

BASIC ASSESSMENT REPORT

In terms of Section 24 and 24(D) of NEMA (Act No. 107 of 1998)

for:

ENVIRONMENTAL IMPACT ASSESSMENT FOR THE PROPOSED CONSTRUCTION OF FACILITIES AND INFRASTRUCTURE FOR THE STORAGE AND HANDLING OF 92 000 ℓ OF A DANGEROUS GOOD (FILLING STATION), CONSISTING OF 4 X 23 000 ℓ TANKS AND THE ESTABLISHMENT OF A SHOPPING CENTRE LOCATED ON ERF 3726, ERF 3727 AND ERF 3728 DANVILLE, MAHIKENG LOCAL MUNICIPALITY, NORTH WEST PROVINCE. THE PROPOSED DEVELOPMENT WILL RESULT IN THE CLEARANCE OF 27 590 M2 OF INDIGENOUS VEGETATION LOCATED WITHIN A CRITICAL BIODIVERSITY AREA.

NWP/EIA/69/2021

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Report Date: October 2021



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DRAFT REPORT


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Report type	Draft Basic Assessment Report		
Project Title	<i>Environmental Impact Assessment for the proposed construction of facilities and infrastructure for the storage and handling of 92 000 ℓ of a dangerous good (filling station), consisting of 4 x 23 000 ℓ tanks and the establishment of a shopping center located on Erf 3726, Erf 3727 and Erf 3728 Danville, Mahikeng Local Municipality, North West Province. The proposed development will result in the clearance of 27 590 m² of indigenous vegetation located within a critical biodiversity area.</i>		
Competent Authority:	North West Department of Economic Development, Environment, Conservation and Tourism		
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EXECUTIVE SUMMARY

MG DEVCO (Pty) Ltd has appointed **AB Enviro Consult CC**, an independent environmental consultancy, to undertake an Environmental Impact Assessment for the proposed construction of facilities and infrastructure for the storage and handling of 92 000 ℓ of a dangerous good (filling station), consisting of 4 x 23 000 ℓ tanks and the establishment of a shopping center located on Erf 3726, Erf 3727 and Erf 3728 Danville, Mahikeng Local Municipality, North West Province. The proposed development will result in the clearance of 27 590 m² of indigenous vegetation located within a critical biodiversity area.

Mahikeng, is the capital city of the North-West Province. The capital falls within Ngaka Modiri Molema District Municipality. The city is also located close to South Africa's border with Botswana. The proposed development falls within the Mafikeng Local Municipality area of jurisdiction and is situated directly south of, and is bordered by, the newly upgraded section of the R503 (Nelson Mandela Drive) road between Lichtenburg and Mahikeng as you enter Mahikeng from Lichtenburg. The newly constructed traffic circle is located on the north western corner of the site. The ring road that connects with the N18 (Dr James Moroka Drive) borders the site to the west. The intersection has been identified as a "Gateway Project" in the Mahikeng Local Municipality IDP 2020-21.

The activity is listed in terms of the Regulations (in force since 4 December 2014) in terms of Section 24(M) and 44 made under section 24(5) of the National Environmental Management Act (NEMA) 1998 (Act 107 of 1998) as amended and published in Government Notice No. R 326 of 2017. The proposed development triggers the following regulations and listed activities:

Number and date of the relevant notice:	Activity No (s) and Activity Description (in terms of the relevant notice)	Description of listed activity as per project description	Time for construction to be completed applied for.
GN.R. 327, 7 April 2017	14	Installation and operation of infrastructure for the storage and handling of 92 000 ℓ of a dangerous good (filling station), consisting of 4 x 23 000 ℓ tanks located on Erf 3726, Erf 3727 and Erf 3728 Danville, Mahikeng Local Municipality, North West Province.	Not Applicable. (Operational component).
GN.R. 327, 7 April 2017	27	The proposed clearance of 2,7590 ha of indigenous vegetation in order to establish a filling station and shopping center on Erf 3726, Erf 3727 and Erf 3728 Danville, Mahikeng Local Municipality, North West Province.	10 years

GN.R. 324, 7 April 2017	12 (h)(iv)	The clearance of 27 590 m ² of indigenous vegetation located within a critical biodiversity area in order to establish a filling station and shopping center on Erf 3726, Erf 3727 and Erf 3728 Danville, Mahikeng Local Municipality, North West Province.	10 years
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Although the entire site is located within a Critical Biodiversity Area (CBA) the site is highly disturbed. Informal dumping at the site is extensive. Old roads run through the site. Fowl-smelling water is present within the road reserve of the R503. This might be stormwater or sewage as a sewage pump station is located on the north-western corner of the site. Bush encroachment of shrub-height *Vachellia* species (Thorns) is noticeable at some areas at the site. Alien invasive weeds are widespread at disturbed areas at the site.

The opinion is being held that the proposed development will strengthen the retail sector within the Mahikeng Local Municipality, due to the provision of a shopping centre and filling station within the urban area. The site is also located at the intersection of the R503 Lichtenburg Road and Bophelong Hospital Road. The intersection has recently been reconstructed to incorporate a new roundabout as part of the upgrading of the R503 road. The intersection has been identified as a “Gateway Project” in the Mahikeng Local Municipality IDP 2020-21. By strengthening the retail sector within the Mahikeng Local Municipality, the proposed development will contribute to the broadening of the income base of the Mahikeng Local Municipality. The proposed development addresses the need identified by the Mahikeng Local Municipality, for the provision of additional business properties, to be alienated by means of full title.

During the construction phase, temporary employment will be created. The increased employment in the area during the construction phase will also result in increased expenditure, which, in addition, will mean that more than just the proposed jobs required for the construction on the site will be created due to economic spin-offs that will result.

The identification, description, evaluation and comparison of alternatives are important for ensuring a sound environmental scoping process.

The alternatives considered for the proposed development includes:

Alternative 1: “The proposed construction of facilities and infrastructure for the storage and handling of 92 000 ℓ of a dangerous good (filling station), consisting of 4 x 23 000 ℓ tanks and the establishment of a shopping center located on Erf 3726, Erf 3727 and Erf 3728 Danville, Mahikeng Local Municipality, North West Province. The proposed development will result in the clearance of 27 590 m² of indigenous vegetation located within a critical biodiversity area.”

This Alternative will entail the installation of the tanks to be **underground and within a sealed bunker**.

Alternative 2: The proposed construction of facilities and infrastructure for the storage and handling of 92 000 ℓ of a dangerous good (filling station), consisting of 4 x 23 000 ℓ tanks and the establishment of a shopping center located on Erf 3726, Erf 3727

and Erf 3728 Danville, Mahikeng Local Municipality, North West Province. The proposed development will result in the clearance of 27 590 m² of indigenous vegetation located within a critical biodiversity area.”

This Alternative will entail the installation of the tanks to be **underground but not within a sealed bunker**.

It is proposed that Alternative 1 be the preferred alternative as the installation of the tanks within a sealed bunker will ensure that should the tanks leak, the total volume of the tank, plus 10% will be contained within the bunker and no contamination of soil or ground water will occur.

Specialist studies were conducted and a full Public Participation Process is being followed. This information was used to generate a sensitivity map that was used to assess the sustainability of the design and layout plan for the proposed development.

A **Geo-Technical Engineer** has been appointed to conduct a Geo-Technical investigation to determine the impact of the Geology of the area on the development. This report will be included into the final BAR as the Engineer was still waiting for results from the Laboratories.

The **Civil Engineer** found that sufficient Bulk water and sewer reticulation capacity is available within close proximity to the development. **Access** has been designed by an Engineer and his recommendations has been incorporated into the layout plan. The Engineer has concluded that the engineering requirements for the development of the filling station will not pose a problem. The traffic flow passing the property, both during and after construction, will be accommodated by the carefully designed entrance and exit roads adhering to the BB2, Guidelines for Access to Filling Stations, 2003. The delivery tanker will be routed through the property to maximise ease of delivery but minimise inconvenience to customers.

The **Fauna and Flora Habitat** study conducted revealed that no Threatened or Near Threatened plant or animal species appear to be resident at the site. No other plant or animal species of particular conservation concern appear to be present at the site. According to the Specialist, vegetation at most of the site is conspicuously degraded, modified or transformed. Indigenous tree species at the site include *Vachellia karroo* (Sweet Thorn), *Vachellia tortilis* subsp. *heteracantha* (Umbrella Thorn), *Vachellia hebeclada* (Candlepod Thorn), *Senegalia mellifera* (Black Thorn) and *Ziziphus mucronata* (Buffalo-thorn). The alien invasive tree species *Melia azedarach* also occurs at the site as well as the alien invasive succulent *Opuntia ficus-indica*. Indigenous grass species include *Eragrostis lehmanniana*, *Eragrostis rigidior*, *Aristida congesta*, *Cynodon dactylon*, *Chloris virgata* and *Heteropogon contortus*. Indigenous forbs and dwarf shrubs include *Gazania krebsiana*, *Bulbine narcissifolia*, *Euphorbia inaequilatera* and *Felicia muricata*,

The **SAHRA Specialist** found no sites, features or material of cultural heritage (archaeological and/or historical) origin or significance in the study area during the physical assessment. The informal dumping of residential household refuse and building rubble occurs throughout the study area. The area itself is surrounded by residential, industrial and business related developments and as a result the larger geographical location has been extensively altered from its original natural and historical landscape. Telephone lines, as well as a dirt road that runs from east to west roughly in the middle of the study area, and a dirt & tar road that comes off the R503 and runs approximately north-south through the land has impacted on the area as well.

The **Feasibility study** found that the proposed filling station will be **FEASIBLE** to develop. The **Retail Study** concluded that: “Based on the findings of this report, a retail centre sized from ± 6,500 to 7,000m² GLA could be sustainable by the year 2023 on the proposed site, provided that it captures 15% market share and 5% inflow. We believe that 5% inflow is possible given the site’s proximity to a provincial hospital as well as the R503 and N18 Bypass.”

Consistent with national priorities, environmental authorities must support "*increased economic growth and promote social inclusion*", whilst ensuring that such growth is "*ecologically sustainable*". In the National Spatial Development Perspective (NSDP) it is highlighted that, to achieve the goal of stimulating sustainable economic activities and to create long-term employment opportunities, it is required that spending on economic infrastructure is focused in priority areas with potential for economic development, with development to serve the broader societies' needs equitably

The purpose of the study is therefore to determine the impacts that the environment may have on the proposed activity, as well as the possible impacts that the activity may have on the environment.

The study is being conducted according to normal scientific practices. A theoretical background review was compiled for the different variables by using available information from the literature. Field verification was undertaken and visits paid to the site to gather further information and/or to verify information. It also includes the identification of *key interest groups*, both governmental and non-governmental, and to establish good lines of communication. Specialist studies were undertaken to determine the impacts on sensitive areas and to determine whether the proposed project can be sustainably implemented. The specialists will also advise on mitigation measures where applicable.

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1. INTRODUCTION

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Figure 1a: Locality Map. (General location of the study area in red polygon (Google Earth 2021).)



FIGURE 1b: Locality Map. (Closer view of the study & proposed development area footprint (Google Earth 2021).)

1.1 THE BASIC ASSESSMENT PROCESS

The purpose of this document is to adhere to the requirements for compilation of Basic Assessment Reports as amended and published in Government Notice R. 326 of 7 April 2017, Appendix 1, and the National Environmental Management Act (Act 107 of 1998) (NEMA).

1.2 DESCRIPTION OF THE PROCESS FOLLOWED

In order to assess a proposed development it is important to take into consideration the principles of NEMA. These principles are outlined in Chapter 1 and read as follows:

- 1) *"The principles set out in this section apply throughout the Republic to the actions of all organs of state that may significantly affect the environment and—*

- a. *shall apply alongside all other appropriate and relevant considerations, including the State's responsibility to respect, protect, promote and fulfil the social and economic rights in Chapter 2 of the Constitution and in particular the basic needs of categories of persons disadvantaged by unfair discrimination;*
 - b. *serve as the general framework within which environmental management and implementation plans must be formulated;*
 - c. *serve as guidelines by reference to which any organ of state must exercise any function when taking any decision in terms of this Act or any statutory provision concerning the protection of the environment;*
 - d. *serve as principles by reference to which a conciliator appointed under this Act must make recommendations; and*
 - e. *guide the interpretation administration and implementation of this Act, and any other law concerned with the protection or management of the environment.*
- 2) *Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.*
- 3) *Development must be socially, environmentally and economically sustainable.*
- 4) (a) *Sustainable development requires the consideration of all relevant factors including the following:*
- (i) *That the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied:*
 - (ii) *that pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied;*
 - (iii) *that the disturbance of landscapes and sites that constitute the nation's cultural heritage is avoided, or where it cannot be altogether avoided, is minimised and remedied;*
 - (iv) *that waste is avoided. or where it cannot be altogether avoided, minimised and re-used or recycled where possible and otherwise disposed of in a responsible manner;*
 - (v) *that the use and exploitation of non-renewable natural resources is responsible and equitable, and takes into account the consequences of the depletion of the resource;*
 - (vi) *that the development use and exploitation of renewable resources and the ecosystems of which they are part do not exceed the level beyond which their integrity is jeopardised;*
 - (vii) *that a risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions; and*
 - (viii) *that negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied.*
- (b) *Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated, and it must take into account the effects of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option.*

- (c) *Environmental justice must be pursued so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons.*
- (d) *Equitable access to environmental resources, benefits and services to meet basic human needs and ensure human well-being must be pursued and special measures may be taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination.*
- (e) *Responsibility for the environmental health and safety consequences of a policy, programme, project, product, process, service or activity exists throughout its life cycle.*
- (f) *The participation of all interested and affected parties in environmental governance must be promoted, and all people must have the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation and participation by vulnerable and disadvantaged persons must be ensured.*
- (g) *Decisions must take into account the interests, needs and values of all interested and affected parties, and this includes recognizing all forms of knowledge, including traditional and ordinary knowledge.*
- (h) *Community wellbeing and empowerment must be promoted through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means.*
- (i) *The social, economic and environmental impacts of activities, including disadvantages and benefits must be considered, assessed and evaluated and decisions must be appropriate in the light of such consideration and assessment.*
- (j) *The right of workers to refuse work that is harmful to human health or the environment and to be informed of dangers must be respected and protected.*
- (k) *Decisions must be taken in an open and transparent manner, and access to information must be provided in accordance with the law.*
- (l) *There must be intergovernmental co-ordination and harmonisation of policies, legislation and actions relating to the environment.*
- (m) *Actual or potential conflicts of interest between organs of state should be resolved through conflict resolution procedures.*
- (n) *Global and international responsibilities relating to the environment must be discharged in the national interest.*
- (o) *The environment is held in public trust for the people, the beneficial use of environmental resources must serve the public interest and the environment must be protected as the people's common heritage.*
- (p) *The costs of remedying pollution, environmental degradation consequent adverse health effects and of preventing, controlling or minimizing further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment.*
- (q) *The vital role of women and youth in environmental management and development must be recognised and their full participation therein must be promoted.*

- (r) *Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure.*”

The above mentioned principals and the applicable legislation, Policies and Guidelines as described in Paragraph 5 of this Report were taken into account in the assessment of the Environmental Impacts for the proposed development. The process followed can be described as follows:

- 1) The EAP was contracted by MG DEVCO (Pty) Ltd as their Independent Environmental Assessment Practitioner.
- 2) A Geo-Technical Engineer has conducted a Geo-Technical investigation to determine the impact of the Geology of the area on the development.
- 3) A Civil Engineer has designed the Bulk Services to ensure a sustainable development.
- 4) A SAHRA Specialist has been appointed to determine the possible impact of the development on Archaeological and Cultural features.
- 5) A Fauna and Flora Habitat specialist has been appointed to determine the impact of the proposed development on the Fauna and Flora of the area.
- 6) A Feasibility Study was conducted to provide a considered estimation of the projected fuel and shop sales based on the trade area demographics and the current traffic count with the scope of work being to undertake a market assessment and demand study for the proposed filling station.
- 7) A Retail Study was conducted to determine the demographic market size and feasibility of the proposed retail centre.
- 8) An Environmental Screening Process was conducted by the EAP to ensure that all the relevant Environmental Legislation is taken into consideration.
- 9) Desk top studies were conducted and alternatives assessed.
- 10) Site inspections were carried out to verify the outcomes of the desktop studies, and the preferred alternative defined.
- 11) A full Public Participation Process is being followed to obtain inputs from interested and affected parties.
- 12) All the information obtained from the above mentioned processes is being used to assess the Environmental Impact that the proposed development may have on the Environment and vice versa.
- 13) The inputs from Specialists, interested and affected parties, together with the knowledge of the EAP is being used to determine measures to avoid, mitigate and manage potential impacts. These measures are described in the Environmental Management Programme.

1.3 ASSESSMENT PHASE

The assessment phase included the necessary investigations to assess the suitability of the identified site and its surrounding environment, for the development proposal. The assessment phase described the “status quo” of the bio-physical, social, economic and cultural environment, and identifies the anticipated environmental aspects associated with the proposed development. The assessment phase included the identification of *key interest groups*, (both government and non-

government), and strived to establish efficient and effective communication. Identifying and informing Interested and affected parties of the proposed development may have an impact on the focus of the EIA. (S. Cliff, 2015).

This phase also determines the *significance of the impact* of the proposed activity on the surrounding Environment. During this phase, a Basic Assessment Report (BAR) is compiled, and, following public review, is submitted to the approving authority – the DEDECT.

The purpose of the Basic Assessment Report is to document the outcome of the Assessment Phase of the project. The report fulfilled the requirements of the EIA Regulations (2014) for the documentation of the Basic Assessment Process. The Report was compiled in accordance with Section 21(3) of NEMA's 2014 EIA Regulation (GN R. 982) as amended and published in Government Notice R. 326 of 7 April 2017.

The Draft Basic Assessment Report will be submitted to DEDECT as soon as the acknowledgement for the project is received.

1.3.1 Objective of the basic assessment process

The objective of the basic assessment process is to, through a consultative process-

- (a) determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;
- (b) identify the alternatives considered, including the activity, location, and technology alternatives;
- (c) describe the need and desirability of the proposed alternatives;
- (d) through the undertaking of an impact and risk assessment process, inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on these aspects to determine—
 - (i) the nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and
 - (ii) the degree to which these impacts—
 - (aa) can be reversed;
 - (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated;
 - (cc) can be avoided, managed or mitigated; and
- (e) through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to—
 - (i) identify and motivate a preferred site, activity and technology alternative;
 - (ii) identify suitable measures to avoid, manage or mitigate identified impacts; and
 - (iii) identify residual risks that need to be managed and monitored.

1.3.2 Scope of assessment and content of basic assessment reports

The BAR assesses those identified potential environmental impacts and benefits (direct, indirect and cumulative impacts) associated with the project design, construction, and operation phases, and recommends appropriate mitigation measures for potentially significant environmental impacts. The Environmental impacts are assessed both before and after mitigation to determine:

- The significance of the impact despite mitigation; and
- The effectiveness of the proposed mitigation measures.

The BAR addresses potential environmental impacts and benefits associated with all phases of the project, including design, construction and operation, and aims to provide the environmental authorities with sufficient information to make an informed decision regarding the proposed project.

Table 1 below provides a summary of the legislative requirements in terms of a Basic Assessment Report as stipulated in Section 23 of the 2014 EIA Regulation (GN R. 982) as amended and published in Government Notice R. 326 of 7 April 2017. Cross-references are provided in terms of the relevant section within this BA Report where the NEMA and BA Report requirements have been addressed.

Table 1: Basic Assessment Report content as per Section 23 of NEMA’s 2014 EIA Regulation (GN R. 982) as amended and published in Government Notice R. 326 of 7 April 2017 Appendix 1.

3. (1) A basic assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include:

Section of the EIA Regulations, 2014	Description of EIA Regulations Requirements for Basic Assessment Reports	Location in this report
Appendix 1, section 3 (a)	Details of the EAP who prepared the report; and the expertise of the EAP, including a curriculum vitae;	Paragraph 2
Appendix 3, section 3 (b)	The location of the development footprint of the activity on the approved site as contemplated in the accepted scoping report, including – (i) The 21 digit Surveyor General code of each cadastral land parcel; (ii) Where available, the physical address and farm name; (iii) Where the required information in items (i) and (ii) is not available, coordinates of the boundary of the property or properties	Paragraph 4 Paragraph 4 Paragraph 4
Appendix 1, section 3 1(c)	A plan which locates the proposed activity or activities applied for, at an appropriate scale, or, if it is – (i) A linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) On land where the property has not been defined, the coordinates within which the activity is to be undertaken;	Appendix A1 and Appendix A2 Paragraph 4
Appendix 1, section 3 (d)	A description of the scope of the proposed activity, including – (i) all listed and specified activities triggered and being applied for; and (ii) a description of the activities to be undertaken including associated structures and infrastructure;	Paragraph 3 Paragraph 3
Appendix 1, section 3 (e)	A description of the policy and legislative context within which the development is proposed including (i) an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report; and (ii) how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments explanation of how the proposed development complies with and responds to the legislation and policy context	Paragraph 5.1 Paragraph 5.2 Paragraph 5.2
Appendix 1, section 3 (f)	A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location.	Paragraph 6

Section of the EIA Regulations, 2014	Description of EIA Regulations Requirements for Basic Assessment Reports	Location in this report
Appendix 1, section 3 (g)	a motivation for the preferred site, activity and technology alternative	Paragraph 4
Appendix 1, section 3 (h)	<p>A full description of the process followed to reach the proposed preferred alternative within the site, including-</p> <p>(i) Details of all alternatives considered;</p> <p>(ii) Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;</p> <p>(iii) A summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;</p> <p>(iv) The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;</p> <p>(v) The impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration, and probability of the impacts, including the degree to which the impacts-</p> <p>(aa) can be reversed;</p> <p>(bb) may cause irreplaceable loss of resources; and</p> <p>(cc) can be avoided, managed, or mitigated.</p> <p>(vi) The methodology used in deterring and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;</p> <p>(vii) Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographic, physical, biological, social, economic, heritage and cultural aspects;</p> <p>(viii) The possible mitigation measures that could be applied and level of residual risk;</p> <p>(ix) the outcome of the site selection matrix</p> <p>(x) If no alternatives, including alternative footprints for the activity were investigated, the motivation for not considering such and;</p> <p>(xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity.</p>	<p>Paragraph 8</p> <p>Paragraph 10</p> <p>Paragraph 10</p> <p>Paragraph 8</p> <p>Paragraph 9</p> <p>Paragraph 9</p> <p>Paragraph 9</p> <p>Paragraph 9</p> <p>Paragraph 9</p> <p>Paragraph 9</p> <p>Paragraph 9</p> <p>Paragraph 9</p> <p>Not Applicable</p> <p>Paragraph 12</p>
Appendix 1, section 3 (i)	<p>A full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including-</p> <p>(i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and</p> <p>(ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;</p>	<p>Paragraph 9</p> <p>Paragraph 8</p> <p>Paragraph 9</p>
Appendix 1, section 3 (j)	<p>An assessment of each identified potentially significant impact and risk, including-</p> <p>(i) cumulative impacts;</p> <p>(ii) the nature, significance and consequences of the impact and risk;</p>	<p>Paragraph 9</p> <p>Paragraph 9</p>

Section of the EIA Regulations, 2014	Description of EIA Regulations Requirements for Basic Assessment Reports	Location in this report
	(iii) the extent and duration of the impact and risk;	Paragraph 9
	(iv) the probability of the impact and risk occurring;	Paragraph 9
	(v) the degree to which the impact and risk can be reversed;	Paragraph 9
	(vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and	Paragraph 9
	(vii) the degree to which the impact and risk can be mitigated;	Paragraph 9
Appendix 1, section 3 (k)	Where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report;	Paragraph 11
Appendix 1, section 3 (l)	An environmental impact statement which contains- (i) a summary of the key findings of the environmental impact assessment: (ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and (iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;	Paragraph 12.2 and 12.2 Figure 2 Paragraph 12
Appendix 1, section 3 (m)	Based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management outcomes for the development for inclusion in the EMPr	Paragraph 11 and 12
Appendix 1, section 3 (n)	Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation	Paragraph 3.1.2.1
Appendix 1, section 3 (o)	A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed	Paragraph 1.4.3
Appendix 1, section 3 (p)	A reasoned opinion as to whether the proposed 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	Paragraph 12.4
Appendix 1, section 3 (q)	Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded and the post construction monitoring requirements finalised	Not Applicable
Appendix 1, section 3 (r)	An undertaking under oath or affirmation by the EAP in relation to- (i) The correctness of the information provided in the report; (ii) The inclusion of the comments and inputs from stakeholders and interested and affected parties; and (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and (iv) Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties.	Paragraph 13 Paragraph 13 Paragraph 13 Paragraph 13
Appendix 1, section 3 (s)	Where applicable, details of any financial provision for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts.	Not Applicable
Appendix 1, section 3 (t)	Any specific information that may be required by the competent authority.	Not Applicable
Appendix 1, section 3 (u)	Any other matters required in terms of section 24(4)(a) and (b) of the Act	Not Applicable

1.3.3 Assumptions, uncertainties, limitations and gaps in knowledge:

This report is based on current available information and, as a result, the following limitations and assumptions are implicit –

The report is based on the *project description* provided by the Applicant as a result of reports that was compiled by the following Specialists:

- A Geo-Technical Engineer has conducted a Geo-Technical investigation to determine the impact of the Geology of the area on the development.
- A Civil Engineer has designed the Bulk Services to ensure sustainable service delivery
- A SAHRA Specialist has been appointed to determine the possible impact of the development on Archaeological and Cultural features.
- An Ecologist has been appointed to determine the impact of the proposed development on the Fauna and Flora of the area.
- A Specialist has been appointed to conduct a Feasibility Study to provide a considered estimation of the projected fuel and shop sales based on the trade area demographics and the current traffic count with the scope of work being to undertake a market assessment and demand study for the proposed filling station.
- A Specialist has been appointed to conduct a Retail Study to determine the demographic market size and feasibility of the proposed retail centre.
- An Environmental Screening Process was conducted by the EAP to ensure that all the relevant Environmental Legislation is taken into consideration.
- Desktop studies were conducted and alternatives assessed.

