portion of the development will be newly constructed. It should further be noted that the existing storm water infrastructure occurs within wetlands that are highly degraded and transformed. Therefore, should alternative 1 (concrete lined channel) be chosen as the preferred option, then the impacting features on the wetland habitat units can be readily mitigated with no long-term significant impacts being imposed on the wetland units.

From a social perspective, both alternatives will provide job opportunities in the construction phase; however, gabion mattress/box lining is a more labour intensive option. However, it is not predicted to be that much of a difference in job opportunities between the two alternatives during the construction phase. There is no difference between both alternatives during the operation phase because either alternative will contribute to the effective transport and storm water system in the project area.

From an economic perspective, gabion mattress/box lining is the preferred alternative as it is the cheaper option. The impact on the economy would be lower if Alternative 2 is preferred.

From a technical/engineering perspective, Alternative 1 (concrete lining) is preferred because it is quick to build, the channel is self cleansing and it will require less maintenance.

Based on all the biophysical, social, economic and technical/engineering perspectives, it is recommended that Alternative 1 (concrete lining) be used for the development. This is because this lining option is a better option in the long-term. Concrete lining will ensure a faster construction time period thereby decreasing the amount of time that construction

activities will impact on the environment. This option is also better in the operational phase because less maintenance is required for the channel. This means that less maintenance work will be done in the channels thus decreasing any further impacts on the environment including flora, fauna and watercourses.

With the selection of the BPEO for proposed Albert Luthuli road and storm water network; the adoption of the mitigation measures included in the BA Report and the dedicated implementation of the EMPr, it is believed that the significant environmental aspects and impact associated with this project can be suitably mitigated. With the aforementioned in mind, it can be concluded that there are no fatal flaws associated with the project and that authorisation can be issued, based on the findings of the specialists and the impact assessment, through the compliance with the identified environmental management provisions.

12.2. Key Recommendations / Opinion of the EAP

Based on the findings of the impact assessment and the specialist studies, **Alternative 1 (concrete lined channels)** is supported as the preferred option.

All recommendations made by the specialists must be adhered to.

12.3. Conditions for Authorisation

- Diligent compliance monitoring of the EMPr, environmental authorisation and other relevant environmental legislation by an Independent Environmental Control Officer (ECO) is crucial to ensure compliance with the stipulated management measures of the BAR.
- All relevant recommendations made by the specialists relating to the preferred site alternative must be adhered to in terms of wetland and air quality issues.
- Areas affected by construction activities need to be suitably stabilised due to the close proximity of the watercourses within the project area. A storm water control plan must be implemented manage storm water and prevent erosion.
- The construction camp area needs to be identified prior to commencement of construction activities. The camp must be adequately fenced and secure at all times.
- All relevant permits must be obtained prior to the commencement of construction activities or as deemed necessary.

13. REFERENCES

- EnviRoss, 2014. Wetland Delineation Survey for the proposed Albert Luthuli Drive upgrade, Embalenhle, Mpumalanga.
- Phamphe, R. 2013. Ecological Survey for the proposed upgrade of Albert Luthuli Drive, Embalenhle, Mpumalanga Province.