Descriptions of the biophysical and social environments are based on specialist fieldwork, investigations, and the Public Participation Process.

2. DETAILS AND EXPERTISE OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

AB Enviro Consult (CC) is a registered consultancy, owned and operated as an independent unit by the registered owner and consultant: **Prof. A.B. de Villiers**

- **Mr J.P. De Villiers** joined the consultancy during 2004
- **Mrs J.E. du Plooy** is a consultant since 2001

Over a period of 25 years (1996-2021) this consultancy has successfully applied for, and obtained positive ROD's and EA's for more than 380 projects. Environmental Control Officer's duties are also performed on various projects.

The company was involved (from 1992-1994) in evaluation of 114 applications for the subdivision of land, 23 applications for resort developments, and 54 applications for business rights for the Department of Agriculture, Conservation and the Environment - North West Province.

The consultancy is qualified to undertake professional studies in waste management and is still involved in the development of waste disposal- (solid and liquid effluent), and emission studies. These studies are conducted both academically and practically. This work relates to mine waste, domestic waste and effluent as well as to the monitoring of waste disposal. Environmental audits in this respect are undertaken on a regular basis.

PERSONAL PARTICULARS AND CAREER HISTORY OF PROF DE VILLIERS

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 Electronic mail : brama@abenviro.co.za
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 POTCHEFSTROOM
 2531

Lecturer & Professor – Potchefstroom University 1969- 2004

ACADEMIC AND PROFESSIONAL QUALIFICATIONS

Post–Matric Qualifications

<u>YEAR</u>	<u>Qualification</u>	<u>Institution</u>	<u>Field of Study</u>
1968	B.Sc.	PU FOR CHE	Geography, Geology
1970	HONNS. B.Sc.	PU FOR CHE	Soil Science
1974	M.Sc.	PU FOR CHE	Geography
1981	Ph.D.	UOFS	Geography

PROFESSIONAL QUALIFICATIONS AND REGISTRATIONS

<u>YEAR</u>	<u>Qualification/ Registration</u>	<u>Institution</u>	<u>Field of Study</u>
1986	Professional Natural Scientist	S.A. Council for Natural Scientists	Environmental Science
1994	Quality Auditor	ESKOM	Auditing
1998	Personnel & Verifying Auditor	SAATCA	Environmental Auditing
2006	Environmental Assessment Practitioner	Interim Certification Board EAPSA	Environmental Science

MEMBERSHIP AND PARTICIPATION IN SOCIETIES, COUNCILS, ETC.

Name of professional societies	YEAR	Capacity
S.A. Geographical Society.	1967-1996	Board Member
Society for Geography	1968-2004	Member
SAGS Western Transvaal	1985-1989 1987-1989 1996	Chairman
Africa Geographical Association	1993-1995	Vice-President.
Society for the Vaal River Catchment	1980-1999	Member
S.A. Society for Photogrammetry, Remote Sensing and Cartography	1984-1996	Member
Dendrological Society	1986-2005	Member
Birdlife South Africa	2003-present	Member
British Geomorphological Research Group	1985-1997	Member
Int Com on Water Resource Systems	1985-1997	Member

Int Com on Continental Erosion	1986-1990	Member
Int Com on Remote Sensing and Data Transmission	1986-1991	Member
Society for S.A. Geographers	1995-2005	Member
SA Photogrammetrical and Geo. Info.	1995-2003	Member
S.A. Association of Geomorphologists	1994-1999	Board Member and member
SADC Mine Dump Study Group	1996-2005	Member

ACADEMIC AND PROFESSIONAL QUALIFICATIONS MR J.P. DE VILLIERS

YEAR	Qualification	Institution	Field of Study
1993	BA	PU FOR CHE	Geography, Economics
1994	HED	PU FOR CHE	Geography Economics
2006	B.Sc.(Honns) Cum Laude	North-West University	Environmental Management
2007	M.Sc.	North-West University	Geography

PROFESSIONAL QUALIFICATIONS AND REGISTRATIONS

YEAR	Qualification/ Registration	Institution	Field of Study
2008	Basic Principles of Ecological Rehabilitation and Mine Closure	Centre for Environmental Management (North West University)	Ecological Rehabilitation
2019	Registered as Environmental assessment Practitioner	EAPASA Registration number: 2019/808	

ACADEMIC AND PROFESSIONAL QUALIFICATIONS MRS J.E. DU PLOOY

YEAR	Qualification	Institution	Field of Study
1999	BA	PU FOR CHE	Geography, Tourism
2000	BA (Honns) Cum Laude	PU FOR CHE	Geography
2003	Master's degree in Environmental Management	PU FOR CHE	Environmental Management
2001	Aquabase Intro	AQUABASE	Hydrology
2001	Geomedia Professional	INTERTECH	GIS
2001	Map Info	SPATIAL TECHNOLOGY	GIS
2020	Registered as Environmental Assessment Practitioner	EAPASA : 2019/1573	

3. DESCRIPTION OF THE ACTIVITY

The applicant intends to develop a filling station, consisting of 4 x 23 000 ℓ tanks and the establishment of a shopping center, located on Erf 3726, Erf 3727 and Erf 3728 Danville, Mahikeng Local Municipality, North West Province. The proposed establishment of the filling station will also involve the eradication of 27 590 m² of indigenous vegetation located within a critical biodiversity area. Figure 2 is a copy of the proposed layout plan.

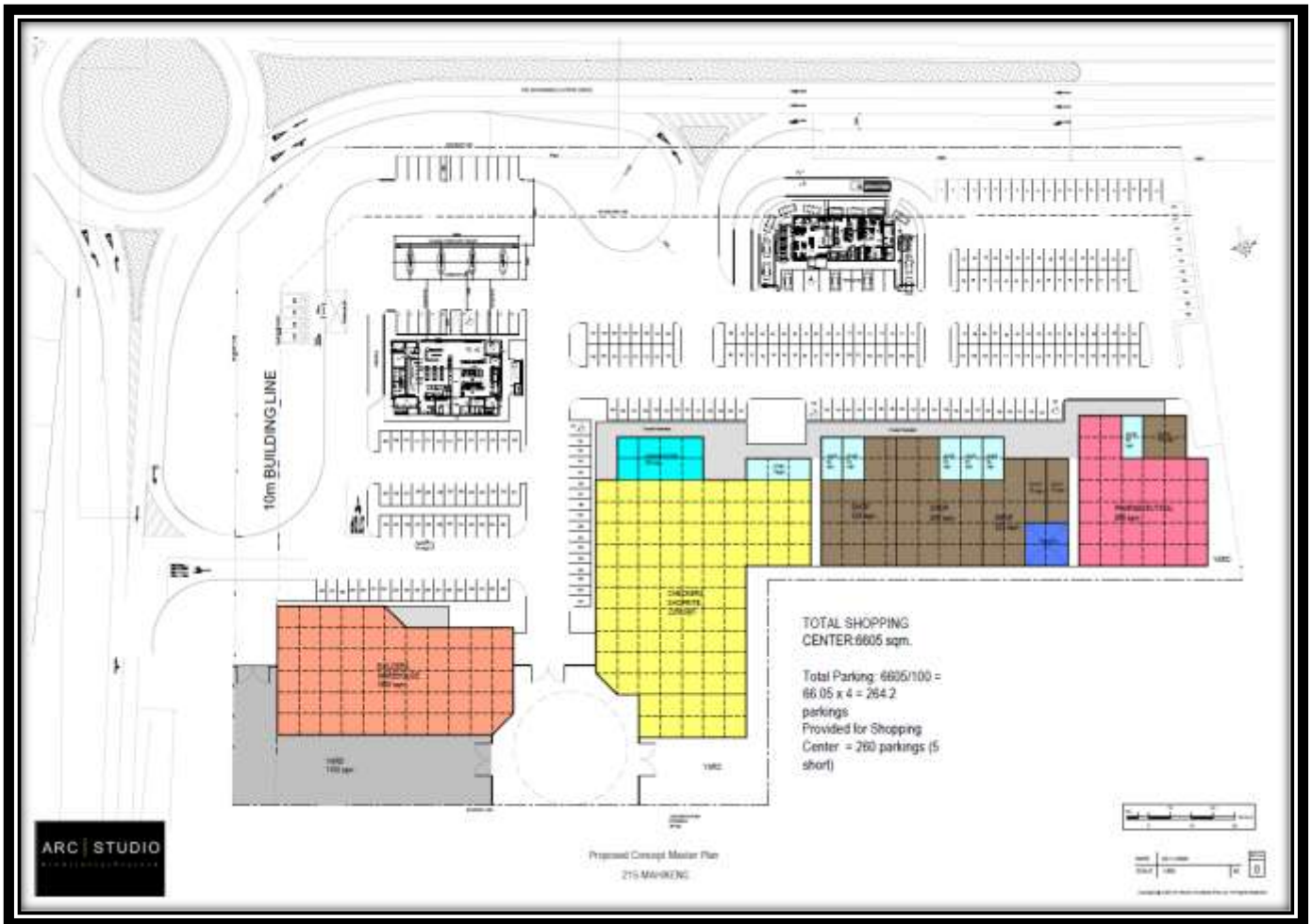


FIGURE 2: PROPOSED LAYOUT PLAN

Footprint of each proposed building:

Tenant	Extent
Engen Filling Station	1 200m ²
KFC	250m ²
Shoprite	3 000m ²
Clicks	800m ²
Cashbuild	1350 + 1000 yard
Other Line Shops	1 500m ²

The proposed shopping centre will be located on the south-eastern corner of the intersection of the R503 Lichtenburg Road and Bophelong Hospital Road. The intersection has recently been reconstructed to incorporate a new roundabout as part of the upgrading of the R503 road. The intersection has been identified as a "Gateway Project" in the Mahikeng Local Municipality IDP 2020-21.

Bulk Services

Water

The Ngaka Modiri Molema District Municipality is the Water Services Authority (WSA) whereas the Mahikeng Local Municipality is the Water Services Provider (WSP).

In addition to the Modimola Dam located to the west of Mahikeng, bulk water for Mahikeng is abstracted from the Grootfontein wellfields and the Molopo Eye for treatment. The estimated reliable delivery of the water sources amounts to 23 Mℓ/day. The Modimola Dam is the primary water source for the Mmabatho Water Treatment Works operated under contract by Sedibeng Water.

The Mmabatho WTW has a design capacity of 20 Mℓ/day although it currently only treats approximately 16 Mℓ/day. The plant services the Lokaleng Reservoir Site located to the northwest of Mahikeng.

The Proposed Development will have an estimated average daily water demand of 30 kℓ/day. The Erven does not have an existing municipal water connection. Due to the extent of the Proposed Development and future internal water management strategy, it is proposed that a new metered Ø 110mm connection be made to the existing bulk pipeline located in Danville to the west of the Proposed Development.

A new fire booster connection will be incorporated into the design of the metered connection to allow the Fire Brigade to boost the internal network in the case of fire. A sufficient number of strategically located fire hydrants will be supplied as part of the internal water network design.

Sewer

All sewage generated in the Greater Mmabatho is treated at two Waste Water Treatment Works located to the east and west of the Modimola Dam respectively. The Mmabatho Waste Water Treatment Works is located to the west of Mahikeng on the eastern side of the Modimola Dam. The plant has an estimated treatment capacity of 24 Mℓ/day. Due to limited functionality of flow meters, the exact current inflow could not be provided by the Local Authority however, it is estimated that the current inflow is between 16 and 17 Mℓ/day. Considering the estimated sewer runoff that will be generated by the Proposed Development, the plant has sufficient capacity to treat current and future generated sewer.

All sewage generated on the Proposed Development will follow the natural topography of the site to flow under gravity conditions towards the north-western corner of the site.

The topography of the Proposed Development can be described as relatively flat although sufficient slope is available to install internal sewer pipelines at minimum gradients.

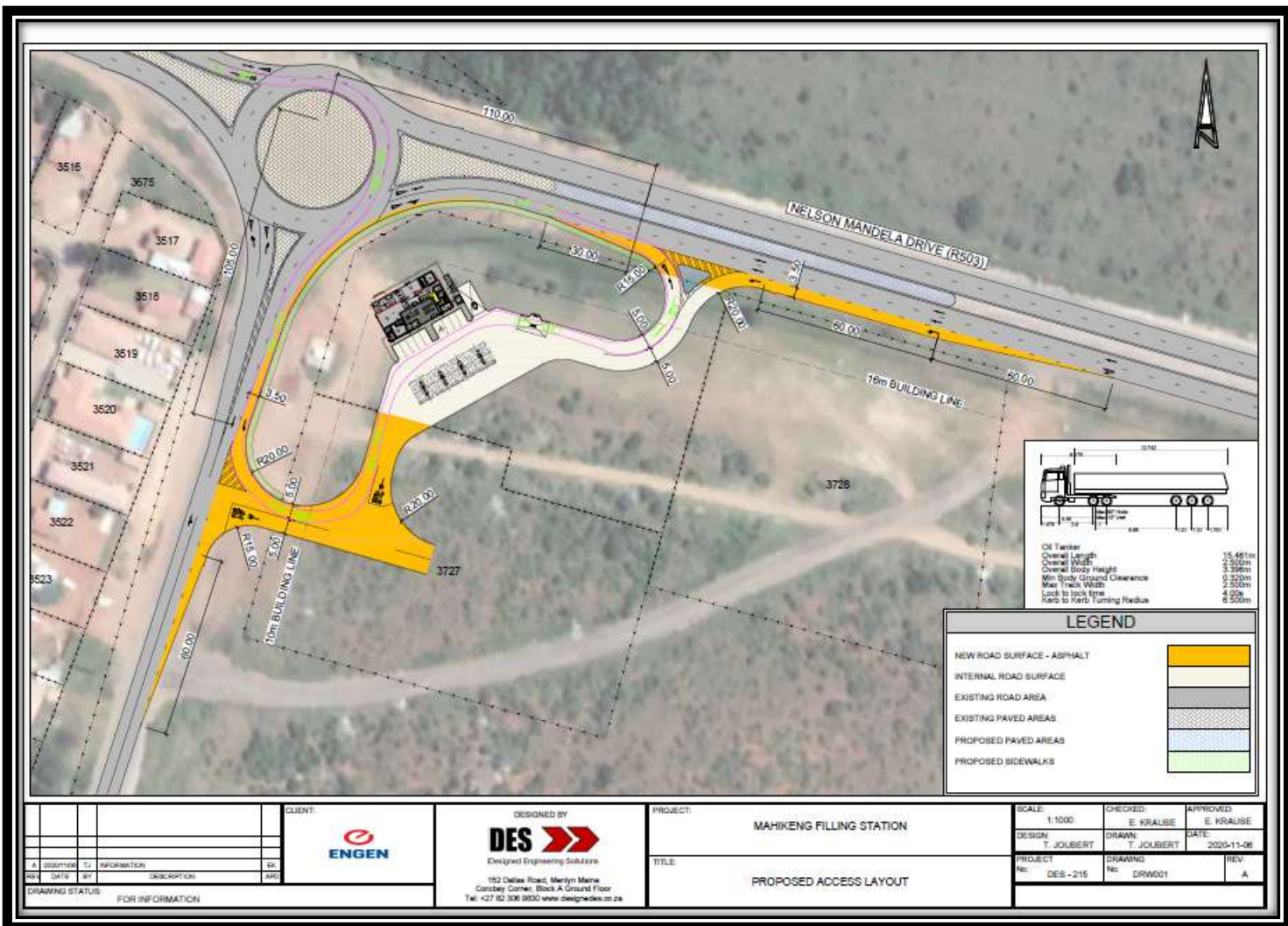
A sewer manhole is located on the corner of the existing township to the west of the Proposed Development where connection to the existing bulk sewer line can be made.

The theoretical sewer runoff of the Proposed Development is approximately 0.9 ℓ/s. Taking into account the peak flow generation periods as well as current size of the existing outfall sewer, the Proposed Development will have a negligible effect on the existing sewer network due to minimal additional flow volumes compared to the existing network.

Access

The Proposed Development is bordered to the north by the R503 Lichtenburg Road and to the west by the Bophelong Hospital Road. The intersection was recently upgraded by means of the full upgrading of the R503 road and construction of a roundabout. The roundabout efficiently calms traffic and allows smooth integration of traffic to and from the Bophelong Hospital Road.

It is proposed that an additional deceleration lane be constructed on the R503 westbound to accommodate westbound access to the new shopping centre while accommodating left turning traffic onto the R503 on an acceleration lane. To avoid right turning eastbound traffic towards the shopping centre, the median of the R503 will be extended at least 30m past the proposed new westbound access. Access for eastbound traffic will therefore be required to turn right at the roundabout to access the shopping centre from Bophelong Hospital Road by means of a left turning access point. See Figure below for a copy of the proposed access layout as was designed by the Engineer.



Proposed access layout

Storm Water

The natural topography of the Proposed Development slopes towards the north-western corner of the stand (towards the roundabout) where storm water is dispersed in a northern direction crossing the R503 road by means of existing rectangular

concrete culverts. Storm water follows natural streams in a north-western direction towards Cookes Lake which in turn overflows into the Molopo River.

In addition to storm water generated on the Proposed Development area, storm water from Danville crosses Bophelong Hospital Road in an eastern direction at the said intersection whereas storm water generated on the southern side of the R503 flows in a western direction to also cross the R503 at the same location next to the roundabout in a northern direction. Open unlined storm water channels in the road reserve convey storm water to the said crossing and it is assumed that the storm water crossing was sufficiently designed upon upgrading of the intersection and roundabout to accommodate existing flow volumes.

All paved areas and roads will be designed to accommodate storm water as surface water towards existing outlets. In addition, sufficiently designed storm water culverts will be installed crossing both proposed new access locations (as mentioned above) to allow unobstructed flow conditions.

All new storm water infrastructure will be designed to avoid additional flow volumes in existing channels while preventing ponding and flooding of any existing or new buildings.

Solid Waste

Municipal Solid Waste (MSW) removal is a function of the Waste & Environmental Management Division of the Mahikeng Local Municipality. Mahikeng currently generates an estimated MSW volume of 150 tons per day. The Proposed Development will not have any significant impact on the current generated MSW compared to the total volume of solid waste generated in the Municipal area. The MSW removal services of the Municipality will be extended to service the Proposed Development.

1 in 100 year Flood Line

The proposed development is not affected by the 1-in-100 year flood line.

Operation and Maintenance of Services

All external municipal services namely water, sewer, roads and storm water, electricity infrastructure as well as refuse removal functions shall remain the function of the Local Authority which is responsible for the operation and maintenance thereof.

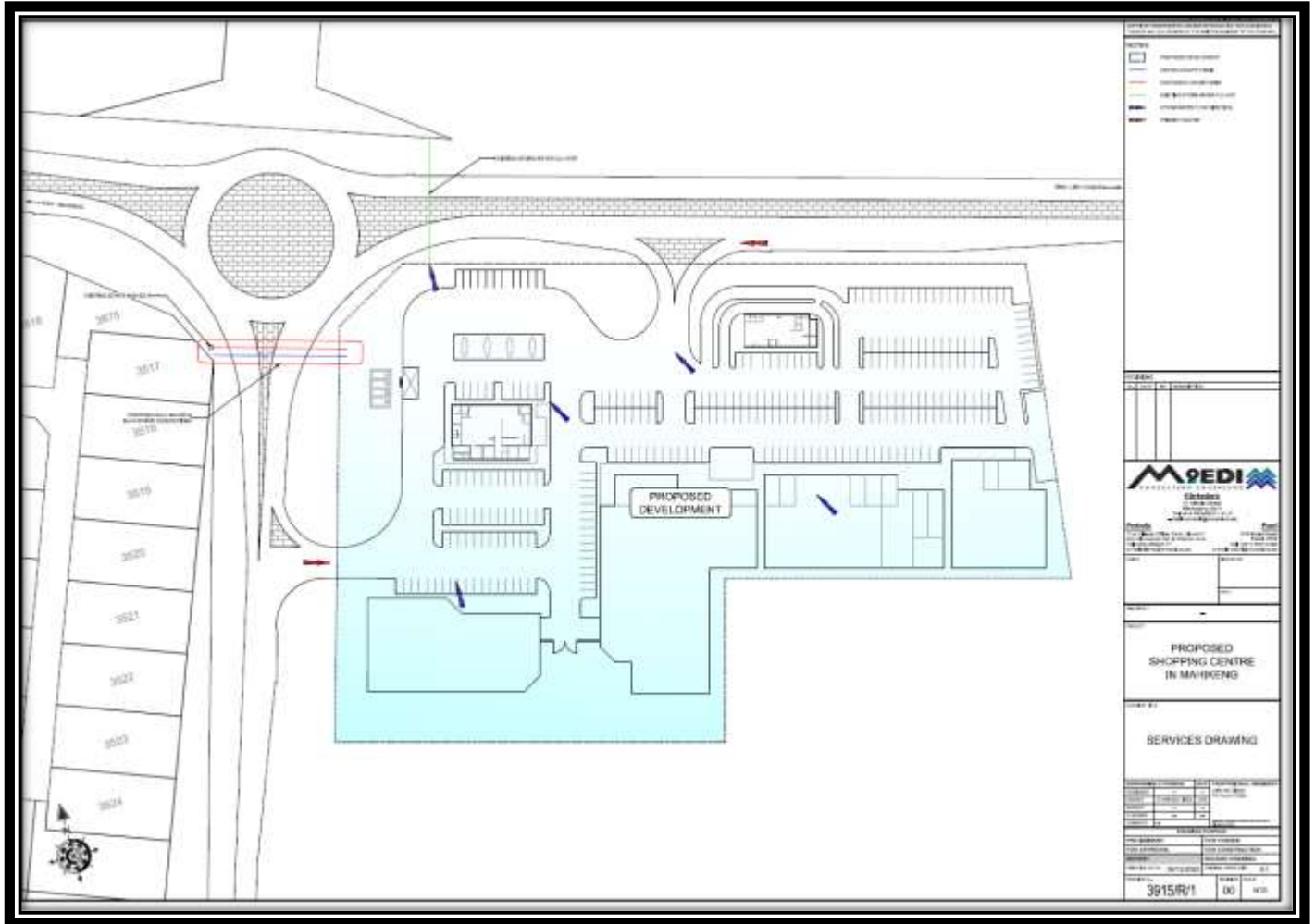


Figure 3: Civil Engineering Services Drawing

Infrastructure for the storage of fuel

The tanks will be installed in sealed underground bunkers. Containment elements are proposed concrete slab minimum 74mm concrete bedding/blinding concrete grade 15/19. Cement is proposed stabilised backfill in 150 mm layers, top slab 150mm thick to engineer’s details. See Figure 4 below.

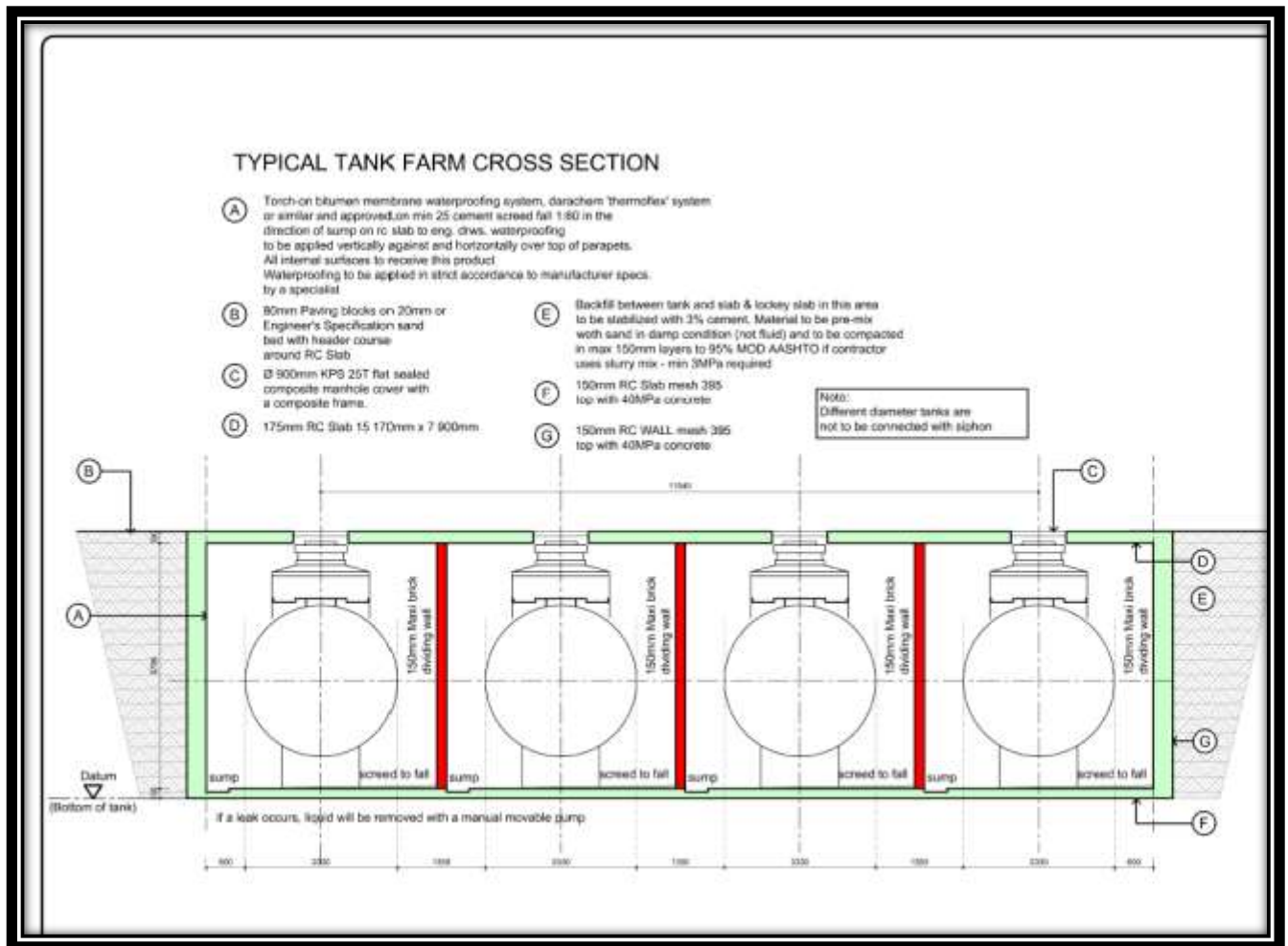


Figure 4: Underground fuel tanks to be installed in sealed bunkers.

RECOMMENDATIONS

Precautionary measures:

Even though the development poses a risk of contamination, sufficient mitigation and management measures exist and can be implemented to ensure the environmental sustainability and viability of the development. The development is therefore supported, based on implementation of the following recommendations and precautionary measures:

The requirements stipulated in SANS 10089 must be complied with, including but not limited to:

- Steel tanks and coatings shall comply with the requirements of SANS 1535.
- Fibre-reinforced plastic tanks shall comply with the requirements of SANS 1668, and all materials used in contact with the tank shall be compatible with the fibre-reinforced resin.
- Installation of fuel leak observation wells adjacent to the tanks.
- A full system integrity test in accordance with an approved test method shall be carried out on the tank after installation
- An efficient stormwater management system must be designed implemented on site.
- Stormwater from the site must drain into a sealed oil sump constructed directly downstream of the site in order to intercept possibly contaminated surface run-off from the apron and parking areas.

- All surface areas where the handling of fuel will take place (apron area) must be sealed by means of concrete slabs underlain by bitumen at the intersections of the concrete slabs, to prevent the infiltration of liquids into the underlying soil. The soil material underlying this layer must be adequately compacted to prevent ingress of liquids through zones of weakness (i.e.: along joints) within the surface seal.
- The buried fuel tanks should be installed according to the SANS 10089-3:2010 standards with a minimum of four fuel leak observation wells around the tanks. This is recommended to detect any leakage or ingress of liquid pollutants in the area surrounding the tanks. The observation boreholes adjacent to the tanks must be constructed to allow easy accessibility for monitoring purposes.
- The regular reconciliation of the volumes of petroleum products is recommended to ensure the early detection of leaks.
- Care should be taken that all fuel lines and fuel dispensers are leak-proof, especially in the light of the corrosion risk posed by the topsoil covering the area.
- A spillage contingency plan must be developed

4. DESCRIPTION OF THE PROPERTY

The property is located on Erf 3726, Erf 3727 and Erf 3728 Danville, Mahikeng Local Municipality, North West Province. The proposed development falls within the Mafikeng Local Municipality area of jurisdiction and is situated directly south of, and is bordered by, the newly upgraded section of the R503 road (Nelson Mandela Drive) between Lichtenburg and Mahikeng as you enter Mahikeng from Lichtenburg. (See Photograph 1) The newly constructed traffic circle (See Photograph 2) is located on the north western corner of the site. The ring road that connects with the N18 (N18 Bypass, Dr James Moroka Drive) borders the site on west. See Photograph 4. (See figure 1a and Figure 1b). The site is located 1km away from Bophelong Regional Hospital/Mahikeng Provincial Hospital. The site has excellent visibility from all directions on the N18 Bypass and the R503.

The R503 has through flow traffic daily, while Mafikeng Provincial Hospital/Bophelong Regional Hospital has in flow of people daily—Health Workers, Patients and Visitors. The Hospital is the main activity generator near the site located ± 1 Km away. An informal taxi rank is also located near the Hospital. The residents of Mosiane View and Danville can even walk to the site—convenience.

The proposed development is located within a critical biodiversity area. See Figure 5 for a copy of the Sensitivity Map as generated from the 2015 North West Biodiversity Map contained in the BGIS Land Use Decision Support (LUDS) Tool. Also see Figure 6 for a copy of a Sensitivity map as determined by the Ecological Fauna and Flora Habitat Specialist.

Figure 5 illustrates the fact that the entire site is located within a Critical Biodiversity Area (CBA) while Figure 6 highlights the highly disturbed character of the site. The site is visibly disturbed. Informal dumping at the site is extensive. See Photograph 4 and 5. Old roads run through the site. See Photograph 6. Fowl-smelling water is present within the road reserve of the R503 (See Photograph 7). This might be stormwater or sewage as a sewage pump station is located on the north-western corner of the site. See Photograph 8. Disturbances include excavations of the past. Bush encroachment of shrub-height *Vachellia* species (Thorns) is noticeable at some areas at the site. Alien invasive weeds are widespread at disturbed areas at the site.



- Red outline
 Boundaries of the site
- Orange-brown outline and shading
 Medium-low sensitivity (on a smaller scale some parts are very low sensitivity)

FIGURE 6: SENSITIVITY MAP (Sensitivity map as determined by the Ecological Fauna and Flora Habitat Specialist)



Photograph 1: R503 (Nelson Mandela Drive) road between Lichtenburg and Mahikeng as you enter Mahikeng from Lichtenburg.



Photograph 2: The newly constructed traffic circle



Photograph 3: The ring road that connects with the N18 (Dr James Moroka Drive) borders the site on west



Photograph 4: Informal dumping at the site is extensive



Photograph 5: Informal dumping at the site is extensive



Photograph 6: Old roads run through the site. Once again also note the extensive informal dumping.



Photograph 7: Fowl-smelling water is present within the road reserve of the R503.



Photograph 8: Sewage pump station is located on the north-western corner.

The Surveyor-general 21-digit site reference number are:

T	O	J	O	0	0	0	4	0	0	0	0	3	7	2	6	0	0	0	0	0
T	O	J	O	0	0	0	4	0	0	0	0	3	7	2	7	0	0	0	0	0
T	O	J	O	0	0	0	4	0	0	0	0	3	7	2	8	0	0	0	0	0

Site Co-ordinates

Latitude (S):

Longitude (E):

Alternative S1 (preferred or only site alternative)

25°	52'	42,36"	25°	39'	48.68"
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5. LEGAL AND OTHER REQUIREMENTS

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
National Environmental Management Act No. 107 of 1998 as amended.	NEMA is the guiding legislation that has been considered during the Environmental Impact Assessment process and the compilation of this Scoping Report.	NW:DEDECT	27 November 1998
The Bill of Rights, Constitution of South Africa, Section 27 (1)(b)	The Constitution of the Republic of South Africa is the legal source of all law, including environmental law, in South Africa. The Bill of Rights is fundamental to the Constitution of South Africa and in, section 24 of the Act, it is stated that: Everyone has the right (a) to an environment that is not harmful to their	National Government	1994

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
	<p>health or well-being; and (b) to have the environment protected, for the benefit of present and future generations through reasonable legislative and other measures that (i) prevent pollution and ecological degradation; (ii) promote conservation; and (iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.</p> <p>Given that environmental management is founded partly on the principles of public participation, Section 195 of the Constitution is of primary relevance:</p> <p>(1) Public administration must be governed by the democratic values and principles enshrined in the constitution, including the following principles: (a) (b) (c) (d) (e) Peoples needs must be responded to, and the public must be encouraged to participate in policymaking. (f) Public administration must be accountable. (g) Transparency must be fostered by providing the public with timely, accessible and accurate information (Government Gazette, 1996).</p>		
New Regulations 2014 in terms of NEMA	Legislation consulted during the environmental impact assessment process to determine whether any listed activities would be triggered. The Regulations were also consulted to determine inter alia the requirements regarding the contents of Scoping reports and the public participation process that should be followed.	NW: DEDECT	7 April 2017
National Water Act (36 OF 1998)	<p>National Water Act (NWA), 1998 (Act 36 of 1998) is the primary statute providing the legal basis for water management in South Africa and has to ensure ecological integrity, economic growth and social equity when managing and using water.</p> <p>The major objectives of the National Water Act are to:</p> <ul style="list-style-type: none"> •Aid in providing basic human needs; •Meet the growing demand of water in a sustainable manner; •Ensure equal access to water and use of water resources; •Protect the quality of water of natural resources; •Ensure integrated management of water resources; •Foster social and economic development; and 	Department of water and sanitation	1998

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
	<p>•Conserve aquatic and related ecosystems.</p> <p>Section 19 of the National Water Act states that the person responsible for land upon which any activity is or was performed which causes, has caused or is likely to cause, pollution of a water resource, must take all reasonable measures to prevent any such pollution from occurring, continuing or recurring.</p>		
<p>National Environmental Management: Biodiversity Act (NEMBA) (ACT NO. 10 OF 2004)</p>	<p>The National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004), provides for the management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act, 1998; the protection of species and ecosystems that warrant national protection; the sustainable use of indigenous biological resources; the fair and equitable sharing of benefits arising from bio-prospecting involving indigenous biological resources; the establishment and functions of a South African National Biodiversity Institute; and for matters connected therewith.</p> <p>In terms of Chapter 4 of the Above Act:</p> <p>52. (1) (a) The Minister may, by notice in the Gazette, publish a national list of ecosystems that are threatened and in need of protection.</p> <p>(b) An MEC for environmental affairs in a province may, by notice in the Gazette, publish a provincial list of ecosystems in the province that are threatened and in need of protection.</p> <p>(2) The following categories of ecosystems may be listed in terms of subsection:</p> <p>(a) critically endangered ecosystems, being ecosystems that have undergone severe degradation of ecological structure, function or composition as a result of human intervention and are subject to an extremely high risk of irreversible transformation;</p> <p>(b) endangered ecosystems, being ecosystems that have undergone degradation of ecological structure, function or composition as a result of human intervention, although they are not critically endangered ecosystems;</p>	<p>NW: DEDECT</p>	<p>2004</p>

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
	<p>(c) vulnerable ecosystems, being ecosystems that have a high risk of undergoing significant degradation of ecological structure, function or composition as a result of human intervention, although they are not critically endangered ecosystems or endangered ecosystems; and</p> <p>(d) protected ecosystems, being ecosystems that are of high conservation value or of high national or provincial importance, although they are not listed in terms of paragraphs (a), (b) or (c).</p> <p>(3) A list referred to in subsection (1) must describe in sufficient detail the location of each ecosystem on the list. 53 (1) The Minister may, by notice in the Gazette, identify any process or activity in a listed ecosystem as a threatening process.</p> <p>(2) A threatening process, identified in terms of subsection (1) must be regarded as a specified activity contemplated in section 24(2)(b) of the National Environmental Management Act (1998) and a listed ecosystem must be regarded as an area identified for the purpose of that section.</p>		
National Environmental Management: Protected Areas Act (ACT NO. 57 OF 2003)	<p>This Act aims to provide for a national system of protected areas in South Africa as part of a strategy to manage and conserve its biodiversity. The Protected Areas Act tries to ensure the protection of the entire range of biodiversity, referring to natural landscapes and seascapes. The Act makes express reference to the need to move towards Community Based natural Resource Management (CBNRM) as its objectives include promoting the participation of local communities in the management of protected areas. The purpose of the Act is:</p> <ul style="list-style-type: none"> •To protect ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes and their ecological integrity. •To conserve biodiversity in those areas; •To protect South Africa's rare species; •To protect vulnerable or ecologically sensitive areas; •To assist in ensuring the sustained supply of environmental goods and services; •To provide for the sustainable use of natural and biological resources; 	National Department of Environmental Affairs	2003

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
	<ul style="list-style-type: none"> •To create or augment destinations for nature-based tourism; •To manage the interrelationship between natural environmental biodiversity, human settlement and economic development; •To contribute to human, social, cultural, spiritual and economic development; •To rehabilitate and restore degraded ecosystems and promote the recovery of endangered and vulnerable species. <p>This Act further stipulates various criteria which must be met before an area can be declared as a special nature reserve, national park, nature reserve and protected environment. It also prescribes a range of procedures, including consultation and public participation procedures which must be followed before any of the kinds of protected areas are declared.</p>		
National Heritage Resources Act, Act No. 25 of 1999	Legislation consulted during the impact assessment process, to determine the legal requirements relating to the management of heritage resources that are present in and around the site.	SAHRA	1999
National Environmental Management: Waste Act, Act No. 59 of 2008, DEDECT together with the List of Waste Activities that Have, or are Likely to Have, a Detrimental Effect on the Environment, GN No. 921 of 29 November 2013	Legislation consulted to determine whether a waste licence will have to be obtained for the development.	NW:DEDECT Waste Section	2008
<i>National Environmental Management: Air Quality Act (Act 39 of 2004)</i>	To protect the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development while promoting justifiable economic and social Development. Construction activities may cause some air pollution.	Department of Environmental Affairs: Directorate Air quality management	2004
<i>The Conservation of Agricultural Resources Act (Act 43 of 1983)</i>	This Act regulates the flow pattern of runoff water, control of weeds and invader plants.	NW: Department of Agriculture	1983
<i>National Veldt and Forest Fire Act (Act 101 of 1998)</i>	Chapter 4 places a duty on owners to prepare and maintain firebreaks.	Department of Agriculture, Forestry and Fisheries	1998
<i>National Forests Act, Act 84 of 1998 (NFA) DEDECT with GN1602 of December 2016.</i>	During the construction phase of the development certain protected trees may be affected. Licences will have to be obtained from the Minister before the affected trees may be cut, disturbed, damaged or destroyed. GN1602 of December 2016 contains the list of protected trees.	Department of Agriculture, Forestry and Fisheries	1998
<i>Occupational Health and Safety Act (Act 85 of 1993)</i>	To provide for the health and safety of persons at work and for the health and safety of persons in connection with the use of plant and machinery and the	Department of Employment and labour	1993

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
	protection of persons other than persons at work against hazards to health.		
<i>Petroleum Products Act (Act 120 of 1977), as amended</i>	The Act regulates the distribution and sale of petroleum	Department of Mineral resources.	1977

5.2 (i) an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report; and

(ii) how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments explanation of how the proposed development complies with and responds to the legislation and policy context

5.2.1 Existing land use rights

The site is currently zoned "Business 1 with filling station as a special consent".

5.2.2 Provincial Spatial Development Framework (PSDF)

In terms of the North West Provincial Spatial Development Framework, 2009, the following spatial vision, aims and interpretation thereof were identified:

- Develop economic sectors and spatial localities in accordance with people's need and potential;
- Deliver on the Constitutional obligation to provide basic services to all citizens;
- Address past and current social inequalities in specific areas by focusing on people and places;
- Offer the poor access to opportunities to exercise choices in improving their quality of life and work together towards a single and integrated economy in a dignified manner; and
- Protect the integrity of the natural resources base and use the natural resource base of the province in a sustainable manner.

In terms of the Provincial Growth and Development Strategy (PGDS) the following key programmes of the Economic enhancement initiative were identified:

- The provincial economy needs to become more productive, more competitive and more diversified.
- Promote labour absorbing activities through Small Enterprises to support and promote private stimulation of rural economies.
- To promote skills development and training in economic practices to enhance economic growth.

Provincial Priority 4 states the following:

- Address the apartheid geography and create the conditions for more humane – and environmentally sustainable – living and working environments.
- It is important to address the entrenched spatial patterns that exacerbate social inequality and economic inefficiency, cognisant of the unique needs and potentials of different rural and urban areas in line with emerging development corridors.
- Active citizenship in spatial development should be supported through properly funded interventions that encompass citizen-led neighbourhood vision and planning processes; and the introduction of social compacts.

- Settlement planning should ensure the creation of spaces that are liveable, equitable, sustainable, resilient and efficient, and that support economic opportunities and social cohesion.

The proposed development complies with the principles as set out above in the sense that the proposed development will be contribute to economic growth in the area.

5.2.3 Urban edge / Edge of Built environment for the area.

The site is located within the urban build-up area, within the urban fringe of the Mahikeng Local Municipality, as contained in the Spatial Development Framework.

5.2.4 Spatial Development Framework (SDF) of the Local Municipality.

The following spatial development framework vision was formulated for the Mahikeng Local Municipality: *"Address key national, provincial and local priorities and principals in order to enhance sustainable urban and rural development and to improve the livelihood of people and by focussing the provision of social-economic infrastructure in areas with the highest growth potential but still attending to the basic needs of people."*

The site is located within the urban build-up area, within the urban fringe of the Mahikeng Local Municipality, as contained in the Spatial Development Framework.

According to the Spatial Development Framework, the following strategic interventions should be applicable within the urban edge:

Urban built-up areas:

- Densification and integration
- Urban infill
- Upgrading and proper maintenance infrastructure
- Urban renewal
- Protection and rehabilitation of environmentally significant local open spaces
- Protection of cultural heritage resources

The site is earmarked for Retail development, in terms of the spatial proposals contained in the Spatial Development Framework. The proposed shopping centre will be located on the south-eastern corner of the intersection of the R503 Lichtenburg Road and Bophelong Hospital Road. The intersection has recently been reconstructed to incorporate a new roundabout as part of the upgrading of the R503 road. The intersection has been identified as a "Gateway Project" in the Mahikeng Local Municipality IDP 2020-21.

In view of the fore-mentioned, the opinion is being held that the proposed development will be in line with the spatial planning proposals contained in the Mahikeng Local Municipality Spatial Development Framework Final Draft Report - December 2018.

5.2.5 Spatial Planning and Land Use Management Act, Act 16 of 2013, (SPLUMA).

The Spatial Planning and Land Use Management Act, Act 16 of 2013, (SPLUMA) came into operation on the 1st of July 2015 and has changed the Planning profession to such an extent that Planning can no longer be used as a tool to separate people and communities. The objectives are:

- *provide for a uniform, effective and comprehensive system of spatial planning and land use management for the Republic;*
- *ensure that the system of spatial planning and land use management promotes social and economic inclusion;*
- *provide for development principles and norms and standards;*
- *provide for the sustainable and efficient use of land;*
- *provide for cooperative government and intergovernmental relations amongst the national, provincial and local spheres of government; and*
- *Redress the imbalances of the past and to ensure that there is equity in the application of spatial development planning and land use management systems.*

SPLUMA's desired outcomes:

- Coherent regulatory framework;
- Constitutional synergy (clear delineation, distribution & allocation of powers among spheres);
- Predictable and transparent regulatory system; and
- Clear, rational and efficient inter-linkages of sectoral and inter-sphere planning tools and policies.

The following guidelines are given for Land Use Management:

- Land resources are used for a variety of purposes which interact and may compete with one another; therefore, it is desirable to plan and manage all uses in an integrated manner.
- Land use management examines all uses of land in an integrated manner, it makes it possible to minimize conflicts, to make the most efficient trade-offs and to link social and economic development with environmental protection and enhancement, thus helping to achieve the objectives of sustainable development.
- The essence of the integrated approach finds expression in the coordination of the sectoral planning and management activities concerned with the various aspects of land use and land resources.
- Integration should consider all environmental, social and economic factors.
- Integrated consideration facilitates appropriate choices and trade-offs, thus maximizing sustainable productivity and use.

The broad objective is to facilitate allocation of land to the uses that provide the greatest sustainable benefits and to promote the transition to a sustainable and integrated management of land resources.

5.2.6 Community/area's need for the activity and the associated land use concerned in terms of strategic as well as local level (e.g. development is a national priority, but within a specific local context it could be inappropriate.)

According to the Spatial Development Framework, the following strategic interventions should be applicable within the urban edge:

Urban built-up areas:

- Densification and integration
- Urban infill
- Upgrading and proper maintenance infrastructure
- Urban renewal
- Protection and rehabilitation of environmentally significant local open spaces
- Protection of cultural heritage resources

The site is earmarked for Retail development, in terms of the spatial proposals contained in the Spatial Development Framework. The proposed shopping centre will be located on the south-eastern corner of the intersection of the R503 Lichtenburg Road and Bophelong Hospital Road. The intersection has recently been reconstructed to incorporate a new roundabout as part of the upgrading of the R503 road. The intersection has been identified as a “Gateway Project” in the Mahikeng Local Municipality IDP 2020-21.

5.2.7 National context and the National Development Plan for 2030

The National Development Plan was compiled by the National Planning Commission in 2011. The vision of the plan is that South Africa will write a new story where the nation’s energies are focused both on attacking poverty and expanding a robust, entrepreneurial and innovative economy. Over the next two decades and beyond, communities will need the resources and capabilities to become their own engines of development and government must support this. Government has to ensure that poor people have the environment, services and skills to improve their lives. At the same time, government must create the conditions and environment for higher levels of public and private investment to create jobs and ensure rising incomes.

The national development plan proposes to invigorate and expand the economic opportunity through investment in infrastructure, more innovation, private investment and entrepreneurialism. The economy will absorb more labour – especially of new work seekers – and wage moderation at all levels will contribute to rising employment. Broadening these opportunities requires faster, more inclusive economic growth and higher levels of investment.

The opinion is being held that the proposed development will not be in conflict with the principles contained within the fore-mentioned National Development Plan, 2030 and will assist in moving closer to a “South Africa that is more inclusive, more dynamic and in which the fruits of growth are shared equitably. In 2030, the economy should be close to full employment, equip people with the skills they need, ensure that ownership of production is more diverse and able to grow rapidly, and provide the resources to pay for investment in human and physical capital.”

5.2.8 The 17 Strategic Integrated Projects (SIPS)

Not listed.

5.2.9 Integrated Environmental Management as set out in Section 23 of NEMA as amended.

The IEM guidelines encourage a pro-active approach to sourcing, collating and presenting information in a manner that can be interpreted at all levels. The basic principles underpinning IEM are that there be: informed decision-making;

- accountability for information on which decisions are taken;
- accountability for decisions taken;
- a broad meaning given to the term environment (i.e. one that includes physical, biological, social, economic, cultural, historical and political components);
- an open, participatory approach in the planning of proposals;
- consultation with interested and affected parties;
- due consideration of alternative options;
- an attempt to mitigate negative impacts and enhance positive aspects of proposals;
- an attempt to ensure that the ‘social costs’ of development proposals (those borne by society, rather than the developers) be outweighed by the ‘social benefits’ (benefits to society as a results of the actions of the developers);
- democratic regard for individual rights and obligations;

- compliance with these principles during all stages of the planning, implementation and decommissioning of the proposals (i.e. from ‘cradle to grave’); and
- the opportunity for public and specialist input in the decision-making process.

The general objectives of Integrated Environmental Management have been taken into account in this Basic Assessment report by means of identifying, predicting and evaluating the actual and potential impacts on the environment, socio-economic conditions and cultural considerations and cultural heritage component. The risks, consequences, alternatives as well as options for mitigation of activities have also been considered with a view to minimise negative impacts, enhance benefits and promote compliance within the principles of environmental management.

Additionally the Basic Assessment process will be undertaken to ensure I&APs have been afforded the opportunity to comment on the proposed activity and that their comments/inputs/concerns will be taken into consideration during the assessment process.

5.2.10 The principles of environmental management as set out in Section 2 of NEMA

The principles of NEMA have been considered in this assessment through compliance with the requirements of the relevant legislation in undertaking the assessment of potential impacts, as well as through the implementation of the principle of sustainable development. In addition, the successful implementation and appropriate management of this project will ensure socio-economic upliftment.

This process will be undertaken in a transparent manner and all efforts will be made to involve interested and affected parties, stakeholders and relevant Organs of State such that an informed decision can be made by the Regulating Authority.

5.2.11 Conclusion

The study is conducted in such a way as to comply with the instructions regarding legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments (as contained within the above-mentioned documents).

The study is conducted in such a way as to comply with the instructions regarding such studies and reports (as contained within the above-mentioned documents).

The following aspects have been dealt with:

SCHEDULE

Actions	Timeframe
1 Communication with authorities and source and analyse relevant baseline information and undertake site inspections	3 days
2 Compile Environmental Application Form for the project	2 days
3 Compile an <i>information requirements list</i> to be distributed to the project team. The Information required would assist with completion of the BAR.	2 days
4 Identify key interested and affected parties (I&APs)	1 day
5 Compilation of terms of reference for specialist studies	2 days
6 Commission specialist studies	1 day

7 Compile draft BAR and make available to the public for a 30 day commenting period and submit the application form to the competent authority. NB: According to the new Regulations a BAR must be submitted 90 days after the application has been submitted. The implication is that all information must be available within 80 days after submitting the Application.	3 days for compilation and 30 days for commenting period (The competent authority has 90 days to request additional information or to refuse the application, from the date of submission)
8 Prepare an Information Sheet (summary of the draft BAR) and distribute to I&APs	1 day
9 Compile and publish media notices (for the BAR) in relevant newspapers	7 – 10 days depending on the day the newspaper is published
10 Compile and place poster/s along the boundary of the site	1 day
11 Hold a public meeting / Open House / focus meeting with I&APs	1 day
12 Receive and address first round of comments from public	3 days
13 Should the draft BAR require substantial changes, these changes will be incorporated into the draft BAR and distributed	Included above (allow an additional 50 days to include #14 below)
14 Allow the identified public to provide comment within a 30 day period on above report.	3 days for compilation and 30 days for commenting period (Competent authority has an additional 50 days)
15 Address comments received on the draft BAR, Finalise BAR and update comments and response table; finalise Basic Assessment Report and submit to authorities	5 days
16 Submit final BAR to authorities for a final decision	1 day, The department has 107 days from the date of receipt to review and come to a final decision.
17 Once the decision is issued, all I&Ps must be formally informed of the decision	20 days
TOTAL AMOUNT OF DAYS:	197 days

6. NEED AND DESIRIBILITY

The opinion is being held that the proposed development will strengthen the retail sector within the Mahikeng Local Municipality, due to the provision of a shopping centre and filling station within the urban area. The site is also located at the intersection of

the R503 Lichtenburg Road and Bophelong Hospital Road. The intersection has recently been reconstructed to incorporate a new roundabout as part of the upgrading of the R503 road. The intersection has been identified as a “Gateway Project” in the Mahikeng Local Municipality IDP 2020-21. By strengthening the retail sector within the Mahikeng Local Municipality, the proposed development will contribute to the broadening of the income base of the Mahikeng Local Municipality.

In view of the objectives contained within the Mahikeng Local Municipality Spatial Development Framework Final Draft Report - December 2018, the Mahikeng Local Municipality envisages to serve the social needs and requirements of the population more properly and to become economically competitive, when compared to other town and cities.

The feasibility study conducted by WSP (See Appendix E) to establish the need for the development determined: It is estimated that the proposed new filling station will sell approximately 372 493 litres of fuel per month during its third year of operation. The Retail Study compiled by Ferridge Solutions concluded that the site has good visibility and accessibility from the R503 and N18 Bypass, limited competition in the catchment area and that the site is overall a good site for retail development. The proposed development addresses the need identified by the Mahikeng Local Municipality, for the provision of additional business properties, to be alienated by means of full title.

During the construction phase, temporary employment will be created. The increased employment in the area during the construction phase will also result in increased expenditure, which, in addition, will mean that more than just the proposed jobs required for the construction on the site will be created due to economic spin-offs that will result.

7. ALTERNATIVES

One of the objectives of a BA is to investigate alternatives to the proposed project. The IEM procedure stipulates that the environmental investigation needs to consider feasible alternatives for any proposed development. Therefore, a number of possible proposals or alternatives for accomplishing the same objectives should be identified and investigated. In order to ensure that the proposed development enables sustainable development, *feasible* alternatives must be explored (S. Cliff, 2015).

The identification, description, evaluation and comparison of alternatives are important for ensuring a sound environmental scoping process. Alternatives should be considered as a *norm* within the Environmental Process (S. Cliff, 2015).

Alternatives have been considered in terms of EIA Regulation, 2014 Appendix 1(h). Alternatives considered includes a consideration of all possible means by which the purpose and need of the proposed activity could be accomplished in the specific instance taking account of the interest of the applicant in the activity. The no-go alternative have also been included to act as a baseline against which the impacts of the other alternatives are assessed.

The determination of whether site or activity (including different processes, etc.) or both is appropriate have been informed by the specific circumstances of the activity and its environment.

7.1 FEASIBLE AND REASONABLE ALTERNATIVES

“alternatives”, in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to—

- (a) the property on which or location where it is proposed to undertake the activity;
- (b) the type of activity to be undertaken;
- (c) the design or layout of the activity;
- (d) the technology to be used in the activity;
- (e) the operational aspects of the activity; and
- (f) the option of not implementing the activity.

Design Alternatives	Description
Alternative Site 1 (preferred or only site alternative)	<p>The proposed construction of facilities and infrastructure for the storage and handling of 92 000 ℓ of a dangerous good (filling station), consisting of 4 x 23 000 ℓ tanks and the establishment of a shopping center located on Erf 3726, Erf 3727 and Erf 3728 Danville, Mahikeng Local Municipality, North West Province. The proposed development will result in the clearance of 27 590 m² of indigenous vegetation located within a critical biodiversity area.</p> <p>This Alternative will entail the installation of the tanks to be underground and within a sealed bunker.</p>
Alternative Site 2	<p>The proposed construction of facilities and infrastructure for the storage and handling of 92 000 ℓ of a dangerous good (filling station), consisting of 4 x 23 000 ℓ tanks and the establishment of a shopping center located on Erf 3726, Erf 3727 and Erf 3728 Danville, Mahikeng Local Municipality, North West Province. The proposed development will result in the clearance of 27 590 m² of indigenous vegetation located within a critical biodiversity area.</p> <p>This Alternative will entail the installation of the tanks to be underground but not within a sealed bunker.</p>

e) **No-go alternative**

Should this option be implemented, the “status-quo” will prevail and none of the advantages listed below will realize.

f) **Please motivate for preferred site, activity and technology alternative**

The proposed construction of facilities and infrastructure for the storage and handling of 92 000 ℓ of a dangerous good (filling station), consisting of 4 x 23 000 ℓ tanks and the establishment of a shopping center located on Erf 3726, Erf 3727 and Erf 3728 Danville, Mahikeng Local Municipality, North West Province. The proposed development will result in the clearance of 27 590 m² of indigenous vegetation located within a critical biodiversity area.

This Alternative will entail the installation of the tanks to be underground and within a sealed bunker.

Installing the tanks within a sealed bunker will ensure that should the tanks leak, the total volume of the tank, plus 10% will be contained within the bunker and no contamination of soil or ground water will occur.

8. DESCRIPTION OF THE ENVIRONMENT THAT MAY BE AFFECTED BY THE PROJECT

8.1 BIO-PHYSICAL ASPECTS

8.1.1 GEOLOGY, TOPOGRAPHY AND SOIL

The site is located on a shallow slope towards the northwest. According to the Geological map for the area, (Geological map 2525 Mafikeng. Scale 1:250 000. The Geological Survey of South Africa) the site is underlain by basaltic amygdaloidal lava, agglomerate & tuff of the Allanridge Formation, and amygdaloidal lava & tuff of the Rietgat Formation, Platberg Group, of the Ventersdorp Supergroup.

Typical soil profile

Dry to slightly moist, dark to dark reddish brown, dense or stiff, intact sandy clay and lava or calcrete gravel. Hillwash or pebble marker, sometimes with large well rounded lava boulders. Dry, kaki speckled black, dense, intact sandy clayey gravel. Moderately to slightly weathered lava.

Special care must be taken to ensure adequate surface drainage to prevent the accumulation of water next to structures.

The site contains slightly compressible and slightly too medium and highly expansive soil, and normal to special foundations will be required as zoned. Some problems regarding excavatability can be expected on specific small portions of the site. Storm water diversion measures such as ponding pools are recommended to control peak flows during thunderstorms. All embankments must be adequately compacted and planted with grass to stop any excessive erosion and scouring of the landscape

No dolomite occurs in the area and no stability investigation is required. No rocky ridges are present.



Geological map 2525 Mafikeng. Scale 1:250 000. The Geological Survey of South Africa

8.1.2 CLIMATE

The climate of the area is typical of the South African interior. In the discussion of this variable, certain aspects of rainfall, temperature and wind that can influence the project will be highlighted.

It must be noted that the climatic data are recorded in the Department of Environmental Affairs (1988) climatic data records. Data for Mafikeng weather station (0508/261 0) is available. The station has continuous records since 1920.

8.1.2.1. Rainfall

The average annual rainfall for the area is 553mm per annum. The highest annual rainfall recorded during the period for which the record is available is 868 mm (1918), while a yearly low of 265mm was recorded in 1930. Of note is the maximum-recorded daily rainfall of 101mm that was recorded on 16/12/1942.

The highest recorded monthly rainfall was recorded during January 1976 namely 360mm. Of importance is the fact that monthly minima of zero rainfall have been recorded for 6 months of the year.

The variability of rainfall as well as the high intensity events will definitely influence the project. On average however, the impact of rainfall can be considered as positive, as sufficient water is generally available for sustaining vegetation. Extreme dry conditions during dry spells will negatively affect the project due to the secondary effects on vegetation as well as the possibility of fire hazards. Extreme maximum events can also have a negative effect on the project during all its phases.

The overall impact can therefore be considered to be “variable” during the construction and operational phases (local in extent and long term in duration). The likelihood that these impacts may occur is probable, medium in intensity and significance. Steps to mitigate negative effects will be described in various sections of the Management Plan.

Due to the scale of the operation, the rainfall of the area cannot be affected by the project and is therefore “Not Applicable:

8.1.2.2. Temperature

The average daily maximum temperature for the winter months for the area is approximately 20° C. The average daily minimum for that time of the year is in the order of 4,5° C.

During the summer months, the average daily maximum is in the order of 29° C and the daily average minimum approximately 16° C. The highest daily maximum recorded was 40,2° C while the lowest recorded temperature was -2,5° C.

In combination with a dry spell, such hot temperatures may be favourable for the spreading of veldt fires.

The general impact of this variable on the project can be considered as positive during the construction and operational phases. The impacts can however be considered as having low intensity impacts of low significance. The extent is local and short term in duration.

Due to the scale of the project, it is clear that it will have no impact on the environment”.

8.1.2.3. Wind

The average wind direction for the area during the summer months is from the north-to-north easterly quadrant, while during the early spring the direction is more north westerly. Southerly winds generally occur during the winter, but are not frequent. Normally very little wind is experienced during the winter due to the presence of the high-pressure cell situated over the country during that time of the year.

The wind speeds are normally fairly low, but high wind speeds may occur during early spring and during of thundershowers.

Wind can be considered as having a low intensity, and a low significance negative impact on the construction and operational phases of the project. The probability is probable and the impacts are local but short in duration. The project can have no influence on the wind and is therefore “not applicable.

Climate Change

According to: WIREs Climate Change 2014, 5605-620. Doi:10.1002/wcc.295: “Climate change is a key concern within South Africa. Mean annual temperatures have increased by at least 1.5 times the observed global average of 0.65°C over the past five decades and extreme rainfall events have increased in frequency. These changes are likely to continue. Climate change poses a significant threat to South Africa’s water resources, food security, health, infrastructure, as well as its ecosystem services and biodiversity. Considering South Africa’s high levels of poverty and inequality, these impacts pose critical challenges for national development. In relation to water, impact studies for the water resources sector have begun to look beyond changes in streamflow to changes in the timing of flows and the partitioning of streamflow into base flows and stormflows, reservoir yields, and extreme hydrological events. Spatially the eastern seaboard and central interior of the country are likely to experience increases in water runoff. Higher frequencies of flooding and drought events are projected for the future. Complexities of the hydrological cycle, influences of land use and management and the linkages to society, health, and the economy indicate far higher levels of complexity in the water resources sector than in other sectors. What has emerged is that land uses that currently have significant impacts on catchment water resources will place proportionally greater demands on the catchment’s water resources if the climate were to become drier. The influence of climate change on water quality is an emerging research field in South Africa, with assessments limited to water temperature and non-point source nitrogen and phosphorus movement. A critical interaction that has not been explored is between changes in water quality and quantity and

the combined impacts, such changes might have impact on various types of water use, e.g., irrigation, domestic consumption, or aquatic ecosystems support”.

8.1.3 SURFACE DRAINAGE

The area lies within the drainage basin of the Molopo River. Plate flow is the dominant drainage pattern on the sites. The natural topography of the Proposed Development slopes towards the north-western corner of the stand (towards the roundabout) where storm water is dispersed in a northern direction crossing the R503 road by means of existing rectangular concrete culverts. Storm water follows natural streams in a north-western direction towards Cookes Lake which in turn overflows into the Molopo River.

In addition to storm water generated on the Proposed Development area, storm water from Danville crosses Bophelong Hospital Road in an eastern direction at the said intersection whereas storm water generated on the southern side of the R503 flows in a western direction to also cross the R503 at the same location next to the roundabout in a northern direction. Open unlined storm water channels in the road reserve convey storm water to the said crossing

Surface drainage will have an influence on the project on a local scale and long in duration. The influence is positive in the sense that no major ground works are necessary to overcome possible erosion by sheet flow. The intensity and significance is low and of a probable probability.

The project will have a negative influence on the environment during the construction phase as the natural overland flow will be disturbed during this phase. If the prescribed management plan for the operational phase is adhered to, no undue stress will be placed on the environment - a positive impact can be expected. The likelihood of these impacts occurring is probable, but the intensity and significance, are judged low. The extent is local and the duration long.

Absence of wetlands

Wetlands such as floodplain wetlands, channelled valley-bottom wetlands, unchannelled valley-bottom wetlands, depressions, seeps and wetland flats appear to be absent at the site. No wetlands are found at the site.

8.1.4 GROUND WATER

Possible infiltration into the groundwater must be taken into account. During the construction phase, no spills of lubricants or construction worker sewage should be allowed to pollute the ground water. During the operational phase, fuel storage tanks must also not pollute groundwater. These aspects are addressed in the EMP.

8.1.5 FLORA AND FAUNA

Site is situated at the Grassland Biome which is represented by the Klerksdorp Thornveld vegetation type (Mucina & Rutherford, 2006). A brief overview of the vegetation type, which serves as an outline of the ecological context of the site, follows.

Klerksdorp Thornveld (Gh 13)

Distribution: In South Africa the Klerksdorp Thornveld is present in the North West Province in two sets of patches, one in the Wolmaransstad, Ottosdal and Hartbeesfontein region, and the other from the Botsalano Game Park north of Mafikeng in the vicinity of Madibogo in the south. Altitude for the entire vegetation type is 1260 – 1580 m (Mucina & Rutherford 2006).

Vegetation and landscape features: Plains or slightly irregular undulating plains with open to dense *Acacia karroo* bush clumps in dry grasslands (Mucina & Rutherford 2006). Geology and soils: Shale, slate and quartzite of the Pretoria Group with interlaid diabase sills and Hekpoort lava supporting relatively shallow and rocky soils (Glenrosa and Mispah forms). Equally represented are eutrophic red plinthic soils (Hutton form) derived mainly from a thick succession of volcanics and sediments of the Ventersdorp Supergroup (Mucina & Rutherford 2006).

Climate: Warm-temperate, summer-rainfall region, with overall mean annual precipitation of 533 mm. Summer temperatures are high. Frequent frosts occur in winter (Mucina & Rutherford 2006).

Important taxa of the Klerksdorp Thornveld listed by Mucina & Rutherford (2006): Small Trees: *Acacia karroo*, *Acacia caffra*, *Celtis africana*, *Searsia lancea*, *Ziziphus mucronata*. Tall Shrubs: *Acacia hebeclada*, *Diospyros lycioides* subsp. *lycioides*, *Ehretia rigida*, *Grewia flava*, *Gymnosporia buxifolia*, *Searsia pyroides*, *Tarchonanthus camphoratus*. Woody Climber: *Asparagus africanus*. Low Shrubs: *Asparagus larinus*, *Asparagus suaveolens*, *Felicia muricata*, *Anthospermum hispidulum*, *Anthospermum rigidum* subsp. *pumilum*, *Aptosimum elongatum*, *Gnidia capitata*, *Gomphocarpus fruticosus* subsp. *fruticosus*, *Helichrysum dregeanum*, *Leucas capensis*, *Pavonia burchellii*, *Pentzia globosa*, *Solanum supinum* var. *supinum*, *Triumfetta sonderi*, *Ziziphus zeyheriana*. Graminoids: *Aristida congesta*, *Cynodon dactylon*, *Eragrostis lehmanniana*, *Eragrostis trichophora*, *Microcloa caffra*, *Panicum coloratum*, *Sporobolus fimbriatus*, *Themeda triandra*, *Andropogon shirensis*, *Anthephora pubescens*, *Aristida junciformis* subsp. *galpinii*, *Aristida stipitata* subsp. *graciliflora*, *Brachiaria nigropedata*, *Brachiaria serrata*, *Bulbostylis burchellii*, *Cymbopogon pospischilii*, *Digitaria eriantha*, *Diheteropogon amplexans*, *Elionurus muticus*, *Eragrostis curvula*, *Eragrostis obtusa*, *Eragrostis racemosa*, *Eragrostis superba*, *Eustachys paspaloides*, *Heteropogon contortus*, *Setaria sphacelata*, *Sporobolus africanus*, *Tragus berteronianus*, *Trichoneura grandiglumis*, *Triraphis andropogonoides*. Herbs: *Acalypha angustata*, *Acanthospermum australe*, *Berkheya onopordifolia* var. *onopordifolia*, *Berkheya setifera*, *Blepharis integrifolia* var. *clarkei*, *Chamaesyce inaequilatera*, *Chascanum adenostachyum*, *Dicoma macrocephala*, *Helichrysum nudifolium* var. *nudifolium*, *Hermannia lancifolia*, *Hibiscus pusillus*, *Jucticia anagalloides*, *Lippia scaberima*, *Nidorella microcephala*, *Nolletia ciliaris*, *Pollichia campestris*, *Rhyncosia adenodes*, *Salvia radula*, *Selago densiflora*, *Teucrium trifidum*, *Tolpis capensis*. Geophytic Herbs: *Bulbine narcissifolia*, *Ledebouria marginata*, *Ornithogalum tenuifolium* subsp. *tenuifolium*, *Raphionacme hirsuta*. Herbaceous Climber: *Rhyncosia venulosa*.

Note: Not all of the above listed plant species for the vegetation types occur at the site in the study area.



Indications of ecological sensitivity at the site

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Red outline	Boundaries of the site
Orange-brown outline and shading	Medium-low sensitivity (on a smaller scale some parts are very low sensitivity)



Photograph 9: View of part of the site. Bush encroachment of shrub-height *Vachellia* species (Thorns) is noticeable at some areas at the site.

Photo: R.F. Terblanche



Photograph 10: Resprouting *Vachellia hebeclada* (Candlepod Thorn) at the site.

Photo: R.F. Terblanche



Photograph 11: Foliage of the widespread *Senegalia mellifera* (Black Thorn) of which a few are present at the site.

Photo: R.F. Terblanche



Photograph 12: Foliage of the widespread *Senegalia mellifera* (Black Thorn) of which a few are present at the site.

Photo: R.F. Terblanche



Photograph 13: The alien invasive weed *Verbena aristigera*, at the site.

Photo: R.F. Terblanche

Habitat and vegetation characteristics

Plants

Extinct, threatened, near threatened and other plant species of high conservation priority in North West Province are listed in Tables 4.2 – 4.8. (Of the Fauna and Flora Habitat Report. Appendix C of this Report). Protected tree species are listed in Table 4.9. (Of the Fauna and Flora Habitat Report. Appendix C of this Report). The presence or not of all the species listed in the tables were investigated during the survey. None of the Threatened and Near Threatened plant species are likely to occur on the site. No other plant species of particular conservation concern is likely to occur at the site.

Vertebrates

Mammals

Since the site falls outside reserves, threatened species such as the black rhinoceros (*Diceros bicornis*) and the African wild dog (*Lycaon pictus*) are obviously not present. No smaller mammals of particular high conservation significance are likely to be found on the site as well.

Birds

With bird species which often have a large distributional range, their presence does not imply that they are particularly dependent on a site as breeding location. Literature sources that were mainly consulted are Barnes (2000), Hockey, Dean & Ryan, P.G. (2005) and Chittenden (2007). No threat to any threatened bird species or any bird species of particular conservation importance are foreseen.

Reptiles

The Southern African Reptile Conservation Assessment (SARCA) was launched in May 2005 (Branch, Tolley, Cunningham, Bauer, Alexander, Harrison, Turner & Bates, 2006). Its primary aim is to produce a conservation assessment for reptiles of South Africa, Lesotho and Swaziland within a four year period, ending 2009 (Branch *et al.*, 2006). Therefore a full up-dated conservation assessment of reptiles, taking into account the recent IUCN (2001) criteria, will only be available in the near future. While the conservation statuses of reptile species are under revision Alexander & Marais (2007) as well as Tolley & Burger 2007) give useful indications of possible red listings in the near future. There appears to be no threat to any reptile species of particular high conservation importance if the site is developed.

Amphibians

No frog species that occur in the North West are listed as Threatened species (Vulnerable, Endangered or Critically Endangered) or Near Threatened species according to IUCN Amphibian Specialist Group (2013). Table 4.17 lists *Pyxicephalus adspersus* (Giant Bullfrog) as Least Concern globally. Suitable habitat for Giant Bullfrog at site appears to be absent.

Invertebrates

Butterflies

Studies about the vegetation and habitat of threatened butterfly species in South Africa showed that ecosystems with a unique combination of features are selected by these often localised threatened butterfly species (Deutschländer and Bredenkamp 1999; Edge 2002, 2005; Terblanche, Morgenthal & Cilliers 2003; Lubke, Hoare, Victor & Ketelaar 2003; Edge, Cilliers & Terblanche, 2008). Threatened butterfly species in South Africa can then be regarded as bio-indicators of rare ecosystems.

Four species of butterfly in Gauteng Province and North West Province combined are listed as threatened in the recent butterfly conservation assessment of South Africa (Mecenero *et al.*, 2013). The expected presence or not of these threatened butterfly species as well as species of high conservation priority that are not threatened, at the site.

Assessment of threatened butterfly species

***Aloeides dentatis dentatis* (Roodepoort Copper)**

The proposed global red list status for *Aloeides dentatis dentatis* according to the most recent IUCN criteria and categories is Endangered (Mecenero *et al.*, 2013). *Aloeides dentatis dentatis* colonies are found where one of its host plants *Hermannia depressa* or *Lotononis eriantha* is present. Larval ant association is with *Lepisiota capensis* (S.F. Henning

1983; S.F. Henning & G.A. Henning 1989). The habitat requirements of *Aloeides dentatis dentatis* are complex and not fully understood yet. See Deuschländer and Bredenkamp (1999) for the description of the vegetation and habitat characteristics of one locality of *Aloeides dentatis* subsp. *dentatis* at Ruimsig, Roodepoort, Gauteng Province. There is not an ideal habitat of *Aloeides dentatis* subsp. *dentatis* on the site and it is unlikely that the butterfly is present at the site.

***Chrysoresis aureus* (Golden Opal/ Heidelberg Copper)**

The proposed global red list status for *Chrysoresis aureus* according to the most recent IUCN criteria and categories is Endangered (Mecenero *et al.*, 2013). *Chrysoresis aureus* (Golden Opal/ Heidelberg Copper) is a resident where the larval host plant, *Clusia pulchella* is present. However, the distribution of the butterfly is much more restricted than that of the larval host plant (S.F. Henning 1983; Terblanche, Morgenthal & Cilliers 2003). One of the reasons for the localised distribution of *Chrysoresis aureus* is that a specific host ant *Crematogaster liengmei* must also be present at the habitat. Fire appears to be an essential factor for the maintenance of suitable habitat (Terblanche, Morgenthal & Cilliers 2003). Research revealed that *Chrysoresis aureus* (Golden Opal/ Heidelberg Copper) has very specific habitat requirements, which include rocky ridges with a steep slope and a southern aspect (Terblanche, Morgenthal & Cilliers 2003). Owing to a lack of habitat requirements and ideal habitat the presence of the taxon is highly unlikely.

***Lepidochrysops praeterita* (Highveld Blue)**

The proposed global red list status for *Lepidochrysops praeterita* according to the most recent IUCN criteria and categories is Endangered (G.A. Henning, Terblanche & Ball, 2009; Mecenero *et al.*, 2013). *Lepidochrysops praeterita* is a butterfly that occurs where the larval host plant *Ocimum obovatum* (= *Becium obovatum*) is present (Pringle, G.A. Henning & Ball, 1994), but the distribution of the butterfly is much more restricted than the distribution of the host plant. *Lepidochrysops praeterita* is found on selected rocky ridges and rocky hillsides in parts of Gauteng, the extreme northern Free State and the south-eastern Gauteng Province. No ideal habitat appears to be present for the butterfly on the site. It is unlikely that *Lepidochrysops praeterita* would be present on the site and at the footprint proposed for the development.

***Orachrysops mijburghi* (Mijburgh's Blue)**

The proposed global red status for *Orachrysops mijburghi* according to the most recent IUCN criteria and categories is Endangered (Mecenero *et al.*, 2013). *Orachrysops mijburghi* favours grassland depressions where specific *Indigofera* plant species occur (Terblanche & Edge 2007). The Heilbron population of *Orachrysops mijburghi* in the Free State uses *Indigofera evansiana* as a larval host plant (Edge, 2005) while the Suikerbosrand population in Gauteng uses *Indigofera dimidiata* as a larval host plant (Terblanche & Edge 2007). There is no suitable habitat for *Orachrysops mijburghi* on the site and it is unlikely that *Orachrysops mijburghi* would be present on the site.

Conclusion on threatened butterfly species

There appears to be no threat to any threatened butterfly species if the site is developed.

Assessment of butterfly species that are not threatened but also of high conservation priority

***Colotis celimene amina* (Lilac tip)**

Colotis celimene amina is listed as Rare (Low density) by Mecenero *et al.* (2013). In South Africa *Colotis celimene amina* is present from Pietermaritzburg in the south and northwards into parts of Kwa-Zulu Natal, Gauteng, Limpopo, Mpumalanga and the North West Provinces (Mecenero *et al.* In press.). Reasons for its rarity are poorly understood. It is highly unlikely that *Colotis celimene amina* would be resident at the site.

***Lepidochrysops procera* (Savanna Blue)**

Lepidochrysops procera is listed as Rare (Habitat specialist) by Mecenero *et al.* (2013). *Lepidochrysops procera* is endemic to South Africa and found in Gauteng, KwaZulu-Natal, Mpumalanga and North West (Mecenero *et al.*, 2013). Owing to a lack of habitat requirements and ideal habitat the presence of the taxon at the site is highly unlikely.

***Metisella meninx* (Marsh Sylph)**

Henning and Henning (1989) in the first South African Red Data Book of Butterflies, listed *Metisella meninx* as threatened under the former IUCN category Indeterminate. Even earlier in the 20th century Swanepoel (1953) raised concern about vanishing wetlands leading to habitat loss and loss of populations of *Metisella meninx*. According to the second South African Red Data Book of butterflies (Henning, Terblanche & Ball, 2009) the proposed global red list status of *Metisella meninx* has been Vulnerable. During a recent large scale atlasing project the *Conservation Assessment of Butterflies of South Africa, Lesotho and Swaziland: Red List and Atlas* (Mecenero *et al.*, 2013) it was found that more *Metisella meninx* populations are present than thought before. Based on this valid new information, the conservation status of *Metisella meninx* is now regarded as Rare (Habitat specialist) (Mecenero *et al.*, 2013). Though *Metisella meninx* is more widespread and less threatened than perceived before, it should be regarded as a localised rare habitat specialist of conservation priority, which is dependent on wetlands with suitable patches of grass at wetlands (Terblanche In prep.). Another important factor to keep in mind for the conservation of *Metisella meninx* is that based on very recent discoveries of new taxa in the group the present *Metisella meninx* is species complex consisting of at least three taxa (Terblanche In prep., Terblanche & Henning In prep.). The ideal habitat of *Metisella meninx* is treeless marshy areas where *Leersia hexandra* (rice grass) is abundant (Terblanche In prep.). The larval host plant of *Metisella meninx* is wild rice grass, *Leersia hexandra* (G.A. Henning & Roos, 2001). Owing to a lack of habitat requirements and ideal habitat the presence of the taxon at the site is highly unlikely.

***Platylesches dolomitica* (Hilltop Hopper)**

Platylesches dolomitica is listed as Rare (Low density) by Mecenero *et al.* (2013). Historically the conservation status of *Platylesches dolomitica* was proposed to be Vulnerable (Henning, Terblanche & Ball 2009). However this butterfly which is easily overlooked and has a wider distribution than perceived before. *Platylesches dolomitica* has a patchy distribution and is found on rocky ledges where *Parinari capensis* occurs, between 1300 m and 1800m (Mecenero *et al.* 2013, Dobson Pers comm.). Owing to a lack of habitat requirements and ideal habitat the presence of the taxon at the site is highly unlikely.

Fruit chafer beetles

No *Ichnestoma stobbiai* or *Trichocephala brincki* were found during the surveys. There appears to be no suitable habitat for *Ichnestoma stobbiai* or *Trichocephala brincki* at the site. There appears to be no threat to any of the fruit chafer beetles of particular high conservation priority if the site were developed.

Scorpions

None of these rock scorpions have been found at the site and the habitat does not appear to be optimal

Conclusions

- Vegetation at most of the site is conspicuously degraded, modified or transformed. Indigenous tree species at the site include *Vachellia karroo* (Sweet Thorn), *Vachellia tortilis* subsp. *heteracantha* (Umbrella Thorn), *Vachellia hebeclada* (Candlepod Thorn), *Senegalia mellifera* (Black Thorn) and *Ziziphus mucronata* (Buffalo-thorn). The alien invasive tree species *Melia azedarach* also occurs at the site as well as the alien invasive succulent *Opuntia ficus-indica*. Indigenous

grass species include *Eragrostis lehmanniana*, *Eragrostis rigidior*, *Aristida congesta*, *Cynodon dactylon*, *Chloris virgata* and *Heteropogon contortus*. Indigenous forbs and dwarf shrubs include *Gazania krebsiana*, *Bulbine narcissifolia*, *Euphorbia inaequilatera* and *Felicia muricata*.

- Alien invasive weed species are visible at the widespread disturbed areas at the site. These alien invasive weeds include *Argemone ochroleuca*, *Verbena aristigera*, *Flaveria bidentis*, *Datura ferox*, *Gomphrena celosioides*, *Schkuhria pinnata*, *Tagetes minuta* and *Verbesina encelioides*.
- The site is visibly disturbed. Informal dumping at the site is extensive. Old roads run through the site. Fowl-smelling water is present at the northeastern boundary of the site. Disturbances include excavations of the past. Bush encroachment of shrub-height *Vachellia* species (Thorns) is noticeable at some areas at the site. Alien invasive weeds are widespread at disturbed areas at the site.
- Wetlands are absent at the site.
- Rocky ridges are absent at the site.
- Grassland at the site is represented by the Klerksdorp Thornveld (Gh 13) which is not listed as a Threatened Ecosystem according to the National List of Threatened Ecosystems (2011).
- No Threatened or Near Threatened plant or animal species appear to be resident at the site. No other plant or animal species of particular conservation concern appear to be present at the site.
- There is little scope for the site to be part of a corridor of particular conservation importance.
- Ecological sensitivity at the site is medium and low (at some areas approaching very low sensitivity at a finer scale).
- Following the mitigations which will be upheld and planned footprint for development all the impact risks listed above are moderate or low.
- If the development is approved a key issue would be continued monitoring and eradication of alien invasive plant species. It is in particular alien invasive species such as *Melia azedarach* (Syringa) and invasive *Prosopis glandulosa* (Mesquite) which should not be allowed to establish.

If the development is approved an opportunity presents itself to cultivate indigenous plant species which would benefit urban nature conservation.

Outline of main landscape and habitat characteristics of the site

HABITAT FEATURE	DESCRIPTION
Topography	The area proposed for the development is on gentle slopes (flat plain).
Rockiness	No rocky ridges are present.

Presence of wetlands	Presence of wetlands at the site is unlikely. Fowl-smelling water was present at the northwestern boundary of the site, which indicates artificial (and likely polluted) sources of water at this part of the site. While some water may gather at the northwestern part of the site from the elevated road, as well as what appears to be leaks, a functional active channel appears to be absent.
Vegetation	<p>Vegetation at most of the site appears to be degraded or modified. Indigenous tree species at the site include <i>Vachellia karroo</i> (Sweet Thorn), <i>Vachellia tortilis</i> subsp. <i>heteracantha</i> (Umbrella Thorn), <i>Vachellia hebeclada</i> (Candlepod Thorn), <i>Senegalia mellifera</i> (Black Thorn) and <i>Ziziphus mucronata</i> (Buffalo-thorn). The alien invasive tree species <i>Melia azedarach</i> also occurs at the site as well as the alien invasive succulent <i>Opuntia ficus-indica</i>. Indigenous grass species include <i>Eragrostis lehmanniana</i>, <i>Eragrostis rigidior</i>, <i>Aristida congesta</i>, <i>Cynodon dactylon</i>, <i>Chloris virgata</i> and <i>Heteropogon contortus</i>. Indigenous forbs and dwarf shrubs include <i>Gazania krebsiana</i>, <i>Bulbine narcissifolia</i>, <i>Euphorbia inaequaliterata</i> and <i>Felicia muricata</i>.</p> <p>Alien invasive weed species are visible at the widespread disturbed areas at the site. These alien invasive weeds include <i>Argemone ochroleuca</i>, <i>Verbena aristigera</i>, <i>Flaveria bidentis</i>, <i>Datura ferox</i>, <i>Gomphrena celosioides</i>, <i>Schkuhria pinnata</i>, <i>Tagetes minuta</i> and <i>Verbesina encelioides</i>.</p>
Signs of disturbances	The site is visibly disturbed. Informal dumping at the site is extensive. Old roads run through the site. Fowl-smelling water is present at the northwestern boundary of the site. Disturbances include excavations of the past. Bush encroachment of shrub-height <i>Vachellia</i> species (Thorns) is noticeable at some areas at the site. Alien invasive weeds are widespread at disturbed areas at the site.
Connectivity	There is little scope for the site to be part of a corridor of particular conservation importance.

8.2. SOCIO ECONOMIC FACTORS

8.2.1. SOCIAL AMENITIES

The opinion is being held that the proposed development will strengthen the retail sector within the Mahikeng Local Municipality, due to the provision of a shopping centre and filling station within the urban area. The site is also located at the intersection of the R503 Lichtenburg Road and Bophelong Hospital Road. The intersection has recently been reconstructed to incorporate a new roundabout as part of the upgrading of the R503 road. The intersection has been identified as a “Gateway Project” in the Mahikeng Local Municipality IDP 2020-21. By strengthening the retail sector within the Mahikeng Local Municipality, the proposed development will contribute to the broadening of the income base of the Mahikeng Local Municipality.

In view of the objectives contained within the Mahikeng Local Municipality Spatial Development Framework Final Draft Report - December 2018, the Mahikeng Local Municipality envisages to serve the social needs and requirements of the population more properly and to become economically competitive, when compared to other town and cities. The proposed development

addresses the need identified by the Mahikeng Local Municipality, for the provision of additional business properties, to be alienated by means of full title.

During the construction phase, temporary employment will be created. The increased employment in the area during the construction phase will also result in increased expenditure, which, in addition, will mean that more than just the proposed jobs required for the construction on the site will be created due to economic spin-offs that will result.

The feasibility study conducted by WSP (See Appendix E) to establish the need for the development determined: It is estimated that the proposed new filling station will sell approximately **372 493 litres** of fuel per month during its third year of operation. The Retail Study compiled by Fernridge Solutions concluded that the site has good visibility and accessibility from the R503 and N18 Bypass, limited competition in the catchment area and that the site is overall a good site for retail development.

8.2.2. AIR QUALITY

“The extent and toxicity of emissions is not necessarily a concise indicator of contributions to ground-level air pollution concentrations or of risks to health and the environment. Such contributions are also a function of the height of emission, temporal variations in the release of pollutants, and the proximity of the source to the people or the environment affected by exposure to the pollutant (such as, for instance, children, or the elderly, or people who are ill, or others who may be particularly sensitive receptors to a specific pollutant above a certain concentration). If an industry is operating close to a school or hospital or centre for the elderly, the potential exposure (in combination with the other contributing factors) is high.

Three factors govern the significance of household fuel-burning emissions:

- (i) the low level of emissions (that is, their height above the ground is generally about 3 m, within people’s breathing zone);*
- (ii) the simultaneous occurrence of peak emissions (during the coldest months of winter and in the early mornings and throughout the evenings) and poor atmospheric dispersion (stable atmosphere with low wind speeds, with the possible development of temperature inversions); and*
- (iii) the release of such emissions within high human exposure areas, given that such emissions generally occur in dense, low-income settlements where population density is high (in addition, the pollution is not only outdoors, but frequently indoors as well, due to poor ventilation, so it affects the whole family).*

The significance of vehicle emissions as contributors to air-pollutant concentrations and health risks is similarly increased by the low level (close to the ground) of the emissions, and their proximity to highly populated areas – on highways, for example, with emissions being particularly high when traffic is congested. Vehicle emissions tend to peak early in the morning and in the evenings, when the potential for atmospheric dispersion is reduced (for example, wind speeds are generally low in the early mornings and evenings, reducing their potential for dispersing pollution).

Given the high volumes of pollutants emitted from fuel-burning within the industrial and power-generation sectors, their contribution to ambient concentrations and public health risks is often lower than might be expected. This is because these sources are generally characterized by constant releases, relatively high above ground level, and further away from residential settlements than are household fuel-burning and vehicle emissions.

Ranking the significance of different sources of pollution on the basis of the total emissions for which each source is responsible would, for example, place industrial emissions above household fuel-burning. If the aim is to reduce impacts on human health, however, then household fuel-burning would need to be targeted as a top priority (Scorgie et al., 2004d).

Historically, air pollution control in South Africa has primarily emphasized the implementation of 'command and control' measures in the industrial sector. The shift from source-based control, to the management of the air that people breathe, emphasizes the importance of targeting a wider range of sources and using more flexible and varied approaches. It means paying greater attention to ambient air quality, as it is more important (and more cost-effective, in many cases) to make sure that the ambient air complies with air quality standards. This approach ensures that human and environmental health is protected and that the cumulative impact of pollution from a number of sources is addressed.

Approaches adopted or considered for future implementation have included: regulation (for example, the use of Atmospheric Emission Licences for Listed Activities); market instruments (such as atmospheric user-charges and pollution taxes); the potential for voluntary agreements, education and awareness raising; and emissions trading. International experience shows that adopting a mix of instruments and interventions is more effective than using a single instrument to improve air quality across various types of source. Although direct regulation remains important in controlling industrial sources, there is evidence that specifying emission limits is more effective than specifying the use of particular technologies, so as to give companies flexibility in selecting the method of achieving success that suits them best. This approach is advocated as being more cost-effective and more likely to stimulate technological advances in pollution control methods and production processes.

For large point sources (that is, sources of pollution that are concentrated on one site, but that have large, constant volumes of many types of pollution) that are few in number, instruments such as emissions trading have been advocated as an effective way to manage pollutant emissions and reduce the costs of compliance.

Implementing an efficient social protection system to alleviate poverty is central to maintaining conditions that facilitate not only economic growth but also environmental sustainability. Many South African households – including those with access to electricity – use coal, wood, and paraffin, due to the relative cost-effectiveness of such fuels for heating (that is, space heating) and cooking purposes.

Many low-cost housing developments and informal settlements are located close to industrial and mining operations, as such land is both available and inexpensive. Poorer communities are more likely to suffer from poor service delivery, including inadequate waste removal that sometimes results in refuse being set alight illegally. These examples show that poverty alleviation could help to improve air quality by enabling people to choose practices that are friendlier to the environment.”

https://www.environment.gov.za/sites/default/files/docs/stateofair_airqualityand_sustainable_development.pdf Date visited: 17/03/2020.

The proposed development is planned and will eventually be developed with the above mentioned in mind. In addition to the above, it should be noted that the project will however create a certain amount of dust during the construction phase. If proper dust suppression measures are implemented this variable will have very little impact (low in intensity and significance during the construction phase).

8.2.3. NOISE

It is a fact that a certain amount of noise will be generated during the construction phase of the project. Noise levels should however rarely exceed the allowable limits. It is unlikely that the project will create any more noise during the operational phase than that already experienced on site with it being bordered by R503 and the N18 Bypass road.

8.2.4. ARCHAEOLOGY AND CULTURAL SITES

Background research indicates that there are some cultural heritage sites and features in the larger geographical area within which the study area falls. No sites, features or material of cultural heritage (archaeological and/or historical) origin or

significance were identified in the study area during the physical assessment. The informal dumping of residential household refuse and building rubble occurs throughout the study area. The area itself is surrounded by residential, industrial and business related developments and as a result the larger geographical location has been extensively altered from its original natural and historical landscape. Telephone lines, as well as a dirt road that runs from east to west roughly in the middle of the study area, and a dirt & tar road that comes off the R503 and runs approximately north-south through the land has impacted on the area as well.

With the original natural & historical landscape largely altered and with the recent impacts it is believed that should any sites, features or material of cultural heritage origin or significance have existed here in the past, it would have been largely disturbed or destroyed as a result.

It should be noted that although all efforts are made to cover a total area during any assessment and therefore to identify all possible sites or features of cultural (archaeological and/or historical) heritage origin and significance, that there is always the possibility of something being missed. This will include low stone-packed or unmarked graves. This aspect should be kept in mind when development work commences and if any sites (including graves) are identified then an expert should be called in to investigate and recommend on the best way forward.

Finally, from a Cultural Heritage point of view it can therefore be concluded that the proposed Retail Business and Filling Station Development should be allowed to continue.

8.2.5 AESTHETICS

Mahikeng, is the capital city of the North-West Province. The capital falls within Ngaka Modiri Molema District Municipality. The city is also located close to South Africa's border with Botswana. The proposed development falls within the Mafikeng Local Municipality area of jurisdiction and is situated directly south of and is bordered by the newly upgraded section of the R503 road between Lichtenburg and Mahikeng as you enter Mahikeng from Lichtenburg. The newly constructed traffic circle is located on the north western corner of the site. The ring road that connects with the N18 (Dr James Moroka Drive) borders the site on west.

Although the site is located within a CBA, vegetation at the site appears to be degraded, modified or in some areas transformed. Disturbances that have caused impacts to vegetation at the site include hitherto cleared areas, small excavations, dirt tracks, trampling, informal dumping, a pavement, planting of exotic trees and establishment of alien invasive weeds. The site borders on tar roads at its northern and western boundaries.

Visual Intrusion is defined as the level of compatibility or congruence of the project with the particular qualities of the area, or its 'sense of place'. This is related to the idea of context and maintaining the integrity of the landscape or townscape.

High visual intrusion – results in a noticeable change or is discordant with the surroundings;

Moderate visual intrusion – partially fits into the surroundings, but clearly noticeable;

Low visual intrusion – minimal change or blends in well with the surroundings.

The proposed development will change the scenic resources of the local area from an undeveloped site to a shopping centre and filling station. The visual intrusion is considered to be moderate as the proposed development partially fits into the surroundings but will be clearly noticeable.

The proposed development will require additional lighting on and in buildings and possibly along roads. This will change the night landscape from unlit to lit.

9. ENVIRONMENTAL IMPACT ASSESSMENT

9.1 ASSESSMENT CRITERIA

Impacts were rated using the following methodology:

Nature of the potential impact		Description of the effect, and the affected aspect of the environment
Duration (time scale)	Short term	Up to 5 years
	Medium term	6 – 15 years
	Long term	More than 15 years
Extent (area)	Local	Confined to study area and its immediate surroundings
	Regional	Region (cadastral, catchment, topographic)
	National	Nationally (The country)
	International	Neighboring countries and the rest of the world.
Magnitude (Intensity)	Low	Site-specific and wider natural and/or social functions and processes are negligibly altered. ((A low intensity impact will not affect the natural, cultural, or social functions of the environment).
	Medium	Site-specific and wider natural and/or social functions and processes continue albeit in a modified way. (Medium scale impact will alter the different functions slightly).
	High	Site-specific and wider natural and/or social functions and processes are severely altered. (A High intensity impact will influence these functions to such an extent that it will temporarily or permanently cease to exist).
Probability	Improbable	Possibility of occurrence is very low. (Such an impact will have a very slight possibility to materialise, because of design or experience).
	Possible	There is a possibility that the impact will occur
	Probable	It is most likely that the impact will occur
	Definite	The impact will definitely occur
Significance	Insignificant	Impact is negligible and will not have an influence on the decision regarding the proposed activity (No mitigation is necessary)
	Very Low	Impact is very small and should not have any meaningful influence on the decision regarding the proposed activity (No mitigation is necessary)
	Low	The impact may not have a meaningful influence on the decision regarding the proposed activity (No mitigation is necessary)
	Medium	The impact should influence the decision regarding the proposed activity (The

Nature of the potential impact		Description of the effect, and the affected aspect of the environment
		project can only be carried through if certain mitigatory steps are taken)
	High	The impact will influence the decision regarding the proposed activity
	Very High	The proposed activity should only be approved under special circumstances
Reversibility	Low	There is little chance of correcting the adverse impact
	Medium	There is a moderate chance of correcting the adverse impact
	High	There is a high chance in correcting the adverse impact
Risk	Low	Assessing a risk involves an analysis of the consequences and likelihood of a hazard being realized. In decision-making, low-consequence / low-probability risks (green) are typically perceived as acceptable and therefore only require monitoring.
	Medium	Other risks (amber) may require structured risk assessment to better understand the features that contribute most to the risk. These features may be candidates for management
	High	High-consequence / high-probability risks (red) are perceived as unacceptable and a strategy is required to manage the risk.

Attributes associated with the alternatives were assessed and is outlined below:

Geographical attributes

The Geographical attributes of an area relates to the characteristics of a particular region, area or place. It influences the determination of site alternatives as it relates to the location of a site in relation to relevant features in the area.

Physical attributes

Physical attributes of an area relates to the processes and patterns in the natural environment. For the purpose of this assessment, the following processes and patterns have been investigated. Geology, soil, topography and landforms, climate and meteorology, surface water and ground water.

Biological attributes

Biological attributes for the purpose of this study includes the distribution of species and ecosystems in geographic space and through geological time. Organisms and biological communities often vary in a regular fashion along geographic gradients of latitude, elevation, isolation and habitat area. The two main branches assessed will be:

Phytogeography is the branch of biogeography that studies the distribution of plants.

Zoogeography is the branch that studies distribution of animals.

Social attributes

Social attributes is closely related to social theory in general and sociology in particular, dealing with the relation of social phenomena and its spatial components.

Economic attributes

Economic attributes includes the location, distribution and spatial organization of economic activities and also takes into account social, cultural, and institutional factors in the spatial economy of the development.

Heritage attributes

The broad generic term Cultural Heritage Resources refers to any physical and spiritual property associated with past and present human use or occupation of the environment, cultural activities and history. The term includes sites, structures, places,

natural features and material of paleontological, archaeological, historical, aesthetic, scientific, architectural, religious, symbolic or traditional importance to specific individuals or groups, traditional systems of cultural practice, belief or social interaction.

Cultural attributes

Cultural attributes relates to the specific characteristics such as language, religion, ethnic and racial identity, and cultural history & traditions of people. These attributes influences family life, education, economic and political structures, and, of course, business practices.

It should be noted that the above mentioned attributes do not occur in isolation and it is not uncommon for an identified impact to overlap with two or more of these attributes. Also note, not all risks require comprehensive and detailed assessment. Solid problem formulation should allow decision-makers to evaluate the extent of subsequent analysis required. The level of effort put into assessing each risk should be proportionate to its significance and priority in relation to other risks, as well as its complexity, by reference to the likely impacts. Consideration should be given to stakeholders’ perceptions of the nature of the risk.

ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase)					
ALTERNATIVE 1: (Preferred Alternative) Installation of underground tanks in sealed bunkers					
Environmental Attribute	Potential impacts and risks	Assessment criteria	Assessment rating (With mitigation)	Proposed mitigation	Assessment rating (Without mitigation)
DIRECT IMPACTS:					
Geographical Physical Social Economic	Installation and operation of infrastructure for the storage and handling of 92 000 ℓ of a dangerous good (filling station), consisting of 4 x 23 000 ℓ tanks and the establishment of a shopping center.	Duration	Long term	Obtain the necessary environmental authorization for the development. Implement the mitigation measures as described in the Environmental Management Plan. Ensure that all activities that may possibly affect ground water are performed in accordance with the requirements of the National Water Act, 1998 (Act 36 of 1998), DW&S and the Local Authority. The correct installation and maintenance of underground fuel tanks and sewage systems must be regarded as having a high priority. Plan to install the underground fuel tanks to comply with the standards set in S.A.N.S. 10089 part 3 addendum June 1990 for pumps and underground tanks, as well as S.A.N.S. 10131 part 2, 1186. This will be the responsibility of the developer. Other standards that will have to be adhered to, will be: o Tank standards; S.A.N.S. 1535:2005 o Piping standards; S.A.N.S. 1830:2006 o Automatic tank gauging to be installed. This will be the responsibility of the developer. o Plan the monitoring system for the fuel storage tanks. Ensure that this system is able to detect any possible	Long term
		Extent	Local		Local
		Magnitude (Intensity)	High		High
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	Low		Low
		Risk	Low		Medium

ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase)

ALTERNATIVE 1: (Preferred Alternative) Installation of underground tanks in sealed bunkers

Environmental Attribute	Potential impacts and risks	Assessment criteria	Assessment rating (With mitigation)	Proposed mitigation	Assessment rating (Without mitigation)
				<p>leakages instantaneously. This will be the responsibility of the developer.</p> <ul style="list-style-type: none"> o Plan for adequate chemical toilets to be used by contractors during the construction phase. The provision and maintenance of which must form part of the contractor liabilities and must be described as such in their contracts. It will be essential that the ECO monitor this aspect very closely. o Plan for the regular inspection of fuel tanks and sewage facilities throughout the life cycle of the project. This will be the responsibility of the owner of the filling station. o The storage and handling of lubricants, oils, paint and material such as cement must be provided for as part of the different contractor's contracts. Specially demarcated and secure storage facilities must be provided for. It will be essential that the ECO monitor this aspect very closely. o Plan the disposal from hard surfaces in such a manner that the water can infiltrate into the underground without causing surface erosion. o Plan to ensure that, before the underground tank and associated pipe work become operational, the necessary leak tests are conducted in accordance with the specifications and requirements of the appointed fuel supply company and the relevant South African Bureau of Standards codes of practice for the petroleum industry. This will be the responsibility of the developer. o Plan to construct the oil traps for the filling station. This will be the responsibility of the developer. <p>Plan to maintain the monitoring boreholes. This will be the responsibility of the developer</p>	
	The proposed development will also involve the eradication of 27 590 m ² of indigenous vegetation located within a critical biodiversity area.	Duration	Long term	Obtain the necessary environmental authorization for the development. Implement the mitigation measures as described in the Environmental Management Plan.	Long term
		Extent	Local		Local
		Magnitude (Intensity)	High		High
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	Low		Low
		Risk	Medium		Medium
		Duration	Short term		Medium term

ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase)

ALTERNATIVE 1: (Preferred Alternative) Installation of underground tanks in sealed bunkers

Environmental Attribute	Potential impacts and risks	Assessment criteria	Assessment rating (With mitigation)	Proposed mitigation	Assessment rating (Without mitigation)
	Disturbed surfaces can lead to erosion and dust pollution.	Extent	Local	Start the rehabilitation of disturbed surfaces as soon as possible. Spray bare surfaces with water to prevent dust pollution. Prepare method statements to this effect.	Local
		Magnitude (Intensity)	Low		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Foreign and invader plant species which are likely to invade disturbed areas.	Duration	Short term	Plan for the eradication of foreign and invader plant species which are likely to invade disturbed areas Start the extermination of any invasive species as soon as possible and maintain the eradication programme.	Medium term
		Extent	Local		Local
		Magnitude (Intensity)	Low		Low
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
	Risk	Low	Medium		
	Ablution facilities for construction workers may cause pollution of surface and underground water.	Duration	Short term	Plan for the provision and maintenance of abluion facilities for construction workers to prevent pollution of surface and underground water Provide portable abluion facilities that will not cause pollution during the construction phase.	Short term
		Extent	Local		Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
	Risk	Low	Medium		
	The proposed development will have an impact on the soil and geology.	Duration	Long term	Properly plan the construction phase in such a manner that impacts on the soil and geology of the area can be minimised. Plan to prevent spills of lubricants/oils that can take place on bare soil. This will include the use of drip trays for vehicles that are standing for more than 24 hours.	Long term
Extent		Local	Local		
Magnitude (Intensity)		Low	Medium		
Probability		Definite	Definite		
Significance		Medium	Medium		
Reversibility		High	High		
Risk	Low	Medium			
Open excavations poses a danger of collapsing on people or on equipment and people- especially small children who may fall into it.	Duration	Short term	Plan to safeguard open trenches in order to alleviate the danger of collapse on people or on equipment and people- especially small children who may fall into it. Ensure that the trenches stay open for as short a time as possible. Ensure that open trenches are demarcated as required by the Occupational Health and Safety Act.	Short term	
	Extent	Local		Local	
	Magnitude (Intensity)	Medium		Medium	
	Probability	Definite		Definite	
	Significance	Medium		Medium	
	Reversibility	High		High	
Risk	Low	Medium			
Indirect impacts:					
Geographical Physical Social Economic	Dust generation from the proposed project could impact on the surrounding area.	Duration	Short term	Spray water on open surfaces to ensure that dust does not cause air pollution during construction. Start the rehabilitation of disturbed surfaces as soon as possible	Short term
		Extent	Local		Local
		Magnitude (Intensity)	Low		Low
		Probability	Probable		Probable
		Significance	Medium		Medium

ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase)

ALTERNATIVE 1: (Preferred Alternative) Installation of underground tanks in sealed bunkers

Environmental Attribute	Potential impacts and risks	Assessment criteria	Assessment rating (With mitigation)	Proposed mitigation	Assessment rating (Without mitigation)
		Reversibility	High		High
		Risk	Low		Medium
	Spills of lubricants / oils can take place on bare soil.	Duration	Short term	<p>Plan and compile method statements to implement measures for the prevention and or handling of spills of lubricants / oils that can take place on bare soil.</p> <p>Prevent spills of lubricants/oils that can take place on bare soil. This will include the use of drip trays for vehicles that are standing for more than 24 hours.</p> <p>Ensure that all construction vehicles are in good working order and not leaking oil and or fuel.</p>	Short term
		Extent	Local		Local
		Magnitude (Intensity)	Low		Low
		Probability	Probable		Probable
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Waste materials such as glass, plastic, metal or paper may present a possible pollution hazard	Duration	Short term	<p>Plan to provide method statements on the handling of waste materials such as glass, plastic, metal or paper which may present a possible pollution hazard</p> <p>Implement the management plan to ensure that: All construction rubble is disposed of in a safe and environmentally acceptable manner. NO concrete, gravel or other rubbish will be allowed to remain on site after the construction phase.</p> <p>All cement is housed as to prevent spills (due to rain and or handling errors).</p> <p>NO glass, plastic, metal, or paper shall be allowed to pollute the area.</p>	Short term
		Extent	Local		Local
		Magnitude (Intensity)	Low		Low
		Probability	Probable		Probable
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Possible social and environmental problems may be experienced as a result of non- compliance to the relevant legislation.	Duration	Short term	<p>Plan to ensure all involved is aware of the possible social and environmental problems that may be experienced as a result of non- compliance to the relevant legislation</p> <p>Ensure that contractors (construction phase) abide by all the requirements of the Occupational Health and Safety Act.</p> <p>Ensure that all contractors are aware of the consequences of non-compliance to the relevant legislation regarding the above-mentioned act as well as with regard to the environment (acts, regulations, and special guidelines).</p>	Short term
		Extent	Local		Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Probable		Probable
		Significance	Medium		Medium
Reversibility		High	High		
Risk		Low	Medium		
New employment opportunities will be created.	Duration	Long term	Plan to create new employment opportunities.	Long term	
	Extent	Local		Local	

ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase)					
ALTERNATIVE 1: (Preferred Alternative) Installation of underground tanks in sealed bunkers					
Environmental Attribute	Potential impacts and risks	Assessment criteria	Assessment rating (With mitigation)	Proposed mitigation	Assessment rating (Without mitigation)
		Magnitude (Intensity)	Medium	Plan to use local labour to ensure local skills development will take place. Contractors will have to ensure that they abide to the requirements of the Occupational Health and Safety Act and the Employment Equity Act.	Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	Medium		Medium
		Risk	Low		Medium
Cumulative impacts:					
Geographical Physical Social Economic	Services (Solid waste, bulk water supply water, sewage, electricity, access and storm water) will be required..	Duration	Long term	Plan to ensure that the services (Solid waste, bulk water supply water, sewage, electricity, access and storm water) are designed and constructed in such a manner that it will not cause Environmental degradation. Ensure that services are constructed and installed as planned.	Long term
		Extent	Local		Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	High		High
		Reversibility	High		High
		Risk	Low		Medium

ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase)					
ALTERNATIVE 2: Installation of underground tanks without bunkers					
Environmental Attribute	Potential impacts and risks	Assessment criteria	Assessment rating (With mitigation)	Proposed mitigation	Assessment rating (Without mitigation)
DIRECT IMPACTS:					
Geographical Physical Social Economic	Installation and operation of infrastructure for the storage and handling of 92 000 l of a dangerous good (filling station), consisting of 4 x 23 000 l tanks and the establishment of a shopping center.	Duration	Long term	Obtain the necessary environmental authorization for the development. Implement the mitigation measures as described in the Environmental Management Plan. Ensure that all activities that may possibly affect ground water are performed in accordance with the requirements of the National Water Act, 1998 (Act 36 of 1998), DW&S and the Local Authority. The correct installation and maintenance of underground fuel tanks and sewage systems must be regarded as having a high priority. Plan to install the underground fuel tanks to comply with the standards set in S.A.N.S. 10089 part 3 addendum June 1990 for pumps and underground tanks, as well as S.A.N.S. 10131 part 2, 1186. This will be the responsibility of the developer. Other standards that will have to be adhered to, will be:	Long term
		Extent	Local		Local
		Magnitude (Intensity)	High		High
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	Low		Low
		Risk	Low		Medium

ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase)

ALTERNATIVE 2: Installation of underground tanks without bunkers

Environmental Attribute	Potential impacts and risks	Assessment criteria	Assessment rating (With mitigation)	Proposed mitigation	Assessment rating (Without mitigation)
				<ul style="list-style-type: none"> ○ Tank standards; S.A.N.S. 1535:2005 ○ Piping standards; S.A.N.S. 1830:2006 ○ Automatic tank gauging to be installed. This will be the responsibility of the developer. ○ Plan the monitoring system for the fuel storage tanks. Ensure that this system is able to detect any possible leakages instantaneously. This will be the responsibility of the developer. ○ Plan for adequate chemical toilets to be used by contractors during the construction phase. The provision and maintenance of which must form part of the contractor liabilities and must be described as such in their contracts. It will be essential that the ECO monitor this aspect very closely. ○ Plan for the regular inspection of fuel tanks and sewage facilities throughout the life cycle of the project. This will be the responsibility of the owner of the filling station. ○ The storage and handling of lubricants, oils, paint and material such as cement must be provided for as part of the different contractor's contracts. Specially demarcated and secure storage facilities must be provided for. It will be essential that the ECO monitor this aspect very closely. ○ Plan the disposal from hard surfaces in such a manner that the water can infiltrate into the underground without causing surface erosion. ○ Plan to ensure that, before the underground tank and associated pipe work become operational, the necessary leak tests are conducted in accordance with the specifications and requirements of the appointed fuel supply company and the relevant South African Bureau of Standards codes of practice for the petroleum industry. This will be the responsibility of the developer. ○ Plan to construct the oil traps for the filling station. This will be the responsibility of the developer. <p>Plan to maintain the monitoring boreholes. This will be the responsibility of the developer</p>	

ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase)

ALTERNATIVE 2: Installation of underground tanks without bunkers

Environmental Attribute	Potential impacts and risks	Assessment criteria	Assessment rating (With mitigation)	Proposed mitigation	Assessment rating (Without mitigation)
	The proposed development will also involve the eradication of 27 590 m ² of indigenous vegetation located within a critical biodiversity area.	Duration	Long term	Obtain the necessary environmental authorization for the development. Implement the mitigation measures as described in the Environmental Management Plan.	Long term
		Extent	Local		Local
		Magnitude (Intensity)	High		High
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	Low		Low
		Risk	Medium		Medium
	Disturbed surfaces can lead to erosion and dust pollution.	Duration	Short term	Start the rehabilitation of disturbed surfaces as soon as possible. Spray bare surfaces with water to prevent dust pollution. Prepare method statements to this effect.	Medium term
		Extent	Local		Local
		Magnitude (Intensity)	Low		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Foreign and invader plant species which are likely to invade disturbed areas.	Duration	Short term	Plan for the eradication of foreign and invader plant species which are likely to invade disturbed areas. Start the extermination of any invasive species as soon as possible and maintain the eradication programme.	Medium term
		Extent	Local		Local
		Magnitude (Intensity)	Low		Low
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Ablution facilities for construction workers may cause pollution of surface and underground water.	Duration	Short term	Plan for the provision and maintenance of abluion facilities for construction workers to prevent pollution of surface and underground water. Provide portable abluion facilities that will not cause pollution during the construction phase.	Short term
		Extent	Local		Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
The proposed development will have an impact on the soil and geology.	Duration	Long term	Properly plan the construction phase in such a manner that impacts on the soil and geology of the area can be minimised. Plan to prevent spills of lubricants/oils that can take place on bare soil. This will include the use of drip trays for vehicles that are standing for more than 24 hours.	Long term	
	Extent	Local		Local	
	Magnitude (Intensity)	Low		Medium	
	Probability	Definite		Definite	
	Significance	Medium		Medium	
	Reversibility	High		High	
	Risk	Low		Medium	
Open excavations poses a danger of collapsing on people or on equipment and people- especially small children who may fall into it.	Duration	Short term	Plan to safeguard open trenches in order to alleviate the danger of collapse on people or on equipment and people- especially small children who may fall into it. Ensure that the trenches stay open for as short a time as possible.	Short term	
	Extent	Local		Local	
	Magnitude (Intensity)	Medium		Medium	
	Probability	Definite		Definite	
	Significance	Medium		Medium	
	Reversibility	High		High	
	Risk	Low		Medium	

ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase)

ALTERNATIVE 2: Installation of underground tanks without bunkers

Environmental Attribute	Potential impacts and risks	Assessment criteria	Assessment rating (With mitigation)	Proposed mitigation	Assessment rating (Without mitigation)
				Ensure that open trenches are demarcated as required by the Occupational Health and Safety Act.	
Indirect impacts:					
Geographical Physical Social Economic	Dust generation from the proposed project could impact on the surrounding area.	Duration	Short term	Spray water on open surfaces to ensure that dust does not cause air pollution during construction. Start the rehabilitation of disturbed surfaces as soon as possible	Short term
		Extent	Local		Local
		Magnitude (Intensity)	Low		Low
		Probability	Probable		Probable
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Spills of lubricants / oils can take place on bare soil.	Duration	Short term	Plan and compile method statements to implement measures for the prevention and or handling of spills of lubricants / oils that can take place on bare soil. Prevent spills of lubricants/oils that can take place on bare soil. This will include the use of drip trays for vehicles that are standing for more than 24 hours. Ensure that all construction vehicles are in good working order and not leaking oil and or fuel.	Short term
		Extent	Local		Local
		Magnitude (Intensity)	Low		Low
		Probability	Probable		Probable
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Waste materials such as glass, plastic, metal or paper may present a possible pollution hazard	Duration	Short term	Plan to provide method statements on the handling of waste materials such as glass, plastic, metal or paper which may present a possible pollution hazard Implement the management plan to ensure that: All construction rubble is disposed of in a safe and environmentally acceptable manner. NO concrete, gravel or other rubbish will be allowed to remain on site after the construction phase. All cement is housed as to prevent spills (due to rain and or handling errors). NO glass, plastic, metal, or paper shall be allowed to pollute the area.	Short term
		Extent	Local		Local
		Magnitude (Intensity)	Low		Low
		Probability	Probable		Probable
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
Possible social and environmental problems may be experienced as a result of non- compliance to the relevant legislation.	Duration	Short term	Plan to ensure all involved is aware of the possible social and environmental problems that may be experienced as a result of non- compliance to the relevant legislation	Short term	
	Extent	Local		Local	
	Magnitude (Intensity)	Medium		Medium	
	Probability	Probable		Probable	
	Significance	Medium		Medium	
	Reversibility	High		High	

ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase)					
ALTERNATIVE 2: Installation of underground tanks without bunkers					
Environmental Attribute	Potential impacts and risks	Assessment criteria	Assessment rating (With mitigation)	Proposed mitigation	Assessment rating (Without mitigation)
		Risk	Low	Ensure that contractors (construction phase) abide by all the requirements of the Occupational Health and Safety Act. Ensure that all contractors are aware of the consequences of non-compliance to the relevant legislation regarding the above-mentioned act as well as with regard to the environment (acts, regulations, and special guidelines).	Medium
	New employment opportunities will be created.	Duration	Long term	Plan to create new employment opportunities.	Long term
		Extent	Local		Local
		Magnitude (Intensity)	Medium	Plan to use local labour to ensure local skills development will take place.	Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	Medium	Contractors will have to ensure that they abide to the requirements of the Occupational Health and Safety Act and the Employment Equity Act.	Medium
		Risk	Low		Medium
Cumulative impacts:					
Geographical Physical Social Economic	Services (Solid waste, bulk water supply water, sewage, electricity, access and storm water) will be required..	Duration	Long term	Plan to ensure that the services (Solid waste, bulk water supply water, sewage, electricity, access and storm water) are designed and constructed in such a manner that it will not cause Environmental degradation.	Long term
		Extent	Local		Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	High		High
		Reversibility	High		High
		Risk	Low	Ensure that services are constructed and installed as planned.	Medium

ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase)					
ALTERNATIVE 3: (No-Go Option)					
Environmental Attribute	Potential impacts and risks	Assessment criteria	Assessment rating (With mitigation)	Proposed mitigation	Assessment rating (Without mitigation)
DIRECT IMPACTS:					
Geographical Physical Social Economic Cultural	No indigenous vegetation will be removed.	Duration	Long term	No mitigation measures required.	Long term
		Extent	Local		Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	High		High
		Reversibility	Low		Low
		Risk	Medium		Medium
Indirect impacts:					
Geographical Physical Social Economic	No new employment opportunities will be created during the planning and design phase.	Extent	Local	Ensure that the development is constructed and operated as planned.	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite

ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase)					
ALTERNATIVE 3: (No-Go Option)					
Environmental Attribute	Potential impacts and risks	Assessment criteria	Assessment rating (With mitigation)	Proposed mitigation	Assessment rating (Without mitigation)
Cultural	No skills enhancement will take place If this option is implemented, the projected boost to the local and regional economy will not take place.	Significance	Medium		Medium
		Reversibility	Medium		Medium
		Risk	High		High
Cumulative impacts:					
Geographical Physical Social Economic Cultural	If this option is implemented, the projected boost to the local and regional economy will not take place. No new employment opportunities will be created. No improvement to local skills development will take place. No broadened Tax base for the Local Municipality.	Extent	Local	Ensure that the development is constructed and operated as planned.	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	High		High
		Reversibility	High		High
		Risk	Medium		Medium

ENVIRONMENTAL IMPACT ASSESSMENT (Construction phase)					
ALTERNATIVE 1: (Preferred Alternative)					
Environmental Attribute	Potential impacts and risks	Assessment criteria	Assessment rating (With mitigation)	Proposed mitigation	Assessment rating (Without mitigation)
DIRECT IMPACTS:					
Geographical Physical Social Economic	Installation and operation of infrastructure for the storage and handling of 92 000 ℓ of a dangerous good (filling station), consisting of 4 x 23 000 ℓ tanks and the establishment of a shopping center.	Duration	Long term	Ensure that all activities that may possibly affect ground water are performed in accordance with the requirements of the National Water Act, 1998 (Act 36 of 1998), DW&S and the Local Authority. The correct installation and maintenance of underground fuel tanks and sewage systems must be regarded as having a high priority. Install the underground fuel tanks to comply with the standards set in S.A.N.S. 10089 part 3 addendum June 1990 for pumps and underground tanks, as well as S.A.N.S. 10131 part 2, 1186. This will be the responsibility of the developer. Other standards that will have to be adhered to, will be: o Tank standards; S.A.N.S. 1535:2005 o Piping standards; S.A.N.S. 1830:2006	Long term
		Extent	Local		Local
		Magnitude (Intensity)	High		High
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	Low		Low
		Risk	Low		Medium

ENVIRONMENTAL IMPACT ASSESSMENT (Construction phase)

ALTERNATIVE 1: (Preferred Alternative)

Environmental Attribute	Potential impacts and risks	Assessment criteria	Assessment rating (With mitigation)	Proposed mitigation	Assessment rating (Without mitigation)
				<ul style="list-style-type: none"> ○ Automatic tank gauging to be installed. This will be the responsibility of the developer. ○ Construct the monitoring system for the fuel storage tanks. Ensure that this system is able to detect any possible leakages instantaneously. This will be the responsibility of the developer. ○ Ensure that adequate chemical toilets are used by contractors during the construction phase. The provision and maintenance of which must form part of the contractor liabilities and must be described as such in their contracts. It will be essential that the ECO monitor this aspect very closely. ○ Ensure the regular inspection of fuel tanks and sewage facilities throughout the life cycle of the project. This will be the responsibility of the owner of the filling station. ○ The storage and handling of lubricants, oils, paint and material such as cement must be provided for as part of the different contractor's contracts. Specially demarcated and secure storage facilities must be provided for. It will be essential that the ECO monitor this aspect very closely. ○ Ensure that, before the underground tank and associated pipe work become operational, the necessary leak tests are conducted in accordance with the specifications and requirements of the appointed fuel supply company and the relevant South African Bureau of Standards codes of practice for the petroleum industry. This will be the responsibility of the developer. ○ Construct the oil traps for the filling station. This will be the responsibility of the developer. 	
	The proposed development will also involve the eradication of 27 590 m ² of indigenous vegetation located within a critical biodiversity area.	Duration	Long term	Obtain the necessary environmental authorization for the development. Implement the mitigation measures as described in the Environmental Management Plan.	Long term
		Extent	Local		Local
		Magnitude (Intensity)	High		High
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	Low		Low
		Risk	Medium		Medium

ENVIRONMENTAL IMPACT ASSESSMENT (Construction phase)

ALTERNATIVE 1: (Preferred Alternative)

Environmental Attribute	Potential impacts and risks	Assessment criteria	Assessment rating (With mitigation)	Proposed mitigation	Assessment rating (Without mitigation)
	Un-rehabilitated, disturbed surfaces can lead to erosion and dust pollution.	Duration	Short term	Start the rehabilitation of disturbed surfaces as soon as possible. Spray bare surfaces with water to prevent dust pollution.	Medium term
		Extent	Local		Local
		Magnitude (Intensity)	Low		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Foreign plant species are likely to invade disturbed areas.	Duration	Short term	Start the extermination of any invasive species as soon as possible and maintain the eradication programme.	Medium term
		Extent	Local		Local
		Magnitude (Intensity)	Low		Low
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Poorly planned ablation facilities for construction workers may cause pollution of surface and underground water.	Duration	Short term	Provide portable ablation facilities that will not cause pollution during the construction phase.	Short term
		Extent	Local		Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	The proposed project can impact on the soil and geology.	Duration	Long term	Prevent spills of lubricants/oils that can take place on bare soil. This will include the use of drip trays for vehicles that are standing for more than 24 hours.	Long term
		Extent	Local		Local
		Magnitude (Intensity)	Low		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
The vegetation of the area will be removed during the construction phase, which will destroy floral and faunal habitats.	Duration	Short term	Start with the rehabilitation of vegetation to minimize the negative effects of the removal of plants. The rule must be to minimize the disturbance of animal life by keeping the footprint as small as possible. No snares may be set.	Short term	
	Extent	Local		Local	
	Magnitude (Intensity)	Medium		Medium	
	Probability	Definite		Definite	
	Significance	Medium		Medium	
	Reversibility	High		High	
	Risk	Low		Medium	
Open trenches can be dangerous as they can either collapse on people or on equipment and people-especially small children, can fall into them.	Duration	Short term	Ensure that the trenches stay open for as short a time as possible. Ensure that open trenches are demarcated as required by the Occupational Health and Safety Act.	Short term	
	Extent	Local		Local	
	Magnitude (Intensity)	Medium		Medium	
	Probability	Definite		Definite	
	Significance	Medium		Medium	
	Reversibility	High		High	
	Risk	Low		Medium	

Indirect impacts:

ENVIRONMENTAL IMPACT ASSESSMENT (Construction phase)

ALTERNATIVE 1: (Preferred Alternative)

Environmental Attribute	Potential impacts and risks	Assessment criteria	Assessment rating (With mitigation)	Proposed mitigation	Assessment rating (Without mitigation)
Geographical Physical Social Economic	Dust generation from the proposed project could impact on the surrounding area.	Duration	Short term	Spray water on open surfaces to ensure that dust does not cause air pollution during construction. Start the rehabilitation of disturbed surfaces as soon as possible	Short term
		Extent	Local		Local
		Magnitude (Intensity)	Low		Low
		Probability	Probable		Probable
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Spills of lubricants / oils can take place on bare soil.	Extent	Local	Prevent spills of lubricants/oils that can take place on bare soil. This will include the use of drip trays for vehicles that are standing for more than 24 hours. Ensure that all construction vehicles are in good working order and not leaking oil and or fuel. No vehicles may be serviced on site.	Local
		Magnitude (Intensity)	Low		Low
		Probability	Probable		Probable
		Significance	Medium		Medium
		Reversibility	High		High
	Risk	Low	Medium		
	Waste materials such as glass, plastic, metal or paper present a possible pollution hazard	Extent	Local	Implement the management plan to ensure that: All construction rubble is disposed of in a safe and environmentally acceptable manner. NO concrete, gravel or other rubbish will be allowed to remain on site after the construction phase. All cement is housed as to prevent spills (due to rain and or handling errors). NO glass, plastic, metal, or paper shall be allowed to pollute the area.	Local
		Magnitude (Intensity)	Low		Low
		Probability	Probable		Probable
		Significance	Medium		Medium
		Reversibility	High		High
	Risk	Low	Medium		
	Non-compliance to the relevant legislation may cause social and environmental problems.	Extent	Local	Ensure that contractors (construction phase) abide by all the requirements of the Occupational Health and Safety Act. Ensure that all contractors are aware of the consequences of non-compliance to the relevant legislation regarding the above-mentioned act as well as with regard to the environment (acts, regulations, and special guidelines).	Local
		Magnitude (Intensity)	Medium		Medium
Probability		Probable	Probable		
Significance		Medium	Medium		
Reversibility		High	High		
Risk	Low	Medium			
New employment opportunities will be created. Local skills development will take place.	Extent	Local	No mitigation measures needed apart from the fact that contractors will have to ensure that they abide to the requirements of the Occupational Health and Safety Act and the Employment Equity Act.	Local	
	Magnitude (Intensity)	Medium		Medium	
	Probability	Definite		Definite	
	Significance	Medium		Medium	
	Reversibility	Medium		Medium	
Risk	Low	Medium			
Cumulative impacts:					

ENVIRONMENTAL IMPACT ASSESSMENT (Construction phase)					
ALTERNATIVE 1: (Preferred Alternative)					
Environmental Attribute	Potential impacts and risks	Assessment criteria	Assessment rating (With mitigation)	Proposed mitigation	Assessment rating (Without mitigation)
Geographical Physical Social Economic	<p><u>Solid waste:</u> The proposed development will add additional solid waste into the existing waste stream of the Local Municipality.</p> <p><u>Sewage:</u> The proposed development will add additional sewage to the sewage system of the Local Municipality.</p> <p><u>Water supply:</u> The proposed development will add pressure to the water supply of Local Municipality.</p> <p><u>Access:</u> More trips will be generated to the area.</p>	Extent	Local	Ensure that the development is constructed as planned.	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	High		High
		Reversibility	High		High
		Risk	Low		Medium
	Indigenous vegetation will be removed.	Extent	Local	No mitigation measures possible.	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	High		High
		Reversibility	Low		Low
Risk		Medium	Medium		
Extent		Local	Local		

ENVIRONMENTAL IMPACT ASSESSMENT (Operational Phase)					
ALTERNATIVE 1: (Preferred Alternative)					
Environmental Attribute	Potential impacts and risks	Assessment criteria	Assessment rating (With mitigation)	Proposed mitigation	Assessment rating (Without mitigation)
DIRECT IMPACTS:					
Geographical Physical Social Economic Cultural	<p>During the operational phase there is the potential that an underground storage tank and associated pipeline can leak. Spills can occur due to Refilling and the refuelling stations located on the forecourt. This can lead to groundwater pollution.</p>	Extent	Local	Additional leak observation wells must be installed around the tank, in line with SANS 10089-3:2010.	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium- high	Recording of the static groundwater level must take place on a bi-annual basis	High
		Reversibility	Medium		Medium
		Risk	Low	<p>Groundwater quality samples should be taken at the monitoring borehole. It is recommended that quarterly monitoring takes place for the first year, to determine the monitoring trends, after which monitoring on a bi-annual basis can be continued. All major physical constituents as per SANS 241 must be analysed.</p>	High

ENVIRONMENTAL IMPACT ASSESSMENT (Operational Phase)					
ALTERNATIVE 1: (Preferred Alternative)					
Environmental Attribute	Potential impacts and risks	Assessment criteria	Assessment rating (With mitigation)	Proposed mitigation	Assessment rating (Without mitigation)
				<p>Hydrocarbon contamination must be conducted additionally. Once trends have been established, the sampling may be focused on the major determinants, including hydrocarbon contamination.</p> <p>A combined sample should be taken, by means of bailing, from the fuel leak observation wells on a biannual basis to and submitted to an accredited laboratory to ensure the detection of any pollution taking place at the immediate vicinity of the storage tanks.</p>	
Indirect impacts:					
Geographical Physical Social Economic Cultural	Lack of rehabilitation may cause problems	Extent	Local	It will be the responsibility of the applicant to ensure that the rehabilitation plan is implemented	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium- high		High
		Reversibility	Medium		Medium
		Risk	Low		High
Cumulative impacts:					
Geographical Physical Social Economic Cultural	Pollution of groundwater from fuels storage tanks or fuel lines.	Extent	Local	It will be the responsibility of the applicant to ensure that the management and monitoring plans are implemented.	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Low		High
		Reversibility	High		Medium
		Risk	Low		High
Geographical Physical Social Economic Cultural	<u>Broadened tax base:</u> The proposed development will generate more income for the Local Municipality.	Extent	Local	No mitigation measures required.	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	High		High
		Reversibility	High		High
		Risk	Medium		Medium

10. PUBLIC PARTICIPATION.

ADVERTISEMENT AND NOTICE

Publication name	Mafikeng Mail	
Date published	28/10/2021	
Site notice 1 position	Latitude	Longitude
	25°52'38.76"S	25°39'47.71"E
Date placed	28/10/2021	

**PROOF OF NEWSPAPER ADVERTISEMENT (MAFIKENG MAIL 28/10/21)
TO FOLLOW**

2. DETERMINATION OF APPROPRIATE MEASURES

Details of the measures taken to include all potential I&APs as required by Regulation 41(2)(e) and 41(6) of GN R.982.

Key stakeholders (other than organs of state) identified in terms of Regulation 40(2)(d) of GN R.982:

Title, Name and Surname	Affiliation/ key stakeholder status	Contact details (tel number or e-mail address)
N/A	Neighbours	See photos

(Please see below)

10.3 AUTHORITY PARTICIPATION

Authorities and organs of state identified as key stakeholders. Key stakeholders identified in terms of Regulation 7(1) and (2) and Regulation 40(2) (a)-(c) of GN R.982:

Authority/Organ of State	Contact person (Title, Name and Surname)	Tel No	Fax No	e-mail	Postal address
Department of Water and Sanitation					
Head of Department: North-West Department of Agriculture and Rural Development					
North West Department of Biodiversity					
North West Department of public works and roads					
Ngaka Modiri Molema District Municipality					
Mahikeng local municipality					
Councillor Ward 27 Mahikeng local municipality					
Eskom					
SAHRA	SAHRIS			SAHRIS	

PLEASE SEE PROOF BELOW



AB ENVIRO-CONSULT CC

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28/10/2021

North West Provincial Operations

Tel: 087-943-3741

Dear Sir/Madam

Environmental Impact Assessment for the proposed construction of facilities and infrastructure for the storage and handling of 92 000 ℓ of a dangerous good (filling station), consisting of 4 x 23 000 ℓ tanks and the establishment of a shopping centre located on Erf 3726, Erf 3727 and Erf 3728 Danville, Mahikeng Local Municipality, North West Province. The proposed development will result in the clearance of 27 590 m² of indigenous vegetation located within a critical biodiversity area.

AB ENVIRO CONSULT was appointed by Mahikeng Local Municipality to submit an application to the Department of Economic Development, Environment and Tourism, North West Province for the above mentioned proposed development. Attached please find a notification of the proposed development and an electronic copy of the draft Basic Assessment report for your comments. You are requested to comment within 30 days from the date of this letter.

In the event of your organisation/department not wishing to comment on this matter, it would be appreciated if we could receive written confirmation thereof to enable us to continue with the finalisation of the application. If no response is however received from your Department/organisation within the said time, it will be assumed that your department/organisation does not wish to comment on this matter and the application will be processed further.

Please be advised, in accordance with POPIA and NEMA, personal data is collected and processed by the applicant/EAP and shared with the Competent Authority to enable informed decision-making.

Please do not hesitate to contact us should any further information or clarification be required.

Yours sincerely,

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MR.J.P. DE VILLIERS (M Sc, EAP-EAPASA, IAIA); MRS.J.E. DU PLOOY (M.E.M; EAP-EAPASA, IAIA)



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28/10/2021

TO: Mr. F. Mofokeng
North-West Department of Agriculture and rural development

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28/10/2021

North West Department of Biodiversity



Environmental Impact Assessment for the proposed construction of facilities and infrastructure for the storage and handling of 92 000 ℓ of a dangerous good (filling station), consisting of 4 x 23 000 ℓ tanks and the establishment of a shopping centre located on Erf 3726, Erf 3727 and Erf 3728 Danville, Mahikeng Local Municipality, North West Province. The proposed development will result in the clearance of 27 590 m² of indigenous vegetation located within a critical biodiversity area.

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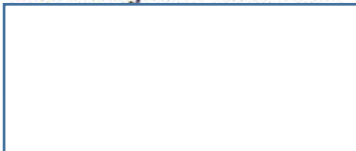
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28/10/2021

North West Department of public works and roads
Director: Ngaka Modiri Molema District



Dear Sir/Madam

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28/10/2021

Eskom



Dear Sir/Madam

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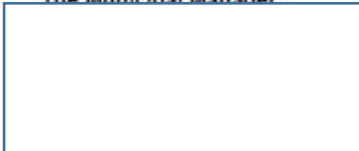
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28/10/2021

Ngaka Modiri Molema District Municipality
The Municipal Manager:



Dear Sir/Madam

Environmental Impact Assessment for the proposed construction of facilities and infrastructure for the storage and handling of 92 000 ℓ of a dangerous good (filling station), consisting of 4 x 23 000 ℓ tanks and the establishment of a shopping centre located on Erf 3726, Erf 3727 and Erf 3728 Danville, Mahikeng Local Municipality, North West Province. The proposed development will result in the clearance of 27 590 m² of indigenous vegetation located within a critical biodiversity area.

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28/10/2021

Mahikeng Local Municipality
The Municipal Manager:

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Please do not hesitate to contact us should any further information or clarification be required.

Yours sincerely,

PROF. A.B. DE VILLIERS

PROF A B DE VILLIERS (M Sc, Ph D, SACNASP)
MR.J.P. DE VILLIERS (M Sc, EAP-EAPASA, IAIA); MRS.J.E. DU PLOOY (M.E.M: EAP-EAPASA, IAIA)



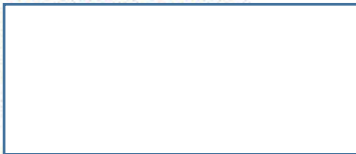
AB ENVIRO-CONSULT CC

Reg no. 2000/016653/23

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28/10/2021

Ngaka Modiri Molema District Municipality
The Councillor Ward 27:



Dear Sir/Madam

Environmental Impact Assessment for the proposed construction of facilities and infrastructure for the storage and handling of 92 000 ℓ of a dangerous good (filling station), consisting of 4 x 23 000 ℓ tanks and the establishment of a shopping centre located on Erf 3726, Erf 3727 and Erf 3728 Danville, Mahikeng Local Municipality, North West Province. The proposed development will result in the clearance of 27 590 m² of indigenous vegetation located within a critical biodiversity area.

AB ENVIRO CONSULT was appointed by Mahikeng Local Municipality to submit an application to the Department of Economic Development, Environment and Tourism, North West Province for the above mentioned proposed development. Attached please find a notification of the proposed development and an electronic copy of the draft Basic Assessment report for your comments. You are requested to comment within 30 days from the date of this letter.

In the event of your organisation/department not wishing to comment on this matter, it would be appreciated if we could receive written confirmation thereof to enable us to continue with the finalisation of the application. If no response is however received from your Department/organisation within the said time, it will be assumed that your department/organisation does not wish to comment on this matter and the application will be processed further.

Please be advised, in accordance with POPIA and NEMA, personal data is collected and processed by the applicant/EAP and shared with the Competent Authority to enable informed decision-making.

Please do not hesitate to contact us should any further information or clarification be required.

Yours sincerely,

PROF. A.B. DE VILLIERS

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10.4 ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

Summary of main issues raised by I&APs	Summary of response from EAP
To be included in the FBAR	To be included in the FBAR

10.5 COMMENTS AND RESPONSE REPORT

I&AP registered:	Comment received:	Response by the EAP:
To be included in the FBAR		

11. SUMMARY OF THE FINDINGS AND RECOMMENDATIONS OF SPECIALISTS

11.1 GEO-TECHNICAL REPORT (Appendix A). (This report will be included into the final BAR as the Engineer was still waiting for results from the Laboratories)

11.1.1 Terms of Reference

The aim of this investigation is to identify and evaluate any possible engineering geological problems before commencement.

11.1.2 Methodology

To be included into the final BAR as the Engineer was still waiting for results from the Laboratories

11.1.3 Recommendations and Conclusions

To be included into the final BAR as the Engineer was still waiting for results from the Laboratories.

11.2 ENGINEERING SERVICES REPORT (See Appendix B for a copy of the report)

11.2.1 Terms of Reference

Moedi Consulting Engineers (Pty) Ltd. has been appointed for the investigation and reporting on the Civil Engineering services required for the proposed new Shopping Centre of approximately 6 605m² on Erven 3726, 3727 and 3728, Danville, Mahikeng.

11.2.2 Methodology

Water

The design of internal services will be dependent on the final proposed development layout of the shopping centre mostly guided by the requirements of the Fire Specialist. The following design guidelines will be followed:

- The internal water supply network will consist of uPVC and/or HDPE pipes of varying diameter according to designs of the Civil Engineer.
- Provision of isolating valves, air release valves and fire hydrants to comply with the requirements of the Local Authority and Building Regulations.
- Cognisance will be taken of pipe diameters and water pressure for firefighting purposes

Sewer

Depending on the future development layout, an internal sewer network of Ø 110mm and Ø 160mm pipes with related Y-junction connections and inspection eyes will be installed to comply with the minimum specifications stipulated in the SANS 10400 Building Regulations. Manholes and rodding eyes will be constructed at necessary positions to allow for effective maintenance.

Roads & Storm Water

The proposed development layout will make provision for internal access roads, parking and service roads linking connector roads (R503 and Bophelong Hospital) to the filling station while ensuring smooth transition to and from retail facilities.

The design of the internal access roads and parking shall provide for an appropriate road surface with cross sections designed to accommodate the channelling of storm water generated on the developed area.

Where storm intensity calculations dictate, sufficiently designed concrete channels will be constructed as part of the cross section to channel storm water.

Roads and storm water infrastructure will generally be designed to follow the natural runoff patterns (north-west) to avoid ponding and flooding of buildings with associated damage.

11.2.3 Recommendations and Conclusions

Water

The Ngaka Modiri Molema District Municipality is the Water Services Authority (WSA) whereas the Mahikeng Local Municipality is the Water Services Provider (WSP).

In addition to the Modimola Dam located to the west of Mahikeng, bulk water for Mahikeng is abstracted from the Grootfontein wellfields and the Molopo Eye for treatment. The estimated reliable delivery of the water sources amounts to 23 Mℓ/day. The Modimola Dam is the primary water source for the Mmabatho Water Treatment Works operated under contract by Sedibeng Water.

The Mmabatho WTW has a design capacity of 20 Mℓ/day although it currently only treats approximately 16 Mℓ/day. The plant services the Lokaleng Reservoir Site located to the northwest of Mahikeng.

The Proposed Development will have an estimated average daily water demand of 30 kℓ/day. The Erven does not have an existing municipal water connection. Due to the extent of the Proposed Development and future internal water management strategy, it is proposed that a new metered Ø 110mm connection be made to the existing bulk pipeline located in Danville to the west of the Proposed Development.

A new fire booster connection will be incorporated into the design of the metered connection to allow the Fire Brigade to boost the internal network in the case of fire. A sufficient number of strategically located fire hydrants will be supplied as part of the internal water network design.

Sewer

All sewage generated in the Greater Mmabatho is treated at two Waste Water Treatment Works located to the east and west of the Modimola Dam respectively. The Mmabatho Waste Water Treatment Works is located to the west of Mahikeng on the eastern side of the Modimola Dam. The plant has an estimated treatment capacity of 24 Mℓ/day. Due to limited functionality of flow meters, the exact current inflow could not be provided by the Local Authority however, it is estimated that the current inflow is between 16 and 17 Mℓ/day. Considering the estimated sewer runoff that will be generated by the Proposed Development, the plant has sufficient capacity to treat current and future generated sewer.

All sewage generated on the Proposed Development will follow the natural topography of the site to flow under gravity conditions towards the north-western corner of the site.

The topography of the Proposed Development can be described as relatively flat although sufficient slope is available to install internal sewer pipelines at minimum gradients.

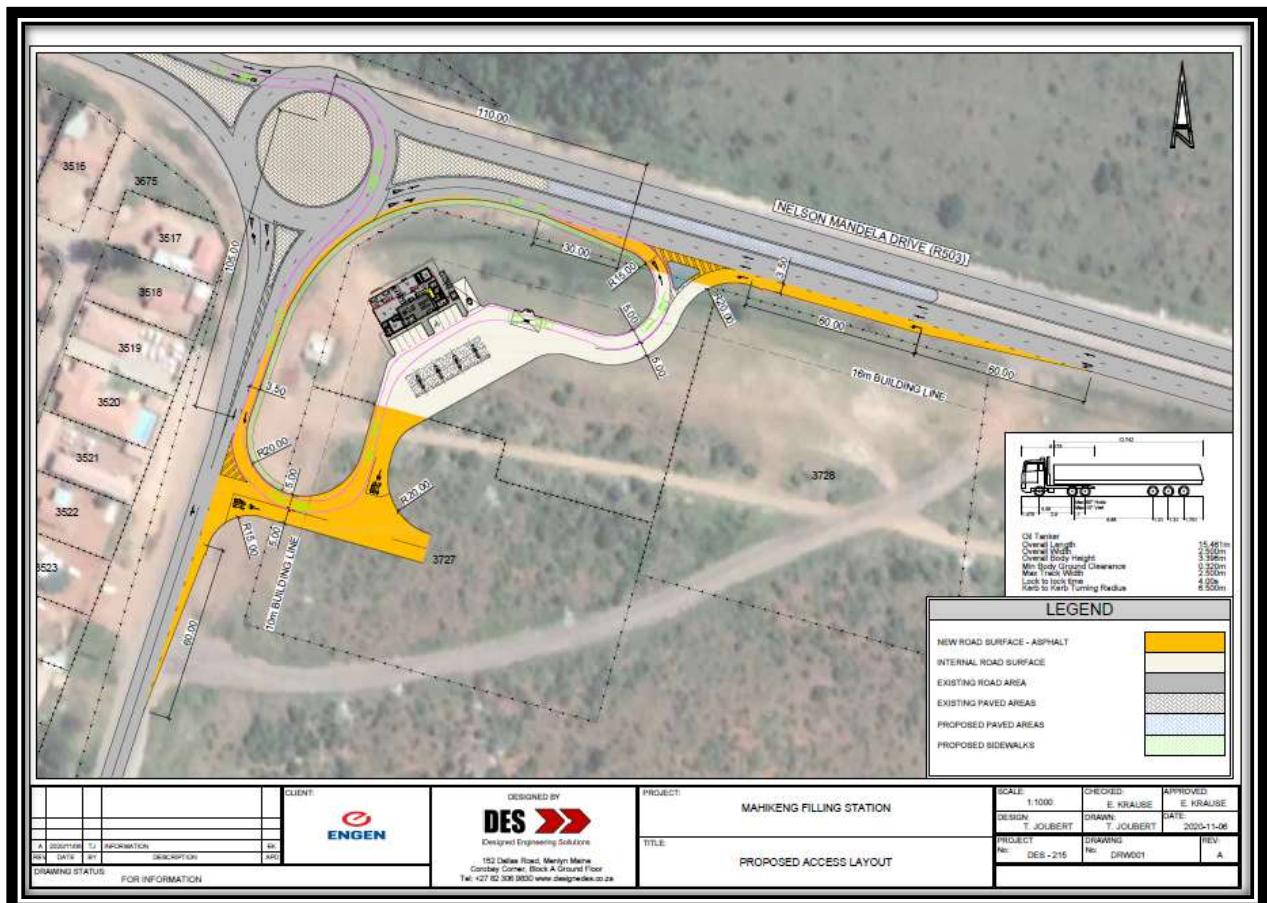
A sewer manhole is located on the corner of the existing township to the west of the Proposed Development where connection to the existing bulk sewer line can be made.

The theoretical sewer runoff of the Proposed Development is approximately 0.9 l/s. Taking into account the peak flow generation periods as well as current size of the existing outfall sewer, the Proposed Development will have a negligible effect on the existing sewer network due to minimal additional flow volumes compared to the existing network.

Access

The Proposed Development is bordered to the north by the R503 Lichtenburg Road and to the west by the Bophelong Hospital Road. As mentioned in the Introduction Section of this report, the afore mentioned intersection was recently upgraded by means of the full upgrading of the R503 road and construction of a roundabout. The roundabout efficiently calms traffic and allows smooth integration of traffic to and from the Bophelong Hospital Road.

It is proposed that an additional deceleration lane be constructed on the R503 westbound to accommodate westbound access to the new shopping centre while accommodating left turning traffic onto the R503 on an acceleration lane. To avoid right turning eastbound traffic towards the shopping centre, the median of the R503 will be extended at least 30m past the proposed new westbound access. Access for eastbound traffic will therefore be required to turn right at the roundabout to access the shopping centre from Bophelong Hospital Road by means of a left turning access point. See Figure below for a copy of the proposed access layout as was designed by the Engineer.



Proposed access layout

Storm Water

The natural topography of the Proposed Development slopes towards the north-western corner of the stand (towards the roundabout) where storm water is dispersed in a northern direction crossing the R503 road by means of existing rectangular concrete culverts. Storm water follows natural streams in a north-western direction towards Cookes Lake which in turn overflows into the Molopo River.

In addition to storm water generated on the Proposed Development area, storm water from Danville crosses Bophelong Hospital Road in an eastern direction at the said intersection whereas storm water generated on the southern side of the R503 flows in a western direction to also cross the R503 at the same location next to the roundabout in a northern direction. Open unlined storm water channels in the road reserve convey storm water to the said crossing and it is assumed that the storm water crossing was sufficiently designed upon upgrading of the intersection and roundabout to accommodate existing flow volumes.

All paved areas and roads will be designed to accommodate storm water as surface water towards existing outlets. In addition, sufficiently designed storm water culverts will be installed crossing both proposed new access locations (as mentioned above) to allow unobstructed flow conditions.

All new storm water infrastructure will be designed to avoid additional flow volumes in existing channels while preventing ponding and flooding of any existing or new buildings.

Solid Waste

Municipal Solid Waste (MSW) removal is a function of the Waste & Environmental Management Division of the Mahikeng Local Municipality. Mahikeng currently generates an estimated MSW volume of 150 tons per day. The Proposed Development will not have any significant impact on the current generated MSW compared to the total volume of solid waste generated in the Municipal area. The MSW removal services of the Municipality will be extended to service the Proposed Development.

1 in 100 year Flood Line

The proposed development is not affected by the 1-in-100 year flood line.

Operation and Maintenance of Services

All external municipal services namely water, sewer, roads and storm water, electricity infrastructure as well as refuse removal functions shall remain the function of the Local Authority which is responsible for the operation and maintenance thereof.

11.3 FAUNA AND FLORA HABITAT REPORT (See Appendix C for a copy of the Report.)

11.3.1 Terms of Reference

An ecological habitat survey is required for an area that has partially been developed at Erven 3726, 3727 and 3728, southeast of Mahikeng, North West Province, South Africa (elsewhere referred to as the site). Survey focused on the possibility that threatened fauna or flora known to occur in North West Province are likely to occur within the proposed development or not. Species of known high conservation priority that do not qualify for threatened status also received attention in the survey.

OBJECTIVES OF THE HABITAT STUDY

The objectives of the habitat study are to provide:

- Surveys to investigate key elements of habitats on the site, relevant to the conservation of fauna and flora.

- Recording of any sightings and/or evidence of existing fauna and flora.
- The selective and careful collecting of voucher specimens of invertebrates where deemed necessary.
- An evaluation of the conservation importance and significance of the site with special emphasis on the current status of threatened species.
- Recording of possible host plants or foodplants of fauna such as butterflies.
- Literature investigation of possible species that might occur on site.
- Integration of the literature investigation and field observations to identify potential ecological impacts that could occur as a result of the development.
- Integration of literature investigation and field observations to make recommendations to reduce or minimise impacts, should the development be approved.

SCOPE OF STUDY

- Surveys to investigate key elements of habitats on the site, relevant to the conservation of fauna and flora.
- Recording of any sightings and/or evidence of existing fauna and flora.
- The selective and careful collecting of voucher specimens of invertebrates where deemed necessary.
- An evaluation of the conservation importance and significance of the site with special emphasis on the current status of threatened species.
- Recording of possible host plants or foodplants of fauna such as butterflies.
- Literature investigation of possible species that might occur on site.
- Integration of the literature investigation and field observations to identify potential ecological impacts that could occur as a result of the development.
- Integration of literature investigation and field observations to make recommendations to reduce or minimise impacts, should the development be approved

11.3.2 Methodology

A desktop study comprised not only an initial phase, but also it was used throughout the study to accommodate and integrate all the data that become available during the field observations.

Survey by R.F. Terblanche during September 2021 was conducted to note key elements of habitats on the site, relevant to the conservation of fauna and flora. The main purpose of the site visits was ultimately to serve as a habitat survey that concentrated on the possible presence or not of threatened species and other species of high conservation priority.

11.3.3 Recommendations and Conclusions

- Vegetation at most of the site is conspicuously degraded, modified or transformed. Indigenous tree species at the site include *Vachellia karroo* (Sweet Thorn), *Vachellia tortilis* subsp. *heteracantha* (Umbrella Thorn), *Vachellia hebeclada* (Candlepod Thorn), *Senegalia mellifera* (Black Thorn) and *Ziziphus mucronata* (Buffalo-thorn). The alien invasive tree species *Melia azedarach* also occurs at the site as well as the alien invasive succulent *Opuntia ficus-indica*. Indigenous grass species include *Eragrostis lehmanniana*, *Eragrostis rigidior*, *Aristida congesta*, *Cynodon dactylon*, *Chloris virgata* and *Heteropogon contortus*. Indigenous forbs and dwarf shrubs include *Gazania krebsiana*, *Bulbine narcissifolia*, *Euphorbia inaequilatera* and *Felicia muricata*.

- Alien invasive weed species are visible at the widespread disturbed areas at the site. These alien invasive weeds include *Argemone ochroleuca*, *Verbena aristigera*, *Flaveria bidentis*, *Datura ferox*, *Gomphrena celosioides*, *Schkuhria pinnata*, *Tagetes minuta* and *Verbesina encelioides*.
- The site is visibly disturbed. Informal dumping at the site is extensive. Old roads run through the site. Fowl-smelling water is present at the northeastern boundary of the site. Disturbances include excavations of the past. Bush encroachment of shrub-height *Vachellia* species (Thorns) is noticeable at some areas at the site. Alien invasive weeds are widespread at disturbed areas at the site.
- Wetlands are absent at the site.
- Rocky ridges are absent at the site.
- Grassland at the site is represented by the Klerksdorp Thornveld (Gh 13) which is not listed as a Threatened Ecosystem according to the National List of Threatened Ecosystems (2011).
- No Threatened or Near Threatened plant or animal species appear to be resident at the site. No other plant or animal species of particular conservation concern appear to be present at the site.
- There is little scope for the site to be part of a corridor of particular conservation importance.
- Ecological sensitivity at the site is medium and low (at some areas approaching very low sensitivity at a finer scale).
- Following the mitigations which will be upheld and planned footprint for development all the impact risks listed above are moderate or low.
- If the development is approved a key issue would be continued monitoring and eradication of alien invasive plant species. It is in particular alien invasive species such as *Melia azedarach* (Syringa) and invasive *Prosopis glandulosa* (Mesquite) which should not be allowed to establish.
- If the development is approved an opportunity presents itself to cultivate indigenous plant species which would benefit urban nature conservation.

11.4 HERITAGE IMPACT ASSESSMENT (HIA) See Appendix D

11.4.1 TERMS OF REFERENCE

The Terms of Reference for the study was to:

1. Identify all objects, sites, occurrences and structures of an archaeological or historical nature (cultural heritage sites) located on the portion of land that will be impacted upon by the proposed development;
2. Assess the significance of the cultural resources in terms of their archaeological, historical, scientific, social, religious, aesthetic and tourism value;
3. Describe the possible impact of the proposed development on these cultural remains, according to a standard set of conventions;
4. Propose suitable mitigation measures to minimize possible negative impacts on the cultural resources;
5. Review applicable legislative requirements

11.4.2 METHODOLOGY

11.4.2.1 Survey of literature

A survey of available literature was undertaken in order to place the development area in an archaeological and historical context. The sources utilized in this regard are indicated in the bibliography.

11.4.2.2 Field survey

The field assessment section of the study was conducted according to generally accepted HIA practices and aimed at locating all possible objects, sites and features of heritage significance in the area of the proposed development. The location/position of all sites, features and objects is determined by means of a Global Positioning System (GPS) where possible, while detail photographs are also taken where needed.

11.4.2.3 Oral histories

People from local communities are sometimes interviewed in order to obtain information relating to the surveyed area. It needs to be stated that this is not applicable under all circumstances. When applicable, the information is included in the text and referred to in the bibliography.

11.4.2.4 Documentation

All sites, objects, features and structures identified are documented according to a general set of minimum standards. Co-ordinates of individual localities are determined by means of the Global Positioning System (GPS). The information is added to the description in order to facilitate the identification of each locality.

11.4.3 RECOMMENDATIONS AND CONCLUSIONS

APelser Archaeological Consulting (APAC) was appointed by AB Enviro Consult to conduct a Phase 1 HIA for a proposed Retail Business & Filling Station Development Erf 3726, Erf 3727 and Erf 3728 Danville, Mahikeng Local Municipality, North West Province.

Background research indicates that there are some cultural heritage sites and features in the larger geographical area within which the study area falls. No sites, features or material of cultural heritage (archaeological and/or historical) origin or significance were identified in the study area during the physical assessment. The informal dumping of residential household refuse and building rubble occurs throughout the study area. The area itself is surrounded by residential, industrial and business related developments and as a result the larger geographical location has been extensively altered from its original natural and historical landscape. Telephone lines, as well as a dirt road that runs from east to west roughly in the middle of the study area, and a dirt & tar road that comes off the R503 and runs approximately north-south through the land has impacted on the area as well.

With the original natural & historical landscape largely altered and with the recent impacts it is believed that should any sites, features or material of cultural heritage origin or significance have existed here in the past, it would have been largely disturbed or destroyed as a result.

It should be noted that although all efforts are made to cover a total area during any assessment and therefore to identify all possible sites or features of cultural (archaeological and/or historical) heritage origin and significance, that there is always the possibility of something being missed. This will include low stone-packed or unmarked graves. This aspect should be kept in mind when development work commences and if any sites (including graves) are identified then an expert should be called in to investigate and recommend on the best way forward.

Finally, from a Cultural Heritage point of view it can therefore be concluded that the proposed Retail Business and Filling Station Development Erf 3726, Erf 3727 and Erf 3728 Danville, Mahikeng Local Municipality, North West Province should be allowed to continue.

11.5 FEASIBILITY STUDY (See Appendix E for a copy of the Report.)

11.5.1 Terms of Reference

DES was commissioned to investigate a site for the possible development and operation of a filling station on Erf 3726, 3727 & 3728, Mahikeng, North West Province.

It is planned that a filling station with a canopy-covered forecourt will be developed on the property and that the facility will have a modern convenience store and full petrol and diesel fuelling facilities.

The brief was to provide a considered estimation of the projected fuel and shop sales based on the trade area demographics and the current traffic count with the scope of work being to undertake a market assessment and demand study for the proposed filling station.

11.5.2 Methodology

This study will take into account the traffic that can have access to the property and the impact that opposition stations in the area will have on the proposed development. The study will assume that the facility will be efficiently operated and will provide all the normal facilities available at a modern contemporary service station.

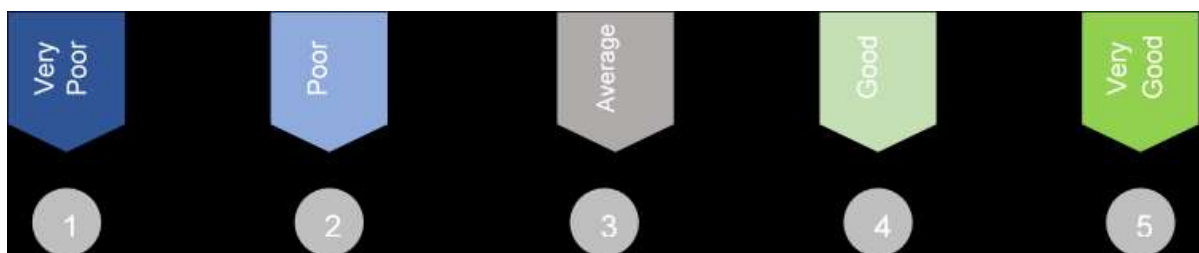
Traffic Growth within the Study Area

It is typical to consider a 5 to 7-year period for potential growth within a study area but precise traffic growth patterns were not analysed nor calculated in-depth for this report, a full investigation of such would require a separate study.

When there is insufficient historic data or data quality is poor and adequate information to calculate expected traffic growth in a study is not available, typical growth rates may be obtained from recommendations by the Committee of Transport Officials (COTO). However, it can be expected that traffic growth in this area will at least keep pace with the National Average as the proposed development will be aimed at the lower to middle-income motorists in the trade area.

EVALUATION OF THE STUDY SITE

A desktop study was conducted for the target property with a qualitative assessment of the most important filling station attributes being assessed on a scale of from **VERY POOR** (1) to **VERY GOOD** (5) as follows:



Traffic counts were conducted on Thursday the 25th February 2021 at the intersection of the R503 and Road A.

VOLUME CALCULATION METHODOLOGY

The following formula is used by the fuel industry to calculate the expected average litres of fuel to be sold in a month:

$$L = ADT \times F^{-} \times p \times d$$

Litres per month (L) = (ADT) Vehicles passing the site per day
(F⁻) Average fuel fill per vehicle
(p) Percentage vehicles of pass-by traffic turning into the site
(d) Trading days in a calendar month

EXPECTED MONTHLY SHOP SALES

The ratio of fuel sold to Rands generated in the convenience store is a function of the type of traffic which the site attracts and the area within which it is located. It is assumed that the site will have a branded convenience store with a minimum of an in-store food offer, and it will lie in a low to middle - income essentially local trade area. It is proposed that the convenience store would generate about R1.20 for every litre of fuel sold.

The estimated Shop Sales in Year-3 is therefore: 372 493 x 1.2 = ± R446 992 per month

IMPACT ON EXISTING FUEL MARKET

To determine the impact on surrounding sites in an urban environment it is typical to look at all local sites within a 3 km radius. This guideline is used by various departments and agencies. However, a filling station outside of the 3km radius and on the same road and on the same side of the road, should also be considered as these filling stations would also be impacted by the proposed new filling station.

11.5.3 Recommendations and Conclusions

The study concluded the following:

Visibility (5)

VERY GOOD. The proposed site is located adjacent to the R503 which is a straight road that allows good vision from oncoming vehicles in both directions. The area around the site is mostly clear open land with little visual obstructions which could reduce a driver's vision of the site.

Proposed Access (4)

GOOD. The proposed site will have a Left-In-Left-Out (LILO) access off the R503 which will allow direct access for north-westbound, towards border, transient traffic. There will be a Full Access from Road A which will allow direct access for traffic travelling in both directions along that road.

Trading Market (4)

GOOD. The proposed site is located along a main road which will give it access to transient traffic travelling into the town, towards the border. There are residential areas south and east of the site that could supply the site with residential traffic. The site will mainly be targeting transient traffic travelling into the town, since there are not many alternatives before this site it may encourage drivers to spend more money on fills and the onsite convenience store. The area consists of low to middle-income residents with a growing population which has good potential for future sales.

Traffic Volumes (5)

VERY GOOD. The traffic counts conducted on Thursday the 25th February 2021 at the intersection of the R503 and Road A showed an Average Daily Traffic (ADT) of 19 330 vehicles for a 24-hour count which is a great number of vehicles. These numbers will be likely to increase once the impact of the Covid-19 regulations phase out.

Competitor Investigation (4)

GOOD. There are seven other filling stations within the 3km radius of influence. Only two of these stations will have a meaningful impact on the proposed site since these two stations are the only stations located on the same side of Nelson Mandela Drive (R503) as the proposed site. The other competitor sites are not situated along the same road as the proposed site or are situated on the opposite side of the shared road, therefore they will not share transient traffic with the site. The closest station before the proposed site heading towards the town is located over 14 km down the R503.

Overall Rating of Site (4.4)

Every aspect of the site location is considered above average. The site has great visibility and traffic volumes which raises the general rating of the site. The overall rating of all the categories is **4.4**.

Conclusions on Competitor Stations

There are seven competitor sites within the 3km radius, most of the sites will have little to no impact on the proposed site due to market barriers and different target markets. There are only two competitor stations which will share a significant amount of traffic with the proposed site.

ENGINEERING CONSIDERATIONS

The engineering requirements for the development of the station will not pose a problem. The traffic flow passing the property, both during and after construction, will be accommodated by the carefully designed entrance and exit roads adhering to the BB2, Guidelines for Access to Filling Stations, 2003. The delivery tanker will be routed through the property to maximise ease of delivery but minimise inconvenience to customers.

Proper signage before and on the property, itself will ensure that all engineering considerations will be adequately catered for.

FINDINGS

- Following the property evaluation, the following findings were arrived at:
- While South Africa has many similar characteristics to developed international markets in terms of political institutions and economic openness, its demographics are more similar to African markets. The total population is growing at a rapid rate and while it is getting older, it is still young compared with developed markets and is much more on par with African countries where young adults will represent the largest sector over the period 2015-2050. The trade area surrounding the proposed station is one such area, presenting a growing market and potential for good future growth in residential and vehicle ownership.
- The trade area comprises of a low to middle - income local residential market with a presently low per capita vehicle ownership, but this is changing with time as this sector of the population is experiencing a rapidly growing disposable income and an urge to acquire own-transport. Because of this, the area has an exciting potential.
- The proposed filling station is situated adjacent to the R503 and Road A. The R503 is the main east- west roads running through the area also connecting the town to other areas. Road A is a north-south running road connecting many residential areas to the R503.

- There are only two (2) meaningful opposition stations in the area, with five (5) other less meaningful stations within the 3km radius of influence.
- The station will have a Left-In-Left-Out (LILO) access from the R503 and a Full-Access from Road A.
- The expected fuel sales (petrol and diesel) for the proposed stations' third year of operation is estimated at **372 493 litres** per month.
- Expected shop sales will be approximately **R446 992** monthly.
- If developed, the proposed station will take approximately **100 800 litres** of fuel per month from the surveyed competitor stations.

CONCLUSION

The general observation around the proposed site can be summarised as follows:

- The **298 444 litres** of fuel sales in the stations' 1st year of operation, rising to approximately **372 493 litres** in its 3rd year, is above the normally assumed benchmark of 300' 000 litres per month, and indeed above 350' 000 litres monthly.
- Estimated 3rd year monthly shop sales of approx. **R446 992** which is also a good shop turnover.

It is concluded that the proposed filling station will be **FEASIBLE** to develop.

11.6 RETAIL STUDY (See Appendix F for a copy of this Report).

11.6.1 Terms of Reference

A Retail Study was conducted to determine the demographic market size and feasibility of the proposed retail centre. The purpose of this report will be to determine the catchment area demographics, associated retail spent and the proposed centre's general viability, target market and required market share. Is a centre viable on the site, and if so, what size first phase and target market?

11.6.2 Methodology

- A catchment area was defined for the purpose of this study to quantify the market that is more likely to support the planned centre.
- Bophelong Regional Hospital is the main activity generator near the site.
- Physical and psychological barriers for SC development in a town setting were taken into consideration.
- Competition limited the catchment area to the West, declining dwelling densities to the North.
- Increasing travel distance as well as declining dwelling densities restricted the catchment area to the South and East.

Catchment Area Demographics

- 2021 AfricaEye dwellings were used as the demographic base for the catchment area.
- An annual growth rate of $\pm 2.40\%$ was calculated for the catchment area by comparing 2015 and 2021 counts.
- The growth rate was used to project future 2023 catchment area dwelling counts.
- An average household size of 3.9 people per house calculated from Census data for the catchment area

11.6.3 Recommendations and Conclusions

- Based on the findings of this report, a retail centre sized from **± 6,500 to 7,000m² GLA** could be sustainable by the year 2023 on the proposed site, provided that it captures 15% market share and 5% inflow. We believe that 5% inflow is possible given the site's proximity to a provincial hospital as well as the R503 and N18 Bypass.
- The planned filling station should be developed simultaneously with the retail centre.
- An **attractive tenant mix** (with a high percentage of national tenants) must be provide in order to attract people to the centre.
- **Signage** placed at strategic points that direct people to Proposed Site will be vital especially along the R503. This could increase visibility of the SC through top-of-mind awareness.
- A mini taxi rank or a pickup/drop off zone designated for taxis should be prioritized in the centre to make it easy to use by everyone in the catchment area.
- Please note that the success of the centre is not only dependent on the market potential itself, but relies on various other factors such as tenant mix, convenience, management etc.

12. CONCLUSIONS AND RECOMMENDATIONS

MG DEVCO (Pty) Ltd has appointed **AB Enviro Consult CC**, an independent environmental consultancy, to undertake an Environmental Impact Assessment for the proposed construction of facilities and infrastructure for the storage and handling of 92 000 ℓ of a dangerous good (filling station), consisting of 4 x 23 000 ℓ tanks and the establishment of a shopping center located on Erf 3726, Erf 3727 and Erf 3728 Danville, Mahikeng Local Municipality, North West Province. The proposed development will result in the clearance of 27 590 m² of indigenous vegetation located within a critical biodiversity area.

This Chapter of the BAR provides a summary of the findings of the impact assessment process, including the EAP's opinion as to whether the activity should or should not be authorised.

12.1 ENVIRONMENTAL IMPACT STATEMENT

The detailed environmental assessment for the proposed development, has not found any environmental impacts that *cannot* be mitigated to acceptable and manageable levels.

Mahikeng, is the capital city of the North-West Province. The capital falls within Ngaka Modiri Molema District Municipality. The city is also located close to South Africa's border with Botswana. The proposed development falls within the Mafikeng Local Municipality area of jurisdiction and is situated directly south of, and is bordered by, the newly upgraded section of the R503 (Nelson Mandela Drive) road between Lichtenburg and Mahikeng as you enter Mahikeng from Lichtenburg. The newly constructed traffic circle is located on the north western corner of the site. The ring road that connects with the N18 (Dr James Moroka Drive) borders the site on west. The intersection has been identified as a "Gateway Project" in the Mahikeng Local Municipality IDP 2020-21.

Although the entire site is located within a Critical Biodiversity Area (CBA) the site is highly disturbed. Informal dumping at the site is extensive. Old roads run through the site. Fowl-smelling water is present within the road reserve of the R503. This might be stormwater or sewage as a sewage pump station is located on the north-western corner of the site. Bush encroachment of shrub-height *Vachellia* species (Thorns) is noticeable at some areas at the site. Alien invasive weeds are widespread at disturbed areas at the site.

The proposed development addresses the need identified by the Mahikeng Local Municipality, for the provision of additional business properties, to be alienated by means of full title.

The opinion is being held that the proposed development will strengthen the retail sector within the Mahikeng Local Municipality, due to the provision of a shopping centre and filling station within the urban area. The site is also located at the intersection of the R503 Lichtenburg Road and Bophelong Hospital Road. The intersection has recently been reconstructed to incorporate a new roundabout as part of the upgrading of the R503 road. The intersection has been identified as a "Gateway Project" in the Mahikeng Local Municipality IDP 2020-21. By strengthening the retail sector within the Mahikeng Local Municipality, the proposed development will contribute to the broadening of the income base of the Mahikeng Local Municipality.

During the construction phase, temporary employment will be created. The increased employment in the area during the construction phase will also result in increased expenditure, which, in addition, will mean that more than just the proposed jobs required for the construction on the site will be created due to economic spin-offs that will result.

The identification, description, evaluation and comparison of alternatives are important for ensuring a sound environmental scoping process.

The alternatives considered for the proposed development includes:

Alternative 1: “The proposed construction of facilities and infrastructure for the storage and handling of 92 000 ℓ of a dangerous good (filling station), consisting of 4 x 23 000 ℓ tanks and the establishment of a shopping center located on Erf 3726, Erf 3727 and Erf 3728 Danville, Mahikeng Local Municipality, North West Province. The proposed development will result in the clearance of 27 590 m² of indigenous vegetation located within a critical biodiversity area.”

This Alternative will entail the installation of the tanks to be **underground and within a sealed bunker.**

Alternative 2: The proposed construction of facilities and infrastructure for the storage and handling of 92 000 ℓ of a dangerous good (filling station), consisting of 4 x 23 000 ℓ tanks and the establishment of a shopping center located on Erf 3726, Erf 3727 and Erf 3728 Danville, Mahikeng Local Municipality, North West Province. The proposed development will result in the clearance of 27 590 m² of indigenous vegetation located within a critical biodiversity area.”

This Alternative will entail the installation of the tanks to be **underground but not within a sealed bunker.**

It is proposed that Alternative 1 be the preferred alternative as the installation of the tanks within a sealed bunker will ensure that should the tanks leak, the total volume of the tank, plus 10% will be contained within the bunker and no contamination of soil or ground water will occur.

Specialist studies were conducted and a full Public Participation Process is being followed. This information was used to generate a sensitivity map that was used to assess the sustainability of the design and layout plan for the proposed development.

A **Geo-Technical Engineer** has been appointed to conduct a Geo-Technical investigation to determine the impact of the Geology of the area on the development. This report will be included into the final BAR as the Engineer was still waiting for results from the Laboratories.

The **Civil Engineer** found that sufficient Bulk water and sewer reticulation capacity is available within close proximity to the development. **Access** has been designed by an Engineer and his recommendations has been incorporated into the layout plan. The Engineer has concluded that the engineering requirements for the development of the station will not pose a problem. The traffic flow passing the property, both during and after construction, will be accommodated by the carefully designed entrance and exit roads adhering to the BB2, Guidelines for Access to Filling Stations, 2003. The delivery tanker will be routed through the property to maximise ease of delivery but minimise inconvenience to customers.

The **Fauna and Flora Habitat** study conducted revealed that no Threatened or Near Threatened plant or animal species appear to be resident at the site. No other plant or animal species of particular conservation concern appear to be present at the site. According to the Specialist, vegetation at most of the site is conspicuously degraded, modified or transformed. Indigenous tree species at the site include *Vachellia karroo* (Sweet Thorn), *Vachellia tortilis* subsp. *heteracantha* (Umbrella Thorn), *Vachellia*

hebeclada (Candlepod Thorn), *Senegalia mellifera* (Black Thorn) and *Ziziphus mucronata* (Buffalo-thorn). The alien invasive tree species *Melia azedarach* also occurs at the site as well as the alien invasive succulent *Opuntia ficus-indica*. Indigenous grass species include *Eragrostis lehmanniana*, *Eragrostis rigidior*, *Aristida congesta*, *Cynodon dactylon*, *Chloris virgata* and *Heteropogon contortus*. Indigenous forbs and dwarf shrubs include *Gazania krebsiana*, *Bulbine narcissifolia*, *Euphorbia inaequilatera* and *Felicia muricata*

The **SAHRA Specialist** found no sites, features or material of cultural heritage (archaeological and/or historical) origin or significance were identified in the study area during the physical assessment. The informal dumping of residential household refuse and building rubble occurs throughout the study area. The area itself is surrounded by residential, industrial and business related developments and as a result the larger geographical location has been extensively altered from its original natural and historical landscape. Telephone lines, as well as a dirt road that runs from east to west roughly in the middle of the study area, and a dirt & tar road that comes off the R503 and runs approximately north-south through the land has impacted on the area as well.

The **feasibility study** found that the proposed filling station will be **FEASIBLE** to develop. The Retail Study concluded that: "Based on the findings of this report, a retail centre sized from ± 6,500 to 7,000m² GLA could be sustainable by the year 2023 on the proposed site, provided that it captures 15% market share and 5% inflow. We believe that 5% inflow is possible given the site's proximity to a provincial hospital as well as the R503 and N18 Bypass."

Consistent with national priorities, environmental authorities must support "*increased economic growth and promote social inclusion*", whilst ensuring that such growth is "*ecologically sustainable*". In the National Spatial Development Perspective (NSDP) it is highlighted that, to achieve the goal of stimulating sustainable economic activities and to create long-term employment opportunities, it is required that spending on economic infrastructure is focused in priority areas with potential for economic development, with development to serve the broader societies' needs equitably.

12.2 ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR)

EMPR's aim to identify and minimise the potential impacts that the proposed construction and operational phases of the project may have on the receiving environment. An EMPR has been developed which is contained in Appendix E and includes detailed mitigatory measures for the construction phase.

As a general guideline, the EMPR should be based on a comprehensive set of environmental aspects (elements of the facility that can interact with the environment), and hence, the EMPR compiled for this application includes the following key components:

- Mechanisms for the on-going identification and assessment of environmental aspects and impacts;
- Environmental management programmes; objectives and targets;
- Environmental monitoring and reporting framework;
- Environmental management procedures; and,
- Mechanisms for the recording of environmental incidents and implementing corrective and preventative actions.

12.3 EAP OPINION

The information contained in this BAR and Specialist Studies, provides a detailed and comprehensive description of the proposed project, baseline environment and potential environmental impacts associated with the proposed development. As no significant impacts that cannot be mitigated were identified, AB Enviro Consult is of the opinion that the project should proceed, provided that the necessary mitigation and management measures are implemented.

Under South African environmental legislation, the Applicant is accountable for the potential impacts of the activities that are undertaken and is responsible for managing these impacts. The Applicant therefore has overall and total environmental responsibility to ensure that the implementation of the construction phase of the EMPR complies with the relevant legislation and the conditions of the environmental authorisation. The applicant will thus be responsible for the implementation of the EMPR.

The environmental management programme (EMPR) should form part of the contract between the construction company and the applicant. This will help ensure that the EMPR is adhered to. It is suggested that a suitably qualified Environmental Control Officer (ECO) be appointed for the construction phase.

12.4 CONDITIONS RECOMMENDED TO BE INCLUDED IN ANY AUTHORISATION THAT MAY BE GRANTED BY THE COMPETENT AUTHORITY IN RESPECT OF THE APPLICATION

The following recommendations has been identified for the “Non-Operational” (pre-construction and construction phase) phase of the proposed development

1. A full copy of the signed EA from DEDECT in terms of NEMA, granting approval for the development must be available on site
2. A copy of the EMPr as well as any amendments thereof must be available on site
3. A suitably qualified ECO must be appointed.
4. Impacts on the environment must be minimised during site establishment and the development footprint must be kept to the approved development area.
5. Vegetation clearing may not commence until such time as the development footprint has been clearly defined.
6. No clearance of vegetation outside of the development footprint may occur.
7. No construction workers or machinery will be allowed within the no-go area that is defined as the non-perennial river, including its riparian and buffer zone.
8. At the end of the construction phase the site and its surrounding area must be free from any pollution that originated as a result of the construction activities.
9. No disturbance of topsoil & subsoil may commence until such time as the development footprint has been clearly defined.
10. No disturbance of topsoil & subsoil outside of the development footprint may occur.
11. At the end of the construction phase the site and its surrounding area must be free from any chemical, fuel, oil and cement spills that originated as a result of the construction activities.
12. At the end of the construction phase the site and its surrounding area must be free from any sewage that originated as a result of the construction activities.
13. At the end of the construction phase the site and its surrounding area must be free from any hazardous or general waste pollution that originated as a result of the construction activities.
14. Dust prevention measures must be applied to minimise the generation of dust.

15. Noise prevention measures must be applied to minimise the generation of unnecessary noise pollution as a result of construction activities on site.
16. Absolutely no burning of waste is permitted.
17. Fires will only be allowed in facilities especially constructed for this purpose.
18. No hunting of animals will be allowed.
19. No intentional destruction of any sites, features or material of cultural heritage (archaeological and/or historical) origin or significance may occur.
20. All Contractors and sub-contractors must abide to the rules and regulations of the Occupational Health and Safety Act, 85 of 1993.

The following recommendations has been identified for the “Operational” phase of the proposed development.

1. A full copy of the signed EA from DEDECT in terms of NEMA, granting approval for the development must be available on site
2. A copy of the EMPr as well as any amendments thereof must be available on site
3. Records of Environmental Monitoring must be available on site.
4. The site and its surrounding area must be kept free from any pollution that originated as a result of the operational activities.
5. The site and its surrounding area must be free from any chemical, fuel, and oil spills that originated as a result of the operational activities.
6. The site and its surrounding area must be free from any hazardous or general waste pollution that originated as a result of the operational activities.
7. The operator of the site must abide to the rules and regulations of the Occupational Health and Safety Act, 85 of 1993.

13. AFFIRMATION BY EAP

- | **Mr. Jean Pierre De Villiers** declare under oath that I:
- a. act as the independent environmental practitioner in this application ;
 - b. do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed;
 - c. do not have and will not have a vested interest in the proposed activity proceeding;
 - d. have no, and will not engage in, conflicting interests in the undertaking of the activity;
 - e. undertake to disclose, to the competent authority, any material information that has or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required;
 - f. will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application;
 - g. will ensure that the comments of all interested and affected parties are considered and recorded in reports that are submitted to the competent authority in respect of the application, provided that comments that are made by interested and affected parties in respect of a final report that will be submitted to the competent authority may be attached to the report without further amendment to the report;
 - h. will keep a register of all interested and affected parties that participated in a public participation process; and
 - i. will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not.

Signature of the Environmental Assessment Practitioner:

Name of company: AB Enviro Consult CC

Date:

Signature of the Commissioner of Oaths:

Date

Designation

Official stamp:

14. LIST OF REFERENCES

Department of Environmental Affairs and Tourism. 1992. Integrated Environmental Management. Pretoria, DEAT.

Department of Environmental Affairs and Tourism. 1998. *Guideline Document - EIA Regulations.* Pretoria, DEAT.

Department of Environmental Affairs. 1988. *Climate of South Africa, climate statistics up to 1984.* Weather Bureau (WB40). Pretoria, Government Printer.

Department of Transport, 19--. *Climate of South Africa Part 1 Climate statistics.* Weather Bureau (WB20). Pretoria Government Printer.

S. Cliff. 2015. Environmental Scoping report for the proposed high density residential township "Tanganani extension 7", to be located on a part of Portion 119 of the farm Diepsloot 388 JR, City of Johannesburg Municipality, Gauteng

**APPENDIX A:
GEO-TECHNICAL REPORT**

**APPENDIX B:
ENGINEERING SERVICES REPORT**

**APPENDIX C:
ECOLOGICAL SPECIALIST REPORT**

**APPENDIX D:
SAHRA SPECIALIST REPORT**

**APPENDIX E:
FEASIBILITY STUDY AND TRAFFIC IMPACT ASSESSMENT**

**APPENDIX F:
ENVIRONMENTAL MANAGEMENT PROGRAMME**

**APPENDIX E:
SPECIALIST DECLARATION OF INDEPENDENCE (TO FOLLOW)**

**APPENDIX F:
PROOF OF BAR SENT TO DW&S**